19th Annual Meeting of the
Society of Urologic Oncology
Extraordinary Opportunities for Discovery
November 28 – 30, 2018
Sheraton Grand Phoenix
Phoenix, Arizona

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<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board of Directors</td>
<td>2</td>
</tr>
<tr>
<td>Committees</td>
<td>3</td>
</tr>
<tr>
<td>Faculty Listing</td>
<td>4</td>
</tr>
<tr>
<td>Promotional Partners</td>
<td>6</td>
</tr>
<tr>
<td>Contributors &amp; Exhibitors</td>
<td>7</td>
</tr>
<tr>
<td>General Information</td>
<td>8</td>
</tr>
<tr>
<td>Educational Needs &amp; Objectives</td>
<td>9</td>
</tr>
<tr>
<td>Accreditation</td>
<td>12</td>
</tr>
<tr>
<td>Industry Satellite Symposium Events</td>
<td>13</td>
</tr>
<tr>
<td>General Scientific Program</td>
<td>15</td>
</tr>
<tr>
<td>Faculty Disclosure Report</td>
<td>24</td>
</tr>
<tr>
<td>Abstract Categories &amp; Poster Maps</td>
<td>39</td>
</tr>
<tr>
<td>Y.U.O. Podium Session</td>
<td>41</td>
</tr>
<tr>
<td>Oral Abstract Session</td>
<td>44</td>
</tr>
<tr>
<td>Poster Session I – Summary</td>
<td>49</td>
</tr>
<tr>
<td>Poster Session I – Full Abstracts</td>
<td>70</td>
</tr>
<tr>
<td>Poster Session II – Summary</td>
<td>202</td>
</tr>
<tr>
<td>Poster Session II – Full Abstracts</td>
<td>223</td>
</tr>
<tr>
<td>Alphabetical Index of Authors</td>
<td>349</td>
</tr>
<tr>
<td>SUO Fellowship Programs</td>
<td>358</td>
</tr>
<tr>
<td>2020 SUO Fellowship Match Timeline</td>
<td>364</td>
</tr>
<tr>
<td>Mark Your Calendars</td>
<td>365</td>
</tr>
</tbody>
</table>
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GENERAL MEETING INFORMATION

Attendee Participation
This meeting is designed to be a discussion of issues among members of the urologic oncology community. All attendees participate in the discussions and are encouraged to interact with program faculty.

Registration/Information Desk Hours
Location: Encanto Foyer
Wednesday, November 28, 2018 10:00 a.m. – 6:00 p.m.
Thursday, November 29, 2018 7:00 a.m. – 5:30 p.m.
Friday, November 30, 2018 7:00 a.m. – 3:25 p.m.

Exhibit Hall Hours
Location: Encanto Ballroom
Wednesday, November 28, 2018 2:30 p.m. – 6:30 p.m.
Thursday, November 29, 2018 7:45 a.m. – 7:00 p.m.
Friday, November 30, 2018 7:45 a.m. – 11:00 a.m.

Poster Sessions
Location: Valley of the Sun Ballroom AB and Foyer
Wednesday, November 28, 2018
- Posters Available for Viewing 1:00 p.m. – 4:45 p.m.
- Hosted Poster Walks by Category 4:45 p.m. – 5:30 p.m.
Thursday, November 29, 2018
- Posters Available for Viewing 1:00 p.m. – 4:45 p.m.
- Hosted Poster Walks by Category 4:45 p.m. – 5:30 p.m.

Networking Lounge
Location: Oculus
Wednesday, November 28, 2018 10:00 a.m. - 6:00 p.m.
Thursday, November 29, 2018 8:00 a.m. - 6:00 p.m.
Friday, November 30, 2018 8:00 a.m. - 3:00 p.m.

EVENING FUNCTIONS

Welcome Reception
Date: Wednesday, November 28, 2018
Time: 5:30 p.m. – 6:30 p.m.
Location: Encanto Ballroom
Attire: Business casual
All are invited to reconnect with colleagues and visit with exhibitors while sampling the signature “SUO Martini” at the SUO Welcome Reception.

Young Urologic Oncologists (Y.U.O.) Dinner*
*Y.U.O. Members only. Membership is limited to the first seven and a half years after completion of fellowship.
Date: Wednesday, November 28, 2018
Time: 6:30 p.m. – 9:00 p.m.
Location: Valley Overlook
Cost: One ticket is included in the registration fee. A limited number of tickets will be available at the Registration/Information Desk.
Attire: Business casual
The SUO’s subsection, the Young Urologic Oncologists (Y.U.O.) invites all Y.U.O. members, fellows and residents to join them at their Annual Dinner Program. Beginning with drinks and a plated dinner, the Y.U.O. program features lectures on mentorship, entrepreneurship and innovation, and other workforce issues in urologic oncology, as well as a special presentation by the winner of the “Paper of the Year” award.

SUO Reception & Awards
Date: Thursday, November 29, 2018
Time: 5:30 p.m. – 7:00 p.m.
Location: Encanto Ballroom
Attire: Business casual
SUO invites all of the attendees to visit with exhibitors, connect with fellow colleagues, and enjoy delicious appetizers and beverages while we honor award winners and Board members. Don’t miss the chance to honor award winners and Board Members at the SUO Awards Reception. Appetizers and drinks will be provided.

2018 AWARD WINNERS

Huggins Award: Martin E. Gleave, MD, FRCSC, FACS
The Huggins Award is given annually in recognition of major lifetime contributions and achievements in research and clinical practice that has contributed to the progress in the treatment of genitourinary neoplasms.

Distinguished Service Award: Daniel Barocas, MD, MPH, FACS
The Distinguished Service Award is awarded to a urologist whose actions at work or in the community exceed job expectations and reflect values of compassion, respect, trust, commitment to excellence and teamwork, and also educate the community about prostate cancer.

BOARD, COMMITTEE AND MEMBER MEETINGS

SUO Board of Directors Meeting
Date: Wednesday, November 28, 2018
Time: 6:30 p.m. – 9:30 p.m.
Location: Deer Valley

SUO-CTC Board Meeting
Date: Wednesday November 28, 2018
Time: 4:30 p.m. – 6:00 p.m.
Location: Paradise Valley

SUO Fellowship Committee Meeting
Date: Thursday, November 29, 2018
Time: 6:30 a.m. – 7:45 a.m.
Location: Camelback B

SUO Fellowship Program Directors’ Meeting
Date: Thursday, November 29, 2018
Time: 12:00 p.m. – 1:00 p.m.
Location: Maryvale

SUO Annual Business Meeting
Date: Thursday, November 29, 2018
Time: 1:20 p.m. – 1:50 p.m.
Location: Valley of the Sun Ballroom CDE
EDUCATIONAL NEEDS & OBJECTIVES

EDUCATIONAL NEEDS

Bladder Cancer
Urothelial cancer of the upper tracts (renal pelvis and ureter) account for less than 10% of all patients with urothelial cancers. Management of these tumors poses special challenges compared to conventional bladder cancers. These tumors have similar histology and natural history as bladder tumors, they tend to present at higher stage and once invasive outside of the primary wall have a poor prognosis.

Recent studies have elucidated new information regarding genetic predispositions for development of these tumors, especially in the condition known as Lynch Syndrome. Patients with this syndrome are increasingly being identified by treating urologists, who are being called on to know the manifestations of this complex syndrome along with recommendations for screening of family members and patients identified with the disease. In addition, new information is being discovered regarding the genomics of upper tract tumors which may be useful in guiding future therapies.

There are special challenges in diagnosis and management of these upper tract tumors. Upper tract endoscopy and biopsy often results in understaging and even missed diagnosis due to inadequate specimens. Current imaging is unable to reliably identify extraluminal extension. In addition, delivery of intraluminal agents such as BCG or chemotherapy is also more difficult and less effective than in the bladder. Finally, the role of neoadjuvant and adjuvant systemic therapy is still unproven, but is under active investigation with several seminal studies recently reported. This session will touch on the most recent information on all of the above areas of upper tract urothelial cancer management.

Although cystectomy has been the gold standard of treatment of muscle-invasive bladder cancer, many patients still succumb to metastatic disease in spite of this surgery, and those who are cured are subject to significant risk of morbidity and changes in quality of life. The bladder cancer sessions will discuss two areas of controversy in management of these cancers. The first is the role of immunotherapy before or after cystectomy for patients who are not eligible for cisplatin-based regimens, with a discussion of the rationale for both approaches along with a review of recent early clinical trials of each strategy. The second will be a panel discussion of several aspects of bladder preserving treatment. This includes the optimal role for chemoradiation as an alternative to surgery, and the potential for cure with chemotherapy or immunotherapy alone. This will include emerging data on genomic predictors of ideal outcome with these various approaches, and an introduction to upcoming clinical trials in this space. Finally, we will have a discussion of collaboration between urologic oncologists and basic scientists in using animal models of non-muscle invasive bladder cancer as a platform for translation to the bedside, as well as an invited lecture on improving outcomes of cystectomy in the octogenarian patient.

Health Services
Financial toxicity is an increasingly recognized side effect of cancer care, even among insured patients. According to the National Cancer Institute, financial toxicity is a term used to describe the problems a patient has related to the costs of medical care. Other terms for financial toxicity include economic burden, economic hardship, financial burden, financial distress, financial hardship, and financial stress. Like other side effects, financial toxicity can have acute and long-term implications (e.g., bankruptcy) adversely impacting quality and even quantity of life.

Unfortunately, cancer patients are more likely to suffer from financial toxicity compared to patients without cancer due in part to expensive treatments and time off work. Given a tendency for providers to overlook the financial burden of cancer treatments and rising costs of cancer care, this session will raise awareness of financial toxicity as a side effect of cancer treatment, and help providers assess and mitigate its impact on patients, their families, and caregivers.

Kidney Cancer
Recent changes in oncologic medical care have had a profound impact in urologic malignancies and particularly in field of kidney cancer management that are of critical clinical utility to the practicing urologist. Thoughtful critique, discussion and debate on these topics go hand-in-hand with the process of dissemination and implementation in the clinical care of patients with various forms of this challenging disease. Notably, an expanding armamentarium of molecular therapeutics for treatment of advanced and metastatic disease has sparked interest in the development of an array of neoadjuvant and adjuvant applications being tested in clinical trials with recently reported results becoming available. The mixed results of such studies are open to careful interpretation and thoughtful discussion as additional studies develop.

Practicing urologists and medical oncologists need to be familiar with the genomic drivers for various forms of kidney cancers, the approach toward personalized medicine in this field, the novel pathways, mechanisms, safety profile and efficacy of available agents. Further, this understanding will support rational trial design and execution for the advancement of our patient care mission. Urologists and medical oncologists should understand the role of checkpoint inhibition in promoting tumor killing by the innate immune system and be familiar with results of promising combination trials. Updates to trial design and objectives from groups like the FDA workshop need to be disseminated.

The standards of interventional treatment are shifting in the management of localized disease, not only through advances in surgical techniques and technologies but also through risk-stratified approaches to patient management. These approaches take into account features such as tumor aggressiveness, patient comorbidities and life-expectancy as well as the risks of contemporary interventions. Developed guidelines based on these variables require dissemination and discussion. Important as well is to understand the limitations of surgical techniques and areas in which data driven decisions regarding the appropriate application of surgical intervention warrant development and oversight.
**Educational Needs & Objectives**

**Prostate Cancer**
Urologists need to be knowledgeable about the emerging data supporting the rationale for treating the primary tumor in men with oligometastatic disease. The results of recent randomized trials as well as those that are currently enrolling will be discussed. In addition, the role of PSMA PET Scan in detecting oligometastatic disease earlier provides the potential for metastasis directed therapy with either salvage surgical resection or stereotactic radiotherapy as an additional local modality to control metastatic disease.

Improved understanding is needed of the genomics in biology of acquired treatment resistance in castrate resistant prostate cancer as well as developing biomarkers that allow for disease segmentation and more precise co-targeting strategies in CRPC. The use of genomic signatures of metastatic tissue biopsies or through plasma circulating tumor DNA is identifying potential actionable alterations that guide selection of novel drugs to improve response. In particular, these include alterations in the DNA damage response or AKT signaling pathways, or immunotherapy. In addition, improved understanding of survival pathways activation in the development of treatment resistance is affording new pathways to target in autophagy or other stress pathways. Finally, the improved understanding of genomic alterations in the androgen receptor itself may allow identification of those patients who benefit from sequencing of AR pathways inhibitors or are likely better to respond to docetaxel. Examples of emergent bench-to-bedside advances in genomics, biology, and treatment of resistance prostate cancer will be discussed in this session providing a framework for advancing precision oncology in mCRPC.

**Testicular Cancer**
Given the rarity and high curability of testicular cancer compared to other genitourinary malignancies, this disease is frequently overlooked at genitourinary oncology conferences. The multidisciplinary forum of urologists, medical oncologists, pathologists, and radiation oncologists attending the SUO meeting provides a prime opportunity to disseminate information critical to the optimal management of these patients. The latest advances in testicular cancer research with potential to change practice in the near future will be reviewed by experts in the field. In particular, there will be 3 areas of focus including recent studies exploring microRNA as a novel biomarker in testicular cancer, the latest updates on the late effects of treatment for testicular cancer affecting survivors, and ongoing trials seeking to determine the optimal management approach for controversial aspects of the disease. This will be accomplished through two lectures and a panel discussion of cases.

**The Complex Interplay Between the Gut & Genitourinary Cancers**
While the focus to date in genitourinary cancers has been genomic profiling and alignment with targeted therapy and immunotherapy, there is increasing recognition that non-host factors may play a role in therapeutic response. Amongst the potential mediators of response is the microbiome. The microbiome refers to the cumulative bacterial flora that populate the skin, respiratory tract, urine, gut or other organs/tissues. In genitourinary cancers, there has been preliminary work to define associations between the microbiome and cancer risk (e.g., a link between the stool microbiome and prostate cancer). Intriguingly, it appears that the microbiome may also guide response to immunotherapy strategies in kidney and bladder cancer. At present, much of the data pertaining to the microbiome has not been presented in urology meetings to practicing clinicians; the session will therefore provide an overview of data associated with the microbiome and suggest how the microbiome could ultimately bear clinical relevance.

**Metabolism, Fasting Interval & Physical Activity Impact on Cancer Outcomes**
Obesity is a worldwide epidemic and obesity-related cancers are a considerable burden in industrialized countries. Given the poor results of standard diet and physical activity interventions to reduce obesity burden, there is considerable interest in identifying more effective and feasible public health approaches to addressing obesity-related cancers, including many urologic cancers. Recent evidence suggests that dietary behaviors such as eating frequency and timing influence numerous aspects of metabolic health and may have downstream effects on human disease and cancer risk. Several lines of evidence also support the specific hypothesis that eating patterns that reduce or eliminate nighttime eating and prolong nightly fasting intervals may result in sustained improvements in human health. These fasting regimens are hypothesized to influence metabolic regulation via effects on (a) circadian biology, (b) the gut microbiome, and (c) modifiable lifestyle behaviors such as sleep. If proven to be efficacious, these eating regimens offer promising, non-pharmacological approaches to improving health at the population level, with multiple public health benefits. Clinicians need to understand the time-restricted feeding hypothesis and evidence supporting it in order to communicate with cancer patients regarding these feeding regimens.

**EDUCATIONAL OBJECTIVES**
At the conclusion of the 19th Annual Meeting of the SUO, attendees will be able to:

**Bladder Cancer**
- Describe the observed differences in the distribution of genomic alterations in upper tract urothelial cancer compared to bladder cancers.
- List the guidelines for evaluating a patient with upper tract urothelial cancer (UTUCC) for possible mutations associated with Lynch Syndrome.
- Describe the degree of observed benefit of neoadjuvant and adjuvant chemotherapy in high-risk UTUCC and list the advantages and disadvantages of each approach.
- List the steps for administering intra-luminal chemo and immunotherapy and the efficacy of each.
- Describe the potential role of checkpoint inhibitors before or after radical cystectomy.
- Describe the use of currently available animal models of non-muscle invasive bladder cancer in a translational treatment program.
- List the ideal characteristics for patients considered for bladder salvage using chemoradiation or chemotherapy or immunotherapy alone, and describe the expected outcomes with these approaches.
- Explain techniques for optimizing outcomes in performing radical cystectomy on very elderly patients.

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**Table of Contents**

10
Health Services
- Define potential sources of financial toxicity in urologic cancer care.
- Explain the implications of financial toxicity among patients with cancer, their families, and caregivers.
- Describe a systematic approach to assessing financial toxicity as a clinically relevant outcome in order to promote shared decision-making about treatment choices.

Kidney Cancer
- Describe the impact of adjuvant systemic therapy on disease progression and survival following resection of localized renal cell carcinoma.
- Explain the rationale for neoadjuvant vs. adjuvant therapy using novel target and immune modulating agents.
- Identify the obstacles to trial accrual for localized renal cell carcinoma.
- Explain the importance of PD-1 in renal cancer and the clinical impact of combined checkpoint inhibition.
- Review the objectives and critically assess clinical trial design in evaluating efficacy of adjuvant therapies in the management of high-risk disease.
- Identify the details of the new guidelines for management of small renal masses.
- Discuss the controversies surrounding kidney sparing surgical techniques of enucleoresection small renal tumors, the limitations of these approaches including aspects of case selection, serious pitfalls and how to avoid them.
- Describe the utility and limitations of cytoreductive surgery in the multi-disciplinary management of advanced disease and the critical role of case selection.

Prostate Cancer
- Discuss the rationale for consideration of treatment of primary and men with oligometastatic prostate cancer.
- Identify the potential benefits and harm associated with the treatment of primary in men with oligometastatic disease.
- Discuss the current state of PSMA PET imaging and metastasis directed therapy in oligometastatic prostate cancer.
- Identify the many mechanisms of treatment resistance and castrate resistant prostate cancer.
- Describe the role of genomics and genomic biomarkers and disease segmentation and its role in co-targeting strategies.
- Explain the update on the progress of parp inhibitors and AKT inhibitors in men with DNA damage response alterations or P10 alterations respectively.
- Discuss the role of stress responses and autophagy in treatment resistant prostate cancer and current studies targeting this adaptor response.

Testicular Cancer
- Identify the 4 microRNAs that have been most thoroughly evaluated as serum markers of testicular GCT.
- Describe the potential advantages of serum microRNA over the classic tumor markers, HCG and AFP as well as the potential limitations.
- Explain the potential applications of serum microRNA to the management of testicular cancer and ongoing research being conducted to bring this test to the clinic.
- Describe the controversies in management and potential role of surgery in the approach to patients with clinical stage II-A and II-B seminoma.
- Explain the latest research and ongoing studies of novel treatment options for patients with relapsed or refractory germ cell tumors.
- Define the cumulative morbidity burden of chemotherapy for testicular cancer.
- Describe the comorbidities that patients treated with testicular cancer are at increased risk of following chemotherapy treatment.
- Describe the recent findings from the multicenter Platinum Study on risk factors for chemotherapy-induced ototoxicity and neurotoxicity.

The Complex Interplay Between the Gut & Genitourinary Cancers
- Define the techniques used to characterize the microbiome in genitourinary cancers.
- Explain preliminary associations between the microbiome and cancer risk.
- Describe how the microbiome may impact the efficacy of certain therapies, such as immunotherapy for kidney cancer.
- Identify how diet may impact microbiome composition.
- Describe potential strategies for microbiome manipulation using diet and novel compounds.

Metabolism, Fasting Interval & Physical Activity Impact on Cancer Outcomes
- Describe the scientific background supporting the major forms of fasting regimens and their association with metabolic health and chronic diseases such as cancer.
- Explain the major hypothesized mechanisms linking fasting regimens and human health and disease.
- Summarize the rodent data supporting the impact of time-restricted feeding on cancer risk and tumor mass.
- Discuss the impact of time-restricted feeding on the gut and the subsequent association with disease and cancer risk.
- Describe the evidence supporting the association of food intake timing on metabolic health and cancer risk in humans.
CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation
This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American College of Surgeons and the Society of Urologic Oncology. The American College of Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AMAPRA Category 1 Credits™
The American College of Surgeons designates this live activity for a maximum of 14.50 AMAPRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Non-physician healthcare professionals will receive a Certificate of Completion. For information on the applicability and acceptance of Certificates of Completion for educational activities certified for AMAPRA Category 1 Credit™ from organizations accredited by the ACCME, please consult your professional licensing board.

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Special Assistance
We encourage participation by all individuals. If you have a disability, advance notification of any special needs will help us better serve you. Call (847) 264-5901 if you require special assistance to fully participate in the meeting.
## Industry Satellite Symposium Events

### WEDNESDAY, NOVEMBER 28, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Details</th>
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| 12:00 p.m. – 1:00 p.m. | **Industry Satellite Lunch Symposium**  
Sponsored by Merck & Co.  
Location: Deer Valley  
“Discussing Anticancer Therapy Along With Patient Monitoring and Management of Adverse Events”  
Gautam Jayram, MD  
Nashville, TN |

### THURSDAY, NOVEMBER 29, 2018

<table>
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<tr>
<th>Time</th>
<th>Event Details</th>
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| 7:00 a.m. - 8:00 a.m. | **Industry Satellite Breakfast Symposium**  
Sponsored by Pfizer  
Location: Deer Valley  
“An Advancement in RCC: Rethink Your Current Practice Following Nephrectomy”  
Neal D. Shore, MD, FACS  
Myrtle Beach, SC |
| 11:45 a.m. - 12:50 p.m. | **Industry Satellite Lunch Symposium**  
Sponsored by AstraZeneca  
Location: Deer Valley  
“Immunooncology Therapy for Patients With Advanced Urothelial Carcinoma Previously Treated With Chemotherapy”  
Neal D. Shore, MD, FACS  
Myrtle Beach, SC |
| 11:45 a.m. - 12:50 p.m. | **Industry Satellite Lunch Symposium**  
Sponsored by PeerView Institute for Medical Education and Bladder Cancer Advocacy Network  
Location: Camelback  
“Keeping Pace With Immunotherapy Advances in Bladder Cancer: Tools for Winning the Race and Optimizing Patient Outcomes”  
Arjun Balar, MD  
New York, New York  
Petros Grivas, MD, PhD  
Seattle, Washington |
### Industry Satellite Symposium Events

**FRIDAY, NOVEMBER 30, 2018**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Details</th>
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| 6:45 a.m. - 8:00 a.m. | **Industry Satellite Breakfast Symposium** | Sponsored by Creative Educational Concepts  
**Location:** Deer Valley  

*Immunotherapy in Urothelial Cancer: Where Are We Now and Where Are We Going?*

Arjun V. Balar, MD  
New York, NY  
Ashish M. Kamat, MD, MBBS, FACS  
Houston, TX  
Neal D. Shore, MD, FACS  
Myrtle Beach, SC |
| 12:20 p.m. – 1:25 p.m. | **Industry Satellite Lunch Symposium** | Sponsored by Astellas Pharma and Pfizer Oncology  
**Location:** Deer Valley  

*A Treatment Option for Castration-Resistant Prostate Cancer (CRPC)*

E. David Crawford, MD  
Aurora, CO |
19th Annual Meeting of the Society of Urologic Oncology
Extraordinary Opportunities for Discovery
November 28 - 30, 2018
Sheraton Grand Phoenix
Phoenix, Arizona

General Scientific Program

Program Co-Chairs
Christopher J. Kane, MD, FACS
Bradley C. Leibovich, MD, FACS

Speakers and times are subject to change.
All sessions located in the Valley of the Sun Ballroom CDE unless otherwise noted.
General Scientific Program

Speakers and times are subject to change.
All sessions will be located in the Valley of the Sun Ballroom CDE unless otherwise noted.

Wednesday, November 28, 2018

Overview

10:00 a.m. - 6:00 p.m.  Registration/Information Desk Open
Location: Encanto Foyer

10:00 a.m. - 6:00 p.m.  Speaker Ready Room
Location: Arcadia

1:00 p.m. - 5:30 p.m.  Poster Displays
Location: Valley of the Sun Ballroom AB and Foyer

2:30 p.m. - 6:30 p.m.  Exhibit Hall Open
Location: Encanto

5:30 p.m. - 6:30 p.m.  Welcome Reception
Location: Encanto

6:30 p.m. - 9:00 p.m.  Young Urologic Oncologists (Y.U.O.) Dinner*
Location: Valley Overlook

General Session

12:00 p.m. - 1:00 p.m.  Industry Satellite Lunch Symposium
Location: Deer Valley

1:00 p.m. - 1:30 p.m.  State-of-the-Art Lecture: Cryo-EM and Drug Discovery
Speaker: Sriram Subramaniam, PhD

1:30 p.m. - 3:00 p.m.  The Complex Interplay Between the Gut and Genitourinary Cancers
Session Chairs: Sumanta K. Pal, MD
Karen Sfanos, PhD

1:30 p.m. - 1:48 p.m.  Variations in the Microbiome in Men Receiving ADT
Speaker: Karen Sfanos, PhD

1:48 p.m. - 2:03 p.m.  The Microbiome and Prostate Cancer Risk
Speaker: Michael A. Liss, MD, MAS

2:03 p.m. - 2:18 p.m.  The Microbiome in Kidney Cancer
Speaker: Sumanta K. Pal, MD

2:18 p.m. - 2:33 p.m.  Bladder Cancer and the Microbiome: Emerging Evidence
Speaker: Gary D. Steinberg, MD

2:33 p.m. - 2:48 p.m.  Diet in GU Cancers: Known Unknowns and Unknown Unknowns
Speaker: Tanya B. Dorff, MD

2:48 p.m. - 3:00 p.m.  Discussion and Q&A

3:00 p.m. - 3:30 p.m.  Break/Visit Exhibits
Location: Encanto
3:30 p.m. - 4:45 p.m.  **Fasting Interval, Metabolism, and Cancer Risk**  
Session Chairs: Ruth Patterson, PhD  
Dorothy D. Sears, PhD

3:30 p.m. - 3:45 p.m.  **Fasting Regimens and Metabolic Health**  
Speaker: Ruth Patterson, PhD

3:45 p.m. - 4:00 p.m.  **Impact of Time-Restricted Feeding on Cancer Risk in Mice**  
Speaker: Dorothy D. Sears, PhD

4:00 p.m. - 4:15 p.m.  **Circadian Fluctuations of the Gut Microbiome and Host Physiology**  
Speaker: Amir Zarrinpar, MD, PhD

4:15 p.m. - 4:30 p.m.  **Impact of Food Intake Timing on Metabolic Health and Cancer Risk in Humans**  
Speaker: Catherine Marinac, PhD

4:30 p.m. - 4:45 p.m.  **Panel Discussion/Q&A**

4:45 p.m. - 5:30 p.m.  **Poster Walks***  
*Location: Valley of the Sun Ballroom AB and Foyer  
*Not CME Accredited

5:30 p.m. - 6:30 p.m.  **Welcome Reception**  
*Location: Encanto

6:30 p.m. - 9:00 p.m.  **Young Urologic Oncologists (Y.U.O.) Dinner***  
*Location: Valley Overlook  
*Not CME Accredited
THURSDAY, NOVEMBER 29, 2018

OVERVIEW

7:00 a.m. - 5:30 p.m.  Registration/Information Desk Open  
  Location: Encanto Foyer

7:00 a.m. - 5:30 p.m.  Speaker Ready Room  
  Location: Arcadia

7:45 a.m. - 7:00 p.m.  Exhibit Hall Open  
  Location: Encanto

1:00 p.m. - 5:30 p.m.  Poster Displays  
  Location: Valley of the Sun Ballroom AB and Foyer

1:20 p.m. - 1:50 p.m.  SUO Annual Business Meeting  
  Location: Valley of the Sun Ballroom CDE

5:30 p.m. - 7:00 p.m.  SUO Reception and Awards  
  Location: Encanto

GENERAL SESSION

7:00 a.m. - 8:00 a.m.  Industry Satellite Breakfast Symposium  
  Location: Deer Valley

8:00 a.m. - 9:00 a.m.  Bladder Cancer Session I: Upper Tract TCC  
  Session Chair: Eila C. Skinner, MD

  8:00 a.m. - 8:15 a.m.  Genomics of Upper Tract Disease  
    Speaker: Jonathan A. Coleman, MD

  8:15 a.m. - 8:30 a.m.  Lynch Syndrome - Diagnosis and Management, Screening, Etc.  
    Speaker: Surena F. Matin, MD

  8:30 a.m. - 9:00 a.m.  Panel Case Discussion: Management of High-Risk UTUCC and the Role of Perioperative Chemotherapy  
    Moderator: Seth P. Lerner, MD

  8:30 a.m. - 8:37 a.m.  Role of Adjuvant Therapy - POUT Trial  
    Speaker: Sandy Srinivas, MD

  8:37 a.m. - 8:44 a.m.  Neoadjuvant Chemotherapy Prior to Nephroureterectomy  
    Speaker: Jean Hoffman-Censits, MD

  8:44 a.m. - 8:51 a.m.  Topical Agents for Upper Tract Urothelial CA - How to Do It?  
    Speaker: Karim Chamie, MD, MSHS

  8:51 a.m. - 9:00 a.m.  Discussion/Q&A
9:00 a.m. - 10:00 a.m.  **Testis Cancer Session**  
Session Chair: Darren R. Feldman, MD

9:00 a.m. - 9:20 a.m.  **Development of Serum MicroRNA as a Novel and Better Tumor Marker for Testicular Germ Cell Tumor than HCG and AFP**  
Speaker: Christian Kollmannsberger, MD, FRCPC

9:20 a.m. - 9:40 a.m.  **The Platinum Study: Late Effects of Testicular Cancer and Its Treatment**  
Speaker: Lois B. Travis, MD, ScD

9:40 a.m. - 10:00 a.m.  **Update on the SEMS Trial - Surgery in Early Metastatic Seminoma**  
Speaker: Siamak Daneshmand, MD  
Panelists: Bradley C. Leibovich, MD, FACS  
Timothy A. Masterson, MD  
Andrew J. Stephenson, MD

10:00 a.m. - 10:25 a.m.  **Break/Visit Exhibits**  
*Location: Encanto*

10:25 a.m. - 10:45 a.m.  **WUOF Lecture: Smart Care of Prostate Cancer Patients Using Artificial Intelligence & IoT**  
Speaker: Ji Youl Lee, MD

10:45 a.m. - 11:45 a.m.  **Kidney Cancer Session I**  
Session Chair: Jonathan A. Coleman, MD  
Moderator: Vitaly Margulis, MD

10:45 a.m. - 11:15 a.m.  **Panel Discussion: Revisiting Cytoreductive Nephrectomy in the Current Era**  
Panelists: Michael L. Blute, Sr., MD  
Robert A. Figlin, MD  
Robert C. Flanigan, MD, FACS  
Arnaud Mejean, MD, PhD

11:15 a.m. - 11:25 a.m.  **Metastatectomy: Update on the Evidence**  
Speaker: Viraj A. Master, MD, PhD, FACS

11:25 a.m. - 11:32 a.m.  **Adjuvant Therapies in Kidney Cancer: FDA Panel Insights**  
Speaker: Sundeep Agrawal, MD

11:32 a.m. - 11:39 a.m.  **Neoadjuvant and Adjuvant Therapy: Current Guidelines and Practical Approach for the Urologic Surgeon**  
Speaker: Robert G. Uzzo, MD

11:39 a.m. - 11:45 a.m.  **Discussion/Q&A**

11:45 a.m. - 12:50 p.m.  **Industry Satellite Lunch Symposium**  
*Location: Deer Valley*

11:45 a.m. - 12:50 p.m.  **Industry Satellite Lunch Symposium**  
*Location: Camelback*

12:50 p.m. - 1:20 p.m.  **SUO-CTC Session: Uro-Oncologic Advancement of Multi-Modal Therapy**  
*Not CME Accredited*  
Session Chair: Colin Dinney, MD  
Presenters: Colin Dinney, MD  
Siamak Daneshmand, MD  
Neema Navai, MD

1:20 p.m. - 1:50 p.m.  **SUO Annual Business Meeting**
1:50 p.m. - 2:15 p.m.  Break/Visit Exhibits  
Location: Encanto

2:15 p.m. - 3:15 p.m.  Health Services Session: Financial Toxicity  
Session Chair: Ted A. Skolarus, MD, MPH

2:15 p.m. - 2:20 p.m.  Introduction  
Speaker: William P. Parker, MD

2:20 p.m. - 2:40 p.m.  Financial Toxicity & Cancer Treatment in America  
Speaker: Fumiko Chino, MD

2:40 p.m. - 2:55 p.m.  Cancer as a Health Shock: Adverse Financial and Employment Outcomes  
Speaker: Christine Veenstra, MD

2:55 p.m. - 3:05 p.m.  Financial Toxicity in Urologic Cancer Care: What Do We Really Know?  
Speaker: Seth A. Strope, MD, MPH

3:05 p.m. - 3:15 p.m.  Discussion

3:15 p.m. - 3:45 p.m.  Huggins Lecture

3:15 p.m. - 3:25 p.m.  *Huggins Medal Presentation  
Speaker: Christopher P. Evans, MD, FACS  
*Not CME Accredited

3:25 p.m. - 3:45 p.m.  Huggins Medal Lecture: Targeting the Adaptive Molecular Landscape of Castration-Resistant Prostate Cancer  
Speaker: Martin E. Gleave, MD, FRCSC, FACS

3:45 p.m. - 4:45 p.m.  Prostate Cancer Session I: Optimizing Management of Metastatic Castrate Sensitive PCA  
Session Chair: Martin E. Gleave, MD, FRCSC, FACS  
Moderators: Matthew R. Cooperberg, MD, MPH  
Todd M. Morgan, MD

3:45 p.m. - 4:05 p.m.  Role for Treatment of the Primary in CaP with Oligometastases

3:45 p.m. - 3:55 p.m.  Treatment of the Primary Is Not Necessary  
Speaker: Scott E. Delacroix, Jr., MD

3:55 p.m. - 4:05 p.m.  Case for RP or RT of the Primary  
Speaker: Brian F. Chapin, MD

4:05 p.m. - 4:25 p.m.  Role for PSMA PET Imaging and Metastasis Directed Therapy of Oligo-metastatic PCA

4:05 p.m. - 4:15 p.m.  PSMA-Guided Salvage Lymph Node Dissection  
Speaker: Derya Tilki, MD

4:15 p.m. - 4:25 p.m.  PSMA-Guided Metastasis Directed Radiation  
Speaker: Phuoc T. Tran, MD, PhD

4:25 p.m. - 4:45 p.m.  Panel Discussion/Q&A  
Moderator: Edward M. Schaeffer, MD, PhD

4:45 p.m. - 5:30 p.m.  Poster Walks*  
Location: Valley of the Sun Ballroom AB and Foyer  
*Not CME Accredited

5:30 p.m. - 7:00 p.m.  SUO Reception and Awards  
Location: Encanto
FRIDAY, NOVEMBER 30, 2018

OVERVIEW

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
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<td>Speaker Ready Room</td>
<td>Arcadia</td>
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<tr>
<td>7:45 a.m. - 11:00 a.m.</td>
<td>Exhibit Hall Open</td>
<td>Encanto</td>
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GENERAL SESSION

<table>
<thead>
<tr>
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<th>Event</th>
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<tr>
<td>6:45 a.m. - 8:00 a.m.</td>
<td>Industry Satellite Breakfast Symposium</td>
<td>Deer Valley</td>
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<td>8:00 a.m. - 8:30 a.m.</td>
<td>Young Urologic Oncologists (Y.U.O.) Program</td>
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<td>Chairs: William T. Lowrance, MD, MPH Matthew J. Resnick, MD, MPH</td>
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<tr>
<td>8:00 a.m. #1</td>
<td>LONG-TERM OUTCOMES OF ACTIVE SURVEILLANCE FOR PROSTATE CANCER – THE MEMORIAL SLOAN KETTERING CANCER CENTER EXPERIENCE</td>
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<td>Presented By: Sigrid Carlsson, MD, PhD, MPH</td>
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<td>8:08 a.m. #2</td>
<td>POST-OPERATIVE OPIOID PRESCRIBING IN UROLOGY: ARE WE CONTRIBUTING TO THE NATIONAL CRISIS?</td>
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<td>Presented By: Kathryn Hacker, MD, PhD</td>
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<td>8:16 a.m. #3</td>
<td>CG0070, AN ONCOLYTIC ADENOVIRUS, FOR BCG-UNRESPONSIVE NON-MUSCLE-INVASIVE BLADDER CANCER (NMIBC): 18-MONTH FOLLOW-UP FROM A MULTICENTER PHASE II TRIAL</td>
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<td>Presented By: Vignesh T. Packiam, MD</td>
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<td>8:30 a.m. - 9:30 a.m.</td>
<td>Kidney Cancer Session II</td>
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<td>Session Chair: Jonathan A. Coleman, MD</td>
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<td>Moderator: Gennady Bratslavsky, MD</td>
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<td>8:30 a.m. - 8:37 a.m.</td>
<td>Hereditary Kidney Cancer and Genetic Testing</td>
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<td>Speaker: Maria Carlo, MD</td>
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<td>8:37 a.m. - 8:44 a.m.</td>
<td>Surgical Perspective on Management for Hereditary Kidney Cancer</td>
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<td>Speaker: Brian M. Shuch, MD</td>
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<td>8:44 a.m. - 8:54 a.m.</td>
<td>Debate: Enucleo Resection vs Wedge Resection for Partial Nephrectomy in &lt;4 cm tumors</td>
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<td>Speakers: Antonio Finelli, MD</td>
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<td>Gopal N. Gupta, MD</td>
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<td>8:54 a.m. - 9:24 a.m.</td>
<td>Panel: Case Presentations on Applying Contemporary Data for Multidisciplinary Management of Kidney Cancer</td>
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<td>Moderator: Abraham A. Hakimi, MD</td>
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<td>Panelists: E. Jason Abel, MD, FACS Stephen A. Boorjian, MD James Brugarolas, MD, PhD Ramaprasad Srinivasan, MD, PhD Christopher G. Wood, MD, FACS</td>
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<tr>
<td>9:24 a.m. - 9:30 a.m.</td>
<td>Discussion/Q&amp;A</td>
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9:30 a.m. - 10:00 a.m.  State-of-the-Art Debate: State of Cytoreductive Nephrectomy in Light of the Recent Carmena Trial Results

9:30 a.m. - 9:40 a.m.  Cytoreductive Nephrectomy Is No Longer Standard of Care in Patients with Metastatic
Speaker: Nizar Tannir, MD

9:40 a.m. - 9:50 a.m.  There Is Still a Role for Cytoreduction
Speaker: Bradley C. Leibovich, MD, FACS

9:50 a.m. - 10:00 a.m.  Rebuttal and Discussion

10:00 a.m. - 10:30 a.m.  Break/Visit Exhibits
Location: Encanto

10:30 a.m. - 11:30 a.m.  Prostate Cancer Session II: Pipeline Co-Targeting Strategies in mCRPC
Session Chair: Martin E. Gleave, MD, FRCSC, FACS
Moderators: Vivek K. Arora, MD, PhD
Isla Garraway, MD, PhD

10:30 a.m. - 10:45 a.m.  Adaptive Survival Pathways – AR Variants and Autophagy
Speaker: Christopher P. Evans, MD, FACS

10:45 a.m. - 11:00 a.m.  DNA Damage Response – ADT + PARPi
Speaker: Noel Clarke, ChM, FRCS(Urol)

11:00 a.m. - 11:15 a.m.  Signal Transduction Pathways - ADT + AKT Trials
Speaker: Brett S. Carver, MD

11:15 a.m. - 11:30 a.m.  Uptake on PSMA Targeted Alpha Emitters in mCRPC
Speaker: Scott Tagawa, MD

11:30 a.m. - 12:00 p.m.  EAU Lecture

11:30 a.m. - 11:35 a.m.  Introduction to the EAU Lecture
Speaker: Christopher P. Evans, MD, FACS

11:35 a.m. - 12:00 p.m.  EAU Lecture: Changing Practice in High Risk Prostate Cancer Using Novel Trial Design: The STAMPEDE Study
Speaker: Noel Clarke, ChM, FRCS(Urol)

12:00 p.m. - 12:20 p.m.  The Changing Face of Urologic Oncologic Surgery from 2000-2018 (63,141 patients) - Impact of Robotics
Speaker: Inderbir S. Gill, MD

12:20 p.m. - 1:25 p.m.  Industry Satellite Lunch Symposium
Location: Deer Valley

1:25 p.m. - 2:25 p.m.  Bladder Cancer Session II
Session Chair: Eila C. Skinner, MD

1:25 p.m. - 1:40 p.m.  Immunotherapy Before or After Cystectomy for Cisplatin Ineligible Patients?

1:25 p.m. - 1:31 p.m.  The Case for Neoadjuvant Immunotherapy
Speaker: Andrea Necchi, MD

1:31 p.m. - 1:37 p.m.  The Case for Adjuvant Immunotherapy
Speaker: Gary D. Steinberg, MD

1:37 p.m. - 1:40 p.m.  Discussion

1:40 p.m. - 1:48 p.m.  Preclinical Models in Bladder Cancer and Translational Research
Speaker: James M. McKiernan, MD
1:48 p.m. - 2:13 p.m.  Panel on Bladder Preservation - When Can We Omit Cystectomy?
Moderator: Cheryl T. Lee, MD

1:48 p.m. - 1:55 p.m.  Before and After Clinical CR from NAC
Speaker: Phillip Abbosh, MD, PhD

1:55 p.m. - 2:02 p.m.  Role of Trimodality and Comparison with Cystectomy in Muscle Invasive Bladder Cancer
Speaker: Alexandre Zlotta, MD, PhD, FRCSC

2:02 p.m. - 2:09 p.m.  Long-Term IO Alone
Speaker: Guru P. Sonpavde, MD

2:09 p.m. - 2:13 p.m.  Discussion/Q&A

2:13 p.m. - 2:25 p.m.  ESOU Lecture: Radical Cystectomy in the Octogenarian
Speaker: Maurizio Brausi, MD

2:25 p.m. - 3:10 p.m.  Oral Abstract Session
Moderator: Marc A. Dall’Era, MD

2:25 p.m.  #4 PHASE 2 STUDY OF PEMBROLIZUMAB MONOTHERAPY FOR HIGH-RISK, NON–MUSCLE INVASIVE BLADDER CANCER (NMIBC) UNRESPONSIVE TO BACILLUS CALMETTE-GUÉRIN (BCG): RESULTS FROM KEYNOTE-057
Presented By: Arjun Balar, MD, PhD

2:32 p.m.  #5 CLINICOPATHOLOGIC CORRELATES OF COPY NUMBER VARIATIONS IN CLEAR CELL RENAL CELL CARCINOMA: A STUDY OF 178 SAMPLES PROFILED WITH NEXT-GENERATION SEQUENCING
Presented By: Angela Yoo

2:39 p.m.  #6 QUALITATIVE AND QUANTITATIVE EVIDENCE OF SIPULEUCEL-T–INDUCED PAP- AND PA2024-SPECIFIC CD8+ CYTOLYTIC RESPONSE AND ITS ASSOCIATION WITH OVERALL SURVIVAL
Presented By: Adam S. Kibel, MD

2:46 p.m.  #7 RENAL BIOPSY CELL CYCLE PROLIFERATION (CCP) SCORE PREDICTS ADVERSE SURGICAL PATHOLOGY IN RENAL CELL CARCINOMA
Presented By: Jeffrey J. Tosoian, MD, MPH

2:53 p.m.  #8 LONG-TERM PATIENT REPORTED OUTCOMES WITH ABIRATERONE ACETATE+PREDNISONE ADDED TO ANDROGEN DEPRIVATION THERAPY IN NEWLY-DIAGNOSED METASTATIC CASTRATION-NAÏVE PROSTATE CANCER: SECOND INTERIM ANALYSIS OF THE LATITUDE STUDY
Presented By: Kim Chi, MD

3:10 p.m. - 3:25 p.m.  Research Scholars Update: Combination Chemotherapy-Immunotherapy for Bladder Cancer
Speaker: William Tabayoyong, MD, PhD

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Wednesday, November 28, 2018

Bladder Cancer: Posters #1 - 31
Kidney Cancer: Posters #32 - 68
Prostate Cancer: #69 - 111
Health Services: #112 - 118

Other: #119 - 123
Penile Cancer: #124 - 125
Testis Cancer: #126 - 132

VALLEY OF THE SUN BALLROOM

AB

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General Session

TO REGISTRATION

TO NETWORKING LOUNGE

Abstract Categories & Poster Maps

Wednesday, November 28, 2018
Thursday, November 29, 2018

Bladder Cancer: Posters #133 - 160
Kidney Cancer: #161 - 198
Prostate Cancer: #199 - 240
Health Services: #241 - 246
Other: #247 - 252
Testis Cancer: #253 - 259

Valley of the Sun Ballroom

Abstract Categories & Poster Maps

40
Podium #1
LONG-TERM OUTCOMES OF ACTIVE SURVEILLANCE FOR PROSTATE CANCER – THE MEMORIAL SLOAN KETTERING CANCER CENTER EXPERIENCE
*Sigrid Carlsson, MD, PhD, MPH1,2,3; Nicole Benfante1; Ricardo Alvim1; Daniel Sjoberg2; Behfar Ehdaie1; Peter Scardino1; James Eastham1 and Karim Touijer1
1Urology Service at the Department of Surgery, Memorial Sloan Kettering Cancer Center, New York; 2Department of Epidemiology and Biostatistics, Memorial Sloan Kettering Cancer Center, New York; 3Institute of Clinical Sciences, Department of Urology, Sahlgrenska Academy at the University of Gothenburg, Sweden
Presented By: Sigrid Carlsson, MD, PhD, MPH

Introduction: To provide accurate counseling for patients considering active surveillance (AS) and reassure clinicians about the safety of the approach, estimates of oncologic outcomes from large-scale, long-term, contemporary prospective cohorts are needed. Here, we report our 17-year experience with AS.

Methods: After IRB approval, we queried our institutional database and identified 2,907 patients (92% Grade Group [GrdGrp] 1; 8.3% GrdGrp 2; <0.1% GrdGrp 3) managed with AS during 2000-2017. Patients were recommended confirmatory biopsy to confirm eligibility. Magnetic Resonance Imaging (MRI) was increasingly utilized in more recent years. Patients were followed semi-annually with digital rectal examination (DRE), prostate specific antigen (PSA) measurements and a review of general health and symptoms. Biopsy was repeated every 2 to 3 years or by changes in MRI, DRE or a sustained PSA-increase. Triggers for intervention included patient preference or disease progression to higher grade or stage. Survival was estimated using the Kaplan-Meier method.

Results: During 2000 to 2017, a total of 2,907 patients were monitored with AS with a median follow-up of 4.2 years (IQR 2.2, 6.7) for those without metastasis. The median age at diagnosis was 63 years (IQR 57, 68), with a trend towards a lower age at diagnosis in more recent years. The treatment-free survival at 5, 10 and 15 years after the start of AS was 75% (95% CI 73%, 77%), 63% (95% CI 60%, 66%) and 57% (95% CI 50%, 63%), respectively. The risk of progression (from GrdGrp 1 to GrdGrp 2 or GrdGrp 3) at 5, 10 and 15 years was 24% (95% CI 22%, 26%), 36% (95% CI 33%, 39%) and 41% (95% CI 35%, 46%), respectively. There was 1 death from prostate cancer (unusual case). The risk of metastasis was 1% (95% CI 1%, 3%) at 10 years (Figure 1). The overall and cancer-specific survival at 10 years were 93% (95% CI 91%, 95%) and 100% (95% CI 99%, 100%) respectively.

Conclusion: Our experience confirms prior reports that AS is a safe management strategy in the long-term, with a 98% 10-year metastasis-free survival at our center. This information is important for patient counseling.

Figure 1. Risk of metastasis among 2,907 men on active surveillance
**Podium #2**

**POST-OPERATIVE OPIOID PRESCRIBING IN UROLOGY: ARE WE CONTRIBUTING TO THE NATIONAL CRISIS?**

*Kathryn Hacker, MD, PhD; Jae Jung; J. Lee Graves; Hannah Cook; Peggy McNaul; Brooke Chidgey; Jami Mann; Angela Smith and Matthew Nielsen*

University of North Carolina at Chapel Hill, Chapel Hill, NC

Presented By: Kathryn Hacker, MD, PhD

**Introduction:** The incidence of new persistent opioid use following surgery is approximately 6-10%, more common than any single post-operative complication. Additionally, a recent systematic review found 67-92% of patients report unused opioid medications after a surgical prescription. Reducing the oversupply of opioids may substantially impact the opioid epidemic as a primary and secondary prevention strategy. However, minimal data are available to inform urologists’ prescribing practices. Therefore, we aimed to evaluate post-surgical opioid requirements of patients following urologic surgeries and adjust prescribing schedules to reduce oversupply of opioid prescriptions.

**Methods:** Patients undergoing urologic procedures associated with 49 specified CPT codes were identified. Details regarding medications prescribed for postoperative pain were obtained through our pharmacy database. Two weeks post-procedure, patients were contacted via telephone to participate in a survey evaluating postoperative opioid usage, storage, and disposal habits.

**Results:** During the study period, 877 patients underwent urologic procedures. We contacted 606, and 264 completed the survey. Among survey respondents, 75% had unused opioids from their initial postoperative prescription, and the average amount of narcotics used was 55% of the initial prescription. In the 6 month study period, approximately 2800 opioid pills remained unused. We then created procedure-specific Standardized Opioid Prescribing Schedules based on known usage data and evaluated subsequent usage data following implementation of standardized prescribing amounts.

**Conclusion:** Consistent with observations in other surgical populations, we identified substantial oversupply from standard prescribing practices following urologic procedures. Extrapolating this number across the US, the 11,703 practicing urologists described in the AUA 2015 census prescribe approximately 24 million excess opioid pills each year. Newly developed data-driven post-operative prescribing schedules coupled with education on appropriate disposal provide an opportunity for urologists to take an active role in opioid stewardship and reduce oversupply and diversion of narcotic medications.
Podium #3
CG0070, AN ONCOLYTIC ADENOVIRUS, FOR BCG-UNRESPONSIVE NON-MUSCLE-INVASIVE BLADDER CANCER (NMIBC): 18-MONTH FOLLOW-UP FROM A MULTICENTER PHASE II TRIAL
*Vignesh T. Packiam1; Daniel A. Barocas2; Karim Chamie3; Ronald L. Davis III4; A. Karim Kader5; Donald L. Lamm6; John Gutheil7; Arthur Kuan8 and Gary D. Steinberg9
1Mayo Clinic, Rochester, MN; 2Vanderbilt University, Nashville, TN; 3University of California Los Angeles, Los Angeles, CA; 4Wake Forest University, Winston-Salem, NC; 5University of California San Diego, San Diego, CA; 6BCG Oncology, P.C., Phoenix, AZ; 7Sciquus Oncology, San Diego, CA; 8Cold Genesys, Inc., Santa Ana, CA; 9University of Chicago, Chicago, IL
Presented By: Vignesh T. Packiam, MD

Introduction: CG0070 is a selective oncolytic adenovirus that exploits retinoblastoma (Rb) pathway defects. We have previously shown promising interim results for this agent. We present mature results from a phase II trial for CG0070 in patients with BCG-unresponsive NMIBC who refused cystectomy.

Methods: Sixty-seven patients with residual BCG-unresponsive high-grade Ta, T1, or CIS +/- Ta/T1 were accrued in this phase II single arm multicenter trial (NCT02365818). Patients were unable to achieve disease free state at 6 months after adequate BCG (BCG-refractory) or developed recurrence after complete response (CR) to BCG (BCG-relapsed). CR was defined as no disease on cystoscopy, cytology, and/or random biopsies. The primary endpoint was 18-month CR. Ten patients were excluded from analysis due to withdrawn consent or subsequent therapy despite continued CR prior to 18 months. One patient was excluded due to pending 18-month follow-up studies.

Results: On analysis of 56 patients, the overall 18-month CR rate was 21% (Figure 1). Among stage subsets, 18-month CR was 17% for CIS-containing tumors (n=42) and 36% for pure Ta, T1 or Ta/T1 disease (n=14). No patients with T1/CIS or T1/Ta/CIS had 18-month CR (n=6). BCG-refractory patients had 32% (n=22) 18-month CR, BCG-relapsed 17% (n=29), unknown 0% (n=5). Eleven patients underwent cystectomy, of which 6 patients had muscle invasive disease. All treatment related adverse events (AEs) were Grade 1-3; immunologic AEs included influenza type illness (7%), fatigue (4%), and chills (1%). Six deaths were secondary to progressive urothelial carcinoma, esophageal carcinoma, lung carcinoma, and cardiac disease.

Conclusion: This phase II study demonstrates that in a high-risk BCG-unresponsive NMIBC population, intravesical CG0070 yielded overall 44%, 30%, and 21% complete response rates at 6, 12, and 18 months, respectively. Rb and checkpoint biomarker analysis is pending to attempt prediction of which patients have durable response to this agent.
Podium #4
PHASE 2 STUDY OF PEMBROLIZUMAB MONOTHERAPY FOR HIGH-RISK, NON–MUSCLE INVASIVE BLADDER CANCER (NMIBC) UNRESPONSIVE TO BACILLUS CALMETTE-GUÉRIN (BCG): RESULTS FROM KEYNOTE-057
*Arjun V. Balar, MD, PhD 1; Girish Kulkarni, MD, PhD 2; Edward Uchio, MD, PhD 3; Joost Boormans, MD, PhD 4; Loïc Mourey, MD, PhD 5; Laurence Krieger, MD, PhD 6; Eric A. Singer, MD, PhD 7; Dean Bajorin, MD, PhD 8; Ashish Kamat, MD, PhD 9; Petros Grivas, MD, PhD 10; Ho Kyung Seo, MD, PhD 11; Hiroyuki Nishiyama, MD, PhD 12; Kijoeng Nam, MD, PhD 13; Ekta Kapadia, MD, PhD 13; Tara Frenkl, MD, PhD 13 and Ronald De Wit, MD, PhD 13

1NYU Langone Medical Center; 2UHN Princess Margaret Cancer Centre; 3UC Irvine Health; 4Erasmus MC Cancer Institute; 5Institut Universitaire du Cancer Toulouse Oncopole; 6Royal North Shore Hospital, Northern Cancer Institute; 7Rutgers Cancer Institute of New Jersey; 8Memorial Sloan Kettering Cancer Center; 9The University of Texas MD Anderson Cancer Center; 10University of Washington, Seattle Cancer Care Alliance, Fred Hutchinson Cancer Research Center; 11National Cancer Center; 12University of Tsukuba; 13Merck Co., Inc.

Presented By: Arjun V. Balar, MD, PhD

Introduction: Activation of the PD-1 pathway has been implicated in resistance to BCG. The PD-1 inhibitor pembrolizumab has shown significant activity in patients with metastatic urothelial carcinoma. KEYNOTE-057 (NCT02625961) is a single-arm phase 2 study of efficacy and safety of pembrolizumab monotherapy in patients with high-risk, BCG-unresponsive NMIBC. Results for cohort A (carcinoma in situ [CIS] or CIS plus papillary tumor) are presented.

Methods: Patients received pembrolizumab 200 mg Q3W for 24 months or until recurrence, progression, or unacceptable toxicity. Eligible patients had histologically confirmed, high-grade, BCG-unresponsive NMIBC, including CIS alone or combination of CIS and papillary disease (cohort A), had been treated with adequate BCG therapy (at least 5/6 induction instillations and 2/3 maintenance therapy instillations), and were unable or unwilling to undergo radical cystectomy. Primary end point for cohort A was complete response (CR); key secondary end points were safety and duration of response. Patients found to have high-risk NMIBC or progressive disease during treatment had to discontinue.

Results: At data cutoff, 101 patients enrolled in cohort A. Median follow-up was 9.4 months (range, 0.2-21.2). Median age was 73.0 years (range, 44-92); 83.2% were male; 72.3% had CIS, 14.9% had CIS with high-grade Ta, and 12.9% had CIS with T1. At month 3 in 85 evaluable patients, CR rate by central assessment was 36.5% (95% CI, 26.3-47.6). Among 31 patients with CR at month 3, median duration of CR was 8.1 months (range, 0+ to 13.7+). Estimated proportion of patients with response duration ≥6 months was 85.6%. Treatment-related adverse events (TRAEs) occurred in 54 patients (55.7%); most common (≥5%) were diarrhea (9.3%), pruritus (9.3%), fatigue (7.2%), hypothyroidism (5.2%), maculopapular rash (5.2%), and arthralgia (5.2%). Grade 3-5 TRAEs occurred in 11 patients (11.3%); most common were arthralgia (2.1%) and hyponatremia (2.1%). Three patients (3.1%) discontinued due to TRAEs, and treatment was interrupted in 8 (8.2%) due to TRAEs. One death was considered treatment related. Immune-mediated AEs occurred in 15 patients (15.5%) and were grade 3/4 in 2 patients (2.1%).

Conclusion: Pembrolizumab exhibits encouraging antitumor activity in patients with high-risk, BCG-unresponsive NMIBC with CIS, and safety is consistent with previous studies. Updated data with additional follow-up will be presented.
Introduction: It has been previously observed that copy number variations in clear cell Renal Cell carcinoma (ccRCC) are events that can have an adverse impact on clinicopathologic outcomes. More specifically, loss of chromosome arm 9p and loss of 14q have been reported to be associated with worse survival. The clinical relevance of all possible arm-level copy-number changes has not been completely elucidated. Previous studies either address only specific events or do not utilize next-generation sequencing to reach conclusions. Thus, we aim to correlate the occurrence of these events with different clinicopathological outcomes in a cohort of 178 patients.

Methods: We retrospectively reviewed the medical records of patients with ccRCC who were sequenced as part of our institutional sequencing program (MSK-IMPACT®). Patients were excluded if the clinical data was deemed to be incomplete or if the sequencing data was not available for analysis. We performed allele-specific copy-number analysis using a previously-validated bioinformatics tool. Since we were mainly interested in broad arm-level events, segments which constituted the highest fraction of each chromosomal arm were considered in the analysis. Recurrence-free survival estimates were computed using the Kaplan-Meier method; a recurrence was defined as any new local or distant lesion found after initial pathological diagnosis. We performed log-rank tests and Cox regression models to compute p-values. FDR correction for multiple-hypothesis testing was performed where appropriate. All the statistical analyses were done under the R platform, v3.5.0.

Results: Both loss of 9p (p<0.001) and 14q (p=0.008) were associated with a shorter time to recurrence in univariate analysis. When loss of 9p was observed, it was associated with concurrent loss of 9q in 97.1% of the samples (p<0.001) demonstrating that this event usually occurs as a full chromosomal loss. We evaluated the co-occurrence of 9p loss and 14q loss. 77.7% of the samples with 9p loss exhibited simultaneous 14q loss (p<0.001). Additionally, we explored the associations of these events with other outcomes. 9p loss was associated with metastatic disease [OR:4.04 (95%CI:1.6-10.19),p=0.004], bigger primary size [OR:7.9 (95%CI:1.7-37.8),p=0.004], and T3 stage [OR:3.6 (95%CI:1.18-11.17),p=0.024].

Conclusion: After evaluating all the possible arm-level changes in copy-number at all chromosome arms, 9p and 14q were associated with worse outcomes.
QUALITATIVE AND QUANTITATIVE EVIDENCE OF SIPULEUCEL-T–INDUCED PAP- AND PA2024-SPECIFIC CD8+ CYTOLYTIC RESPONSE AND ITS ASSOCIATION WITH OVERALL SURVIVAL

*Adam S. Kibel, MD; Charles G. Drake, MD; Emmanuel S. Antonarakis, MD; Daniel George, MD; Daniel P. Petrylak, MD; Eric J. Small, MD; David I. Quinn, MD; Evan Y. Yu, MD; Nancy N. Chang, PharmD; Erica Dearstyne; Matt Harmon; Dwayne Campgan; Heather Haynes; Tuyen Vu; Nadeem A. Sheikh and Brant A. Inman, MD

1Dana-Farber/Brigham and Women’s Cancer Center, Harvard University, Boston, MA; 2Columbia University Herbert Irving Comprehensive Cancer Center, Department of Urology, and the Columbia Center for Translational Immunology, New York, NY; 3Johns Hopkins Sidney Kimmel Comprehensive Cancer Center, Baltimore, MD; 4Duke Cancer Institute, Durham, NC; 5Yale Cancer Center, New Haven, CT; 6Helen Diller Family Comprehensive Cancer Center, University of California San Francisco, CA; 7Norris Comprehensive Cancer Center, University of Southern California, Los Angeles, CA; 8University of Washington and Seattle Cancer Care Alliance, Seattle, WA; 9Dendreon Pharmaceuticals LLC, Seattle, WA

Presented By: Adam S. Kibel, MD

**Introduction:** Sipuleucel-T is an FDA-approved autologous cellular immunotherapy for metastatic castration-resistant prostate cancer comprising peripheral blood mononuclear cells (PBMCs) activated with PA2024 antigen (prostatic acid phosphatase [PAP] conjugated to GM-CSF). Sipuleucel-T–induced peripheral cellular and humoral immune responses to PAP and/or PA2024 correlate with overall survival (OS). The localization of CD4+ and CD8+ cytotoxic T lymphocytes (CTLs) at prostate tumor rim after neoadjuvant sipuleucel-T suggested that a cellular immune response may mediate the clinical benefit observed. We evaluated the cytolytic potential of PAP- and PA2024-specific CD8+ T cells, provided visual evidence of T-cell–induced cytolysis, and assessed the relationship of PAP- and PA2024-specific cytolytic response with OS.

**Methods:** To determine cytolytic activity, cell-surface CD107a expression on PAP- or PA2024-specific CD8+ T cells was measured by flow cytometry using samples (N=22) from STAND, STAMP, and STRIDE trials. Pearson correlation coefficient was used to assess correlation of OS with PAP- and PA2024-directed CTL activity. For real-time imaging of CTL activity, purified CD8+ (effector) T cells at baseline, week 6, and week 26 from STAMP (n=3) were co-cultured with PAP-expressing monocytes (target) cells. Videos were acquired over 4 hours using confocal microscopy.

**Results:** PAP- and PA2024-specific CTL activity significantly increased at weeks 6 and 26 post-sipuleucel-T (P<0.0001); the magnitude of PAP and PA2024 CTL activity at week 26 positively correlated with OS (Pearson’s R=0.52 and 0.67; P=0.013 and 0.0006, respectively). Higher PA2024-CTL activity at week 26 was significantly associated with longer OS using tertile analysis (P=0.0005). Video captures at week 6 and 26 showed activated CD8+ T cells (dark grey) migrating toward (Fig. A and D) and contacting PAP-expressing target cells (green; B and E), resulting in cell death (loss of green, C and F). Cell destruction was not observed in non-PAP-expressing cells, or at baseline, when CD8+ T cells were not yet activated by sipuleucel-T.

**Conclusion:** Quantitative and qualitative evidence of sipuleucel-T–induced PAP-specific CD8+ T-cell responses observed in this study, with correlation between OS and magnitude of CTL activity, provide a link between the mechanism of sipuleucel-T and clinical benefit. Real-time imaging demonstrates that sipuleucel-T acts, in part, through the activation of anti-PAP CTLs that can target and kill PAP-expressing cells.

Still images of sipuleucel-T activated CD8+ T cells destroying PAP-expressing targets at week 6 and week 26 (see text for description).

Arrows and boxes highlight images of interest.
Podium #7
RENAL BIOPSY CELL CYCLE PROLIFERATION (CCP) SCORE PREDICTS ADVERSE SURGICAL PATHOLOGY IN RENAL CELL CARCINOMA
*Jeffrey J. Tosoian1; Adam Feldman2; Rohit Mehra1; Placede Tiemen3; J. Stuart Wolf, Jr.3; Shulin Wu2; Steven Stone3; Chin-Lee Wu and Todd Morgan1
1University of Michigan; 2Massachusetts General Hospital; 3Myriad Genetics; 4University of Texas at Austin
Presented By: Jeffrey J. Tosoian, MD, MPH

Introduction: Renal mass biopsies (RMB) are often performed in patients with small renal masses to distinguish malignant from benign lesions. However, due to a limited ability to accurately assess tumor grade and adverse pathology, the role of biopsy in selecting patients with renal cell carcinoma (RCC) for active surveillance has been questionable. Tissue-based gene expression classifiers may provide additional information in this setting, and we previously showed that the cell cycle proliferation (CCP) score measured in nephrectomy specimens is associated with RCC recurrence. Here we sought to determine whether CCP score can improve risk stratification in patients with localized RCC who have undergone RMB.

Methods: We identified patients with RCC who underwent RMB and subsequent partial or radical nephrectomy at the University of Michigan or Massachusetts General Hospitals from 2000-2014. CCP scores were generated from biopsies as previously described. The primary outcome was adverse pathology at surgery, defined as: Fuhrman grade 3-4, pT stage≥3, papillary type II histology, or evidence of nodal or distant metastases at surgery. Logistic regression analysis was performed to determine the association of age, sex, histology, grade, and CCP score at biopsy (categorized by the median) with adverse surgical pathology. Factors demonstrating a significant association (p<0.05) on univariable analysis were included in a multivariable model.

Results: Overall, 95/205 patients (46%) had adverse surgical pathology. Patients with adverse pathology were older (median age 64.7 vs. 59.7 years, p=0.008) and more frequently male (74% vs. 55%, p=0.005) than those without adverse pathology. A total of 18/19 (95%) of those with high grade cancer on biopsy had adverse pathology; however, 53/113 (47%) with low grade cancer on biopsy also had adverse pathology. In a multivariable model including age, sex, and biopsy grade (Table 1), CCP score was associated with nearly two-fold higher odds of adverse pathology (OR 1.87, 95%CI 1.01, 3.47; p=0.048). This association increased (OR 1.95, 95%CI 1.03, 3.65; p=0.038) when limiting the analysis to the 186 patients with Fuhrman 1-2 or ungraded tumors.

Conclusion: In this cohort of patients with RCC, biopsy CCP score was significantly associated with adverse surgical pathology. This association was independent of Fuhrman grade, suggesting this classifier provides prognostic information beyond that obtained from conventional pathologic assessment.

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<th>Table 1.</th>
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<td>Multivariable OR (95% CI)</td>
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<td>Age</td>
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<tr>
<td>Male sex</td>
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<tr>
<td>Biopsy grade</td>
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<td>Low (Fuhrman 1-2)</td>
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<td>High (Fuhrman 3-4)</td>
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<td>Ungraded</td>
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<td>CCP &gt; 0.09</td>
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Introduction: The first interim analysis of the LATITUDE study demonstrated survival benefits and improved patient reported outcomes (PRO) in patients with newly-diagnosed high-risk metastatic castration-naïve prostate cancer (NDx-HR-mCNPC) treated with abiraterone acetate plus prednisone added to androgen deprivation therapy (AA+P+ADT group) versus placebos plus ADT (PBO+ADT group). We present the long-term PRO results of second pre-planned analysis following unblinding of the study.

Methods: A total of 1199 patients were randomized 1:1 to AA+P+ADT (n=597) or PBO+ADT (n=602). The Brief Pain Inventory-Short Form (BPI-SF), Brief Fatigue Inventory (BFI), and Functional Assessment of Cancer Therapy-Prostate (FACT-P) were administered at baseline, monthly during Cycles 2-13, then every 2 months until treatment discontinuation (TD). The EQ-5D-5L was administered at the same frequency until TD, then every 4 months until 12 months from TD. Kaplan-Meier method and Cox model were used to analyse the time to event variables and to obtain the hazard ratios (HR). Changes from baseline in PRO scales were estimated using repeated measures mixed-effects analyses.

Results: The median follow-up was 41 months in the second interim analysis compared with 30.9 months in the first interim analysis. Treatment was ongoing in 205 (34%) patients in the AA+P+ADT group and 70 (12%) in the PBO+ADT group. Compliance rate for all PRO questionnaires was ≥90% in both groups. For the patients in the AA+P+ADT group, there was a significant decrease in the risk of progression for worst pain intensity, pain interference, worst fatigue intensity, and fatigue interference (Table). There was also a significant delay in time to health-related quality of life (HRQoL) degradation in AA+P+ADT group compared to PBO+ADT, as assessed by FACT-P and EQ-5D-5L (Table). There was a significantly greater improvement from baseline in all PRO measures in AA+P+ADT group compared with PBO+ADT. Improvements in the AA+P+ADT group were achieved as early as Cycle 2 and maintained at most of the timepoints across the analysis period.

Conclusion: This analysis demonstrated long-term maintenance and improvement of PROs in favor of AA+P+ADT treatment vs PBO+ADT. In addition to the improvements in survival, these results support the use of AA+P+ADT for patients with NDx-HR-mCNPC.

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<th>Table: Time to Progression and Relative Risk for PRO Endpoints</th>
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<td><strong>Median time (months)</strong></td>
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<td>Time to worst pain intensity progression (BPI-SF)</td>
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<td>Time to pain interference progression (BPI-SF)</td>
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<td>Time to worst fatigue intensity progression (BFI)</td>
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<td>Time to fatigue interference progression (BFI)</td>
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<td>Time to FACT-P degradation (Total Score)</td>
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<td>Time to FACT-P degradation (Pain-related subscale)</td>
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<td>Time to FACT-P degradation (Prostate cancer subscale)</td>
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<td>Time to EQ-5D VAS degradation (EQ-5D VAS)</td>
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*Median not reached; NCDR: Minimal clinically important difference
Poster Session I
Wednesday, November 28, 2018
1:00 p.m. - 5:30 p.m.
Poster Walks
Valley of the Sun Ballroom AB and Foyer
See page 70 for full abstracts

Poster #1
EVALUATING POST-OPERATIVE OPIOID USE FOLLOWING RADICAL CYSTECTOMY
*Kathryn Hacker, MD, PhD; Jae Jung; J. Lee Graves; Hannah Cook; Peggy McNaull; Brooke Chidgey; Jami Mann; Angela Smith and Matthew Nielsen*
*University of North Carolina at Chapel Hill, Chapel Hill, NC*
Presented By: Kathryn Hacker, MD, PhD

Poster #2
DECREASING URETERAL STENT DURATION AFTER RADICAL CYSTECTOMY WITH ILEAL CONDUIT FORMATION IS NOT ASSOCIATED WITH INCREASED URETERAL STRICTURE RATES
*Hamza M. Beano; Jiaxian He, Caitlin Hensel; William Worillow; Rupalie Bose; William Townsend; Kris Gaston; Peter Clark; Katherine Whitten; Lauren Childs and Stephen Riggs*
*Department of Urology, Carolinas Medical Center/Atrium Health; 2Department of Cancer Biostatistics, Levine Cancer Institute/Atrium Health*
Presented By: Hamza M. Beano, MD

Poster #3
PREOPERATIVE RISK FACTORS PREDICTING POSTOPERATIVE COMPLICATIONS IN RADICAL CYSTECTOMY FOR BLADDER CANCER
*Sida Niu, MD; Stefan Graw, MS; Derek Jensen, MD; Vassili Glazyrine, MS; Jeffrey Holzbeierlein, MD; Devin Koestler, PhD and Eugene Lee, MD*
*Department of Urology; University of Kansas Medical Center; 2Department of Biostatistics, University of Kansas Medical Center*
Presented By: Sida Niu, MD

Poster #4
REAL-WORLD IMPACT OF MINIMALLY INVASIVE VERSUS OPEN RADICAL CYSTECTOMY IN PERIOPERATIVE OUTCOMES AND SPENDING: AN INSTRUMENTAL VARIABLE ANALYSIS
*Parth K. Modi, MD, MS; Brent Hollenbeck, MD, MS; Mary Oerline, MS; Alon Weizer, MD; Jeffrey Montgomery, MD, MHSA; Samuel Kaffenberger, MD; Andrew Ryan, PhD and Chad Ellimoottil, MD, MS*
*University of Michigan*
Presented By: Parth K. Modi, MD, MS

Poster #5
DISPARATE ESTIMATES OF BENEFIT FROM POST-DISCHARGE ANTICOAGULATION AFTER CYSTECTOMY IN THE LITERATURE: IMPLICATIONS FOR COST EFFECTIVENESS?
*Kristian D. Stensland, MD, MPH; Brendan Waldoch, MS; Mark Broadwin, MS; Navneet Ramesh, BA; Alireza Moinzadeh, MD; Harras Zaid, MD and David Canes, MD*
*Lahey Hospital and Medical Center; 2Tufts University School of Medicine*
Presented By: Kristian D. Stensland, MD, MPH

Poster #6
THE EFFECT OF CHRONIC KIDNEY DISEASE ON RADICAL CYSTECTOMY OUTCOMES
*Matthew Winter, BMBS (Hons), FRACS; Shane Pearce; Aliasher Shakir; Akbar Ashrafi; Giovanni Cacciamani; Luis Medina; Michael Lin-Brande; Angelica Hernandez; Hannah Landsberger; Andre Berger; Andre Abreu; Anne Schuckman; Hooman Djaladat; Siamak Daneshmand; Monish Aron; Inderbir Gill and Mihir Desai*
*University of Southern California, Institute of Urology*
Presented By: Matthew Winter, BMBS (Hons), FRACS
Poster Session I — Summary

Poster #7
TRAJECTORY OF PHYSICAL SYMPTOMS FOLLOWING RADICAL CYSTECTOMY
*Mehrdad Alemozaffar, MD, MS1; Jennifer Adouli1; Frances Kim1; Anasua Bandyopadhyay1; Jay Shah2 and Viraj Master1
1Department of Urology, Emory University School of Medicine, Atlanta, GA; 2Department of Urology, Stanford University School of Medicine, Palo Alto, CA
Presented By: Mehrdad Alemozaffar, MD, MS

Poster #8
URETERAL STENT URINE CULTURE FOLLOWING RADICAL CYSTECTOMY WITH ILEAL CONDUIT DIVERSION PREDICTS UTI-RELATED READMISSION RATES
*Hamza M. Beano, MD1; Caitlin Hensel2; Jiaxian He2; Rupali Bose2; William Worrilow1; Peter Clark1; Kris Gaston1; Jared Brown2; Madelon Haskin2; Jaclyn Mieczkowski3 and Stephen Riggs3
1Department of Urology, Levine Cancer Institute/Atrium health; 2Department of Cancer Biostatistics, Levine Cancer Institute/Atrium health; 3Department of Urology, Carolinas Medical Center/Atrium Health
Presented By: Hamza M. Beano, MD

Poster #9
WEEKEND DISCHARGE FOLLOWING RADICAL CYSTECTOMY PREDICTS SUBSEQUENT HOSPITAL READMISSION
*Jeffrey J. Tosoiian, MD, MPH1; James Tracey1; Sapan Ambani1; Takahiro Osawa2; Chang He1; Jeffrey Montgomery1; Alon Weizer1 and Todd Morgan1
1University of Michigan; 2Hokkaido University
Presented By: Jeffrey J. Tosoiian, MD, MPH

Poster #10
MODELING AUTOMATED ASSESSMENT OF SURGICAL PERFORMANCE UTILIZING COMPUTER VISION: PROOF OF CONCEPT
*Amir Baghdadi, PhD1, 2, 3; Lora A. Cavuoto2; Ahmed A. Hussein1; Youssef Ahmed1 and Khurshid A. Guru1
1Roswell Park Comprehensive Cancer Center, Dept. of Urology, Buffalo, NY; 2University at Buffalo, Dept. of Industrial and Systems Eng., Buffalo, NY; 3University at Buffalo, Dept. of Mechanical and Aerospace Eng., Buffalo, NY
Presented By: Amir Baghdadi, PhD

Poster #11
EPIDURAL ANESTHESIA LEADS TO INCREASED POSTOPERATIVE COMPLICATIONS AFTER RADICAL CYSTECTOMY: AN ANALYSIS FROM THE NATIONAL SURGICAL QUALITY IMPROVEMENT PROJECT (NSQIP) DATABASE
Sephalie Patel1; Robert Ackerman2, 3; David Boulware4 and *Michael A. Poch, MD4
1H. Lee Moffitt Cancer Canter; 2University of Texas Southwestern Medical Center; 3Univsersity of South Florida; 4H. Lee Moffitt Cancer Center
Presented By: Michael A. Poch, MD

Poster #12
THE IMPACT OF URETHRAL FROZEN SECTION OMISSION DURING RADICAL CYSTECTOMY WITH ORTHOTOPIC NEOBLADDER
*Craig Labbate, MD1; Ryan Werntz, MD1; Brittany Adamic, MD1; Norm Smith, MD1 and Gary Steinberg, MD1
1University of Chicago, Chicago IL
Presented By: Craig Labbate, MD

Poster #13
COMPLICATIONS AND SURVIVAL OUTCOMES OF SALVAGE CYSTECTOMY AFTER TRIMODALITY THERAPY
*Alberto C. Pieretti, MD1,2; Ross Krasnoff1; Adam Feldman1,2; Naren Nimmagadda1,2; Douglas Dahl1,2; Jason Efstatio1,4; Michael Blute1,2 and Matthew Wszolek1,2
1Harvard University; 2Massachusetts General Hospital, Department of Urology, Boston, MA; 3MedStar Washington Hospital Center, Department of Urology, Washington, DC; 4Massachusetts General Hospital, Department of Radiation Oncology, Boston, MA
Presented By: Alberto C. Pieretti, MD
Poster #14
CONTEMPORARY ANALYSIS OF URETEROENTERIC STRICTURES AFTER OPEN AND ROBOT-ASSISTED RADICAL CYSTECTOMY: A POPULATION-BASED STUDY
Alvin Goh1; *Neal Patel, MD2; Andre Belarmino3; Tianyi Sun4; Art Sedkrakyan4 and Jim Hu2
1Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY; 2Department of Urology, Weill Cornell Medicine-New York Presbyterian Hospital, New York, NY; 3Weill Cornell Medical College, New York, NY; 4Department of Health Policy, Weill Cornell Medicine, New York, NY
Presented By: Neal Patel, MD

Poster #15
WHICH FRAILTY ASSESSMENTS ARE MOST PREDICTIVE OF COMPLICATIONS AFTER RADICAL CYSTECTOMY?
*Madeleine L. Burg, BA1; Thomas G. Clifford, MD1; Michael Lin-Brande, BS1; Gus Miranda, BS1; Jie Cai, MS1; Sumeet Bhanvadia, MD1; Hooman Djaladat, MD, MS1; Anne K. Schuckman, MD1 and Siamak Daneshmand, MD1
1Institute of Urology, USC/Norris Comprehensive Cancer Center, University of Southern California, Los Angeles, CA
Presented By: Madeleine L. Burg, BA

Poster #16
UTILITY OF ROUTINE PRE-OPERATIVE 18-FLUORODEOXYGLUCOSE POSITRON EMISSION TOMOGRAPHY-COMPUTED TOMOGRAPHY (18-FDG PET/CT) IN IDENTIFYING PATHOLOGIC LYMPH NODE METASTASES AT RADICAL CYSTECTOMY
Shawn Dason1; *Nathan C. Wong, MD1; Andreas Meier1; Timothy F. Donahue1; Lorenzo Mannelli1; Pier Luigi Di Paolo1; Victor A. McPherson1; Lucas W. Dean1; Jonathan E. Rosenberg2; Dean F. Bajorin3; Guido Dalbagni1; H. Alberto Vargas1 and Bernard H. Bochner1
1Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY, USA; 2Department of Radiology, Memorial Sloan Kettering Cancer Center, New York, NY, USA; 3Department of Medicine, Memorial Sloan Kettering Cancer Center, New York, NY, USA
Presented By: Nathan C. Wong, MD

Poster #17
WHAT CAUSES SARCOPENIA IN BLADDER CANCER PATIENTS: DEMOGRAPHIC FACTORS, LIFESTYLE FACTORS, OR CANCER?
*Yingqi Wang, MS1; Andrew Chang, MD2; WEI PHIN TAN, MD2; Joseph Fantony, MD2; Gregory Barton, MD2; Paul Wischmeyer, MD2; Rajan Gupta, MD* and Brant Inman, MD2
1DUKE-NUS Medical School, Singapore; 2Division of Urology, Duke University Medical Center, Durham, NC; 3Division of Anesthesiology, Duke University Medical Center, Durham, NC; 4Division of Radiology, Duke University Medical Center, Durham, NC
Presented By: Yingqi Wang, MS

Poster #18
NOVEL MODELS FOR PREDICTION OF RADICAL CYSTECTOMY POST-OPERATIVE COMPLICATIONS AND CARE PATHWAYS
*Jacob Taylor, MD, MPH1; Xiaosong Meng, MD, PhD1; Audrey Renson2; James S. Wysock, MD1; Samir S. Taneja, MD1; William C. Huang, MD1 and Marc A. Bjurlin, MD2
1NYU Langone Health; 2NYU Langone Hospital – Brooklyn
Presented By: Jacob Taylor, MD, MPH

Poster #19
INDOCYANINE GREEN MINIMIZES URETERO-ENTERIC STRICTURES AFTER ROBOTIC RADICAL CYSTECTOMY
Nariman Ahmadi1; *Akbar Ashrafi, BHB, MBChB, FRACS(Urol)2; Natalie Hartman2; Aiasger Shahir3; Giovanni Cacciamani1; Daniel Freitas1; Carlos Fay1; Mihir Desai1; Inderbir Gill1 and Monish Aron1
1USC Institute of Urology; 2Keck School of Medicine, University of Southern California
Presented By: Akbar Ashrafi, BHB, MBChB, FRACS (Urol)
Poster #20
EVALUATING THE COST OF SURVEILLANCE FOR NON-MUSCLE INVASIVE BLADDER CANCER: AN ECONOMIC ANALYSIS BASED ON RISK CATEGORIES
Matthew Mossanen, MD MPH1; Ye Wang, PhD2; *Julie Szymaniak, MD1; Wei Shen Tan, MD PhD4; Melissa J. Huynh, MD1,2; Mark A. Preston, MD MPH1,2; Quoc-Dien Trinh, MD1,2; Guru Sonpavde, MD2; Deborah Schrag, MD MPH2; Adam S. Kibel, MD1,2 and Steven L. Chang, MD MS1,2,3
1Division of Urology, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA; 2Dana-Farber Cancer Institute, Boston, MA; 3Center for Surgery and Public Health, Brigham and Women’s Hospital, Boston, MA; 4University College of London, London, England
Presented By: Julie Szymaniak, MD

Poster #21
EVALUATION OF A BLOOD-BASED ASSAY TO PREDICT CLINICAL RESPONSE TO INTRAVESICAL BACILLUS CALMETTE-GUERIN IN PATIENTS WITH UROTHELIAL CARCINOMA OF THE BLADDER
*Michael B. Rothberg, MD1; Wenjun Le2,3; Ronald L. Davis III1 and Zheng Cui1,2,4
1Department of Urology, Wake Forest School of Medicine, Winston-Salem, North Carolina; 2The Institute for Translational Nanomedicine, Shanghai East Hospital; 3The Institute for Biomedical Engineering and Nanoscience, Tongji University School of Medicine, Shanghai, China; 4Department of Pathology, Wake Forest School of Medicine, Winston-Salem, North Carolina
Presented By: Michael B. Rothberg, MD

Poster #22
PKM2: A NOVEL URINE MARKER FOR BLADDER CANCER
Weiya Liu1; Benjamin Woolbright1; *Meredith Metcalf, MD1; Karim Pirani1; Ryan Didde1; Gaurav Kaushik1; Jill Hamilton-Reeves1; John Taylor1; Jeffrey Holzbeierlein1; Srikanth Anant1 and Eugene Lee1
1University of Kansas
Presented By: Meredith Metcalf, MD

Poster #23
NATURAL HISTORY OF EARLY HIGH-GRADE BCG FAILURE IN PATIENTS WHO CONTINUE THERAPY IN EORTC TRIAL 30962
*Justin T. Matulay, MD1; Roger Li, MD2; Richard J. Sylvester, MD3 and Ashish M. Kamat, MD, MBBS1
1Department of Urology, Division of Surgery, University of Texas MD Anderson Cancer Center, Houston, TX; 2Department of Genitourinary Oncology, H. Lee Moffitt Cancer Center Research Institute, Tampa, FL; 3European Association of Urology Guidelines Office, Brussels, Belgium
Presented By: Justin T. Matulay, MD

Poster #24
SEQUENTIAL INTRAVESICAL GEMCITABINE AND DOCETAXEL IN THE TREATMENT OF BACILLUS CALMETTE-GUERIN NAÏVE PATIENTS WITH NON-MUSCLE INVASIVE BLADDER CANCER
*Lewis Thomas IV, MD1; Ryan Steinberg, MD2; Kenneth Nepple, MD3 and Michael O’Donnell, MD2
1Department of Urology, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland OH; 2Department of Urology, University of Texas Southwestern Medical Center, Dallas TX; 3Department of Urology, University of Iowa Hospitals and Clinics, Iowa City IA
Presented By: Lewis J. Thomas IV, MD

Poster #25
TLD-1433 PHOTODYNAMIC THERAPY FOR BCG-UNRESPONSIVE NMIBC - A PHASE IB CLINICAL STUDY
*Girish S. Kulkarni, MD, PhD, FRCSC1,2; Lothar Lilge1,2; Arkady Mandel2; Nathan Perelis1,2; Michael Nesbitt2; Roger Dumoulin-White4; Wayne Embree4, and Michael A. S. Jewett1,2
1University of Toronto, Department of Surgery and Surgical Oncology, Division of Urology; 2University Health Network, Toronto; 3University of Toronto, Department of Medical Biophysics; 4Theralase Technologies Inc., Toronto
Presented By: Girish S. Kulkarni, MD, PhD, FRCSC
Poster #26

URINARY CYTOKINE PROFILE TO PREDICT RESPONSE TO INTRAVESICAL BCG WITH OR WITHOUT HS-410 THERAPY IN PATIENTS WITH NON-MUSCLE INVASIVE BLADDER CANCER

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Presented By: Amirali Salmasi, MD, MS

Poster #27

EVALUATION OF CONTEMPORARY URINE CYTOLOGY PERFORMANCE AND THE EFFECT OF ADVANCED CYSTOSCOPIC TECHNIQUES

*Yuval Freifeld¹ and Yair Lotan¹

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Presented By: Yuval Freifeld

Poster #28

CONTEMPORARY OUTCOMES OF NON-MUSCLE INVASIVE BLADDER CANCER PATIENTS TREATED WITH BCG

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Presented By: Justin T. Matulay, MD

Poster #29

GEO-MAPPING AND SPATIAL ANALYSIS OF ENVIRONMENTAL EXPOSURES IN PATIENTS WITH BLADDER CANCER IN UPSTATE NEW YORK: AN EXPLORATORY STUDY

Hijab Khan¹; Zhu Jin¹; *Ahmed Hussein, MD¹; Youssef Ahmed¹; Samantha Bulkivish²; Shelby Hall¹; Renuka Kannappan¹; Omer Rana¹; Peter Rogerson¹; Samina Raja¹ and Khurshid Guru¹

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Presented By: Ahmed A. Hussein, MD

Poster #30

PLANNED SECONDARY ANALYSIS OF PURE-01: ROLE OF BLADDER MULTIPARAMETRIC MAGNETIC RESONANCE IMAGING (mpMRI) TO PREDICT PATHOLOGIC RESPONSE TO NEOADJUVANT PEMBROLIZUMAB AND UPDATED EFFICACY ANALYSES

*Andrea Necchi, MD¹; Antonella Messina¹; Alberto Briganti² Daniele Raggi¹; Elena Farè¹; Filippo Pederzoli²; Maurizio Colecchia¹; Marco Bianchi²; Renzo Colombo²; Andrea Gallina²; Andrea Salonia² and Francesco Montorsi²

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Presented By: Andrea Necchi, MD

Poster #31

SURGICALLY-INDUCED STRESS ALTERS TUMOR SURVIVAL AND RESPONSE TO ADJUVANT IMMUNOTHERAPY IN BLADDER CANCER

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Presented By: Karen Wheeler, MD, PhD
Poster #32
THE CONTINUING STAGE MIGRATION FOR RENAL CELL CANCER: UPDATED ANALYSIS OF NATIONAL CANCER DATABASE
*Syed Johar Raza, MD⁵; Sameer Siddiqui¹ and Zachary Hamilton¹
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Presented By: Syed Johar Raza, MD

Poster #33
SALVAGE AND PALLIATIVE RADIATION IN OLIGOMETASTATIC RENAL CELL CARCINOMA: A DESCRIPTIVE COHORT ANALYSIS
Ross Avant, MD⁴; *Mary E. Westerman, MD¹; Christine Lohse, MD²; R. Houston Thompson, MD¹ and Aaron M. Potretzke, MD¹
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Presented By: Mary E. Westerman, MD

Poster #34
FIRST-LINE SYSTEMIC THERAPY FOR METASTATIC RENAL CELL CARCINOMA: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS
*Zachary Klaassen, MD¹,²; Christopher J. D. Wallis³; Bimal Bhindi⁴; Xiang Y. Ye⁵; Thenappan Chandrasekar⁶; Ann M. Farrell⁷; Hanan Goldberg⁸; Stephen A. Boorjian⁹; Bradley Leibovich, MD, FAC⑦; Girish S. Kulkarni¹⁰; Prakesh S. Shah¹¹; Georg A. Bjarnason¹²; Daniel Heng¹³; Raj Satkunasivam¹⁴ and Antonio Finelli¹⁵
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Presented By: Zachary Klaassen, MD

Poster #35
THE PREDICTIVE ROLE OF PREOPERATIVE HEMATOLOGICAL PARAMETERS IN SARCOMATOID RENAL CELL CARCINOMA
*Roy Mano, MD¹; Kyle A. Blum, MD, MSc¹; Renzo G. DiNatale, MD¹; Andrew W. Silagy, MD¹; Julian Marcon, MD; Jonathan A. Coleman, MD¹; Paul Russo, MD¹ and A. Ari Hakimi, MD¹
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Presented By: Roy Mano, MD

Poster #36
CLINICAL PREDICTORS OF SARCOMATOID KIDNEY CANCER: THE RESULTS OF A UCLA AND FRENCH URO-CCR NETWORK COLLABORATION
Cédric Lebacle, MD¹,²; *Aydin Pooli, MD²; Izak Faiena, MD²; David C. Johnson, MD, MPH⁵; Jean-Christophe Bernhard, MD³; Philippe Paparel, MD⁴; Karim Bensalah, MD⁵; Jean-Baptiste Beauval, MD⁶; Arnaud Méjean, MD⁷; Charles Dariane, MD⁷; Pierre Bigot, MD⁸; Hervé Lang, MD⁹; Thomas Bessede, MD⁹; Alexandre De La Taille, MD¹⁰; Laurent Salomon, MD¹⁰; Morgan Rouprêt, MD¹¹; Stéphane Larré, MD¹²; Priscilla Leon, MD¹²; Olivier Cussenot, MD¹²; Franck Bruyère, MD¹³; Jean-Alexandre Long, MD¹⁴; Idir Ouzaid, MD¹⁶; Jacques Irani, MD¹⁶; Jean-Jacques Patard, MD¹¹; Arie S. Belldegrun, MD²; Karim Chamie, MD² Alexandra Drakaki, MD¹⁸ and Allan Pantuck, MD²
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Presented By: Aydin Pooli, MD
Poster #37
PRIMARY SMALL CELL CARCINOMA OF THE KIDNEY: DISEASE CHARACTERISTICS AND OUTCOMES
*Kyle P. Michelson, BA1; Nicholas Suss1; Dennis Robins, MD1; Viktor Flores, MD1; Thomas Monaghan1; Brian McNeil, MD1; Jeffrey Weiss, MD1,2 and Andrew Winer, MD1,3
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Presented By: Kyle Peter Michelson, BA

Poster #38
A MODIFIED MAYO CLINIC CLASSIFICATION FOR RENAL CELL CARCINOMA WITH INFERIOR VENA CAVA EXTENSION
Timothy D. Lyon1; Houston Thompson1; Christine Lohse1; Theodora Potretzke1; Paras Shah1; Stephen Boorjian1; John Cheville1 and Bradley Leibovich, MD, FACS1
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Presented By: Timothy D. Lyon

Poster #39
PREDICTORS OF RECEIVING A LYMPH NODE DISSECTION AT THE TIME OF SURGERY FOR NON-METASTATIC RENAL CELL CARCINOMA
Kushan Radadia1; Zorimar Rivera-Nunez2; Sinae Kim3; Nicholas Farber1; *Joshua Sterling, MD4; Parth Mod1; Sharad Goyal1; Rahul Parikh2; Robert Weiss1; Isaac Kim1; Sammy Elsamra1; Thomas Jang1 and Eric Singer1
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Presented By: Joshua Sterling, MD

Poster #40
PRELIMINARY INVESTIGATION OF RADIOGENOMICS IN SARCOMATOID DEDIFFERENTIATION OF RENAL CELL CARCINOMA
*Julian Marcon1; Renzo G. Di Natale1; Andrew W. Silagy1; Roy Mano1; Kyle A. Blum1, Eduard Reznik2; Jonathan A. Coleman1; Paul Russo1; Cihan Duzgol1; Oguz Akin2 and A. Ari Hakimi1
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Presented By: Julian Marcon

Poster #41
IMPROVING THE DEFINITION OF HIGH-RISK PATIENTS FOR TUMOR RECURRENCE IN CLEAR CELL CARCINOMA-THE U-CISS CLASSIFICATION
Cedric Lebacle, MD1,2; Nils Kroeger, MD2; *Aydin Pooli, MD1; Sandy T. Liu, MD2; Karim Chamie, MD1; Arie S. Belldegrun, MD1; Alexandra Drakaki, MD1,4 and Allan J. Pantuck, MD1
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Presented By: Aydin Pooli, MD
Poster Session I — Summary

Poster #42
IMMUNE RESPONSE IN PATIENTS WITH METASTATIC RENAL CELL CARCINOMA TREATED WITH ADGMCA9 (DC-ADGMCAIX) FROM THE PHASE I, OPEN LABEL, DOSE ESCALATION AND COHORT EXPANSION STUDY
*Izak Faiena, MD; Nazy Zomorodian; Beata Berent-Maoz; Ankush Sachdeva; Adrian Bot; Fairouz Kabinnovar; Jonathan Said; Gardenia Cheung-Lau; Jia Pang; Mignonette Macaballi; Thinle Chodon; Xiaoyan Wang; Paula Cabrera; Paula Kaplan-Lezco; Sandy Liu; Begonya Comin-Anduix; Allan Pantuck; Arie Beldegrun; Karim Charnie and Alexandra Drakaki
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Presented By: Izak Faiena, MD

Poster #43
MICRO RNA BASED SIGNATURE: A NOVEL SURVIVAL CORRELATION IN PATIENTS WITH CLEAR CELL RENAL CELL CARCINOMA
Jacob W. Greenberg; Stephen Proctor, M.D; Ibifiri Wilcox; Jonathan Silberstein, M.D and *L. Spencer Krane, MD
1Tulane University School of Medicine; 2Urology Department
Presented By: L. Spencer Krane, MD

Poster #44
IMPACT OF HISTOLOGIC SUBTYPE ON OVERALL SURVIVAL OF OBSERVED T1A KIDNEY CANCERS: IMPLICATIONS FOR BIOPSY AS A RISK STRATIFICATION TOOL
*Nermarie Velazquez, MD; Audrey Renson, MPH; Stella K. Kang, MD, MSc; William C. Huang, MD; and Marc A. Bjurlin, DO, MSc
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Presented By: Nermarie Velazquez, MD

Poster #45
IDENTIFICATION OF NOVEL EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) SPLICE VARIANTS IN CLEAR CELL RENAL CELL CARCINOMA
*Saif Zaman; Jamie Teer; Jingsong Zhang; Todd Knepper; Philippe Spiess; Wade Sexton; Matthew Smith; Mayer Fishman; Tony Magiocco; Julio Pow-Sang; Michael Poch; Scott Gilbert; Theresa Boyle and Brandon Manley
1Moffitt Cancer Center
Presented By: Saif Zaman

Poster #46
MICORRNA SIGNATURE PROVIDES A NOVEL BIOMARKER FOR OVERALL SURVIVAL IN PAPILLARY RENAL CELL CARCINOMA
*Jacob W. Greenberg; Stephen Proctor, MD; Ibifiri Wilcox; Jonathan Silberstein, MD, FACS, MBA and L. Spencer Krane, MD
1Tulane University School of Medicine
Presented By: Jacob W. Greenberg

Poster #47
THE UCLA HISTO-GENETIC RISK CLASSIFICATION (U-HGRC) TO PREDICT RECURRENCE OF LOCALIZED CLEAR-CELL RENAL CELL CARCINOMA
Cédric Lebacle, MD; *Aydin Pooli, MD; Sandy Liu, MD; Nils Kroeger, MD; Karim Chamie, MD; Izak Faiena, MD; Arie S. Beldegrun, MD; Alexandra Drakaki, MD and Allan J. Pantuck, MD
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Presented By: Aydin Pooli, MD
Poster Session I — Summary

Poster #48
THE GAIN OF CHROMOSOME 5Q PREDICTS A FAVORABLE PROGNOSIS IN LOCALIZED RENAL CELL CARCINOMA
Cedric Lebacle, MD1; Aydin Pooli, MD1; Nils Kroeger, MD2; Izak Faiena, MD3; Sandy T. Liu, MD4; Karim Chami, MD5; Arie Belldegrun, MD6; Alexander Drakaki, MD6,7 and Allan J. Pantuck, MD1
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Presented By: Aydin Pooli, MD

Poster #49
IMMUNOLOGIC IMPACT OF THE SURGICAL RESECTION OF RENAL TUMORS: IMPLICATIONS FOR CYTOREDUCTION IN THE IMMUNE CHECKPOINT INHIBITOR ERA
*Bimal Bhindi, MD, CM, MSc, FRCSC1,2,3; Paras Shah1; Christine Lohse1; Ross Mason1; Henan Zhang1; Lance Pagliaro1; Brian Costello1; R. Houston Thompson1; Stephen Boorjian1; John Cheville1; Haidong Dong1 and Bradley Leibovich, MD, FACS1
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Presented By: Bimal Bhindi, MD, CM, MSc, FRCSC

Poster #50
EARLY DIAGNOSIS OF CLEAR CELL KIDNEY CANCER VIA VHL/HIF PATHWAY-REGULATED CIRCULATING MICRORNA-210
*Izak Faiena, MD1; Maria Giraldez2; Amirali Salmasi1; Alexandra Drakaki1; Muneeesh Tewari2 and Allan Pantuck1
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Presented By: Izak Faiena, MD

Poster #51
THE ASSOCIATION OF ROBOTIC-ASSISTED VERSUS PURE LAPAROSCOPIC RADICAL NEPHRECTOMY WITH PERIOPERATIVE OUTCOMES AND HOSPITAL COSTS
Boris Gershman, MD1; Laura Bukavina, MD MPH2; Fredrick Schumacher, PhD1, MPH3,4; Badrinath Konety, MD, MBA5; Zhengyi Chen, PhD6; Li Li, MD, PhD7; Alexander Kutikov, MD8; Marc Smaldone, MD MS9; Robert Abouassaly, MD, MS9,10 and Simon Kim, MD, MPH11,12
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Presented By: Laura Bukavina, MD MPH

Poster #52
SUBTYPING OF CLEAR CELL RENAL CELL CARCINOMA PATIENTS TO DETERMINE FACTORS ASSOCIATED WITH OVERALL SURVIVAL
*Jacob W. Greenberg and L. Spencer Krane, MD
1Tulane School of Medicine
Presented By: Jacob W. Greenberg

Poster #53
SELF-REPORTED QUALITY OF LIFE AS A RISK PREDICTION TOOL IN RENAL CELL CARCINOMA
*Ridwan Alam, MD, MPH1; Hiten Patel, MD, MPH2; Michael Gorin, MD3; Michael Johnson, MD1; Mohamad Allaf, MD1 and Phillip Pierorazio, MD1
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Presented By: Ridwan Alam, MD, MPH
Poster #54
OVERALL SURVIVAL OF BIOPSY CONFIRMED T1B AND T2A KIDNEY CANCERS MANAGED WITH OBSERVATION: INFLUENCE OF TUMOR HISTOLOGY
*Nermarie Velazquez, MD; Audrey Renson, MPH; Stella K. Kang, MD, MSc; William C. Huang, MD; and Marc A. Bjurlin, DO, MSc
1NYU Langone Health, Department of Urology, New York, NY; 2NYU Langone Hospital - Brooklyn, Department of Clinical Research, Brooklyn, NY; 3NYU Langone Health, Department of Radiology, New York, NY; 4NYU Langone Hospital - Brooklyn, Department of Urology, Brooklyn, NY
Presented By: Nermarie Velazquez, MD

Poster #55
LIMITED UTILITY OF ULTRASOUND SURVEILLANCE AFTER RADICAL AND PARTIAL NEPHRECTOMY FOR RENAL CELL CARCINOMA
*Ahmad El-Arabi, MD; Garth Sherman, BS; Caleb Kennon, BS; Jill Jones, MD; Moben Mirza, MD; William Parker, MD; Jeffrey Holzbeierlein, MD; David Duchene, MD; and Eugene Lee, MD
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Presented By: Ahmad El-Arabi, MD

Poster #56
DISPARITIES IN SURVIVAL OUTCOMES IN AFRICAN AMERICANS IN RENAL CELL CARCINOMA: IMPACT OF ONCOLOGICAL VERSUS NON-ONCOLOGICAL FACTORS
*Margaret Meagher; Aaron Bradshaw; David Anyakora; Dattatraya Patil, MBBS, MPH; Kazutaka Saito, MD, PhD; Brittney Cotta, MD; Yusuke Yasuda, MD; Ahmed Eldefrawy, MD; Stephen Ryan, MD; Ryan Nasseri; Juliana Alksne; Fang Wan; Yasuhisa Fujii, MD, PhD; Viraj Master, MD, PhD; and Ithaar Derweesh, MD
1UC San Diego School of Medicine; 2Emory University School of Medicine; 3Tokyo Medical and Dental University
Presented By: Margaret Frances Meagher

Poster #57
CAN WE PREDICT FUNCTIONAL OUTCOMES AFTER PARTIAL NEPHRECTOMY?
*Hajime Tanaka, MD, PhD; Yanbo Wang, MD, PhD; Chalairat Suk-Ouchchai; Diego Aguilar Palacios, MD; Elvis R. Caraballo, MD; Yunlin Ye, MD, PhD; Erick M. Remer, MD; Jianbo Li, MD, PhD; Robert Abouassaly, MD and Steven C. Campbell, MD, PhD
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Presented By: Hajime Tanaka, MD, PhD

Poster #58
SURVEY OF RENAL MASS BIOPSY UTILIZATION AMONG UROLOGIC ONCOLOGISTS
*Tariq A. Khemes, MD; Anthony Bul; Daniel Shapiro; Sara L. Best; Shane Wells; Timothy Ziemlewicz; Meghan Lubner; J. Louis Hinshaw; Fred Lee Jr.; David F. Jarrard; Kyle A. Richards; Tracy M. Downs; Stephen Nakada and E. Jason Abel
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Presented By: Tariq A. Khemes, MD

Poster #59
STAGE-SPECIFIC CONDITIONAL SURVIVAL IN RENAL CELL CARCINOMA AFTER NEPHRECTOMY
*Joseph Cheaib, MD, MPH; Hiten Patel, MD, MPH; Michael Johnson, MD; Michael Gorin, MD; Elliott Haut, MD, PhD; Joseph Canner, MHS; Mohamed Alfa, MD; and Phillip Pierorazio, MD
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Presented By: Joseph Cheaib, MD, MPH
Poster #60
PROGNOSTIC VALUE OF HISTOLOGIC SUBTYPE AND TREATMENT MODALITY FOR T1a KIDNEY CANCERS
*Michael Siev, MD; Audrey Renson, MPH; Stella Kang, MD; William Huang, MD and Marc Bjurlin, DO
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Presented By: Michael Siev, MD

Poster #61
GENDER ASSOCIATED PSYCHOLOGICAL DISTRESS DIFFERENCES IN NON-METASTATIC RENAL CELL CARCINOMA PATIENTS
*Hanan Goldberg, MD; Jaime O. Herrera-Caceres; Anika Petrella; Zachary Klaassen; Thenappan Chandrasekar; Christopher Wallis; Dixon Woon; Neil Fleschner; Girish Kulkarni; Antonio Finelli; Michael Jewett1 and Robert Hamilton1
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Presented By: Hanan Goldberg, MD

Poster #62
IS PATIENT PSYCHOLOGICAL DISTRESS A DETERRING FACTOR FOR CHOOSING ACTIVE SURVEILLANCE FOR SMALL RENAL MASSES IN PATIENTS YOUNGER THAN 70?
*Hanan Goldberg, MD; Jaime Omar Herrera Cáceres; Anika Petrella; Thenappan Chandrasekar; Zachary Klaassen; Christopher Wallis; Dixon Woon; Neil Fleschner; Girish Kulkarni; Antonio Finelli; Michael Jewett1 and Robert Hamilton1
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Presented By: Hanan Goldberg, MD

Poster #63
DEVELOPMENT AND VALIDATION OF A NOVEL SCORING INDEX CART (C-REACTIVE PROTEIN, AGE, RACE, AND TUMOR SIZE) TO PREDICT RENAL FUNCTIONAL DECLINE POST PARTIAL NEPHRECTOMY
*Margaret F. Meagher; Dattatraya Patil, MBBS, MPH; Kazutaka Saito, MD, PhD; Brittney Cotta, MD; Yosuke Yasuda, MD; Aaron Bradshaw; Ahmed Eldefrawy, MD; Stephen Ryan, MD; Ryan Nasseri; David Anyakora; Juliana Alksne; Fang Wann; Yasuhisa Fujii, MD, PhD; Viraj Master, MD, PhD and Ithaar Derweesh, MD
1UC San Diego School of Medicine; 2Emory University School of Medicine; 3Tokyo Medical and Dental University
Presented By: Margaret F. Meagher

Poster #64
TREATMENT TRENDS AND DISPARITIES IN USE OF PARTIAL NEPHRECTOMY FOR T1A RENAL MASSES
*Allison May, MD; Johar Syed; Facundo Davaro; Sameer Siddiqui and Zachary Hamilton
1Saint Louis University
Presented By: Allison May, MD

Poster #65
IMPACT OF POSITIVE SURGICAL MARGINS ON SURVIVAL AFTER RADICAL NEPHRECTOMY IN LOCALIZED KIDNEY CANCER: ANALYSIS OF THE NATIONAL CANCER DATABASE
*Stephen T. Ryan; Reith Sarkar; Ahmet Bindayi; Zach Hamilton; James Murphy and Ithaar Derweesh
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Presented By: Stephen T. Ryan

Poster #66
USING COMPUTED TOMOGRAPHY (CT) SCAN FEATURES TO PREDICT AGGRESSIVE VERSUS INDOLENT RENAL TUMOR HISTOLOGY
*Bimal Bhindi, MD, CM, MSc, FRCS; Robert Hartman; Theodora Potretzke; R. Houston Thompson; Christine Lohse; Ross Mason; Brian Costello; Aaron Potretzke; Stephen Boorjian; John Cheville and Bradley Leibovich, MD, FACS
1Mayo Clinic, Rochester, MN, USA; 2University of Calgary, Calgary, AB, Canada; 3Southern Alberta Institute of Urology, Calgary, AB, Canada
Presented By: Bimal Bhindi, MD, CM, MSc, FRCS
Poster #67
PROPOSAL FOR TRIPARTITE RE-CLASSIFICATION OF T1 RENAL CELL CARCINOMA INTO cT1a (VERY LOW RISK), cT1b (LOW RISK) AND cT1c (INTERMEDIATE RISK) SUBSTAGES
*Aaron Bradshaw, BS; Robert Uzzo, MD; Alessandro Larcher, MD; Ahmed Eldefrawy, MD; Umberto Capitanio; MD; Shreyas Joshi, MD; Stephen Ryan, MD; Margaret Meagher, BS; Brittny Cotta, MD; Addison Yee; Fang Wan, MS; Francesco Montorsi, MD and Ithaar Derweesh, MD
1University of California, San Diego; 2Fox Chase Cancer Center; 3Ospedale San Raffaele, Milan, Italy
Presented By: Aaron Bradshaw, BS

Poster #68
LONG TERM OUTCOMES AFTER CT AND US-GUIDED PERCUTANEOUS RADIOFREQUENCY ABLATION OF 135 PATHOLOGICALLY PROVEN RENAL CELL CARCINOMAS
*Sepideh Shakeri, MD; Sohrab Afshari Mirak, MD; Amirhossein Mohammadian Bajgiran, MD; Danielle Ponzini; Preeti Ahuja, PhD; and Steven Raman, MD
1UCLA
Presented By: Sepideh Shakeri, MD

Poster #69
RE-THINKING “CASTRATION RESISTANCE”: NOVEL INSIGHTS USING AN INTEGRATED ADAPTATION-BASED MODEL TO QUANTIFY RESPONSE TO ANDROGEN TARGETED THERAPIES
*Andrew Chang, MD, PhD and Brant Inman
1Duke Urology
Presented By: Andrew Chang, MD, PhD

Poster #70
OBESITY AND METASTATIC CASTRATION RESISTANT PROSTATE CANCER: RESULTS FROM THE CONTROL ARMS OF ASCENT2, MAINSAIL AND VENICE TRIALS
*Alberto Martini, MD; Qainat N Shah, MPH; Nicholas M Brown, BS; Sujit S Nair, PhD and Ashutosh K Tewari, MD
1Department of Urology, Icahn School of Medicine at Mount Sinai
Presented By: Alberto Martini, MD

Poster #71
EXTENDED OVERALL SURVIVAL OBSERVED IN PATIENTS WITH CASTRATION-RESISTANT PROSTATE CANCER AND LYMPH NODE-ONLY METASTASES TREATED WITH SIPULEUCEL-T
David F Penson, MD, MPH; Andrew J Armstrong, MD; Shaker Dakhil, MD; *Raoul S. Concepcion, MD, FACS; Celestia S Higano, MD; Philip W Kantoff, MD; Luke T Nordquist, MD; Oliver Sartor, MD; James L Ballen, MD; Vahan Kassabian, MD; Ronald F Tutrone, MD; Nicholas J Vogelzang, MD; Matt Harmon; Hong Tang, MD; Bruce Brown, MD and Christopher M Pieczonka, MD
1Vanderbilt University Medical Center; 2Duke Cancer Institute; 3Cancer Center of Kansas; 4Urology Associates P.C; 5University of Washington and Fred Hutchinson Cancer Research Center; 6Memorial Sloan Kettering Cancer Center; 7GU Research Network; 8Tulane Medical School; 9First Urology; 10Georgia Urology; 11Chesapeake Urology Research Associates; 12Comprehensive Cancer Centers of Nevada; 13Dendreon Pharmaceuticals LLC; 14Associated Medical Professionals
Presented By: Raoul S. Concepcion, MD, FACS

Poster #72
INCORPORATING MPMRI BIOPSY DATA INTO ESTABLISHED PRE-RP NOMOGRAMS: POTENTIAL IMPACT OF AN INCREASINGLY COMMON CLINICAL SCENARIO
Thenappan Chandrasekhar, MD; *Joon Yau Leong; Elwin Tham; Seth Teplitsky; Leonard Gomella, MD; Costas Lallas, MD and Edouard Trabulsi, MD
1Department of Urology, Thomas Jefferson University, Philadelphia PA, USA
Presented By: Joon Yau Leong
Poster #73
QUESTIONING THE STATUS QUO: SHOULD GLEASON 3+3=6 PCA BE CONSIDERED A “NEGATIVE CORE” FOR PRE-RP RISK NOMOGRAMS?
Thenappan Chandrasekar, MD1; *Joon Yau Leong1; Elwin Tham1; Seth Teplitsky1; Leonard Gomella, MD1; Edouard Trabulsi, MD1 and Costas Lallas, MD1
1Department of Urology, Thomas Jefferson University, Philadelphia PA, USA
Presented By: Joon Yau Leong

Poster #74
TARGETED ABLATION USING ULTRASOUND-GUIDED IRREVERSIBLE ELECTROPORATION OF INDEX TUMORS (TARGET STUDY): PROSPECTIVE DEVELOPMENT STUDY EVALUATING SAFETY AND PATIENT-REPORTED FUNCTIONAL AND SEXUAL OUTCOMES
*Taehyoung Lee, MD1; Sivaraman Arjun, MD1; Vertosick Emily, MPH1; Govindarajan Srimathveeravalli, PhD1; Stephen Solomon, MD1; James Eastham, MD1; Jonathan Coleman, MD1 and Behfar Ehdaei, MD, MPH1
1Memorial Sloan Kettering Cancer Center, New York, NY
Presented By: Taehyoung Lee, MD

Poster #75
ROLE OF WNT10B IN NORMAL PROSTATE GLAND DEVELOPMENT AND OPPOSING DUAL ROLES IN PROSTATE CANCER
*Ikenna Madueke, MD, PhD1; Wen-Yang Hu; Danping Hu1; Michael Abern1 and Gail Prins1
1University of Illinois at Chicago
Presented By: Ikenna Madueke, MD, PhD

Poster #76
PROSPECTIVE EVALUATION OF A NEW PATIENT DECISION AID TO ENHANCE PROSTATE CANCER SCREENING DECISION-MAKING
*Michael A. Brooks, MD1; Anita Misra-Hebert2; Alexander Zajichek3; Sigrid Carlsson4; Jonas Hugosson4; Michael Kattan2 and Andrew Stephenson1
1Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH; 2Department of Quantitative Health Sciences, Cleveland Clinic, Cleveland, OH; 3Departments of Surgery and Epidemiology and Biostatistics, Memorial Sloan Kettering Cancer Center, New York, N; 4Institute of Clinical Sciences, Sahlgrenska Academy at Gothenburg University, Sweden
Presented By: Michael A. Brooks, MD

Poster #77
PROSPECTIVE EVALUATION OF HIGH INTENSITY FOCUSED ULTRASOUND (HIFU) FOR PATIENTS FOR FOCAL PROSTATE CANCER IN ALL GRADE GROUPS
Bruno Nahar1; *Abhishek Bhat, MD, M1; Maria Becerra1; Diana Lopategui1; Nachiketh Soodana1; Mark Gonzalgo1; Chad Ritch1; Sanoj Punnen and Dipen Parekh1
1University of Miami Hospital; 2Mount Sinai Medical Center
Presented By: Abhishek Bhat, MD U

Poster #78
SCREENING AND DETECTION OF PROSTATE CANCER IN MEXICO
*Jaime Arturo Aviña Magaña, MD1; Adrian Garza, Eduardo Gonzalez1; Jaime Herrerra1; Ricardo Castillejos1 and Guillermo Feria1
National Institute of Medical Sciences and Nutrition Salvador Zubirán, Urology Department, Mexico City
Presented By: Jaime Arturo Aviña Magaña, MD

Poster #79
TOWARDS A RAPID DIAGNOSIS OF PROSTATE CANCER WITH OPEN-TOP LIGHT-SHEET MICROSCOPY
Weisi Xie1; Adam Glaser1; Nicholas Reder2; Jonathan Liu1 and *Lawrence True2
1University of Washington, Dept Mechanical Engineering; 2University of Washington, Dept Pathology
Presented By: Lawrence True
Poster #80
NATIONAL TRENDS AND PERIOPERATIVE OUTCOMES OF PELVIC LYPHADENECTOMY DURING RADICAL PROSTATECTOMY
Alejandro Abello, MD; Kamyar Ghabili; Patrick Kenney; Preston Sprenkle and Michael Leapman
Yale School of Medicine
Presented By: Alejandro Abello, MD

Poster #81
OUR INITIAL EXPERIENCE WITH THE 4Kscore® AND HOW IT CHANGES PRACTICE IN AN ACADEMIC UROLOGY PRACTICE
Hailiu Yang, MD; Colin Sperling, BA; Jeffrey Tomaszewski, MD and Allen Seftel, MD
Cooper University Hospital Department of Surgery, Division of Urology; Cooper Medical School of Rowan University
Presented By: Hailiu Yang, MD

Poster #82
LIFE TABLES TO OPTIMIZE PROSTATE CANCER TREATMENT IN THE VHA
Ericka Sohlberg, MD; i-Chun Thomas, MS; Timothy Daskivich, MD MSHPM; Ted Skolarus, MD MPH; Jeremy Shelton, MD MSHPM; Dani Makarov, MD MS; Jonathan Bergman, MD MPH; Kristopher Kapphahn, MS; Jaden Yang, MS; James Brooks, MD; Manisha Desai, PhD and John T Leppert, MD MS
Department of Urology, Stanford University, Stanford, CA; Division of Urology, VA Palo Alto Healthcare System, Palo Alto, CA; Division of Urology, Cedars-Sinai Medical Center, Los Angeles, CA; Department of Urology, University of Michigan, Ann Arbor, MI; VA Ann Arbor Healthcare System, Ann Arbor, MI; Department of Urology, University of California-Los Angeles, Los Angeles, CA; Veterans Administration Greater Los Angeles Healthcare System, Los Angeles, CA; Department of Urology, NYU Langone Hospital-Brooklyn, Brooklyn, NY; Quantitative Sciences Unit, Department of Medicine, Stanford University, Stanford, CA; Departments of Urology and Medicine, Stanford University, Stanford, CA
Presented By: Ericka Sohlberg, MD

Poster #83
PROSTATE BIOSPY TRENDS AND RESULTS OVER A 20-YEAR PERIOD IN A HIGH-VOLUME TERTIARY CENTER
Jaime O. Herrera-Caceres, MD; Hanan Goldberg; Dixon T.S. Woon; Thenappan Chandrasekar; Omar Alhunaidi; Zachary Klaassen; Alexandra Gleave; Ants Toi and Neil Fleshner
Princess Margaret Cancer Centre, University of Toronto, University Health Network
Presented By: Jaime O. Herrera-Caceres, MD

Poster #84
15 YEAR MORTALITY AFTER RADICAL PROSTATECTOMY FOR LOCALIZED PROSTATE CANCER IN THE PROSTATE SPECIFIC ANTIGEN SCREENING ERA
Alex Jan Xu, BA; Elton Llukani, MD; Herbert Lepor, MD
New York University School of Medicine; NYU Langone Health, Department of Urology
Presented By: Alex Jan Xu, BA

Poster #85
AFRICAN-AMERICAN PATIENTS ON ACTIVE SURVEILLANCE FOR PROSTATE CANCER DO AS WELL AS NON-AFRICAN-AMERICAN PATIENTS: A MATCHED COHORT ANALYSIS
Lewis J. Thomas IV, MD; Yaw Nyame; Ahmed El-Shafie; Charles Dai; Vishnuvardhan Ganesan; Anna Zampini; Hans Arora; Alice Crane; Daniel Hettle; Khaled Fareed; Robert Stein; Ryan Berglund; Michael Gong; Eric Klein and Andrew Stephenson
Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH; Department of Urology, University of Washington, Seattle, WA; Lerner College of Medicine, Cleveland Clinic, Cleveland, OH
Presented By: Lewis J. Thomas IV, MD

Poster #86
UPGRADING RATES OF A RACIALLY DIVERSE GROUP OF VETERANS ON ACTIVE SURVEILLANCE
Jacob W. Greenberg; Allison H. Feibus, MS; Gabriel Z. Leinwand, MD; L. Spencer Krane, MD and Jonathan L. Silberstein, MD, MBA, FACS
Tulane University School of Medicine
Presented By: Jonathan L. Silberstein, MD, MBA, FACS
Poster #87
EVALUATING PERCEIVED SUGGESTION OF TREATMENT RECOMMENDATION FOR MEN WITH LOW RISK PROSTATE CANCER
*Behfar Ehdaie, MD, MPH; Elizabeth Schofield; Lauren Gelfarb; Michael Diefenbach and Christian Nelson
1Division of Urology, Memorial Sloan Kettering Cancer Center, NY NY; 2Psychiatry Service, Department of Psychiatry and Behavioral Sciences, Memorial Sloan Kettering Cancer Center, NY, NY; 3Department of Medicine and Urology, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell
Presented By: Behfar Ehdaie, MD, MPH

Poster #88
THREE-DIMENSIONAL PROSTATE MODELING AND PROCEDURE PLANNING FOR PROSTATE PARTIAL GLAND CRYOABLATION
Nicole Wake, PhD; Andrew Rosenkrantz, MD; Daniel Sodickson, MD, PhD; Hersh Chandarana, MD and *James Wysock, MD, MS
1Center for Advanced Imaging Innovation and Research and Bernard and Irene Schwartz Center for Biomedical Imaging, Department of Radiology, NYU School of Medicine, NYU Langone Health, New York, NY; 2Division of Urologic Oncology, Department of Urology, NYU School of Medicine, NYU Langone Health, New York, NY
Presented By: James S. Wysock, MD, MS

Poster #89
RACIAL DIFFERENCES IN PATIENT-REPORTED OUTCOMES OF MEN TREATED FOR LOCALIZED PROSTATE CANCER
*Pauline L. Filippou, MD; Cleo Samuel, PhD; Antonia Bennett, PhD; Mian Wang, PhD; Arlene Chung, MD; Ethan Basch, MD, MSc; Ronald Chen, MD, MPH; Bryce Reeve, PhD and Angela Smith, MD, MS
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Presented By: Pauline L. Filippou, MD

Poster #91
POOLED RESULTS FROM TWO PROSPECTIVE VALIDATION STUDIES OF THE EPI TEST DEMONSTRATES CONSISTENT PERFORMANCE TO PREDICT HIGH-GRADE PROSTATE CANCER AT INITIAL BIOPSY
J McKiernan; *Michael Donovan, MD, PhD; A Margolis; A Partin; B Carter; G Brown; P Torkler; M Noerholm; J Skog; N Shore; G Andriole; I Thompson and P Carroll
1Columbia University Medical Center, NYC, NY, 2Icahn School of Medicine at Mt. Sinai, 3Urology Center of Englewood, Englewood, NJ, 4Johns Hopkins Hospital, Baltimore, MD, 5Delaware Valley Urology, Voorhees, NJ, 6Exosome Diagnostics GmbH, Martinsried, Germany, 7Exosome Diagnostics, Inc., Waltham, MA, 8Atlantic Urology Clinics, Myrtle Beach, SC, 9Washington University, St. Louis, MO, 10UT Health Science Center, San Antonio, TX, 11University of California at San Francisco, CA
Presented By: Michael Donovan, MD, PhD

Poster #92
MOLECULAR DISSECTION OF MAGNETIC RESONANCE IMAGING VISIBLE AND INVISIBLE PROSTATE CANCER
*Simpa Salami, MD, MPH; Jeremy Kaplan; Srinivas Nallandhighal, MS; Matthew Lee, MD; Junhee Yoon, MSc; Daniel Hovelson, PhD; Komal Plouffe, MS; Arvin George, MD; Matthew Davenport, MD; Sungyong You, PhD; Scott Tomlins, MD, PhD; Nicole Curci, MD; Hyung Kim, MD; Daniel Spratt, MD; Aaron Udager, MD, PhD and Ganesh Palapattu
1University of Michigan, Ann Arbor, MI; 2Cedars-Sinai Medical Center, Los Angeles, CA; 3Strata Oncology, Ann Arbor, MI
Presented By: Simpa Samuel Salami, MD, MPH
Poster #93
THE PROGNOSTIC IMPORTANCE OF SPOP MUTATION IN PROSTATE CANCER
Jonathan E. Shoag, MD; Deli Liu; Elai Davicioni; Seagle Liu; Yang Liu; Xiayoue Ma; Clara Oromendia and Christopher Barbieri
Weill Cornell Medicine; GenomeDx
Presented By: Jonathan E. Shoag, MD

Poster #94
BENIGN OR CLINICALLY-INSIGNIFICANT PROSTATE CANCER (GLEASON SCORE 3+3) IN PI-RADS CATEGORY 5 LESIONS WITH EXTRAPROSTATIC EXTENSION ON MULTI-PARAMETRIC MRI
Kamyar Ghabili Amirkhiz, MD; Jason Hao; Sarah Amalraj; Michael Leapman; Jeffrey Weinreb and Preston Sprenkle
Department of Urology, Yale School of Medicine, New Haven, CT, USA; Department of Radiology and Biomedical Imaging, Yale School of Medicine, New Haven, CT, USA
Presented By: Kamyar Ghabili Amirkhiz, MD

Poster #95
ASSOCIATIONS BETWEEN HOSPITAL VOLUME AND OUTCOMES OF ROBOT-ASSISTED RADICAL PROSTATECTOMY
Leilei Xia, MD; Benjamin Taylor; Ruchika Talwar; Raju Chelluri; Jay Raman and Thomas Guzzo
University of Pennsylvania; Weill Cornell Medicine; Penn State Health - Milton S. Hershey Medical Center
Presented By: Leilei Xia, MD

Poster #96
DO THE NUMBER OF TARGETED CORES AND PROSTATE VOLUME AFFECT THE PROSTATE CANCER YIELD OF MRI-US FUSION BIOPSIES?
Vidit Sharma, MD; Matteo Soligo, MD; Michele Colicchia, MD; Adam T Froemming, MD; Robert H McLaren, MD; Lance A Mynderse, MD and R. Jeffrey Karnes, MD
Mayo Clinic Urology; Mayo Clinic Radiology
Presented By: Vidit Sharma, MD

Poster #97
EVALUATION OF ESCHERICHIA COLI RESISTANCE TO FLUOROQUINOLONES IN MEN UNDERGOING PROSTATE PROCEDURES: IT’S TIME TO CHANGE PREOPERATIVE PROPHYLAXIS
Colin Sperling, BA; Lucia Rose, PharmD; Hailiu Yang, MD; Dana Byrne, MD; Henry Fraimow, MD; Jeffrey Tomaszewski, MD and Allen Settel, MD
Cooper Medical School of Rowan University; Cooper University Hospital, Department of Pharmacy; Cooper University Hospital Department of Surgery, Division of Urology; Cooper University Hospital Department of Medicine, Division of Infectious Diseases
Presented By: Colin Sperling, BA

Poster #98
SIMULATED RESULTS OF THE PRECISION ALGORITHM FOR PROSTATE CANCER DIAGNOSIS AT A SINGLE ACADEMIC CENTER: SAFETY AND RISK FACTORS FOR FAILURE
Marshall C. Strother, MD; Lauren Schwartz, MD; Lisa Jones, MD, PhD; Colin Sperling, BA; Mark Rosen, MD, PhD; Ibardo Zambrano, MD; Alan Wein, MD and Thomas Guzzo, MD
University of Pennsylvania, Div Urology; University of Pennsylvania, Dpt Pathology; University of Pennsylvania, Dpt Radiology; Cooper Medical School
Presented By: Marshall C. Strother, MD

Poster #99
SETTING THE BAR: A 4KSCORE OF 7.5% PROVIDES HIGH SENSITIVITY AND NEGATIVE PREDICTIVE VALUE FOR DETECTING AND RULING OUT SIGNIFICANT PROSTATE CANCER
Amit S. Bhattu, MD; Yan Dong, PhD; Alexander Kong, MD; Stephen Zappala, MD; Dipen Parekh, MD and Sanoj Punnen, MD
Fellow in urological oncology and robotic surgery, University of Miami and Miller school of medicine; OPKO diagnostics, Woburn; Andover Urology; Chairman, Professor, Department of Urology, University of Miami, Miller school of medicine; Assistant Professor, Department of Urology, University of Miami, Miller school of medicine
Presented By: Amit S. Bhattu
Poster #100
RADICAL PROSTATECTOMY FOLLOWING A PERIOD OF ACTIVE SURVEILLANCE
Ashwin S. Balakrishnan1,2; Janet Cowan1,2 and Peter Carroll1,2
1University of California San Francisco, Dept. of Urology; 2UCSF Helen Diller Family Comprehensive Cancer Center, San Francisco, CA
Presented By: Ashwin S. Balakrishnan

Poster #101
SPINK1 EXPRESSION IS NOT ASSOCIATED WITH PATHOLOGIC OR ONCOLOGIC OUTCOMES POST-PROSTATECTOMY IN RACE-SPECIFIC COHORTS
*Farzana Faisal, MD1; Harsimar Kaur2; Jeffrey Tosoian3; Edward Schaeffer4 and Tamara Lotan2
1Department of Urology, Johns Hopkins School of Medicine, Baltimore, MD; 2Department of Pathology, Johns Hopkins School of Medicine, Baltimore, MD; 3Department of Urology, University of Michigan, Ann Arbor, MI; 4Department of Urology, Northwestern University, Chicago, IL
Presented By: Farzana Faisal, MD

Poster #102
EARLY ONCOLOGIC AND FUNCTIONAL OUTCOMES OF MR-GUIDED FOCAL HIFU FOR INTERMEDIATE-RISK PROSTATE CANCER
Nathan Perlis1; *Guan H. Tan, MBBS, MS, FRCS (Urol)1; Antonio Finelli1; Eugen Hlasney1; Robert Hamilton1; Alexandre Zlotta1-2; Girish Kulkarni1; Kateri Corr1; Rosanna Chan1; Stuart McCluskey1; Walter Kucharczyk1 and Sangeet Ghai1
1University Health Network; 2Mount Sinai Hospital
Presented By: Guan H. Tan, MBBS, MS, FRCS (Urol)

Poster #103
ONCOLOGICAL OUTCOMES OF MEN WITH DUCTAL AND INTRADUCTAL PROSTATE CANCER TREATED WITH PROSTATECTOMY
*Andrew W, Silagy1; Ken Chow1; Anthony Costello1; Niall Corcoran1 and Homayoun Zargar1
1Department of Urology, Royal Melbourne Hospital, Melbourne, Victoria, Australia
Presented By: Andrew W. Silagy

Poster #104
CLINICAL, PATHOLOGIC, AND ONCOLOGIC FINDINGS OF RADICAL PROSTATECTOMY PATIENTS WITH EXTRAPROSTATIC EXTENSION DIAGNOSED ON PRE-OPERATIVE PROSTATE BIOPSY
Farzana Faisal, MD1; Jeffrey Tosoian2; Christian Pavlovich1 and Tamara Lotan1
1Department of Urology, Johns Hopkins School of Medicine, Baltimore, MD; 2Department of Urology, University of Michigan, Ann Arbor, MI; 3Department of Pathology, Johns Hopkins School of Medicine, Baltimore, MD
Presented By: Farzana Faisal, MD

Poster #105
CLINICALLY SIGNIFICANT GLEASON 8 DOWNGRADING IN SUB-STRATIFIED HIGH RISK PROSTATE CANCER OCCURS INFREQUENTLY
*Chad Reichard, MD1; Jonathan Duplisea1; Yaw Nyame2; Debasish Sundi3; Jeffrey Tosoian4; Mary Achim1; Lamont Wilkins5; Ridwan Alam6; Andrew Stephenson1; Eric Klein7; Ashley Ross4; Mohamad Allaf6; John Davis1 and Brian Chapin1
1UT MD Anderson Cancer Center, Houston, TX; 2UW Medicine, Seattle, WA; 3The Ohio State University Wexner Medical Center, Columbus, OH; 4University of Michigan Medical Center, Ann Arbor, MI; 5Cleveland Clinic Lerner College of Medicine, Cleveland, OH; 6Johns Hopkins Medicine, Baltimore, MD; 7Cleveland Clinic, Cleveland, OH; 8Texas Oncology, Dallas, TX
Presented By: Chad Reichard, MD

Poster #106
ADT-FREE SURVIVAL AFTER INDUCTION ADT FOR RADICAL PROSTATECTOMY RECURRENT PROSTATE CANCER
*Daniel C. Edwards, DO1; Gaybrielle James2; Khurshid Guru2; Eric Kauffman2 and James Mohler2
1Hahnemann University Hospital/Drexel University College of Medicine; 2Roswell Park Cancer Institute
Presented By: Daniel C. Edwards, DO
Poster #107
INSIGHT INTO THE GENOMIC BASIS FOR TERTIARY GLEASON 5 COMPONENT AND WORSE CLINICOPATHOLOGICAL OUTCOME
*Alberto Martini, MD1; Joanna Wang, MD1; Nicholas M. Brown, BSv; Zeynep Gul, MD11; John P Sfakianos, MD1; Sujit S. Nair, PhD1 and Ashutosh K. Tewari, MD1
1Department of Urology, Icahn School of Medicine at Mount Sinai
Presented By: Alberto Martini, MD

Poster #108
INHERITED GERMLINE MUTATIONS IN MEN WITH PRIMARY AND SECONDARY PROSTATE CANCER
Edward M. Uchio, MD1; Greg Gin, MD1; Cory Hugen, MD1; Karen Copeland, MS, MBA2; Ryan Bernhisel; MStat2; Kaylee Henson, MS, CGC2; Johnathan Lancaster, MD, PhD2 and Todd Cohen, MD2
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Presented By: Edward M. Uchio, MD

Poster #109
PROVENT: A PHASE 3 STUDY OF SIPULEUCELT-T THERAPY IN SUBJECTS WITH LOCALIZED PROSTATE CANCER FOLLOWED BY ACTIVE SURVEILLANCE
*Neal D. Shore, MD, FACS1; Andrew J. Armstrong, MD2; Matthew R. Cooperberg, MD, MPH3; Joseph F. Renzulli, MD4; Nadeem Sheikh, PhD5; Robert Tyler, PhD5; Matthew Harmon6; Bruce Brown, MD6 and David F. Penson, MD, MPH6
1Carolina Urologic Research Center; 2Duke Cancer Institute; 3University of California, San Francisco; 4Yale School of Medicine; 5Dendreon Pharmaceuticals LLC; 6Vanderbilt University Medical Center
Presented By: Neal D. Shore, MD, FACS

Poster #110
PREDICTORS OF CLINICALLY SIGNIFICANT PROSTATE CANCER IN ANTERIOR FIBROMUSCULAR STROMA LESIONS ON MULTI-PARAMETRIC MAGNETIC RESONANCE IMAGING
*Kamyar Ghabili Amirkhiz, MD1; Richard Ho1; Michael Leapman1; Jeffrey Weinreb2; Peter Schualam1 and Preston Sprenkle1
1Department of Urology, Yale School of Medicine, New Haven, CT, USA; 2Department of Radiology and Biomedical Imaging, Yale School of Medicine, New Haven, CT, USA
Presented By: Kamyar Ghabili Amirkhiz, MD

Poster #111
USE OF STATINS IN COMBINATION WITH ANDROGEN DEPRIVATION THERAPY IN PATIENTS WITH ADVANCED PROSTATE CANCER: IMPACT ON ONCOLOGICAL OUTCOMES
*Tariq A. Khemees, MD1; Anderson-Carte Anderson-Carter1; Jinn-ing Liou2; E. Jason Abel1; Tracy M. Downs1; David F. Jarrard1 and Kyle A. Richards1
1Department of Urology, University of Wisconsin; 2Department of Medicine, University of Wisconsin
Presented By: Tariq A. Khemees, MD

Poster #112
VALUE BASED MEDICINE IN UROLOGY: IMPACT OF THE NYU ROBOTIC PARTIAL NEPHRECTOMY PATHWAY ON OUTCOMES
*Dora K. Jericevic1; Benoit Peyronnet1; Xiaosong Meng1; Marc Bjurlin1; James Wysock1; Michael Stifelman2 and William Huang1
1New York University; 2Hackensack University
Presented By: Dora K. Jericevic

Poster #113
REGIONAL VARIATION IN THE “DIFFUSION” OF RADICAL PROSTATECTOMY
*Kevin J. Chua, BS1; Elisabeth Sebesta, MD2; Gen Li, PhD3 and Elias Hyams, MD2
1SUNY Downstate College of Medicine; 2Columbia University Medical Center Department of Urology; 3Columbia University Department of Biostatistics
Presented By: Kevin J. Chua, BS
Poster #114
PRIMARY CARE PERSPECTIVE AND IMPLEMENTATION OF A MULTI-DISCIPLINARY, INSTITUTIONAL PROSTATE CANCER SCREENING ALGORITHM EMBEDDED IN THE ELECTRONIC HEALTH RECORD (EHR)
*Alireza Aminsharifi, MD, PhD; Ariel Schulman; John Anderson; Laura Fish; Kevin Oeffinger; Kevin Shah and Thomas J. Polascik
1Duke Cancer Institute; 2Duke Primary Care, Department of Medicine
Presented By: Alireza Aminsharifi, MD, PhD

Poster #115
THE ASSOCIATION OF BROADBAND INTERNET ACCESS WITH UROLOGIC CANCER MORTALITY IN THE UNITED STATES
Paige E. Nichols, MD; Taylor Kohn; Nora Haney; CJ Stimson; Phillip Pierorazio and Michael Johnson
1Department of Urology, Mayo Clinic, Rochester, MN; 2James Buchanan Brady Urological Institute, Johns Hopkins Hospital, Baltimore, MD; 3Department of Urologic Surgery, Vanderbilt University Medical Center
Presented By: Paige E. Nichols, MD

Poster #116
UTILIZATION OF PSYCHIATRIC RESOURCES PRIOR TO GENITOURINARY (GU) CANCER DIAGNOSIS: IMPLICATIONS FOR SURVIVAL OUTCOMES
*Zachary Klaassen, MD; Christopher J. D. Wallis; Hanan Goldberg; Thenappan Chandrasekar; Rashid K. Sayyid; Stephen B. Williams; Kelvin A. Moses; Martha K. Terris; Robert K. Nam; Paul Kurdyak and Girish S. Kulkarni
1Medical College of Georgia at Augusta University, Augusta, GA; 2Georgia Cancer Center, Augusta, GA; 3University of Toronto, Division of Urology, Toronto, ON, Canada; 4Thomas Jefferson University, Philadelphia, PA; 5The University of Texas Medical Branch, Galveston, TX; 6Vanderbilt University, Department of Urology, Nashville, TN; 7Sunnybrook Health Science Centre, Toronto, ON, Canada; 8Centre for Additional and Mental Health, Toronto, ON, Canada
Presented By: Zachary Klaassen, MD

Poster #117
QUALITY OF CANCER SURVEILLANCE CARE AFTER PROSTATE CANCER SURGERY
Christina H. Chapman, MD, MS; Megan Caram, MD, MS; Alexander Tsodikov, PhD; Jennifer Burns, MHSA; Alexander Zaslavsky, PhD and Ted Skolarus, MD, MPH
1Center for Clinical Management Research, Veterans Affairs Ann Arbor Healthcare System; 2University of Michigan
Presented By: Christina H. Chapman, MD, MS

Poster #118
ASSESSING THE QUALITY OF SURGICAL CARE FOR CLINICALLY LOCALIZED PROSTATE CANCER: RESULTS FROM THE CEASAR STUDY
*Peter A. Reisz, MD; Zhiguo Zhao, PhD; Li-Ching Huang, PhD; Tatsuki Koyama, PhD; David Penson, MD, MPH; and Daniel Barocas, MD, MPH
1Vanderbilt University Medical Center, Dept. of Urology, Nashville, TN; 2Vanderbilt University School of Medicine, Dept. of Biostatistics, Nashville, TN
Presented By: Peter A. Reisz, MD

Poster #119
URETHRAL MELANOMA – CLINICAL, PATHOLOGICAL AND MOLECULAR CHARACTERISTICS
Roy Mano, MD; Benedikt Höh, MD; Alejandro Sanchez, MD; Alvin Goh, MD; S. Machele Donat, MD; Harry W. Herr, MD; Bernard H. Bochner, MD; Guido Dalbagni, MD and Timothy F. Donahue, MD
Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, New York
Presented By: Roy Mano, MD

Poster #120
OPTIMIZING THE SEQUENCE OF CHEMOTHERAPY IN UPPER TRACT UROTHELIAL CARCINOMA WITH CLINICALLY POSITIVE REGIONAL LYMPH NODES
*Nicholas Chakiryan, MD; Ann Martinez Acevedo; Jen Jane Liu; Christopher Amling; Mark Garzotto and Ryan Kopp
1Oregon Health and Science University, Portland, OR; 2Portland VA Medical Center, Portland, OR
Presented By: Nicholas Chakiryan, MD
Poster #121
TIME FROM DIAGNOSIS TO CHEMOTHERAPY AS A PREDICTOR OF OVERALL SURVIVAL IN UPPER TRACT UROTHELIAL CARCINOMA PATIENTS WITH CLINICALLY POSITIVE LYMPH NODES
*Nicholas Chakiryan, MD; Ann Martinez Acevedo; Jen Jane Liu; Christopher Amling and Ryan Kopp
1Oregon Health and Science University, Portland, OR; 2Portland VA Medical Center, Portland, OR
Presented By: Nicholas Chakiryan, MD

Poster #122
PREOPERATIVE PREDICTIVE MODEL FOR SYSTEMIC DISEASE RECURRENCE FOLLOWING RADICAL NEPHROURETERECTOMY FOR HIGH GRADE UPPER TRACT UROTHELIAL CARCINOMA
*Yuval Freifeld; Solomon Woldu; Nirmish Singla; Rashed Ghandour; Timothy Clinton; Rohan Kulangara; Aditya Bagrodia; Jay D. Raman; Surena F. Matin; Firas G. Petros; Hong Zhu; Jingsheng Yan; Yair Lotan and Vitaly Margulis
1Department of Urology, UT Southwestern Medical Center; 2UT Southwestern Faculty of Medicine; 3Penn State Health Milton S. Hershey Medical Center, Hershey, PA; 4MD Anderson Cancer Center, Houston, TX; 5Department of Clinical Science, UT Southwestern Medical Center
Presented By: Yuval Freifeld

Poster #123
OUTCOMES OF MICROPAPILLARY VARIANT UPPER TRACT UROTHELIAL CARCINOMA
*Jonathan Duplisea, MD; Firas Petros, MD; Roger Li, MD; Bryan Fellman, PhD; Charles Guo, MD; Bogdan Czerniak, MD PhD; Arlene Sieffker-Radteke, MD; John Araujo, MD; Colin Dinney, MD and Surena Matin, MD
1Department of Urology, The University of Texas MD Anderson Cancer Center; 2Department of Biostatistics, The University of Texas MD Anderson Cancer Center; 3Department of Pathology, The University of Texas MD Anderson Cancer Center; 4Department of Genitourinary Medical Oncology, The University of Texas MD Anderson Cancer Center
Presented By: Jonathan Duplisea, MD

Poster #124
PREDICTING OVERALL SURVIVAL (OS) IN PATIENTS (PTS) WITH PENILE SQUAMOUS CELL CARCINOMA (PSCC) UNDERGOING REGIONAL LYMPH NODE DISSECTION (LND) ± MULTIMODAL THERAPY
*Andrea Necchi, MD; Luigi Mariani; Yao Zhu; Ding-Wei Ye; Antonio Ornellas; Nick Watkin; Michael Ager; Salvatore Lo Vullo; Oliver Hakenberg; Axel Heidenreich; Daniele Raggi; Mario Catanzeraro; Paulo Ornellas; Mounsif Azizi and Philippe Spiess
1Fondazione IRCCS Istituto Nazionale dei Tumori, Milano, Italy; 2Fudan University Shanghai Cancer Center; 3Hospital Mário Kröeff and Brazilian Cancer Institute, Rio de Janeiro, Brazil; 4St. George’s University Hospitals, NHS Foundation Trust, London, United Kingdom; 5University Hospital Rostock, Rostock, Germany; 6Universitätsklinikum Köln, Köln, Germany; 7Moffitt Cancer Center and Research Institute, Tampa, FL, USA
Presented By: Andrea Necchi, MD

Poster #125
DEMOGRAPHIC DISPARITIES IN THE INCIDENCE AND OUTCOMES OF PENILE CANCER IN APPALACHIAN KENTUCKY
*Patrick Hensley MD; John Loomis and Andrew James
1Department of Urology, University of Kentucky College of Medicine
Presented By: Patrick Hensley, MD

Poster #126
PRIMARY TESTICULAR LYMPHOMA: TREATMENT PATTERNS AND SURVIVAL OF 1740 MEN FROM THE NATIONAL CANCER DATABASE
*Fernando Caumont, MD; John Burns; Sydney Akapame; Jing Xie; Christopher Porter and John Paul Flores
1Section of Urology and Renal Transplantation, Virginia Mason Medical Center, Seattle, WA; 2Axio Research, Seattle, WA; 3Section of Hematology and Oncology, Virginia Mason Medical Center, Seattle, WA
Presented By: Fernando Caumont, MD
Poster #127
NATIONWIDE PATTERNS OF CARE FOR STAGE II NON-SEMINOMATOUS GERM CELL TUMOR: RPLND AND CHEMOTHERAPY UTILIZATION
*Rashed Ghandour, MD1; Caleb Ashbrook, BA1; Yuval Freifeld, MD1; Nirmish Singla, MD1; Yair Lotan, MD1; Vitaly Margulis, MD1; Solomon Woldu, MD1 and Aditya Bagrodia, MD1
1University of Texas Southwestern Medical Center
Presented By: Rashed Ghandour, MD

Poster #128
DOES PRIOR INGUINOSCROTAL SURGERY ALTER RECURRENCE PATTERNS AND SURVIVAL OUTCOME FOR PATIENTS WITH TESTICULAR CANCER? THE PRINCESS MARGARET CANCER CENTRE EXPERIENCE
*Thenappan Chandrasekar, MD1,2; Dixon T.S. Woon1; Jaime O. Herrera-Caceres2; Hanan Goldberg3; Zachary Klaassen2; Neil E. Fleshner2; Michael A.S. Jewett2 and Robert J. Hamilton2
1Thomas Jefferson University, Dept. of Urology, Philadelphia; PA1 2University of Toronto, Department of Surgical Oncology, Division of Urology, Toronto, Canada
Presented By: Thenappan Chandrasekar, MD

Poster #129
NATIONAL MANAGEMENT TRENDS IN CLINICAL STAGE IIA NON-SEMINOMATOUS GERM CELL TUMOR (NSGCT) AND OPPORTUNITIES TO AVOID DUAL THERAPY
*Ryan P. Werntz, MD1; Craig Labbate1; Vignesh Packiam2 and Scott Eggener1
1University of Chicago, Chicago IL; 2Mayo Clinic, Rochester MN
Presented By: Ryan P. Werntz, MD

Poster #130
SURVIVAL RATES AFTER RETROPERITONEAL LYMPH NODE DISSECTION (RPLND) FOR TESTICULAR SEMINOMA
*Alexandra Tabakin, MD1; Sinae Kim, PhD2; Charles Polotti, MD1; Brian Shinder, MD, MS1; Zorimar Rivera-Núñez, PhD2; Joshua Sterling, MD, MS1; Nicholas Farber, MD1; Kushan Radadia, MD1; Isaac Kim, MD, PhD1; Eric Singer, MD, MA1 and Thomas Jang, MD, MPH3
1Rutgers Robert Wood Johnson Medical School, Division of Urology, New Brunswick, NJ; 2Rutgers Cancer Institute of New Jersey, Department of Radiation Oncology, New Brunswick, NJ; 3Section of Urologic Oncology, Rutgers Cancer Institute of New Jersey, New Brunswick, NJ
Presented By: Alexandra Tabakin, MD

Poster #131
A RETROSPECTIVE REVIEW OF PARTIAL ORCHIECTOMY AT THE PRINCESS MARGARET CANCER CENTRE
*Gregory J. Nason, MSc, FRCS Urol, FEBU1; Lynn Cartwright-Anson1; Michael Jewett1; Martin O’Malley2; Joanne Sweet3 and Robert Hamilton1
1Division of Urology, Department of Surgical Oncology, Princess Margaret Cancer Centre, University Health Network and University of Toronto; 2Department of Medical Imaging, Princess Margaret Cancer Centre, University Health Network and University of Toronto; 3Department of Pathology, Laboratory Medicine and Pathology, University Health Network and University of Toronto
Presented By: Gregory J. Nason, MSc, FRCS Urol, FEBU

Poster #132
DOES SCHEDULED ALVIMOPAN, ACETAMINOPHEN AND GABAPENTIN IMPROVE SHORT-TERM CLINICAL OUTCOMES AFTER RETROPERITONEAL LYMPH NODE DISSECTION?: A PILOT STUDY
Adam C. Calaway, MD1; Rich Foster1; Yan Tong2; Richard Bihrlle1; Timothy Masterson1 and Clint Cary1
1Indiana University School of Medicine, Department of Urology; 2Indiana University Purdue University Indianapolis, Department of Biostatistics
Presented By: Adam C. Calaway, MD
Poster Session I – Full Abstracts

Poster #1
EVALUATING POST-OPERATIVE OPIOID USE FOLLOWING RADICAL CYSTECTOMY
*Kathryn Hacker, MD, PhD1; Jae Jung1; J. Lee Graves1; Hannah Cook1; Peggy McNaull1; Brooke Chidgey1; Jami Mann1; Angela
Smith1 and Matthew Nielsen1
1University of North Carolina at Chapel Hill, Chapel Hill, NC
Presented By: Kathryn Hacker, MD, PhD

Introduction: The incidence of new persistent opioid use following surgery is approximately 6-10%, more common than any single post-operative complication. Additionally, a recent systematic review found 67-92% of patients report unused opioid medications after a surgical prescription. Reducing the oversupply of opioids may substantially impact the opioid epidemic as a primary and secondary prevention strategy. We aimed to evaluate both inpatient and outpatient opioid requirements of patients following radical cystectomy and risk factors for increased opioid use.

Methods: Patients who underwent radical cystectomy at the University of North Carolina were identified and a retrospective analysis of inpatient opioid requirements post-operatively was performed. We evaluated the association of the amount of opioid use with demographic characteristics, pre-operative diagnoses, cancer characteristics, post-operative complications, and cancer recurrence. Additionally, we evaluated post-hospital discharge opioid use and obtained details regarding medications prescribed for postoperative pain through our pharmacy database. Two weeks post-procedure, patients were contacted to participate in a survey evaluating postoperative opioid use and disposal habits.

Results: After radical cystectomy, patients utilize a wide range of morphine equivalent amounts during their inpatient post-operative course despite use of multi-modal pain regimens. Following discharge, 11 of the 28 patients who underwent a radical cystectomy during the 6 month study period were surveyed. These patients were prescribed an average of 34 tablets of 5 mg oxycodone and 80% filled this prescription. Patients reported an average of 11 tablets used following discharge and 55% reported having received counseling on proper disposal of narcotic medications.

Conclusion: Inpatient opioid use following radical cystectomy displays a wide range of opioid requirements which vary based on patient and surgical characteristics. However, following discharge, we identified that patients are receiving an oversupply of opioid medications. Multimodal pain control for inpatients and development of data-driven post-operative prescribing schedules will potentially allow urologists to decrease the opioid requirement following radical cystectomy.
### Poster #2

**DECREASING URETERAL STENT DURATION AFTER RADICAL CYSTECTOMY WITH ILEAL CONDUIT FORMATION IS NOT ASSOCIATED WITH INCREASED URETERAL STRICTURE RATES**

*Hamza M. Beano; Jiaxian He; Caitlin Hensel;; William Worrell; Rupalie Bose; William Townsend; Kris Gaston; Peter Clark; Katherine Whitton; Lauren Childs and Stephen Riggs*

1Department of Urology, Carolinas Medical Center/Atrium Health; 2Department of Cancer Biostatistics, Levine Cancer Institute/Atrium Health

Presented By: Hamza M. Beano, MD

### Introduction:
In previously published data, we have demonstrated that changing the stent removal date from postoperative day (POD) 14 to POD 4 after radical cystectomy with ileal conduit formation (RCIC) was associated with decreased urinary tract infection (UTI)-adverse events. However, there was concern that earlier stent removal would result in increased rates of ureteral strictures. We therefore evaluated whether earlier stent removal after RCIC was associated with increased stricture rates.

### Methods:
This is a single center analysis of a prospectively collected cystectomy dataset from 1/2014 to 1/2018. Patients were divided per protocol change date of April 10th, 2015, to cohort A (stent removal goal POD4) and cohort B (stent removal goal POD14). Patients who underwent abdominal/pelvic radiation or continent diversions were excluded. The primary measured outcome was clinically significant ureteral stenosis rate defined as evidence of obstruction on imaging with flank pain, worsening kidney function or recurrent UTI. Secondary outcome was 90-day UTI-related readmission. Two-sample t-test and Fisher’s exact test were used to estimate p-values. Multivariate logistic regression was used to estimate odds ratios (OR).

### Results:
251 patients underwent cystectomy between 1/2014 and 1/2018 at our institute. 72 patients were excluded per above criteria resulting in 102 patients in cohort A and 75 in cohort B. There was no statistically significant difference in the median age, gender division, racial makeup, median Charlson Comorbidity Index (CCI), ASA score, pathological stage or percentage of patients who underwent preoperative chemotherapy. The outcomes and perioperative metrics are summarized in the table. On multivariate logistic regression analysis, no difference was found in ureteral stricture rates (OR=2.05 (95% CI: 0.67,6.24), p = 0.207) at a median follow up of 9.8 months.

### Conclusion:
This study reaffirms the previously presented data supporting that decreasing ureteral stenting duration is associated with decreased UTI-related readmissions and it shows there was no increase in ureteral stenosis rates. In fact there was a trend of decreased stenosis rates in the short ureteral stenting duration which did not reach statistical significance. Given its potential benefits, strong consideration should be directed towards early stent removal.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All Patients</th>
<th>Cohort A</th>
<th>Cohort B</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length of stay days</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (Range)</td>
<td>6 (4-45)</td>
<td>6 (4-45)</td>
<td>6 (4-31)</td>
<td>0.813</td>
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<tr>
<td><strong>Estimated Blood Loss cc</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Median (Range)</td>
<td>300 (290-3700)</td>
<td>300 (290-3700)</td>
<td>300 (290-3700)</td>
<td>0.668</td>
</tr>
<tr>
<td><strong>UAE-related readmissions n(%)</strong></td>
<td>32 (18.1)</td>
<td>12 (11.8)</td>
<td>20 (26.7)</td>
<td>0.017</td>
</tr>
<tr>
<td><strong>Ureteral stricture n(%)</strong></td>
<td>15 (8.5)</td>
<td>6 (5.9)</td>
<td>9 (12)</td>
<td>0.177</td>
</tr>
<tr>
<td><strong>Median follow-up months</strong></td>
<td>9.8</td>
<td>7.3</td>
<td>15.1</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Poster #3
PREOPERATIVE RISK FACTORS PREDICTING POSTOPERATIVE COMPLICATIONS IN RADICAL CYSTECTOMY FOR BLADDER CANCER
*Sida Niu, MD*; Stefan Graw, MS; Derek Jensen, MD; Vassili Glazyrine, MS; Jeffrey Holzbeierlein, MD; Devin Koestler, PhD and Eugene Lee, MD
1Department of Urology; University of Kansas Medical Center; 2Department of Biostatistics, University of Kansas Medical Center
Presented By: Sida Niu, MD

Introduction: While radical cystectomy (RC) is the gold-standard treatment for patients with muscle-invasive bladder cancer and is recommended for patients with recurrent or progressive non-muscle invasive bladder cancer, it is associated with a significant rate of complications, hospital readmission, and mortality. We aim to develop a prediction model to assess the risk of complications in the 31 to 90-day postoperative period using routinely collected data in the course of preoperative history, physical examination and staging in patients undergoing RC for bladder cancer.

Methods: We retrospectively reviewed 508 patients who underwent RC for bladder cancer from January 2008 to October 2016. Potential preoperative risk predictors collected include pathology, laboratory values, proposed procedure type, and prior treatments. Postoperative complications were graded using the Clavien-Dindo scale. Multivariable logistic regression models were used to examine the association between preoperative factors and complications during the 31 to 90-day postoperative period. A combination-wise feature selection scheme was used to select preoperative factors to include in prediction models. Prediction accuracy was assessed using the area under the receiver operating characteristic curve (AUROC) and a cross-validation procedure was used for model validation.

Results: Univariable analysis of 28 preoperative variables demonstrated that 14 variables were associated with increased complication risks in the 31 to 90-day postoperative period. Nine of these preoperative variables were selected for the design of the prediction models based on AUROC from univariable analysis. BMI, creatinine and preoperative chemotherapy had the highest prediction accuracy on univariable analysis, with average AUROCs of 0.646, 0.601, 0.573 and odds ratios of 1.09, 1.28 and 1.81, respectively. Twenty prediction models with the highest AUCs, ranging from 0.663 to 0.645, were created using different combinations of 3 to 5 variables per model. The best performing prediction model utilized only the 3 most predictive individual variables to achieve an AUROC of 0.663.

Conclusion: Our findings suggest routinely collected preoperative variables may be useful for determining patient risk for short-term postoperative complications after RC. Prediction models can help identify at-risk patients who may benefit from patient education, counseling and development of risk reduction strategies. Interactions between individual variables should be evaluated to further improve accuracy of the prediction models.
Poster #4
REAL-WORLD IMPACT OF MINIMALLY INVASIVE VERSUS OPEN RADICAL CYSTECTOMY IN PERIOPERATIVE OUTCOMES AND SPENDING: AN INSTRUMENTAL VARIABLE ANALYSIS
*Parth K. Modi, MD, MS; Brent Hollenbeck, MD, MS; Mary Oerline, MS; Alon Weizer, MD; Jeffrey Montgomery, MD, MHSA; Samuel Kaffenberger, MD; Andrew Ryan, PhD and Chad Ellimoottil, MD, MS
1University of Michigan
Presented By: Parth K. Modi, MD, MS

Introduction: In a randomized control trial conducted at high volume centers, robotic and open cystectomy were recently shown to have similar oncologic and perioperative outcomes. However, because the majority of cystectomies are performed in low-volume centers, it is unknown whether these findings are broadly generalizable.

Methods: We studied Medicare patients who underwent radical cystectomy for bladder cancer between 2008 and 2015. We examined the length of stay, readmission rate, and 90-day spending after minimally invasive or open cystectomy. We used multiple regression to estimate the association between minimally invasive surgery and the outcomes while accounting for measured clinical and demographic variables. To account for unmeasured confounding, we used regional variation in minimally invasive cystectomy as an instrumental variable.

Results: Of 4760 patients, 693 (14.6%) underwent a minimally invasive procedure and 4,067 (85.4%) had an open approach. Minimally invasive cystectomy was associated with shorter length of stay in multiple regression (10.2 days v 11.7 days, P<0.001) and instrumental variable (10.5 days v 11.7 days, P=0.12) models. No difference in readmission rate was noted in multiple regression (27.4% v 26.8%, P=0.75) or instrumental variable models (31.5% v 26.1%, P=0.46). Minimally invasive cystectomy was associated with lower 90-day spending ($34,565 v $37,373, P<0.001) in multiple regression, but not instrumental variable ($38,151 v $36,797, P=0.64) models.

Conclusion: In patients across diverse institutions in the United States, minimally invasive cystectomy was associated with a shorter length of stay than open cystectomy, but with no significant difference in readmission rate or 90-day spending.
Introduction: Guidelines from the EAU and other organizations recommend extended duration anticoagulation after radical cystectomy (RC) for the prevention of venous thromboembolic events (VTE). Low molecular weight heparin is generally the anticoagulant of choice, but it is both expensive and a burden for patients to administer. The benefit of extended duration anticoagulation in guideline statements is estimated using assumptions of risk reduction based on RCTs in other areas (e.g. orthopedics), but do not include randomized studies of cystectomies with no prolonged anticoagulation. In order to provide an estimate of real world risk with and without prophylaxis, we performed a systematic review of cystectomy studies to assess reported risks of VTE in the published literature.

Methods: PubMed and Medline were queried for all studies including “radical cystectomy” to capture all cystectomy studies. Studies including patients operated on after 1990 with data on post-discharge prophylaxis, deep venous thromboembolism (DVT) and pulmonary embolism (PE) were included. Data on in-hospital and post-discharge prophylaxis, rates of DVT and PE were collected. These data were pooled to estimate rates of these events with and without prolonged anticoagulation.

Results: A total of 9,880 abstracts were screened, with 536 full texts examined to yield 23 studies that included a total of 8,452 post-cystectomy patients (5,509 no post-discharge anticoagulation, 2,943 with post-discharge anticoagulation). This comprised 12 studies with no post-discharge prophylaxis, 10 studies with post-discharge low molecular weight heparin, and 1 study comparing the two strategies. The rate of DVT was 2.8% in the no anticoagulation group, compared to 1.9% in the anticoagulation group (p=0.013). The rate of PE was 1.25% in the no anticoagulation group compared to 1.29% in the anticoagulation group (p=0.96). Limiting only to studies with 28 days of post-discharge prophylaxis yields a summary rate of 1.9% for DVT, 1.1% for PE.

Conclusion: Prolonged prophylactic anticoagulation in the published literature likely prevents VTE. The apparent benefit from post-discharge prophylaxis in published studies is much more modest than data used for guideline statements which are based on smaller studies prone to statistical fragility and theoretical extrapolated benefits. In cost effectiveness analyses of post-discharge prophylaxis after cystectomy, conservative sensitivity analyses should be employed when estimating benefits of prophylaxis.
**Poster #6**  
**THE EFFECT OF CHRONIC KIDNEY DISEASE ON RADICAL CYSTECTOMY OUTCOMES**  
*Matthew Winter, BMBS (Hons), FRACS*; Shane Pearce; Aliasger Shakir; Akbar Ashrafi; Giovanni Cacciamani; Luis Medina; Michael Lin-Brande; Angelica Hernandez; Hannah Landsberger; Andre Berger; Andre Abreu; Anne Schuckman; Hooman Djaladat; Sia Daneshmand; Monish Aron; Inderbir Gill and Mihir Desai

1 University of Southern California, Institute of Urology

Presented By: Matthew Winter, BMBS (Hons), FRACS

**Introduction:** Radical cystectomy (RC) is associated with high morbidity. The aim of this study is to compare the outcomes for RC in patients with chronic kidney disease (CKD) in a high-volume tertiary referral center.

**Methods:** A total of 990 patients underwent a RC with intention to cure from August 2009 to August 2016 as identified from our prospectively collated institutional approved database that. The pre-operative Modification of Diet in Renal Disease (MDRD) GFR (mL/min/1.73 m²) was calculated and the entire cohort were classified into the following categories MDRD GFR>60 (Group A = Normal), MDRD GFR>30-59 (Group B = Stage 3 CKD) and MDRD GFR <30 (Group C = Stage 4 CKD). Pre-, intra- and postoperative characteristics, oncological outcomes, and 90-day complications were compared using SAS statistical software. Multivariable logistic regression was used to assess the effect of CKD on significant outcomes based on univariate analysis.

**Results:** Patients undergoing RC were classified in the following groups: Group A (n=583, 58.9% median GFR 77), Group B (n=367, 37.1%, median GFR 50) and Group C (n=40, 4%, median GFR 21). CKD patients undergoing RC were significantly older (p<0.001), more likely to have a higher modified Charlson score, higher ASA score (p<0.001), lower pre-operative baseline hemoglobin, (p<0.001), non-organ confined and lymph node positive disease (p=0.003). Estimated blood loss, ERAS protocol, neoadjuvant chemotherapy and length of stay were no different between the groups. The 90 day complication rates were Group A (n=394, 67.6%), Group B (n=269, 73.3%) and Group C (n=33, 82.5%). CKD patients are more likely to develop a low and high-grade 90-day complication (p<0.001) and receive a blood transfusion (p=0.000). Recurrence free survival, at median follow-up of 3.1yrs was not different between groups (p=0.61); however, overall survival was worse in the CKD population (p=0.007). On multivariable analysis, after controlling for age, diversion type and Charlson score, CKD did not remain an independent factor for transfusion or 90 day complication rates.

**Conclusion:** CKD is associated with a higher likelihood of non-organ confirmed disease, the presence of positive lymph nodes and lower overall survival post cystectomy. CKD does not affect length of stay, recurrence free survival, need for transfusion or 90-day complication rates.
Poster #7

TRAJECTORY OF PHYSICAL SYMPTOMS FOLLOWING RADICAL CYSTECTOMY
*Mehrdad Alemozaffar, MD, MS1; Jennifer Adouli1; Frances Kim1; Anasua Bandyopadhyay1; Jay Shah2 and Viraj Master1
1Department of Urology, Emory University School of Medicine, Atlanta, GA; 2Department of Urology, Stanford University School of Medicine, Palo Alto, CA
Presented By: Mehrdad Alemozaffar, MD, MS

Introduction: Symptom trajectories following radical cystectomy have not been well studied among patients with bladder cancer. In administering pre-and post-operative symptom surveys, our goal was to better understand the time required for physical symptoms to normalize.

Methods: Symptom data was collected for patients at Emory University Hospital who underwent open and robot-assisted radical cystectomy between November 2016 and August 2018. Our team administered pre-operative MD Anderson Symptom Inventories (MDASI) to assess baseline symptoms, collected a survey each day for up to seven days during hospital stay, and made follow up phone calls 30- and 90-days following cystectomy.

Results: A total of 97 patients were given symptom surveys before and after cystectomy. There was a median of six surveys completed per patient, and eight physical symptoms were analyzed over the 90-day period. During the hospital stay, all eight symptoms were present, but varied in severity with time. For pain and dry mouth, the average severity was greatest at post-operative day 1 (POD1), while fatigue and nausea tended to be most severe at POD2. Symptom scores for constipation, lack of appetite, and malaise were most prominent around POD4 and POD5, but were consistently elevated throughout hospital stay. Vomiting appeared most frequently around POD2 to POD5, but was relatively uncommon compared to other symptoms. At the 30-day assessment, seven of the eight physical symptom scores displayed no significant difference compared to baseline levels. Of note, lack of appetite showed a significant increase in severity compared to pre-operative scores (P < 0.01) at day 30. However, all eight physical symptoms returned to baseline levels by the 90-day follow-up (all P > 0.05).

Conclusion: The eight physical symptoms under study tended to be most severe during hospital stay, and all but lack of appetite returned to baseline by day 30, with lack of appetite returning to baseline by 90 days. Though every patient will have a unique recovery from radical cystectomy, an overall trend of physical symptom normalization was seen by 30-90 days following surgery.
Poster #8
URETERAL STENT URINE CULTURE FOLLOWING RADICAL CYSTECTOMY WITH ILEAL CONDUIT DIVERSION PREDICTS UTI-RELATED READMISSION RATES
*Hamza M. Beano, MD1; Caitlin Hensel2; Jiaxian He2; Rupali Bose2; William Worrilow1; Peter Clark3; Kris Gaston3; Jared Brown3; Madelon Haskin3; Jaclyn Mieczkowski3 and Stephen Riggs3
1Department of Urology, Levine Cancer Institute/Atrium health; 2Department of Cancer Biostatistics, Levine Cancer Institute/Atrium health; 3Department of Urology, Carolinas Medical Center/Atrium Health
Presented By: Hamza M. Beano, MD

Introduction: We hypothesized that ureteral stent urine culture (UC) results may predict urinary tract infection (UTI)-related readmissions following robotic radical cystectomy with ileal conduit diversion (RCIC). Starting in 2015, we adopted a strict stent removal protocol to include stent urine culture (UC) and a single dose IV antibiotic given prior to removal targeted for postoperative day 4. We analyzed the results of this coordinated effort.

Methods: This is a single center analysis of a prospectively collected cystectomy dataset from 4/2015 to 1/2018. The patients were divided according to stent culture results into the positive cohort (single or multiple organism with CFU > 1,000) and negative cohort (no growth, contaminated results or organism/s growth with <1,000 CFU). Measured outcomes were 90-day Urinary Adverse Events (UAE; UTI requiring inpatient or outpatient antibiotics within our institutional system or by outside report), overall-readmission rate and UTI-related readmission rates. Fisher’s exact tests were used to compare rates and logistic regression was used to estimate odds ratios (OR).

Results: 202 patients underwent RCIC between 4/2015 and 1/2018. 146 patients had complete data and were included in the analysis. There were 70 patients in the positive group and 76 in the negative group. There was no statistically significant difference in the median age, gender, racial makeup, median Charlson Comorbidity Index (CCI), median ASA score, pathological stage or percentage of patients who underwent preoperative chemotherapy between both groups. The outcomes are summarized in the table. Multivariable logistic regression analysis concluded that a positive stent culture predicted higher UTI-related readmission rate (OR=4.19, 95%CI:1.16,15.11, p-value=0.029).

Conclusion: A positive stent culture was significantly associated with increased 90-day UTI-related readmission rate. There was no correlation with UAE or total readmission rates. Further analysis is warranted to study whether the organisms isolated with positive stent culture correlated with organisms isolated during UTI-related readmission episodes. Readmission incidence or severity could be mitigated by earlier, more precise antibiotic use and possibly use of prophylactic antibiotics per stent culture results.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All Patients (n = 146)</th>
<th>SCX Positive (n = 70)</th>
<th>SCX Negative (n = 76)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readmission n (%)</td>
<td>46 (31.5)</td>
<td>23 (32.9)</td>
<td>23 (30.3)</td>
<td>0.859</td>
</tr>
<tr>
<td>Readmission due to UTI n (%)</td>
<td>18 (12.3)</td>
<td>13 (18.6)</td>
<td>5 (6.6)</td>
<td>0.042</td>
</tr>
<tr>
<td>Urinary adverse events n (%)</td>
<td>48 (32.9)</td>
<td>27 (38.5)</td>
<td>21 (27.6)</td>
<td>0.217</td>
</tr>
</tbody>
</table>

*Abbreviations: SCX Stent Culture Results, UTI Urinary Tract Infection*
Poster #9

WEEKEND DISCHARGE FOLLOWING RADICAL CYSTECTOMY PREDICTS SUBSEQUENT HOSPITAL READMISSION

*Jeffrey J. Tosoian, MD, MPH1; James Tracey1; Sapan Ambani1; Takahiro Osawa2; Chang He1; Jeffrey Montgomery1; Alon Weizer1 and Todd Morgan1

1University of Michigan; 2Hokkaido University
Presented By: Jeffrey J. Tosoian, MD, MPH

Introduction: Hospital readmission after surgery is a source of considerable cost and morbidity. Weekend discharge has been described as an independent risk factor for readmission after some complex surgical procedures. We sought to evaluate the association between weekend discharge and subsequent readmission in patients who underwent radical cystectomy.

Methods: We performed a retrospective review of all patients who underwent radical cystectomy at our institution from 2003-2012. The primary outcome was 90-day hospital readmission. Patients were categorized according to weekday vs. weekend (i.e. Saturday/Sunday) discharge. Logistic regression analysis was performed to determine the association of demographic and clinical variables with readmission. Factors demonstrating a statistically significant association (p<0.05) on univariable analysis were included in a multivariable model.

Results: Overall, 187 (26%) of 726 patients underwent weekend discharge from the hospital. Weekend discharge was significantly associated with shorter operative times (<6 hours: OR 1.95, 95% CI 1.39-2.73, p<0.001) as well as shorter length of hospital stay (≤7 days: OR 1.78, 95% CI 1.27-2.49, p=0.001). Ninety-day hospital readmission was observed in 221 (30%) patients and was significantly more common among patients discharged on the weekend (36.9% vs. 28.2%, p=0.026). On multivariable analysis including race, body mass index, peri-operative blood transfusion, inpatient complication grade, discharge destination, and distance from our institution, weekend discharge remained significantly associated with readmission (OR 1.52, 95% CI 1.06-2.18, p=0.023). Non-Caucasian race (OR 2.52, 95% CI 1.33-4.77, p=0.005) and peri-operative blood transfusion (OR 1.75, 95% CI 1.10-2.77, p=0.018) were also significantly associated with readmission.

Conclusion: Weekend discharge following radical cystectomy appears to be a significant risk factor for early hospital readmission. Supplemental outpatient services should be considered for these and other high-risk patients to reduce the morbidity associated with this event.
Poster #10
MODELING AUTOMATED ASSESSMENT OF SURGICAL PERFORMANCE UTILIZING COMPUTER VISION: PROOF OF CONCEPT
*Amir Baghdadi, PhD1, 2, 3; Lora A. Cavuoto2; Ahmed A. Hussein1; Youssef Ahmed1 and Khurshid A. Guru1
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Presented By: Amir Baghdadi, PhD

Introduction: Thorough lymph node dissection (LND) is an integral part of robot-assisted radical cystectomy (RARC). There is a lack of consensus about what constitutes adequate LND. Current methods are subject to inter-rater variability. In this context, we sought to use computer vision methods to identify and extract valid measures to develop and validate an automated scoring system for LND.

Methods: 20 recorded LNDs were included with a total of 200 frames/case from the console feed before and after LND with near-equivalent view and zoom. The quality of lymph node clearance was assessed based on the features derived from a computer vision algorithm: the number and area of the nerve/vessels (N-Vs) detected using the proposed Automated Structure Detection (ASD) method; image median Color Map by the assumption of decrease in yellow color after lymphatic and fatty tissue removal; and mean entropy, which measures the level of disorganization in the image. Each video frame was pre-processed for N-Vs detection using a series of image processing operations including binary conversion, edge and line detection, and object identification while considering geometrical characteristics of target objects, e.g. aspect ratio, width, height, and orientation. The N-Vs were labeled by fusing the information from both line and object detection processes (Figure 1). The automated scores (AS) were compared to Pelvic Lymphadenectomy Appropriateness and Completion Evaluation (PLACE), which is a subjective evaluation based on objective measures scored by a panel of expert surgeons. Logistic regression analysis was employed to compare AS and PLACE scores.

Results: 14 cases were used to develop the automated scoring algorithm. A logistic regression model was trained and validated using the aforementioned features with 30% holdout cross validation. This model was applied to the remaining 6 previously unseen cases for testing and the accuracy of predicting the PLACE scores was 83.3% (5 correct score allocation across the 6 test cases).

Conclusion: To our knowledge, this is the first automated surgical skill assessment tool that provides objective evaluation of surgical performance with high accuracy compared to expert surgeon assessment.
Poster #11  
**EPIDURAL ANESTHESIA LEADS TO INCREASED POSTOPERATIVE COMPLICATIONS AFTER RADICAL CYSTECTOMY: AN ANALYSIS FROM THE NATIONAL SURGICAL QUALITY IMPROVEMENT PROJECT (NSQIP) DATABASE**  
Sephalie Patel¹; Robert Ackerman²,³; David Boulware⁴ and *Michael A. Poch, MD⁴  
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Presented By: Michael A. Poch, MD

**Introduction:** Epidural anesthesia has been associated with a decrease in cardiopulmonary complications and decrease in blood loss in orthopedic procedures. Its influence on outcomes of patients receiving radical cystectomies is unknown. We aim to use the large national database from the National Surgical Quality Improvement Project (NSQIP) to examine whether postoperative complications may be affected by use of epidural anesthesia during radical cystectomy.

**Methods:** Data was collected from the 2014-2016 participant user files of the NSQIP database. Patients receiving radical cystectomy were identified by CPT code and further stratified by anesthesia type. Demographics, length of stay, and 30 day complications including death were collected and analyzed using univariable and multivariable analysis.

**Results:** A total of 6,448 patients met the inclusion criteria for analysis. Between 2014-2016, 5,064 patients received general anesthesia only (GA) and 1,384 patients received general and epidural anesthesia (GEA). Demographic information was similar in both group except for high ASA physical status score which was greater in the GA group (77% vs 72.9%, p=0.002). Multivariable analysis showed an overall increase in major (17.8% vs 18.5%) and minor (34.2% vs 40%) complications in the GEA group (p=0.0046). Multivariable ordinal regression model showed epidural anesthesia, higher ASA status, female gender, BMI, COPD, and insulin dependent diabetes to have an association with a higher incidence of overall complications. Multivariable Cox Proportional Hazards regression model found no association between epidural anesthesia and death within 30 days. In addition, the analysis did show that patients with increased age and history of COPD did sustain an increased 30 day mortality.

**Conclusion:** Patients undergoing radical cystectomy may experience more complications with use of epidural anesthesia. This may be due to end organ effects from the hemodynamic changes of epidural anesthesia. Further single intervention epidural studies need to be performed to isolate the effects of epidural anesthesia on individual surgical procedures.
THE IMPACT OF URETHRAL FROZEN SECTION OMISSION DURING RADICAL CYSTECTOMY WITH ORTHOTOPIC NEOBLADDER

Craig Labbate, MD; Ryan Werntz, MD; Brittany Adamic, MD; Norm Smith, MD and Gary Steinberg, MD

University of Chicago, Chicago IL

Presented By: Craig Labbate, MD

Introduction: Current guidelines recommend verifying a negative urethral margin after radical cystectomy prior to orthotopic neobladder (ONB) creation due to risk of urethral recurrence. At our institution, we do not routinely send urethral frozen margins prior to ONB. We sought to determine the rate of urethral recurrence, metastatic recurrence and need for urethrectomy and conversion to non-orthotopic diversion in patients with a urethral positive surgical margin (PSM) on final pathological analysis.

Methods: We queried our institutional bladder cancer database from 2007-2017 for all patients who underwent radical cystectomy (RC) with ONB creation. Chart review was performed to identify positive margins on final pathology and disease recurrence prior to last follow up. Patients with urethral PSM were reviewed to determine rate of urethral recurrence. Disease-free survival was compared between patients with positive and negative urethral PSMs after controlling for tumor stage and nodal status.

Results: A total of 384 patients underwent RC with ONB. Sixteen patients (4.5%) had a urethral PSM. Higher tumor stage increased risk of PSM with pT4 tumors having the highest rate of urethral PSM (16.7%). Carcinoma in situ (n=9) was the most common finding at the final margin. Three patients had invasive tumor at the margin. One (6.2%) of the 16 patients with a urethral PSM experienced recurrence and required urethrectomy. In the entire cohort 5 patients (1.2%) underwent urethrectomy for urethral recurrence. The rate of urethrectomy was not statistically different (p=0.19). In patients with urethral PSM there were also metastases to lung (3), pelvic sidewall (2), and one metachronous upper tract recurrence. Patients with a urethral PSM were at increased risk of any recurrence (HR 2.3) by Cox regression. However, progression-free and overall survival during follow up were not statistically significant (p=.32, p=0.64, respectively).

Conclusion: Urethral PSMs occur in <5% of patients following RC with ONB, and urethral recurrence is rare even in the setting of a urethral PSM. In our series, urethral recurrence after ONB was not associated with positive urethral margin. The risk of developing metastatic disease was also not associated with urethral PSM. Thus, the practice of routinely obtaining a negative frozen margin prior to ONB is likely unnecessary.
COMPLICATIONS AND SURVIVAL OUTCOMES OF SALVAGE CYSTECTOMY AFTER TRIMODALITY THERAPY
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1Harvard University; 2Massachusetts General Hospital, Department of Urology, Boston, MA; 3MedStar Washington Hospital Center, Department of Urology, Washington, DC; 4Massachusetts General Hospital, Department of Radiation Oncology, Boston, MA
Presented By: Alberto C. Pieretti, MD

Introduction: Trimodality therapy (TMT) involving maximally safe transurethral resection of bladder tumor followed by concurrent external beam radiation and chemotherapy is an accepted treatment for muscle invasive bladder cancer treatment (MIBC). Salvage cystectomy is required for some patients with intravesical recurrence after TMT. We compared complications and survival outcomes between salvage cystectomy post TMT (SC), primary cystectomy (PC) and primary cystectomy with prior history of non-TMT abdominal or pelvic radiotherapy (PC with Hx XRT).

Methods: Two hundred and seventy-five patients were identified and retrospectively reviewed who underwent radical cystectomy at Massachusetts General Hospital for clinical cT1-T4 bladder cancer between 2003 to 2013. Patients who underwent radical cystectomy for benign or clinical cTa or cTis disease were excluded. Patients were grouped as having PC, SC, or PC with Hx XRT. Early complications (≤90 days) and late complications (>90 days) were compared between surgical groups by organ system and Clavien-Dindo classification. Disease-specific survival (DSS) and overall survival (OS) were evaluated between surgical groups using the Kaplan-Meier method.

Results: There was no difference in the overall incidence of early complications (≤90 days) between the groups. Early respiratory, infectious and neurological complications were more common after SC than in PC or PC with Hx XRT. There was no difference in early Clavien-Dindo grade 3 to 5 complications between the groups. Regarding late complications (>90 days), the rate at 5 years was higher in SC compared to PC and PC with Hx XRT (79.3%, 33.8% and 50.5%, p=0.003). Higher rate of late infectious, gastrointestinal and genitourinary complications was seen in SC compared to PC and PC with Hx XRT. There was a higher rate of major late complications (Clavien-Dindo 3-5) in the SC group. There was no difference in 5 year DSS or OS between the groups.

Conclusion: SC for intravesical recurrence post TMT has an early complication rate that is comparable to PC and PC with Hx XRT. However, SC is associated with a higher risk of overall and major late complications, including infectious, gastrointestinal and genitourinary complications. This potential increase in morbidity is acceptable however as SC has comparable DSS and OS to PC and PC with Hx XRT.

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**Fig 1** - Predicted probability of any early complication (≤90 days) in SC, PC, and PC with Hx XRT.

**Fig 2** - Kaplan-Meier plots for rate of late complications of Primary Cystectomy, Salvage Cystectomy and Primary Cystectomy with Hx XRT.

**Fig 3** - Kaplan-Meier plots for rate of late complications of Primary Cystectomy, Salvage Cystectomy and Primary Cystectomy with Hx XRT.
Poster #14
CONTEMPORARY ANALYSIS OF URETEROENTERIC STRICTURES AFTER OPEN AND ROBOT-ASSISTED RADICAL CYSTECTOMY: A POPULATION-BASED STUDY
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Presented By: Neal Patel, MD

Introduction: Robot-assisted radical cystectomy (RARC) has been shown to have comparable oncologic efficacy compared to open radical cystectomy (ORC). However, due to differences in surgical approach the incidence of benign ureteroenteric strictures may differ. We compared the rates of benign strictures after RARC and ORC using population-based data.

Methods: From Surveillance, Epidemiology, and End Results (SEER)-Medicare, we identified 332 RARC and 1449 ORC performed during 2009 and 2014, using International Classification of Diseases-9th edition and Current Procedural Terminology 4th edition to compared the development of uretero-enteric stricture at 6 months, 1 year and 2 years following radical cystectomy. We defined ureteroenteric stricture as the need for procedural intervention, consistent with prior studies. Additionally, we compared the incidence of stricture diagnosis. Multivariable proportional hazards regression was performed to determine factors associated with stricture development.

Results: Gender, age, race, Charlson co-morbidity index, diversion type and the presence of pre-operative hydronephrosis did not differ significantly by surgical approach. The incidence of ureteroenteric stricture at 6 months and 12 was higher for RARC vs. ORC at 12.1% vs. 7.0% (p<0.01) and 15.0% vs. 9.5% (p=0.01), respectively. However, the RARC vs. ORC. stricture incidence at 2 years did not differ significantly at 14.6% vs. 11.4% (p=0.29). Similarly, the stricture diagnosis rates were significantly lower following ORC at 6, 12, and 24 months (p<0.05). In adjusted analysis, RARC (HR 1.70, 95% CI 1.28-2.26) and pre-operative hydronephrosis (HR 1.48, 95% CI 1.15-1.91) were associated with the development of stricture. Conversely, higher hospital volume was associated with a lower risk of stricture (HR 0.43, 95% CI 0.29-0.63).

Conclusion: RARC is associated with a higher rate of post-radical cystectomy stricture complication diagnosis and intervention on a population-based level that is mitigated by higher hospital volume. Technical factors are likely responsible and prospective studies are needed to assess the influence of the distal ureteral dissection and/or tension on the anastomosis. A significant study limitation is the inability to differentiate intra-corporeal diversion with our use of administrative data. However, a stricture complication compounds the cost of RARC, which are already significant higher than ORC.

Figure 1: Kaplan-Meier estimates with number of subjects at risk and 95% Hall-Wellner Bands for stricture free survival
Poster #15
WHICH FRAILTY ASSESSMENTS ARE MOST PREDICTIVE OF COMPLICATIONS AFTER RADICAL CYSTECTOMY?
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Presented By: Madeleine L. Burg, BA

Introduction: Frailty is defined as a syndrome of decreased physiological reserve, which can be measured using a prospective frailty assessment or a frailty index. Although frailty has been associated with worse postoperative outcomes after radical cystectomy (RC), no study has directly compared these two methods. We aimed to determine which method is most predictive of complications after RC.

Methods: Patients >65 years undergoing open or robotic RC were assessed from 2014-2017 at a tertiary-care referral center. Patients were assessed preoperatively using the Fried Frailty Criteria (FFC): grip strength, gait speed, physical activity level, feelings of exhaustion, and shrinking (>10 pounds of weight loss in past year). Patients were also scored using the 11-item modified frailty index (mFI), 15-item urologic oncology modified frailty index[1] (oncFI), and 5-item simplified frailty index (sFI).[2] Thirty-day complications were recorded per the Clavien-Dindo classification system and classified as overall and high-grade (>Grade IIIa). Univariate analyses and multivariable logistic regression analysis were performed.

Results: 123 patients were assessed preoperatively, with 109 patients receiving full FFC assessment. 59 patients (48%) had >1 30-day complication with 16 patients (13%) having a high-grade complication. On univariate analysis, oncFI (p=0.04) and shrinking (p=0.005) were predictive of overall complications, while FFC (p=0.02) and sFI (p=0.02) were predictive of high-grade complications. On multivariable logistic regression, shrinking (OR 3.79, 95% CI 1.64-9.26, c-index 0.70) was predictive of overall complications, while oncFI >4 was not (OR 3.89, 95% CI 0.93-18.70), after adjusting for patient age, pathologic stage, and type of urinary diversion. For high-grade complications, being intermediately frail or frail on FFC (OR 4.87, 95% CI 1.39-22.77, c-index 0.68) and sFI >3 (OR 68.00, 95% CI 3.83-1,000, c-index 0.68) were predictive of high-grade complications.

Conclusion: Shrinking alone may be best predictor of increased risk for any complication after RC. FFC may be best predictor for high-grade complications, although this analysis is limited by few high-grade events. mFI and oncFI may not be predictive of complications after RC, contradicting prior retrospective studies using the National Surgical Quality Improvement database. Further prospective studies are warranted on larger institutional cohorts.

References
Poster #16
UTILITY OF ROUTINE PRE-OPERATIVE 18-FLUORODEOXYGLUCOSE POSITRON EMISSION TOMOGRAPHY-COMPUTED TOMOGRAPHY (18-FDG PET/CT) IN IDENTIFYING PATHOLOGIC LYMPH NODE METASTASES AT RADICAL CYSTECTOMY

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Presented By: Nathan C. Wong, MD

Introduction: Fluorine-18 2-fluoro-2-deoxy-D-glucose (FDG) positron emission tomography (PET)/computed tomography (CT) has an established role in advanced urothelial carcinoma. However, its ability to detect lymph node metastases prior to radical cystectomy and pelvic lymph node dissection (RC-PLND) is not well defined. Herein, we characterize the diagnostic properties of routine pre-operative PET/CT in patients with muscle-invasive urothelial carcinoma undergoing RC-PLND.

Methods: We identified patients with muscle-invasive urothelial carcinoma (MIUC) that had undergone RC-PLND at our institution between August 2012 and February 2017 with a pre-operative 18-FDG PET/CT. Preoperative PET/CT was routinely performed prior to RC-PLND at our institution during this period. All PET/CT studies were re-reviewed and annotated in detail by a genitourinary radiologist. Criteria for PET positivity was a SUVMax above background. The cohort was stratified by clinical node status (≥1cm short-axis pelvic lymph nodes on CT) and chemotherapy status (chemotherapy untreated or scan post-chemotherapy). We assessed sensitivity (Sn), specificity (Sp), positive predictive value (PPV), and negative predictive value (NPV).

Results: Our study cohort included 182 patients who underwent RC-PLND for MIUC with a total of 208 pre-operative PET/CT scans (78 scans pre-chemotherapy, 61 scans post-chemotherapy and 69 scans without chemotherapy). The rate of pN+ disease was 52.6% in cN+ (38 scans) and 21.8% in cN- (170). The median metastatic focus size in pN+ patients was 5 mm. Test properties are detailed in Table 1. In cN+ patients, a negative PET-CT had utility in ruling out pathological positivity (Sn 100% without chemotherapy and 75% following chemotherapy treatment). In patients with cN- disease, PET-CT rarely detected pN+ disease (Sn 7.1-10%).

Conclusion: There is limited utility of routine pre-operative 18-FDG PET/CT for MIUC at RC-PLND. This is because PET/CT does not detect the low-volume lymph node metastases present in clinically node-negative patients. The primary role of PET/CT is in adjudicating enlarged lymph nodes identified by CT in the clinically node-positive patient.

Figure 1: Diagnostic properties of PET/CT for pathological node disease on a per-patient level stratified by CT findings and chemotherapy status.

<table>
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<tr>
<th></th>
<th>Overall</th>
<th>TP</th>
<th>FP</th>
<th>FN</th>
<th>TN</th>
<th>Sn</th>
<th>Sp</th>
<th>PPV</th>
<th>NPV</th>
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<tr>
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Poster #17
WHAT CAUSES SARCOPENIA IN BLADDER CANCER PATIENTS: DEMOGRAPHIC FACTORS, LIFESTYLE FACTORS, OR CANCER?
*Yingqi Wang, MS¹; Andrew Chang, MD²; WEI PHIN TAN, MD²; Joseph Fantony, MD²; Gregory Barton, MD²; Paul Wischmeyer, MD³; Rajan Gupta, MD⁴ and Brant Inman, MD²
¹DUKE-NUS Medical School, Singapore; ²Division of Urology, Duke University Medical Center, Durham, NC; ³Division of Anesthesiology, Duke University Medical Center, Durham, NC; ⁴Division of Radiology, Duke University Medical Center, Durham, NC

Presented By: Yingqi Wang, MS

Introduction: Malnutrition and sarcopenia are associated with overall and cancer-specific mortality in bladder cancer. However, why sarcopenia and body composition changes occur in bladder cancer is currently unknown.

Methods: A cross-sectional sample of 472 bladder cancer patients were assessed by International Physical Activity Questionnaire Long form and the Diet History Questionnaire II (DHQ2). The DHQ2 was converted into Healthy Eating Index 2010 scores and component nutrients. 286 patients underwent a CT abdomen/pelvis within 6 months of the questionnaire and were eligible for this study. Skeletal muscle (SM), subcutaneous adipose tissue (SAT), and visceral adipose tissue (VAT) were measured at the L3 vertebra level using Slice-O-Matic image analysis software by two independent raters. Inter-rater agreement was measured by the intraclass correlation coefficient (ICC). Associations between patient demographics, tumor characteristics, physical activity, diet quality, and body composition were examined by stratified analyses and regression models.

Results: Inter-rater agreement for body composition was excellent with ICC of 0.975, 0.996, and 0.972 for SM, SAT, and VAT respectively. Increasing age was associated with less SM (p<0.01), less SAT (p<0.01), but not with VAT (p=0.22). Males had more SM (p<0.01), more VAT (p<0.01), but less SAT (p=0.04) than women. The presence of comorbidities (measured by Elixhauser score) did not affect SM (p=0.94), but was associated with much higher SAT (p<0.01) and VAT (p<0.01). AJCC stage was not associated with body composition. Increasing physical activity was associated with lower SAT (p<0.01), lower VAT (0.02), but surprisingly not with SM mass (0.81). The Healthy Eating Index 2010, total daily carbohydrate consumption, and total daily calorie intake showed no association with body composition. Total daily protein consumption was associated with increased SM (p=0.01) and increased VAT (p=0.05), but not SAT (p=0.34). Total daily fat consumption was associated with increased SM (0.02), increased SAT (0.05), and increased VAT (<0.01).

Conclusions: Disease stage, calorie intake, and carbohydrate intake did not affect body composition. However, age, gender, comorbidities, physical activity level, and daily fat and protein consumption all affected body composition. This suggests targeted lifestyle interventions might only partially reverse sarcopenia.
Introduction: Radical cystectomy (RC) is commonly performed for the management of muscle invasive bladder cancer. While RC has one of the highest rates of morbidity among urologic surgery, our ability to predict post-operative complications remains poor. To address this challenge, we aim to create novel models to predict complications and factors leading to extended length of hospital stay and discharge to a higher level of care after RC.

Methods: Using the American College of Surgeons National Surgical Quality Improvement Program, perioperative adverse outcome variables for patients undergoing elective RC for bladder cancer from 2005-2016 were extracted. Variables assessed include occurrence of minor, infectious, serious, or any adverse events, extended length of hospital stay, and discharge to higher-level care. To develop predictive models of RC complications, we fit generalized additive model (GAM), least absolute shrinkage and selection operator (LASSO) logistic, neural network, and random forest models to training data using various candidate predictor variables. Each model was evaluated on the test data using ROC curves.

Results: A total of 7557 patients were identified who met the inclusion criteria. A total of 2,221 complications occurred. LASSO logistic models demonstrated the highest area under curve (AUC) for predicting any complications (0.63), discharge to a higher level of care (0.75), extended length of stay (0.68) and infectious (0.62) adverse events. It was comparable to random forest in predicting minor (0.60) and serious (0.63) adverse events (Figure 1).

Conclusion: Our models have improved performance at predicting complications, extended length of hospital stay, and discharge to a higher level of care after RC compared to commonly used comorbidity indices. These novel predictive models may allow for improved preoperative counseling and risk stratification of men undergoing RC. In addition, identifying the most important variable leading to each type of adverse event may allow for targeted optimization of modifiable variables pre-op to reduce post-op adverse events.

Figure 1: Box plots showing AUC for predictive models of cystectomy complications on test data, estimated using 1000 bootstrap resamples.

AUC – area under curve
LOS – length of stay
GAM - generalized additive model
LASSO - least absolute shrinkage and selection operator
Poster #19
INDOCYANINE GREEN MINIMIZES URETERO-ENTERIC STRICTURES AFTER ROBOTIC RADICAL CYSTECTOMY
Nariman Ahmadi1; *Akbar Ashrafi, BHB, MBChB, FRACS(Urol)1; Natalie Hartman2; Aliasger Shakir1; Giovanni Cacciamani1; Daniel Freitas1; Carlos Fay1; Mihir Desai1; Inderbir Gill1 and Monish Aron1
1USC Institute of Urology; 2Keck School of Medicine, University of Southern California
Presented By: Akbar Ashrafi, BHB, MBChB, FRACS(Urol)

Introduction: We evaluated the impact of Indocyanine green (ICG) for assessment of ureteral vascularity on the rate of stricture formation after robotic-assisted radical cystectomy (RRC) with intra-corporeal urinary diversion (ICUD).

Methods: We identified 179 patients undergoing RRC and ICUD between January 2014 and May 2017 and divided the patients into two groups based on the utilization of ICG for assessment of ureteral vascularity (non-ICG group and ICG group). We retrospectively reviewed the medical records to identify the length of ureter excised. Demographic, perioperative outcomes including 90-day complications and readmissions, and the rate of uretero-enteric stricture were compared between two groups. The two groups were compared using the t-test for continuous variables and the chi-squared test for categorical variables. A p-value <0.05 was considered statistically significant.

Results: A total of 132 and 47 patients were in the non-ICG group and the ICG group respectively. There were no differences in baseline characteristics and perioperative outcomes including operating time, estimated blood loss and length of stay. The ICG group was associated with a greater length of ureter being excised during the uretero-enteric anastomosis and a greater proportion of patients having long segment (>5cm) ureteral resection (Table 1). The median follow-up was 14 and 12 months in the non-ICG and ICG groups, respectively. The ICG group was associated with zero uretero-enteric strictures compared to a per-patient stricture rate of 10.6% and a per-ureter stricture rate of 6.6% in the non-ICG group (p=0.020 and p=0.013, respectively).

Conclusion: The use of ICG fluorescence to assess distal ureteral vascularity during RRC and ICUD can reduce the risk of ischemic uretero-enteric strictures. The technique is simple, safe and reproducible. Larger studies are needed to confirm these findings.

Table 1. Comparison of ureteral excision and uretero-enteric stricture in patients with and without indocyanine green assessment of ureteral vascularity in patients undergoing robotic radical cystectomy and intracorporeal urinary diversion

<table>
<thead>
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<th></th>
<th>Non-ICG</th>
<th>ICG</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Total number of ureter-enteric anastomoses</td>
<td>256</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>Length of excised ureter, cm</td>
<td></td>
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<tr>
<td>Overall</td>
<td>2.2 (0-9)</td>
<td>2.7 (0-8)</td>
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<td>Left ureter</td>
<td>2.0 (0-7)</td>
<td>2.4 (0-6)</td>
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</tr>
<tr>
<td>Right ureter</td>
<td>2.2 (0-9)</td>
<td>3.1 (0-8)</td>
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<tr>
<td>Exclusion length &lt;5 cm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>188 (73)</td>
<td>56 (63)</td>
<td>0.078</td>
</tr>
<tr>
<td>Left ureter</td>
<td>98 (77)</td>
<td>31 (69)</td>
<td>0.271</td>
</tr>
<tr>
<td>Right ureter</td>
<td>90 (70)</td>
<td>25 (57)</td>
<td>0.101</td>
</tr>
<tr>
<td>Exclusion length ≥5 cm</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Overall</td>
<td>15 (6)</td>
<td>16 (18)</td>
<td>0.002</td>
</tr>
<tr>
<td>Left ureter</td>
<td>7 (6)</td>
<td>7 (16)</td>
<td>0.034</td>
</tr>
<tr>
<td>Right ureter</td>
<td>8 (6)</td>
<td>9 (20)</td>
<td>0.006</td>
</tr>
<tr>
<td>No. of patient with strictures</td>
<td>14 (10.6)</td>
<td>0 (0)</td>
<td>0.020</td>
</tr>
<tr>
<td>No. of anastomosis with strictures</td>
<td>17 (6.6)</td>
<td>0 (0)</td>
<td>0.013</td>
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</tbody>
</table>
Poster #20

EVALUATING THE COST OF SURVEILLANCE FOR NON-MUSCLE INVASIVE BLADDER CANCER: AN ECONOMIC ANALYSIS BASED ON RISK CATEGORIES

Matthew Mossanen, MD MPH1,2; Ye Wang, PhD3; Julie Szymaniak, MD1; Wei Shen Tan, MD PhD5; Melissa J. Huynh, MD1,2; Mark A. Preston, MD MPH1,2; Quoc-Dien Trinh, MD1,2; Guru Sonpavde, MD2; Deborah Schrag, MD MPH2; Adam S. Kibel, MD1,2 and Steven L. Chang, MD MS1,2,3

1Division of Urology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA; 2Dana-Farber Cancer Institute, Boston, MA; 3Center for Surgery and Public Health, Brigham and Women's Hospital, Boston, MA; 4University College of London, London, England

Presented By: Julie Szymaniak, MD

Introduction: Non-muscle invasive bladder cancer (NMIBC) is a biologically heterogeneous disease and is one of the most expensive malignancies to treat on a per patient basis. In part, this high cost is attributed to the need for long-term surveillance. Prognostic factors for disease recurrence and progression can classify patients into low, intermediate, and high-risk categories to guide management strategies. We sought to perform an economic analysis of surveillance strategies to elucidate sources of costs in the management of NMIBC.

Methods: A Markov model was constructed to determine the average 5-year costs for the surveillance of patients with NMIBC. Patients were stratified into low, intermediate, and high-risk groups based on the EORTC risk calculator to determine recurrence and progression rates according to each category. The index patient was a compliant 65-year-old male. A total of four health states were utilized in the Markov model: no evidence of disease, recurrence, progression and cystectomy, and death. Low-risk patients underwent cystoscopy 3 months after TURBT, at 9 months, then annually until 5 years. Intermediate/high-risk patients underwent cystoscopy 3 months after TURBT, then every 3 months for 2 years, followed by every 6 months until 5 years.

Results: Cumulative costs of care over a 5-year period were approximately $52,125 for low-risk, $146,250 for intermediate-risk, and $366,143 for high-risk NMIBC. The primary driver of cost was progression to muscle-invasive disease requiring definitive therapy, contributing to 81% and 92% of overall cost for intermediate and high-risk disease. Although low-risk tumors have a high likelihood of 5-year recurrence, the overall cost contribution of recurrence was 8%, whereas disease progression accounted for 71%.

Conclusion: Although protracted surveillance cystoscopy contributes to the expenditures associated with NMIBC, progression substantially increases the overall cost of care across all three patient risk groups and most notably for intermediate and high-risk disease patients.
Poster #21
EVALUATION OF A BLOOD-BASED ASSAY TO PREDICT CLINICAL RESPONSE TO INTRAVESICAL BACILLUS CALMETTE-GUERIN IN PATIENTS WITH UROTHELIAL CARCINOMA OF THE BLADDER

*Michael B. Rothberg, MD1; Wenjun Le2, 3; Ronald L. Davis III1 and Zheng Cui2, 3, 4
1Department of Urology, Wake Forest School of Medicine, Winston-Salem, North Carolina; 2The Institute for Translational Nanomedicine, Shanghai East Hospital; 3The Institute for Biomedical Engineering and Nanoscience, Tongji University School of Medicine, Shanghai, China; 4Department of Pathology, Wake Forest School of Medicine, Winston-Salem, North Carolina
Presented By: Michael B. Rothberg, MD

Introduction: Intravesical instillation of Bacillus Calmette-Guerin (BCG) is the most effective therapy for non-muscle invasive bladder cancer (NMIBC); however, one-third of patients receiving treatment with BCG fail to respond. Identifying non-responders prior to BCG treatment would better utilize this resource and prevent delay of receipt of second line therapies. We sought to evaluate the ability of a novel blood-based assay to predict clinical response to intravesical BCG.

Methods: Eligible patients with biopsy-confirmed NMIBC provided a 10cc blood sample prior to BCG treatment. Leukocytes were fractionated into granulocytes and mononuclear cells with >97% purities. Leukocytes were co-cultured with target cancer cells in the presence of either BCG or E. coli. The cancer killing activity (CKA) of leukocytes, driven by in vitro stimulation from live bacteria, against several cancer cell lines over a 24-hour period was determined.

Results: Of the nineteen patients enrolled, ten patients had a definitive clinical response to intravesical BCG, while five patients were definitive non-responders. Four patients had indeterminate clinical responses. When clinical outcomes were compared to twelve different assay combinations of leukocytes, cancer cells, and bacteria, the CKA from the granulocytes, 5637 bladder cancer cells, and BCG co-cultures gave correct predictions of response to intravesical BCG for twelve of fifteen patients and the CKA from the granulocytes, J82 bladder cancer cells, and BCG co-cultures gave correct predictions of response to intravesical BCG for ten of fifteen patients.

Conclusion: The clinical response to intravesical BCG treatment may be predictable using this novel blood-based assay and warrants further investigation.
Introduction: Bladder cancer cells have a heightened affinity for glucose and demonstrate a shift to aerobic glycolysis-dependent metabolism, known as the Warburg effect. One of the principal drivers of the Warburg effect is pyruvate kinase, PKM2, which oscillates between an active tetramer and an inactive dimer, with the dimer predominating in bladder cancer. Clinically, overexpression of PKM2 is associated with tumor size, nodal metastatic disease, stage, disease progression, and overall survival in other cancer types. We aim to further characterize PKM2 in different bladder cancer cell lines, in particular the dimer known as tumor M2-PK, as a urinary marker of disease and a potential target for cancer treatment.

Methods: UMUC-3 and HTB-9 bladder cancer cells were assessed for proliferation under conditions of differential glucose levels using the hexosaminidase assay. Western blot and Blue-native analysis was performed for protein expression of PKM2. Cells were also treated with shikonin to assess the role of PKM2 in cell proliferation. Institutional review board approval was obtained to collect healthy control and bladder cancer patient urine samples. The ScheBo® M2-PK™ EDTA Plasma Test was performed on urine samples to assess urine tumor M2-PK values.

Results: UMUC-3 and HTB-9 bladder cancer cell lines both demonstrated statistically significant increases in cell proliferation when exposed to higher glucose levels. Compared to the standard 100 mg/dL glucose condition, UMUC-3 cells demonstrated a 2-fold increased growth rate and HTB-9 cells showed a 1.7-fold increase at 200 mg/dL; a 3.75-fold decreased growth rate was observed in UMUC-3 and a 2.8-fold decrease in HTB-9 cells when glucose was reduced to 25 mg/dL. Increased growth in higher glucose concentrations correlated with an up-regulation of PKM2 protein expression on Western Blotting. Treatment with shikonin switched PKM2 isoforms from the dimer to the tetramer and reduced cell proliferation. Dimeric tumor M2-PK was significantly correlated with the presence of bladder cancer in patient samples.

Conclusion: We demonstrate that PKM2, specifically the dimer (Tumor-M2PK), is a urinary marker of bladder cancer and promising as a target of drug therapy.
Poster #23
NATURAL HISTORY OF EARLY HIGH-GRADE BCG FAILURE IN PATIENTS WHO CONTINUE THERAPY IN EORTC TRIAL 30962
*Justin T. Matulay, MD1; Roger Li, MD2; Richard J. Sylvester, MD3 and Ashish M. Kamat, MD, MBBS1
1Department of Urology, Division of Surgery, University of Texas MD Anderson Cancer Center, Houston, TX; 2Department of Genitourinary Oncology, H. Lee Moffitt Cancer Center Research Institute, Tampa, FL; 3European Association of Urology Guidelines Office, Brussels, Belgium
Presented By: Justin T. Matulay, MD

Introduction: The standard treatment of high-risk non-muscle invasive bladder cancer (NMIBC) is intravesical instillation of BCG. It is important to know the natural history of patients who fail early to inform decision-making.

Methods: Between 1997 and 2005, 1355 NMIBC patients without CIS receiving BCG-induction therapy were randomized to 1 or 3 years of BCG-maintenance in EORTC trial 30962. Patients continued treatment until second recurrence or progression. Here in we report on the outcomes data for patients with grade 3 (G3) disease at 3-month cystoscopy (immediately following initial BCG-induction) or at 6-month cystoscopy (following first BCG-maintenance course). We excluded patients who progressed early (within 6 months) to remove influence of potential understaging.

Results: There were 319 patients with G3 NMIBC who received complete induction course of BCG (≥5 instillations) and met our inclusion criteria. Of these 319 patients, 17 (5%) had an early G3 recurrence either at initial post-induction cystoscopy (n=7) or after 1 maintenance course (n=10) – i.e were BCG-refractory. Of the non-BCG refractory patients, 273 (86%) patients remained free of G3 recurrence while 29 recurred with a G3 tumor: 25 (8%) <12 months after last BCG treatment and 4 (1%) ≥12 months from last BCG. Progression occurred in 39 patients (12%); the rate of progression was 53% (9/17) in those who were BCG-refractory, 64% (16/25) in those who had a G3 recurrence within 12 months of last BCG treatment, 50% (2/4) among those with a G3 recurrence >12 months after the last BCG treatment and only 4% (12/273) in those without any G3 recurrence. Patients with recurrences or multiple tumors had the highest progression rates. Death from bladder cancer occurred in 23 patients (7%); this corresponded to 3% (9/273) without prior G3 recurrence, 35% (6/17) BCG-refractory, 28% (7/25) with G3 recurrence <12 months from last BCG treatment and 25% (1/4) with G3 recurrence ≥12 months after last BCG treatment. Recurrent patients had the highest rates of death from bladder cancer.

Conclusion: The timing of G3 recurrence while on BCG therapy has a major impact on progression and death rate. These data must be considered when designing clinical trials in BCG unresponsive patients.
Poster #24
SEQUENTIAL INTRAVESICAL GEMCITABINE AND DOCETAXEL IN THE TREATMENT OF BACILLUS CALMETTE-GUERIN NAÏVE PATIENTS WITH NON-MUSCLE INVASIVE BLADDER CANCER
*Lewis Thomas IV, MD1; Ryan Steinberg, MD2; Kenneth Nepple, MD3 and Michael O'Donnell, MD3
1Department of Urology, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland OH; 2Department of Urology, University of Texas Southwestern Medical Center, Dallas TX; 3Department of Urology, University of Iowa Hospitals and Clinics, Iowa City IA
Presented By: Lewis J. Thomas IV, MD

Introduction: Bacillus Calmette-Guerin (BCG) is the standard of care for patients with new non-muscle invasive bladder cancer (NMIBC) after transurethral tumor resection. Multiple studies have compared single agent intravesical chemotherapy to BCG in BCG naïve cohorts, with nearly all studies demonstrating BCG superiority. However, the use of sequential intravesical chemotherapy in a BCG naïve cohort has not been previously reported. The objective of this work was to determine the efficacy of sequential intravesical gemcitabine and docetaxel (Gem/Doce) in BCG naïve patients with NMIBC.

Methods: Patients without prior BCG exposure who underwent Gem/Doce intravesical treatments were retrospectively identified. These patients had been treated with 6 weekly instillations of gemcitabine (1 gram of gemcitabine in 50ml of sterile water) followed immediately by docetaxel (37.5 mg of docetaxel in 50mL of saline). Patients without evidence of recurrence then underwent maintenance therapy with once monthly instillations for two years. Treatment success was defined as no bladder cancer recurrence and no cystectomy. Intention-to-treat analysis was performed using the Kaplan Meier method.

Results: Thirty patients received treatment with a median overall follow-up of 18 months. Eighty percent (n=24) of patients had high risk disease. Median age was 78 years old. The most common indications for Gem/Doce therapy were “advanced age/frailty” (n=15), “immunosuppression” (n=4), and “BCG Shortage” (n=4). Treatment success was 96% at 3 months, 89% at 1 year, and 89% at 2 years from start of induction. No patients progressed or required cystectomy. Treatments were generally well tolerated, with only one patient unable to tolerate the induction course and two patients deferring maintenance therapy. Common side-effects included urinary urgency/frequency (30%), dysuria (26%), and hematuria (23%). A need for dose reduction or course delay was uncommon (16%). The all-cause mortality rate was 3.5% at 1 year, and 16.5% at 2 years. Neither bladder cancer nor the treatments were the cause of any of the deaths.

Conclusion: Sequential intravesical gemcitabine and docetaxel is an effective treatment for BCG naïve NMIBC. Treatments are generally well tolerated even in a frail and comorbid patient population. Further evaluation of this combination therapy for BCG naïve disease is warranted.
**Poster #25**

**TLD-1433 PHOTODYNAMIC THERAPY FOR BCG-UNRESPONSIVE NMIBC - A PHASE IB CLINICAL STUDY**

*Girish S. Kulkarni, MD, PhD, FRCSC¹,²; Lothar Lilge³,²; Arkady Mandel⁴; Nathan Perlis¹,²; Michael Nesbitt²; Roger Dumoulin-White⁴; Wayne Embree⁴, and Michael A. S. Jewett¹,²

¹University of Toronto, Department of Surgery and Surgical Oncology, Division of Urology; ²University Health Network, Toronto; ³University of Toronto, Department of Medical Biophysics; ⁴Theralase Technologies Inc., Toronto

Presented By: Girish S. Kulkarni, MD, PhD, FRCSC

**Introduction:** TLD-1433 is a ruthenium-based photodynamic compound that demonstrates preferential uptake by bladder cancer cells. Green light (525 nm) activates TLD-1433, releasing free radicals causing cell death. Our aim was to assess the safety, tolerability, pharmacokinetics and exploratory efficacy of TLD-1433 Photodynamic Therapy (PDT) in NMIBC BCG-Unresponsive patients.

**Methods:** TLD-1433 was instilled intravesically in the preoperative holding area for 1 hour. Drug activation was performed using a 525 nm, 3 W laser with a target dose of 90 J/cm² of bladder surface area (transurethrally under general anesthesia with a rigid cystoscope). The laser system continuously measured irradiance [mw/cm²] enabling optimization of the laser light as a function of bladder size, shape and diffuse reflectance. A 3+3 dose escalation strategy, starting with the Maximum Recommended Starting Dose (MRSD) of 0.35 mg/cm² with an increase to the planned Therapeutic Dose (TD) of 0.70 mg/cm² was followed. Safety, tolerability and pharmacokinetics (blood and urine) were reviewed by an independent Data Safety and Monitoring Board. Adverse events (AEs) were recorded according to World Health Organization terminology. Patients underwent cystoscopy at 3 and 6 months post-treatment to assess efficacy, defined as recurrence-free survival.

**Results:** Three patients were treated at the MRSD. At 30 days post treatment, all patients had tolerated the procedure well with no grade 3, 4 or 5 AEs. Pharmacokinetic analysis demonstrated minimal systemic absorption of drug with no photosensitivity reactions. All drug was cleared from the plasma within 72 hrs of activation. Three patients were then treated at the Therapeutic Dose, again with no grade 3, 4 or 5 AEs and an identical pharmacokinetic profile to the half dose. At half dose, all patients had recurrent, but not progressive, NMIBC at the 180 day cystoscopy. At therapeutically dose, 2 of 3 patients were tumour-free at the 180 day cystoscopy. Moderate bladder irritability was reported at full dose which primarily resolved within 90 days.

**Conclusion:** TLD-1433 PDT appears to be a safe and well tolerated treatment at the Therapeutic Dose. An encouraging efficacy signal of CR up to 180 days post-treatment makes this treatment an appealing option for NMIBC BCG-Unresponsive patients and warrants further investigation in a phase II trial.
**Poster #26**

**URINARY CYTOKINE PROFILE TO PREDICT RESPONSE TO INTRAVESICAL BCG WITH OR WITHOUT HS-410 THERAPY IN PATIENTS WITH NON-MUSCLE INVASIVE BLADDER CANCER**

*Amirali Salmasi, MD, MS1,2; David Elashoff3; Rong Guo3; Alexander Upfill-Brown2; Charles Rosser4; Jason Rose5; Louise Giffin5; Louis Gonzalez5 and Karim Chamie1,2*

1Institute of Urologic Oncology, David Geffen School of Medicine at University of California, Los Angeles, California; 2Department of Urology, David Geffen School of Medicine at University of California, Los Angeles, California; 3Department of Medicine Statistics Core, David Geffen School of Medicine, University of California, Los Angeles, California; 4Clinical and Translational Research Program, University of Hawaii Cancer Center, Honolulu, Hawaii; 5Heat Biologics, Durham, North Carolina

Presented By: Amirali Salmasi, MD, MS

**Introduction:** Despite extensive research to identify biomarkers of response in patients with non-muscle-invasive bladder cancer (NMIBC), there is no biomarker to date that can serve this purpose. Herein, we report how we leveraged serial urine samples to query a panel of cytokines at varying time points in an attempt to identify predictive biomarkers of response in NMIBC.

**Methods:** Serial urine samples were collected from 50 patients with intermediate- or high-risk NMIBC enrolled in a phase II study, evaluating intravesical BCG +/- intradermal HS-410 therapy. Samples were collected at baseline, week-7, week-13, week-28 and at end of treatment. 105 cytokines were analyzed in each sample. To predict outcome of time to event (either recurrence or progression), univariate and multivariable Cox analyses were performed. Naive Bayes (NB), a classifier based on applying Bayes’ theorem, which relates a strong independence assumption between features within the classifier, was also used to construct receiving operating curve of selected significant biomarkers.

**Results:** 15 patients developed recurrence and 4 patients progressed during the follow-up period. Among clinicopathologic variables, ever-smoker vs non-smoker status was associated with an improved response rate (HR 0.38, 95%CI 0.14-0.99, p=0.04). In the most clinically relevant model, the percent change (for 100 units) of IL-18 binding protein-a (HR 1.995, 95%CI 1.16-3.44, p=0.01), IL-23 (HR 1.12, 95%CI 1.01-1.23, p=0.03), IL-8 (HR 0.27, 95%CI 0.07-1.08, p=0.06), and interferon-gamma-induced-protein-10 (HR 0.95, 95%CI 0.91-0.99, p=0.04) at week-13 from baseline best predicted time to event (C-index 0.70). In NB classification, lower levels of interferon-inducible T-cell alpha chemoattractant (ITAC), IL-1b, IL-2, IL-16, and macrophage inflammatory protein (MIP-1a/MIP1-b) at week 13 were predictors of higher rate of recurrence or failure. (Table)

**Conclusion:** Urinary cytokines provided additional value to clinicopathologic features to predict response to immune modulation in patients with intermediate- and high-risk NMIBC. Moreover, the predictive value of urinary cytokines was time dependent. Notably, a panel of cytokines measured at week 13 can be used to identify patients who will recur, and thus, has no benefit from further maintenance treatment. This study serves as a hypothesis generating report for future studies to evaluate the role of urine cytokines as a predictive biomarker of response to immune treatments.

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**Table.** Classification analysis of urinary cytokine at week 13 (ITAC, IL16, IL1b, IL2, MIP-1alpha/MIP-1beta). The discriminatory features of model using Naive Bayes technique.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
<th>AUC</th>
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<td>Full training dataset</td>
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<td>0.642</td>
<td>0.311</td>
<td>0.828</td>
<td>0.756</td>
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<tr>
<td>10-fold cross validation</td>
<td>0.642</td>
<td>0.548</td>
<td>0.533</td>
<td>0.65</td>
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Poster #27  
EVALUATION OF CONTEMPORARY URINE CYTOLOGY PERFORMANCE AND THE EFFECT OF ADVANCED CYSTOSCOPIC TECHNIQUES  
*Yuval Freifeld¹ and Yair Lotan¹  
¹UT Southwestern Medical Center  
Presented By: Yuval Freifeld  

Introduction: Urine cytology is one of the cornerstones in the diagnosis and follow-up of patients with urothelial carcinoma of the bladder (UCB). Historic data established cytology to be highly specific although sensitivity varies widely and may be influenced by factors such as reader experience and history of bladder cancer. The introduction of new cystoscopic techniques, such as blue light cystoscopy, may impact the performance of cytology. Our objective was to evaluate the performance of urinary cytology based on contemporary data including the effect of enhanced cystoscopic techniques.

Methods: Individual patient data was obtained from 3 prospective studies, PC B305, PC B308 evaluating the use of Blue Light Cystoscopy with hexaminolevulinate (BL-C), and Cxbladder monitoring study evaluating the Cxbladder Monitor test for the detection of recurrent urothelial carcinoma. Specificity and sensitivity of cytology in each study and for the overall cohort were calculated.

Results: 1487 urine samples from 1375 patients were included in the analysis, overall 615 tumors were detected correlating to 41% of the cytological specimens. Pooled sensitivity and specificity for cytology was 40.8% and 92.8%, respectively. Pooled sensitivity was 11.4% for low grade / WHO grade 1 disease and 54.3% for high grade / WHO grade 3 disease. There were no differences in cytology sensitivity based on the type of cystoscopy used with sensitivity of 41.3% and 40.4% in WLC and BL-C, respectively. Subgroup analysis including CIS showed a trend towards lower cytology sensitivity in BL-C (54.5%) vs WLC (69.2%).

Conclusion: Based on analysis of contemporary data, the sensitivity of cytology for detecting HG and CIS tumors remains low. On a per patient analysis, cytology sensitivity is not affected by the use of advanced cystoscopic techniques except for patients with CIS. The use of cytology as the main adjunct to cystoscopy in high risk patients can lead to missed opportunities for early detection of recurrence and determining which patients are not responding to intravesical therapies like BCG.
**Poster Session I — Full Abstracts**

**Poster #28**

**CONTEMPORARY OUTCOMES OF NON-MUSCLE INVASIVE BLADDER CANCER PATIENTS TREATED WITH BCG**

*Justin T. Matulay, MD; Roger Li, MD; Neema Navai, MD; H. Barton Grossman, MD; Bogdan A. Czerniak, MD; Charles C. Guo, MD; Colin P. N. Dinney, MD and Ashish M. Kamat, MD*

1Department of Urology, Division of Surgery, University of Texas MD Anderson Cancer Center, Houston, TX; 2Department of Genitourinary Oncology, H. Lee Moffitt Cancer Center Research Institute, Tampa, FL; 3Department of Pathology, Division of Pathology Laboratory Medicine, University of Texas MD Anderson Cancer Center, Houston, TX

Presented By: Justin T. Matulay, MD

**Introduction:** Intravesical BCG remains the standard therapy for non-muscle invasive bladder cancer (NMIBC) despite a historical relapse rate of 30-40%. We present the clinical characteristics and natural history from a contemporary cohort who completed induction BCG for NMIBC in an effort to identify predictors of clinical outcomes to aid treatment decisions.

**Methods:** We retrospectively identified NMIBC patients treated with induction BCG at our institution between 2000 and 2015. Only patients receiving full 6 instillation induction therapy were included in the analysis. Cystoscopy was performed at standard intervals to assess response to therapy. All treatment decisions regarding additional BCG treatment (re-induction or maintenance) or definitive therapy (i.e. radical cystectomy) were made by the treating urologist. Clinical outcomes were timed from date of first induction BCG instillation and included recurrence free survival (RFS), cystectomy free survival (CFS), progression free survival (PFS), and cancer specific survival (CSS). Statistical analysis included chi-square, Kaplan-Meier, and binomial logistic regression.

**Results:** In total, 412 patients were included in the final analysis. At baseline our cohort was 80.1% male, 84.7% Caucasian, and 33.9% never-smokers. Disease characteristics included predominantly HG (87.4%) and multifocal (60.7%) disease evenly distributed between T1 (49.5%) and Ta (45.6%) with CIS alone (4.9%) in the remainder. Only 6.1% of patients received prior BCG therapy. In the entire cohort, disease recurred in 41.3% (n=170) at a median 76.2 months (95% CI 63.0-89.4), with of 65 patients (15.8%) undergoing radical cystectomy. Progression occurred in 14.1% (n=58) at a mean 151.1 months (95% CI 142.3-159.9) and 19 patients (4.6%) died from their disease at 158.5 months (95% CI 139.1-177.9). On multivariate analysis (Table) RFS was significantly associated with multifocality and prior BCG; CFS was associated with prior BCG; and PFS was associated with HG disease present on first recurrence.

**Conclusion:** In a contemporary cohort of NMIBC patients who received a complete course of BCG induction, we found that recurrence is common but only 15.8% went on to RC and CSS was excellent at 95.4% over 13 years of follow-up. Repeated therapy with BCG appears to be the strongest indicator of worse clinical outcomes, suggesting these patients might require consideration for other treatment options.

<table>
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<th>p-value</th>
<th>CFS (HR 95% CI)</th>
<th>p-value</th>
<th>PFS (HR 95% CI)</th>
<th>p-value</th>
<th>CSS (HR 95% CI)</th>
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<td>Index Tumor stage</td>
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<td>1.03 (0.26-4.06)</td>
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<td>Solitary</td>
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<td>1.72 (1.60-5.51)</td>
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<td>1.72 (1.64-4.06)</td>
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<tr>
<td>2</td>
<td>2.94 (1.72-11.10)</td>
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<td>1.50 (0.24-9.38)</td>
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</table>

**Note:** Disease recurrence, grade, and tumor stage, 5-year overall survival, and 5-year progression-free survival are reported.
GEO-MAPPING AND SPATIAL ANALYSIS OF ENVIRONMENTAL EXPOSURES IN PATIENTS WITH BLADDER CANCER IN UPSTATE NEW YORK: AN EXPLORATORY STUDY

Hijab Khan1; Zhu Jin1; Ahmed Hussein, MD1; Youssef Ahmed1; Samantha Bulkivish2; Shelby Hall1; Renuka Kannappan1; Omer Rana1; Peter Rogerson3; Samina Raja4 and Khurshid Guru1
1Roswell Park Comprehensive Cancer Center, Dept. of Urology, Buffalo, NY; 2University of Buffalo, Food Systems Planning and Healthy Community Lab, Buffalo, NY; 3University of Buffalo, Dept. of Geography, Buffalo, NY; 4University of Buffalo, Department of Urban and Regional Planning, Buffalo, NY
Presented By: Ahmed A. Hussein, MD

Introduction: The potential association of environmental exposures with bladder cancer is yet to be elucidated. We aimed to map patients treated with bladder cancer at our institution using Geographic Information Systems (GIS), and further attempted to identify and describe any environmental "hot spots."

Methods: A retrospective review of our prospectively maintained database for patients with bladder cancer who visited our institution between 2006 and 2016 was performed. ArcGIS (v 10.4) was used to map patient residential addresses in Erie and Niagara counties in Upstate New York. We also conducted a "Hot Spot" analysis using the Getis-Ord Gi* statistic (using 90-99% confidence intervals). Analysis was conducted at the census block level (the smallest geographic unit used by the US Census Bureau) and accounted for population density of patients older than 50 years. Hot spots were further described in terms of water body quality (using reports from the New York State Department of Environmental Conservation) and industrial site presence (using data from the Environmental Protection Agency Facility Registry Service).

Results: Out of 1543 patients with bladder cancer who visited our institution, 49% lived in Erie and Niagara counties. The mean age was 68 years (SD=13), 68% were males, and 55% used tobacco. Four hot spots were identified (Figure 1). Poor water quality was present in 3 and industrial sites were identified in 2 out of the 4 hot spots. Water was contaminated with priority organic pollutants in one hot spot and pathogens in another. Additional suspected contaminants were present in 2 hot spots. Industrial sites produced specialty chemicals and processed food in one hot spot and fabricated metal at a second.

Conclusion: Spatial clustering of patients in 4 hotspots was identified in Erie and Niagara counties in Upstate New York. Within these hot spots, water quality and industrial sites of environmental concern were also identified. Future work will involve determining the relationship between these exposures, patient characteristics, and prevalence of bladder cancer.

Figure 1: Hot spot analysis of bladder cancer in Erie and Niagara Counties (2006-2016), accounting for population density of people>50 years of age. Census tract level to maintain patient privacy. Industrial sites represented in blue.
Poster #30
PLANNED SECONDARY ANALYSIS OF PURE-01: ROLE OF BLADDER MULTIPARAMETRIC MAGNETIC RESONANCE IMAGING (mpMRI) TO PREDICT PATHOLOGIC RESPONSE TO NEOADJUVANT PEMBROLIZUMAB AND UPDATED EFFICACY ANALYSES

*Andrea Necchi, MD1; Antonella Messina1; Alberto Briganti2 Daniele Raggi1; Elena Farè1; Filippo Pederzoli2; Maurizio Colecchia1; Marco Bianchi2; Renzo Colombo3; Andrea Gallina2; Andrea Salonia2 and Francesco Montorsi3
1Fondazione IRCCS Istituto Nazionale dei Tumori, Milano, Italy; 2Vita Salute San Raffaele University and Urological Research Institute, IRCCS San Raffaele Hospital, Milano, Italy; 3Vita Salute San Raffaele University and Urological Research Institute, IRCCS San Raffaele Hospital, Milano, Italy
Presented By: Andrea Necchi, MD

Introduction: Preliminary findings from PURE-01 study (pembrolizumab before radical cystectomy [RC] in muscle-invasive bladder carcinoma [MIBC] reported pathologic complete responses (pT0) in 42% of patients (Necchi A et al, ASCO 2018). We herewith present a secondary outcome analysis and updated efficacy.

Methods: In the PURE-01 study (NCT02736266), pembrolizumab was administered prior to RC in clinical T2-3bN0M0 patients. The patients were assessed with bladder mpMRI before and after treatment (3 cycles of 200 mg pembrolizumab every 3 weeks) prior to RC. All mpMRI examinations were made through bladder catheterization to allow for consistent bladder wall distension. The imaging protocol consisted of triplanar T2-weighted fast spin-echo sequences, DWIs in transverse planes at different b-values and DCE after the injection of contrast agent. Radiologic response was assessed as follows: complete response (CR), partial response (PR), defined as a reduction in bladder tumor volume ≥65%, or an apparent diffusion coefficient (ADC) value ≥1 in post-therapy target lesions.

Results: From 02/17 to 05/18, 61 patients were enrolled. 32 (52.5%) had cT3, 27 (44.3%) had cT2, and 2 (4%) had cT2-3N1. All patients underwent RC: there were 24 pT0 (39.3%, 95% CI: 28.1–51.9%). Downstaging to pT<2 was obtained in 36 patients (59%, 95% CI: 46.5–70.5%). In 51.3% of the patients with PD-L1 CPS≥10% (n=39), RC indicated pT0, whereas RC indicated pT0 in only 15.8% of those with a CPS<10% (n=19). A total of 34 patients had assessable disease with mpMRI. Radiologic response was obtained in 14 patients (41.2%). Median “mean ADC” of post therapy lesions in pT0 patients was 1 versus 0.8 in non-pT0 patients. In total, 8 patients (23.5%) showed CR (n=7) or PR (n=1), and 7 patients (20.6%) showed ADC≥1, respectively. Sensitivity and specificity of bladder mpMRI assessments are shown in the Table, for both the pT0 and pT≤1 endpoints.

Conclusion: The features of ADC value response post-immunotherapy recapitulate those after chemotherapy, although the utility of ADC assessment deserves additional studies on post-immunotherapy tumor lesions, pending DCE evaluation. Conversely, volumetric response provides valid assessment of pT≤1 response. Activity of pembrolizumab is confirmed with a larger sample size.

<table>
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<th>Endpoint: pT≤1</th>
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<td>CR+PR</td>
<td>8</td>
<td>Sensitivity: 62.5% Specificity: 89.5%</td>
<td>Sensitivity: 100% Specificity: 80.8%</td>
</tr>
<tr>
<td>ADC≥1</td>
<td>7</td>
<td>Sensitivity: 28.5% Specificity: 95%</td>
<td>Sensitivity: 57.1% Specificity: 90%</td>
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</table>
**Poster #31**

**SURGICALLY-INDUCED STRESS ALTERS TUMOR SURVIVAL AND RESPONSE TO ADJUVANT IMMUNOTHERAPY IN BLADDER CANCER**

*Karen Wheeler, MD, PhD1; Niannan Ji1; Neelam Mukherjee1 and Robert Svatek1*

University of Texas Health Science Center San Antonio, Urology Dept, San Antonio TX

Presented By: Karen Wheeler, MD, PhD

**Introduction:** Bladder cancer (BC) remains one of the deadliest of all genitourinary cancers. The mainstay of treatment remains radical cystectomy. Recent success of adjuvant anti-PDL1 immunotherapy following surgery for lung cancer has infused interest in post-operative immunotherapy following radical cystectomy and several adjuvant trials are underway. However, surgery itself causes immune dysregulation, which could influence the response to adjuvant immune therapy. The influence of surgery on subsequent immunotherapy is not known.

**Methods:** C57BL/6 mice were challenged with BC and then subjected to anesthesia with or without surgery (2 cm midline laparotomy) under sterile conditions. Metastatic cancer was induced by injecting 0.5 x 10^6 MB49 bladder tumor cells via tail vein into male mice on the day of surgery. Orthotopic (bladder) cancer was induced by catheterizing the bladders of female mice and injecting poly-L-lysine followed by 0.08x10^6 MB49 cells, one day prior to surgery. Anti-PD-L1 was given intraperitoneally on days 1, 7, and12 after surgery. Mice were followed for survival and necropsy was done at time of death. Immune studies were conducted on spleen and tumor-draining lymph nodes (TDLNs) to examine effect of surgery on exhausted T cell phenotypes.

**Results:** Surgery caused a profound increase in pulmonary and liver metastasis associated with reduced survival in mice challenged with MB49 via tail vein (A). As potential mechanisms, surgery increased the percentage of exhausted splenic T cells characterized by expression of PD-1, TIM-3, and LAG-3 and diminished natural killer (NK) production of the pro-inflammatory cytokines IFN-γ and TNF-α (B). Surgery alone had no effect on survival of mice that did not receive bladder tumors. However, surgery does significantly decrease the efficacy of α-PD-L1 immunotherapy against orthotopic MB49 bladder tumors (C). As expected, α-PD-L1 immunotherapy increased the generation of tumor-specific cells in TDLNs, but surgery significantly reduced this effect (D).

**Conclusion:** Surgical stress dampens NK cell cytotoxic cytokines and promotes bladder cancer metastasis. Surgery also suppresses tumor-specific immunity and clinical response to α-PD-L1 BC immunotherapy. These findings have important implications for surgical management of BC and the potential efficacy of adjuvant BC immunotherapy.
Poster #32
THE CONTINUING STAGE MIGRATION FOR RENAL CELL CANCER: UPDATED ANALYSIS OF NATIONAL CANCER DATABASE
*Syed Johar Raza, MD1; Sameer Siddiqui1 and Zachary Hamilton1
1Division of Urology, Saint Louis University Hospital, St. Louis MO
Presented By: Syed Johar Raza, MD

Introduction: Previous analysis of the national cancer database (NCDB), revealed a stage migration for renal cell carcinoma (RCC) with increased diagnosis of AJCC stage I disease and a simultaneous decline of advanced stages. It remains unknown if this trend has continued in the most recent decade. Our aim was to analyze stage patterns of disease presentation, with a secondary analysis of overall survival (OS) outcomes.

Methods: The NCDB was queried for RCC cases between 2004 and 2015. Patients were stratified by AJCC stage, and histology codes included clear cell, renal cell carcinoma not otherwise specified, papillary, and chromophobe. Linear regression analysis and chi-square was performed to determine trends in presentation over time. Cox regression and Kaplan-Meier (KM) survival curves were utilized for survival. Data was analyzed using SPSS v24 with p<0.05 denoting significance.

Results: A total of 296395 patients were identified with RCC over the study period. The incidence of RCC increased from 2004 to 2015 (11634 vs 34793 cases). Comparing 2004 to 2015, there was a significant proportional increase in stage 1 (58.9% vs 66.6%) with subsequent decrease in stage 3 (8.5% vs 7.9%) and stage 4 (21.2% vs 14.9%, all p<0.001). No change in stage 2 disease was seen (10.4% vs 10.6%, p=0.329). Additionally patients with clinical metastatic disease also significantly decreased from 19.1% to 12.7% (p<0.001). On KM analysis, the 5 year OS was noted to be 82%, 74.8%, 60% and 12.7% for AJCC stage I, II, III and IV respectively. On multivariable Cox regression analysis age, higher Charlson score, higher AJCC stage and non clear cell histology were significant predictors of mortality.

Conclusion: The incidence of RCC is increasing with a continued proportional stage migration towards stage 1 disease and decrease in advanced cases. AJCC staging continues to be a good prognostic indicator of overall survival, along with other clinical and pathologic indicators.
Poster #33
SALVAGE AND PALLIATIVE RADIATION IN OLIGOMETASTATIC RENAL CELL CARCINOMA: A DESCRIPTIVE COHORT ANALYSIS
Ross Avant, MD; *Mary E. Westerman, MD; Christine Lohse, MD; R. Houston Thompson, MD and Aaron M. Potretzke, MD
Mayo Clinic Department of Urology, *Mayo Clinic Department of Health Science
Presented By: Mary E. Westerman, MD

Introduction: In renal cell carcinoma (RCC), radiation therapy (RT) has been described as an adjunctive intraoperative therapy to provide maximal margin control during resection as well as a primary therapy for local disease control for patients with metastatic spinal lesions. To our knowledge however, the role of RT in controlling oligometastatic RCC (oRCC) with or without adjunctive therapy has not been previously described.

Methods: 3,865 patients treated with radical or partial nephrectomy for unilateral, sporadic ccRCC between 1970 and 2010 of whom 334 (8.6%) patients had oRCC either synchronous (41%) or metachronous (59%). Descriptive statistics were performed.

Results: Of 334 patients with oRCC, 84 (25%) patients received RT for a solitary metastatic lesion of which 41 (49%) were synchronous and 43 (51%) were metachronous. Following surgery, mean time to lesion development was 42.8 months. Bone lesions (70%) were most common, followed by brain (16%) and lung (4.6%). 16 (37%) were treated with a combination of surgery and XRT and 49% required systemic therapy. Following diagnosis and treatment of oRCC, 65% developed additional metastatic disease at a mean of 11 months. With follow up of 25.4 months, 35 (81%) patients died, including 83% who died from RCC. Eight (18.6%) were still alive at a mean of 35 months, however only 3 (7%) were free of disease. 2 of the 3 had undergone concurrent surgery.

Conclusion: Use of radiotherapy in treatment of metachronous oRCC is uncommon and rarely curative. Most patients develop additional sites of metastatic disease requiring subsequent systemic therapy.
**Poster Session I — Full Abstracts**

**Poster #34**

**FIRST-LINE SYSTEMIC THERAPY FOR METASTATIC RENAL CELL CARCINOMA: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS**

*Zachary Klaassen, MD; Christopher J. D. Wallis; Bimal Bhindi; Xiang Y. Ye; Thenappan Chandrasekar; Ann M. Farrell; Hanan Goldberg; Stephen A. Boorjian; Bradley Leibovich; Girish S. Kulkarni; Prakesh S. Shah; Georg A. Bjarnason; Daniel Heng; Raj Satkunasivam and Antonio Finelli*

1Medical College of Georgia at Augusta University, Augusta, GA; 2Georgia Cancer Center, Augusta, GA; 3University of Toronto, Division of Urology, Toronto, ON, Canada; 4Mayo Clinic, Department of Urology, Rochester, MN; 5MiCare Research Centre, Mount Sinai Hospital, Toronto, ON, Canada; 6Thomas Jefferson University, Philadelphia, PA; 7Mayo Clinic Libraries, Mayo Clinic, Rochester, MN; 8Department of Paediatrics, Mount Sinai Hospital, Toronto, ON, Canada; 9Sunnybrook Health Sciences Centre, Division of Medical Oncology, Toronto, ON, Canada; 10University of Calgary, Department of Oncology, Calgary, AB, Canada; 11Department of Urology and Center for Outcomes Research, Houston Methodist Hospital, Houston, TX

Presented By: Zachary Klaassen, MD

**Introduction:** In the last decade, there has been a proliferation of treatment options for metastatic renal cell carcinoma (mRCC). However, direct comparative data are lacking for most of these agents. The objective of this study was to indirectly compare the efficacy and safety of systemic therapies used in the first-line treatment of mRCC.

**Methods:** Medline, EMBASE, Web of Science, and Scopus databases were searched using the OvidSP platform for studies indexed from database inception to February 10, 2018. Abstracts of conferences of relevant medical societies were included, and the systematic search was supplemented by hand search. For the systematic review, we identified any parallel-group randomized controlled trials assessing first-line systemic therapy. For network meta-analysis, we used fixed-effect models with Bayesian approach for the direct and indirect treatment comparisons, limited to a clinically-relevant network based on standard practice patterns. Progression-free survival (PFS) was the primary outcome. Overall survival (OS) and grade 3 and 4 adverse events (AEs) were secondary outcomes.

**Results:** In total, 37 trials reporting on 13,128 patients were included in the systematic review. The network meta-analysis comprised 10 trials reporting on 4,819 patients. Compared to treatment with sunitinib, PFS (10 trials, 4,819 patients) differed in a significant manner only for those patients who received cabozantinib (HR 0.48, 95% credible interval (CrI) 0.31-0.74), leading to a high likelihood (SUCRA 91%) that cabozantinib was the preferred treatment. For OS (5 trials, 3,379 patients), compared to sunitinib, only nivolumab plus ipilimumab was associated with a significantly lower risk of overall mortality (HR 0.68, 95%CrI 0.55-0.85), leading to a 48% chance that nivolumab plus ipilimumab was the preferred option. There was a 67% likelihood that nivolumab plus ipilimumab was the best tolerated regime with respect to AEs.

**Conclusion:** Cabozantinib and nivolumab plus ipilimumab are likely to be the preferred first-line agents for treating mRCC; however, direct comparative studies are warranted. These findings may provide guidance to patients and clinicians when making treatment decisions and may help inform future direct comparative trials.
Poster #35
THE PREDICTIVE ROLE OF PREOPERATIVE HEMATOLOGICAL PARAMETERS IN SARCOMATOID RENAL CELL CARCINOMA
*Roy Mano, MD 1; Kyle A. Blum, MD, MSc 1; Renzo G. DiNatale, MD 1; Andrew W. Silagy, MD 1; Julian Marcon, MD; Jonathan A. Coleman, MD 1; Paul Russo, MD 1 and A. Ari Hakimi, MD 1
1Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, New York
Presented By: Roy Mano, MD

Introduction: Pre-operative hematological parameters have a prognostic role in patients with renal-cell carcinoma (RCC); however, their predictive value in RCC with sarcomatoid dedifferentiation is uncertain. We aimed to evaluate the association between pre-operative hematological parameters and the outcome of patients with localized and metastatic sarcomatoid RCC who underwent nephrectomy.

Methods: After obtaining IRB approval we queried our institutional nephrectomy database and identified 230 patients with sarcomatoid RCC who underwent nephrectomy between the years 1994 – 2018 and had a complete blood count drawn within 1 month before the procedure. The pre-operative neutrophil lymphocyte ratio (NLR), lymphocyte monocyte ratio (LMR) and platelet lymphocyte ratio (PLR) were calculated and evaluated as continuous variables and dichotomized based on maximally selected rank statistics. The Kaplan-Meier method was used to estimate survival. Univariate and multivariate Cox regression models were used to identify independent predictors of outcome. Model discrimination were compared using the Harrell c-index.

Results: The study cohort included 177 males (77%) and 53 females (23%) with a median age of 60 years (IQR 52, 68). 115 patients underwent nephrectomy for localized disease and 115 underwent cytoreductive nephrectomy. Median (IQR) NLR, LMR and PLR were 3.8 (2.9, 5.42), 2.83 (2, 4) and 218 (161, 318). Median follow-up for survivors was 32 months (IQR 9, 56). Estimated 2- and 5-year cancer specific survival rates were 73% and 57% for patients who were treated for localized disease and 36% and 21% for patients who underwent cytoreductive nephrectomy. NLR, LMR and PLR were all significant predictors of cancer specific survival on univariate and multivariate analyses (Table 1). Adding NLR, LMR and PLR to the base model adjusted for tumor size, margin status, T-stage and M-stage increased the c-index for cancer specific survival from 0.69 to 0.722, 0.713 and 0.705, respectively. NLR remained a significant predictor of outcome in subgroup analyses of patients who underwent cytoreductive nephrectomy and nephrectomy for localized disease.

Conclusion: Pre-operative hematological parameters may assist in predicting outcome of patients undergoing nephrectomy for localized and metastatic sarcomatoid RCC. Among the parameters studied, NLR increased the ability to discriminate between outcomes the most and should be evaluated in future studies.

Table 1 – Univariate and multivariate predictors of cancer specific survival for patients undergoing nephrectomy for sarcomatoid RCC (n=230)

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<th>Variable</th>
<th>Univariate model</th>
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<td>HR (95% CI)</td>
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Introduction: Sarcomatoid renal cell carcinoma (sRCC) is associated with a poor prognosis. Predisposing factors of this mesenchymal dedifferentiation of the tumor remain unknown. In this context, we examined the association of potential pathogenic factors with the presence of sRCC.

Methods: Data from patients with a renal cell carcinoma from both UCLA and the French UroCCR network (patients with sRCC, UroCCR n°45 study) between 1974 and 2018 were retrospectively analyzed. A cohort of patients with sRCC was compared with UCLA patients with renal cell carcinoma without sarcomatoid features (nsRCC). Potentials factors included age, estimated glomerular filtration rate (eGFR, CKD-EPI), gender, smoking status, hypertension, and endocrine disorders: diabetes and hypothyroidism. We quantified the association of these factors with the presence of sRCC in univariable and multivariable logistic regression analyses.

Results: A total of 586 patients with sRCC were compared with 2,178 patients with nsRCC. Mean age, and relative frequency of male gender, active smoker, and diabetes, for sRCC and nsRCC were 63 vs. 60 years, 73% vs. 66%, 23% vs. 14%, and 18% vs. 14%, respectively. On univariable analysis, age (OR=1.017, 95%CI [1.010-1.025], p<.0001), male gender (OR=1.35, 95%CI [1.10-1.65], p=.004), active smoking (OR=1.87, 95%CI [1.48-2.36], p<.0001), and diabetes (OR=1.32, 95%CI [1.03-1.70], p=.026) were associated with the presence of sarcomatoid dedifferentiation (Table 1a). On multivariable analysis, age (+2.1% per year, OR=1.021, 95%CI [1.013-1.029], p<.0001), male gender (OR=1.33, 95%CI [1.08-1.64], p=.008), and active smoking (OR=1.95, 95%CI [1.54-2.47], p<.0001) were independently associated with the presence of sarcomatoid dedifferentiation (Table 1b). The AUC of the model was 0.61.

Conclusion: In this study we found that sarcomatoid dedifferentiation was associated with age, male gender, and active smoking. Further studies are needed to confirm these results and perhaps establish the underlying biology that may contribute to these findings.
**Poster Session I — Full Abstracts**

**Poster #37**

**PRIMARY SMALL CELL CARCINOMA OF THE KIDNEY: DISEASE CHARACTERISTICS AND OUTCOMES**

*Kyle P. Michelson, BA1; Nicholas Suss1; Dennis Robins, MD1; Viktor Flores, MD1; Thomas Monaghan1; Brian McNeil, MD1; Jeffrey Weiss, MD1,2 and Andrew Winer, MD1,3*

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Presented By: Kyle Peter Michelson, BA

**Introduction:** Primary small cell carcinoma (PSCC) of the kidney represents a rare disease entity. There is little data about the characteristics, optimal therapies, and survival associated with this malignancy. We examined the largest cohort of patients to date with PSCC of the kidney in order to better characterize the disease.

**Methods:** We utilized the National Cancer Database (NCDB) to identify patients with histology-confirmed primary small cell carcinoma of the kidney with no history of other malignancies between 2004 and 2015. Three patients with unknown treatment regimens and the one patient who received radiotherapy alone were excluded from analysis. Adjusted Cox proportional hazards regression was utilized to assess overall patient survival. Kaplan-Meier analysis was used to estimate median survival time.

**Results:** We identified 121 patients with PSCC of the kidney who met inclusion criteria. The patients with treatment had a median overall survival time of 10.28 months. 23.1% of patients had no treatment, with a median survival of 1.64 months. We found no gender predominance in disease prevalence (Table 1). Female gender, however, was associated with increased mortality when compared to males (p=0.043, OR 2.02). Patients treated at academic facilities had significantly improved survival (p=0.046, OR 2.80) fared worse compared to those treated at comprehensive community cancer programs. Metastasis upon presentation, found in 47.1% of patients, was associated with an increased risk of mortality (p=0.043, OR 2.23), as was lymph node involvement (cN1: p=0.05, OR 2.46). Surgery alone was performed in 26.4% of patients with a median survival of 9.00 months (Figure 1) compared to 13.50 months in the 18.2% of patients who received surgery with adjuvant chemotherapy (p=0.37).

**Conclusion:** PSCC of the kidney is a rare and very aggressive malignancy with a median survival less than one year. In the largest cohort of such patients to date, we found that multimodal treatment approaches improve survival. Surgery alone is associated with a lower median survival time, despite being the most frequently employed treatment modality. Future studies should focus on correlating clinical tumor staging with specific treatment modalities to best optimize management for individual patients.
Introduction: The Mayo Clinic classification for renal cell carcinoma with inferior vena cava (IVC) extension may not be optimized for predicting perioperative morbidity. Further, there has been confusion in the literature as to whether a level III thrombus corresponds to a tumor above the caudate venous branches or major hepatic veins. We sought to determine whether operative maneuvers were associated with complications following nephrectomy with IVC thrombectomy, and whether this could be used to refine the existing classification.

Methods: We identified patients treated with radical nephrectomy and level I-IV IVC thrombectomy at our institution and grouped them into training (2000-2010) and validation (2011-2015) cohorts. Associations between clinical and operative variables with 30-day postoperative complications, prolonged length of stay (≥ 75th percentile) and extensive units of blood transfused (≥ 75th percentile) were examined in the training cohort using logistic regression and were used to propose a modified thrombus classification. Preoperative images were reviewed by one radiologist to determine the proposed classification. Discrimination of the current and proposed classifications for perioperative outcomes was evaluated using AUCs.

Results: There were 166 patients in the training cohort and 87 in the validation cohort, of whom 52 (31%) and 29 (33%) experienced a complication within 30 days, respectively. On univariable analysis, operative maneuvers most strongly associated with adverse outcomes included a retro- or suprahepatic IVC clamp position and need for cardiopulmonary bypass. Modified thrombus levels were proposed: level I (into IVC below inferior margin of the caudate lobe), level II (above inferior margin of caudate lobe, below major hepatic veins), level III (above major hepatic veins, below diaphragm), level IV (above diaphragm). Discrimination of the current and proposed classifications for perioperative outcomes was similar (Table). On multivariable analysis, only clinical features including tumor size, ECOG status ≥ 1, preoperative varicocele, and need for additional surgical procedures were statistically significantly associated with 30-day complications.

Conclusion: We propose a modification to the Mayo Clinic thrombus classification that more clearly informs the need for specific operative maneuvers, clarifies ambiguity over the importance of the major hepatic veins, and retains similar associations with perioperative outcomes.

Table: Univariable Associations of the Current and Proposed Thrombus Classifications with Perioperative Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Any 30-day Complication AUC</th>
<th>Prolonged Length of Stay (≥ 75th percentile) AUC</th>
<th>Extensive Units of Blood Transfused (≥ 75th percentile) AUC</th>
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<tr>
<td>Training Cohort</td>
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<tr>
<td>Current Classification</td>
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<td>0.61</td>
<td>0.72</td>
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<td>Proposed Classification</td>
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<td>Validation Cohort</td>
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<td>Current Classification</td>
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<td>Proposed Classification</td>
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Poster #39
PREDICTORS OF RECEIVING A LYMPH NODE DISSECTION AT THE TIME OF SURGERY FOR NON-METASTATIC RENAL CELL CARCINOMA

Kushan Radadia1; Zorimar Rivera-Nunez2; Sinae Kim3; Nicholas Farber1; *Joshua Sterling, MD1; Parth Modi1; Sharad Goyal2; Rahul Parikh1; Robert Weiss1; Isaac Kim1; Sammy Elsamra1; Thomas Jang1 and Eric Singer1

1Section of Urologic Oncology, Rutgers Cancer Institute of New Jersey, New Brunswick, NJ; 2Department of Radiation Oncology, Rutgers Cancer Institute of New Jersey, New Brunswick, NJ; 3Division of Biometrics, Rutgers Cancer Institute of New Jersey, New Brunswick, NJ

Presented By: Joshua Sterling, MD

Introduction: The benefit of a lymph node dissection (LND) in renal cell carcinoma (RCC) remains poorly defined. Despite this uncertainty, the American Urological Association (AUA) guideline on localized renal cancer recommends that LND be performed for staging purposes when there is suspicion of regional lymphadenopathy on imaging. Using the National Cancer Database (NCDB), we examined factors associated with the receipt of LND at the time of kidney surgery.

Methods: The NCDB was queried for non-metastatic patients who underwent partial nephrectomy or nephrectomy for RCC from 2010 to 2014. Patient socio-demographics, clinical characteristics, and treatment factors were extracted. Logistic regression models were used to examine factors associated with the receipt of LND.

Results: We identified 110,963 patients who underwent surgery for RCC, of whom 11,867 (11%) had LND performed at the time of surgery. Clinical lymph node (cLN) and pathologic lymph node (pLN) information were available in 11,300 patients, of which 1,725 were preoperatively staged as having positive cLN. In the entire study population, patients who were cLN positive were approximately 19 times more likely to receive a LND at the time of surgery (OR: 18.68, 95%CI: 16.62-21.00). Among patients who were cLN negative (n=106,370), patients who received care at an academic/research institution (OR: 1.58, 95%CI: 1.43-1.74), traveled farther (>31 miles) to a treatment center (OR: 1.22, 95%CI: 1.14-1.30), and had a higher clinical tumor (cT) stage (cT2-4, OR range: 4.87-11.1) were more likely to undergo a LND despite being cLN negative. Patients who underwent robotic or laparoscopic surgery were less likely to receive a LND compared to open surgery (OR: 0.73, 95%CI: 0.69-0.78 and OR: 0.60, 95%CI: 0.59-0.66 respectively) (Table 1).

Conclusion: The greatest single predictor of LND receipt is being cLN positive. Among patients who are cLN negative, predictors of undergoing LND include treatment center type, distance to the treatment center, and cT stage. The impact of treatment center type and location on access to and outcomes from RCC surgery need further investigation. Additional studies to determine the accuracy of clinical staging and assess novel preoperative imaging modalities that evaluate nodal involvement are indicated.

Table 1. Multivariable logistic regression model that predicts receipt of lymphadenectomy in patients with non-metastatic RCC who are cLN negative (n = 106,370).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio (OR)</th>
<th>95% Confidence Interval (CI)</th>
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<td>cLN Positive</td>
<td>18.68</td>
<td>16.62-21.00</td>
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<tr>
<td>Academic/Research Institution</td>
<td>1.58</td>
<td>1.43-1.74</td>
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<td>Distance &gt;31 Miles</td>
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<td>1.14-1.30</td>
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<tr>
<td>Clinical T Stage cT2-4</td>
<td>4.87-11.1</td>
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<td>Robotic Surgery</td>
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<tr>
<td>Laparoscopic Surgery</td>
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</table>
Poster #40
PRELIMINARY INVESTIGATION OF RADIOGENOMICS IN SARCOMATOID DEDIFFERENTIATION OF RENAL CELL CARCINOMA

Julian Marcon1; Renzo G. Di Natale1; Andrew W. Silagy1; Roy Mano1; Kyle A. Blum1; Eduard Reznik2; Jonathan A. Coleman1; Paul Russo1; Cihan Duzgol3; Oguz Akin3 and A. Ari Hakimi1

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Presented By: Julian Marcon

**Introduction:** Sarcomatoid dedifferentiation of renal cell carcinoma (sRCC) can occur in any RCC subtype and is associated with aggressive tumor biology and poor prognosis. The association between imaging features and genomic mutations has been examined in clear cell RCC and has revealed specific radiogenomic subgroups with prognostic value. This study aims to correlate imaging features with genomic findings in the sRCC setting and explore their association with survival.

**Methods:** After obtaining IRB approval we analyzed data for 25 patients who underwent nephrectomy with a histological diagnosis of sRCC between April 2012 and October 2017. All patients had a preoperative CT scan available for review and underwent comprehensive molecular testing using next-generation targeted gene sequencing (MSK-IMPACT). The top mutated genes in our cohort were evaluated (VHL, TERT, PTEN, BAP1, PBRM1, SETD2, ARID2, TP53). Segmentation analysis tracking was performed using TeraRecon iNtuition® v4.4.13 software to determine tumor volume, long axis tumor size and mean attenuation values. The presence of multiple morphological features was also evaluated (e.g. locoregional lymphadenopathy, renal vein invasion). Statistical analysis included Fisher’s exact test and Wilcoxon test for the comparison of genomic findings and imaging features, Cox proportional-hazards model and log-rank test were used for survival analysis.

**Results:** The cohort included 19 men and 6 women at a median age of 52 years (IQR: 46-58). Median patient follow-up of the whole cohort was 25.9 months (IQR 12-37.6). 10 patients died of kidney cancer within the observation period. There was a significant association between tumor volume and mutation in the TP53 gene (p=0.029, Fig. 1A). No significant associations were found between genomic alterations and survival. However, higher tumor volume and radiographic presence of locoregional lymphadenopathy were significantly associated with worse survival (HR=7.85, 95% CI: 1.5-40, p=0.013, q=0.035 and HR: 7.26, 95% CI: 1.9-27.5, p=0.004, q=0.025, respectively, Fig. 1B).

**Conclusion:** The association between TP53 mutation and tumor size in the current cohort may suggest that TP53 is an important driver event in large sRCC tumors. Importantly, size was the most significant clinical predictor for overall survival. Further studies in larger patient cohorts are required to validate these findings.
IMPROVING THE DEFINITION OF HIGH-RISK PATIENTS FOR TUMOR RECURRENCE IN CLEAR CELL CARCINOMA - THE U-CISS CLASSIFICATION

Cedric Lebacle, MD; Nils Kroeger, MD; Aydin Pooli, MD; Sandy T. Liu, MD; Karim Chamie, MD; Arie S. Beldegrun, MD; Alexandra Drakaki, MD and Allan J. Pantuck, MD

1Institute of Urologic Oncology, Department of Urology, David Geffen School of Medicine at UCLA, Los Angeles, CA; 2Department of Urology, University Hospital Bicetre, APHP, University Paris-Saclay, Le Kremlin Bicetre, France; 3Department of Urology, University Medicine Greifswald, Germany; 4Department of Hematology and Oncology, David Geffen School of Medicine at University of California, Los Angeles, CA

Presented By: Aydin Pooli, MD

Introduction: Thirty percent of patients with localized clear cell renal cell carcinoma (ccRCC) will ultimately develop metastatic disease or local recurrence after nephrectomy. However, current clinical/pathological risk stratification systems still misclassify patients who will ultimately recur after surgery. Given the recent approval of sunitinib in the adjuvant setting for high-risk nephrectomized patients, optimized methods to better stratify risk of recurrence is important. We sought to improve the existing UISS for prognostication of high risk patients by the addition of genetic information in a new UCLA cytogenetic integrated staging system (U-CISS).

Methods: A total of 240 patients from the UCLA cytogenetic database with ccRCC and cytogenetic analysis were included in the study. Fifty patients developed tumor recurrence. The UCLA cytogenetic database was used to assign ccRCC to a new high-risk group. In a continuation of our previous research, cytogenetic (combined loss 3p-14q) and a pathological high-risk feature (microvascular invasion MVI) were implemented in the UISS. Association with recurrence free survival (RFS) was analyzed in a univariable and multivariable fashion; prognostic accuracy was tested with the concordance index. All tumors that had either MVI, combined loss 3p/14q or both in the low-risk group were placed into the new U-CISS intermediate group. Tumors with one or both risk factors in the intermediate group were placed into the new U-CISS high-risk group.

Results: On multivariate analysis, combined loss 3p-14q, and MVI were independent prognostic factors. The U-CISS placed significantly better prognosticated RFS in the high-risk group (7/50 (14%) with UISS vs. 23/50 (46%) with U-CISS) and thus, was more accurate in prognosticating RFS (Figure 1). The c-index for recurrence prognostication was improved in the U-CISS (0.70 vs. 0.65 for the UISS). Furthermore, the U-CISS also was a better prognostication tool when the intermediate and high-risk group were combined (prognostication of 74% with U-CISS vs. 68% UISS).

Conclusion: The use of U-CISS, which integrates genomic alterations with traditional clinical and pathologic features, allowed a re-allocation of patients to create a better stratification of recurrence risk. This new definition of high-risk of recurrence could significantly improve selection of patients who are in greatest need of closer surveillance and/or adjuvant treatment.
Poster #42
IMMUNE RESPONSE IN PATIENTS WITH METASTATIC RENAL CELL CARCINOMA TREATED WITH ADGMCA9 (DC-ADGMCAIX) FROM THE PHASE I, OPEN LABEL, DOSE ESCALATION AND COHORT EXPANSION STUDY

*Izak Faiena, MD 1; Nazy Zomorodian 1; Beata Berent-Maoz 2; Ankush Sachadeva 1; Adrian Bot 3; Fairouz Kabinnova 1; Jonathan Said 1; Gardenia Cheung-Lau 1; Jia Pang 1; Mignonette Macaballi 1; Thinite Chodon 1; Xiaoyan Wang 1; Paula Cabrera 2; Paula Kaplan-Lezco 2; Sandy Liu 2; Begonya Comin-Anduix 3; Allan Pantuck 1; Arie Beldegrun 1; Karim Chamie 1 and Alexandra Drakaki 1
1Institute of Urologic Oncology, Department of Urology, David Geffen School of Medicine at University of California, Los Angeles, CA; 2Department of Medicine, Division of Hematology and Oncology, David Geffen School of Medicine at University of California, Los Angeles, CA; 3Department of Medicine, Division of Hematology and Oncology, David Geffen School of Medicine at University of California, Los Angeles, CA; 4Department of Pathology, David Geffen School of Medicine at University of California, Los Angeles, CA; 5Department of Surgery, Division of Surgical Oncology and Jonsson Comprehensive Cancer Center University of California Los Angeles, Los Angeles, CA; 6Center for Immunotherapy, Roswell Park Cancer Institute, Buffalo, NY; 7Department of General Internal Medicine and Healthy Services Research, University of California Los Angeles, Los Angeles, CA

Presented By: Izak Faiena, MD

Introduction: Patients with mRCC were treated in a phase I trial with autologous dendritic cells transduced by a replication deficient adenovirus comprised of GM-CSF+CAIX. Nine patients in three dose-escalation cohorts (5, 15, and 50X10^6 cells/administration) were injected based on a 3+3 design.

Methods: An enzyme-linked immunospot (ELISpot) assay determined the frequency of CAIX-specific IFN-γ producing T-cells in blood. 15-mer overlapping peptides from CAIX-protein, AdV5-pepton, and controls (+/-) were plated in Elispot plates pre-coated with anti-IFN-γ antibody. Subsequent to assay development, the number of T-cells responding to CAIX was calculated as above the lower limit of detection (LLD). After subtracting the backgrounds, fold-change was calculated with respect baseline. Positive immunological response was defined as the mean fold-change plus two. Further assessment included immunohistochemistry (IHC) staining of tissue from patients #4 (with PD) and #8 (with SD) for CAIX, CD4/8, Ki67, GrZB, PD1/L1. The samples were scored based on percent positivity and staining intensity. Tissue was obtained from the primary tumor prior to vaccination, and the target tumor at the end of the study period (16 months).

Results: ELISpot showed consistently positive responses against CAIX upon vaccination with DC-vaccine, more prominently in patients in cohort 3 (high dose) and in those with longer time to progression. None of the treated patients showed an objective response. However, patient #8 who achieved stable disease (SD) lasting 18 months had more than 2-fold change in immune response over baseline on day 35 and 60 after the first vaccination cycle. All nine patients showed different degrees of immunological reaction to AdV5 at baseline and elevation at the end of the study. IHC showed that both patients had high CAIX expression in primary tumor and on the target lesion post vaccination. Immune infiltrates were seen at baseline in both subjects, with predominant CD4/8 T-cells in patient #8 with a high PD-1 expression in infiltrating lymphocytes without PD-L1 expression in the tumor environment.

Conclusion: DC-AdGMCAIXvaccination may elicit robust immunologic response against CAIX in patients with ccRCC. The findings of high PD-1 expression in the patient with SD in both the primary tumor and target lesion warrants future efforts to explore how combination therapies with biological response modifiers may further enhance clinical responses.
Poster #43
MICRO RNA BASED SIGNATURE: A NOVEL SURVIVAL CORRELATION IN PATIENTS WITH CLEAR CELL RENAL CELL CARCINOMA

Jacob W. Greenberg¹,²; Stephen Proctor, M.D¹,²; Ibifiri Wilcox¹; Jonathan Silberstein, M.D¹,² and *L. Spencer Krane, MD¹,²
¹Tulane University School of Medicine; ²Urology Department
Presented By: L. Spencer Krane, MD

Introduction: Micro RNAs (miRNA) are short non-coding RNA which are associated with post-transcriptional regulation of gene expression. As clear cell renal cell carcinoma (ccRCC) remains the most common primary renal malignancy and accounts for the majority of more than 14,000 deaths from renal malignancies each year, identification of miRNA signatures may portend prognostic significance could help subset patients with ccRCC eventually leading to therapeutic pathways. miRNAs have demonstrated importance in intratumor communication in ccRCC, however there are no established miRNA biomarkers. In this study, we sought to create a miRNA signature to predict risk overall mortality in patients with ccRCC.

Methods: Patient’s clinical data and level 3 miRNA expression profiles were obtained from the Cancer Genome Atlas (TCGA) repository (https://portal.gdc.cancer.gov). Clinical data was correlated with miRNA expression data. Regression analysis, Kaplan-Meier curves, and Heatmap clustering were performed using R packages ComplexHeatmap, Tidyverse, and Survival. Statistical analysis was performed using R Studio v3.4.4. Significant miRNAs were isolated and a diagnostic high, medium, and low score were created correlating to miRNA expression levels of each patient.

Results: We identified 4 miRNAs (mir-204, mir-181a-1, mir-29b-1, let-7d) that significantly affected survival and created a weighted score from these. (Score = (0.776*hsa-mir-204)+(-0.507*hsa-mir-181a-1)+(-0.459*hsa-mir-29b-1)+(-0.42*has-let-7d)) We were able to subset the cohort using hierarchical clustering into 3 survival categories: low, medium, and high. The low, medium, and high score groups had 278, 84, and 103 subjects respectively. Subjects with a medium and high miRNA score show a decreased significance, p < 0.05 and p < 0.00005 respectively (Figure 1). On multivariate analysis, medium and high score along with age, nodal status, metastatic deposit, and T3 or greater lesion were all independently associated with overall survival.

Conclusion: We have created a novel miRNA signature to predict survival in ccRCC. Prospective validation of these markers is ongoing along with further determination of let-7d’s role in aggressive tumor development.

Figure 1:
Poster #44
IMPACT OF HISTOLOGIC SUBTYPE ON OVERALL SURVIVAL OF OBSERVED T1A KIDNEY CANCERS: IMPLICATIONS FOR BIOPSY AS A RISK STRATIFICATION TOOL
*Nermarie Velazquez, MD; Audrey Renson, MPH; Stella K. Kang, MD, MSc; William C. Huang, MD and Marc A. Bjurlin, DO, MSc
1NYU Langone Health, Department of Urology, New York, NY; 2NYU Langone Hospital - Brooklyn, Department of Clinical Research, Brooklyn, NY; 3NYU Langone Health, Department of Radiology, New York, NY; 4NYU Langone Hospital - Brooklyn, Department of Urology, Brooklyn, NY
Presented By: Nermarie Velazquez, MD

Introduction: Pathologic information obtained via renal biopsy may guide decision-making for small kidney cancers (T1a). However, there is a paucity of data on the ability of histologic subtype to predict overall outcomes in non-operative management in T1a kidney cancers. For biopsy to be utilized as a risk stratification tool in selecting surveillance vs treatment, the prognostic value of differing renal cell carcinoma (RCC) histologic subtypes should be assessed. Our study aim was to determine the impact of histologic subtype on overall survival (OS) in patients with observed, biopsy proven, T1a kidney cancers.

Methods: We queried the National Cancer Data Base from 2004 – 2015 for patients with biopsy proven RCC who were managed non-operatively. OS was estimated by Kaplan-Meier curves based on histologic subtype. Cox proportional regression models were used to determine whether histologic subtypes predicted survival. Our adjusted model used inverse probability weights for possible confounding factors including age, sex, race/ethnicity, insurance status, median income, proportion without high school diploma, urbanicity, Charlson-Deyo index, and tumor grade.

Results: Of the 132,958 T1a renal masses identified, 1,614 had biopsy proven histology and were managed non-operatively. Of those, 61% were clear cell, 33% papillary, and 6% chromophobe. Adjusted Kaplan-Meier curves demonstrated a difference in OS between histologic subtypes (p=0.010, Figure 1) with a greater median OS for patients with chromophobe (85.1 months, HR 0.45, p=0.005) compared to clear cell (64.8 months, reference group); no difference was observed between papillary (68.1 months, HR 0.93, p=0.5) and clear cell. However, predictive models using cox proportional hazards failed to demonstrate predictive power of histologic subtype with C-index 0.54 which approached the null (Figure 2).

Conclusion: RCC chromophobe histologic subtype demonstrates better prognosis with longer median OS compared to either clear cell or papillary in non-operatively managed T1a kidney cancers. However, incorporating biopsy proven histologic subtype into a risk stratification model to predict OS in non-operatively managed T1a kidney cancers appears to have limited utility. Competing risks appear to drive OS rather than histologic subtype. As such, biopsy data may be incorporated into a larger risk stratification system to ultimately assist informed decision making.

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**Figure 1.** Kaplan-Meier Survival Curves. Adjusted using inverse probability weights for confounding factors: age, sex, race/ethnicity, insurance status, census median income (2000 and 2012), census proportion without high school diploma (2000 and 2012), urbanicity (2000 and 2012), Charlson-Deyo index, tumor volume, and tumor grade.

**Figure 2.** Predictive performance of Cox proportional hazards models. *Demographic include age, sex, race/ethnicity, insurance status, census median income (2000 and 2012), census proportion without high school diploma (2000 and 2012), urbanicity (2000 and 2012), Charlson-Deyo index, tumor grade, and tumor volume.*
**Poster Session I – Full Abstracts**

**Poster #45**

**IDENTIFICATION OF NOVEL EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) SPLICE VARIANTS IN CLEAR CELL RENAL CELL CARCINOMA**

*Saif Zaman1; Jamie Teer1; Jiingsong Zhang1; Todd Knepper1; Philippe Spiess1; Wade Sexton1; Matthew Smith1; Mayer Fishman1; Tony Magliocco1; Julio Pow-Sang1; Michael Poch1; Scott Gilbert1; Theresa Boyle and Brandon Manley

1Moffitt Cancer Center

Presented By: Saif Zaman

**Introduction:** It is well established that alterations of epidermal growth factor receptor (EGFR) are associated with the development and progression of epithelial tumors across several cancer types. Alternative splicing and alterations of EGFR splice sites can cause translational changes and EGFR alterations have demonstrated associations with clinical and therapeutic outcomes in several malignancies.

**Methods:** Our institutional CLIA approved next generation targeted sequencing assay Moffitt STAR™ includes both DNA and RNA analyses. This assay has two targeted components. DNA sequencing is employed for identification of substitutions; small insertion/deletions and copy number variants and RNA sequencing is employed for identification of gene fusions and splice site variants. DNA and RNA extracted by DNA and RNA FFPE Allprep (Qiagen, Inc.) were prepared into sheared DNA and cDNA. The regions of interest were hybridized using the Trusight Tumor 170 (Illumina, Inc) library prep kit. Sequencing was performed using the Illumina NextSeq 500 instrument. Data was analyzed using the Illumina BaseSpace Enterprise TST170 app v1.0 and a customized analysis pipeline within the Clinical Genomics Workspace software platform from PierianDx.

**Results:** We identified a previously unreported EGFR gene splice variant, c.2470-188_c.2470-2 between exons 20 and 21 in four of eight renal cell carcinomas subjected to this sequencing assay. All four tumors were clear cell renal cell carcinoma (ccRCC) and the tissue examined was from three primary renal tumors (average tumor size 10.1cm) and from one L2 epidural tumor metastasectomy. The average age of the patients at time of surgery was 60 years. To date, one patient had localized disease without recurrence at 6 months follow up, one presented with metastatic disease and two patients developed metastatic disease on surveillance. All variants were identified at the RNA level without obvious corresponding DNA alterations. There was an average of 106 unique reads (average of 7.7% of all reads) for these cases supporting this variant. A representative case with corresponding Shashimi plot is demonstrated in Figure 1. This splice variant has not been detected in the approximately 150 other solid tumors cases that have been analyzed with this assay thus far.

**Conclusion:** We present four cases of ccRCC with a novel EGFR splice variant.
Poster #46
MICRONA SIGNATURE PROVIDES A NOVEL BIOMARKER FOR OVERALL SURVIVAL IN PAPILLARY RENAL CELL CARCINOMA
*Jacob W. Greenberg; Stephen Proctor, MD1; Ibifiri Wilcox1; Jonathan Silberstein, MD, FACS, MBA and L. Spencer Krane, MD1
1Tulane University School of Medicine
Presented By: Jacob Greenberg

Introduction: Renal Cell Carcinoma is newly diagnosed in 58,000 individuals in the United States annually. Papillary Renal Cell Carcinoma (pRCC) is the second most common variant of renal cell carcinoma accounting for approximately 15% of these cases. Currently, there are no widely adopted biomarkers that predict patient outcomes with pRCC. The aim of this study is to create a diagnostic score based on identified miRNA signatures that could be used predict patient survival.

Methods: Patient’s clinical data and level 3 miRNA expression profiles was obtained from the Cancer Genome Atlas (TCGA) repository, an NIH funded open genomic database (https://portal.gdc.cancer.gov). Clinical data was correlated with miRNA expression data, and regression analysis Kaplan-Meier curves and Heatmap clustering were performed using R packages ComplexHeatmap and Survival regression. Statistical analysis was also performed using R Studio v3.4.4. Significant miRNAs were isolated and a diagnostic high and low score was created correlating to a miRNA expression levels.

Results: A total of 276 patients were identified who met inclusion criteria and included in this study. Two miRNAs, hsa-mir-335 and has-mir-5010, were identified using regression analysis to be most associated with overall survival. Clustering analysis produced 213 patients with a high score and 63 patients with a low score. Patients with a low score showed a significant decrease in survivability (P<0.0001) (Figure 1). This was validate in multivariate analysis with known risk factors

Conclusion: We have created a novel miRNA signature to predict survival in pRCC using previously unreported miRNA biomarkers. hsa-mir-335 has been identified in gastric cancer as biomarker and is upstream chromosome 7q from MET, a well-known amplified gene in pRCC. hsa-mir-5010 has been used as biomarker in colon cancer but has no validated targets currently. Prospective validation of these markers is ongoing along with further determination of mir-5010 role in disease progression in underway.
Poster #47
THE UCLA HISTO-GENETIC RISK CLASSIFICATION (U-HGRC) TO PREDICT RECURRENCE OF LOCALIZED CLEAR-CELL RENAL CELL CARCINOMA
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Presented By: Aydin Pooli, MD

Introduction: Thirty percent of patients with localized clear cell renal cell carcinoma (ccRCC) will ultimately recur after nephrectomy, however current clinical/pathological risk stratification systems still misclassify these patients. Given the recent approval of sunitinib in the adjuvant setting for high-risk nephrectomized patients, optimized methods to better stratify risk is important. We have developed a novel classification integrating cytogenetic findings to better stratify the time to recurrence after surgery for localized RCC.

Methods: All patients with ccRCC who underwent surgery at UCLA, had cytogenetic analysis available, and had a minimum of 6 months follow up post operatively, were included in this study. CHAID decision tree and Kaplan Meier analysis were utilized to stratify recurrence risk into three U-HGRC groups. Histologic parameters were selected using logistic regression and cytogenetic parameters using principal component analysis. Survival analyses of the model were validated on the all follow-up population. Recurrence was defined as any local recurrence or development of new onset metastatic progression.

Results: A total of 656 patients with localized ccRCC who underwent surgery at UCLA had cytogenetic analysis available. Of those, a sub-population of 463 patients having at least 6-months follow-up formed the principal study cohort. Patients were divided into low-risk (U-HGRC 1), intermediate-risk (U-HGRC 2), and high-risk (U-HGRC 3) groups based on primary T-stage, tumor size, presence of sarcomatoid features, gain of chromosome 5q, loss 10q, or loss X/Y. On Kaplan-Meier analysis, disease-free survival (DFS), and overall survival (OS) were significantly different between groups (Figure 1, Log-rank p-value < 0.0001). For patients in U-HGRC 3 median DFS and estimated median OS were 2.7 [CI95% 1.9-4.9] and 6.3 [95%CI 5.1-15.7] years (not reached for U-HGRC 1 and U-HGRC 2). The 5-year risks of recurrence and [95%CI] for U-HGRC group 1, 2 and 3 patients were 9% [5-13], 25% [17-33] and 62% [50-74], respectively. The AUC for recurrence prognostication was significantly improved comparing to the current UISS system (0.75 for U-HGRC vs. 0.67 for the UISS, p=0.001).

Conclusion: The U-HGRC, which integrates genomic alterations with traditional clinical and pathologic features, allowed a better stratification of recurrence risk and overall survival that could help to select appropriate patients for surveillance and adjuvant therapy protocols.
Poster #48
THE GAIN OF CHROMOSOME 5Q PREDICTS A FAVORABLE PROGNOSIS IN LOCALIZED RENAL CELL CARCINOMA
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Presented By: Aydin Pooli, MD

Introduction: While gain of 5q is a frequently seen cytogenetic abnormality noted to occur in patients with renal cell carcinoma (RCC), little is known about its prognostic significance. We investigated the association of gain of 5q with disease-free survival (DFS) in patients with localized (non-metastatic T1-2) RCC.

Methods: All patients with primary tumor stage T1-2 RCC who underwent surgery at UCLA and had tumor cytogenetic analysis were included in the study. Alterations in chromosome 5q was specifically reviewed for this study. Logistic regression analyses were used to assess association of gain of 5q with final histopathology, ISUP grading, and T-stage. Cox proportional hazard modeling and Kaplan-Meier analyses were used to assess the impact of gain of 5q on DFS. Recurrence was defined as any local recurrence or development of new metastasis.

Results: A total of 654 patients were included in this study. Gain of 5q occurred in 106 (16.2%) patients. Gain of 5q was more commonly seen in clear cell versus non-clear cell tumors (19% vs. 9%, OR=2.237, 95%IC [1.305-3.831], p=.003). Gain of 5q was not associated with ISUP grade (p=.08) or T-stage (p=.55). However, on Kaplan-Meier analysis, gain of 5q was associated with an improved DFS (Figure 1, Log-rank p=.016). The 5-, 10-, and 15-year risk of recurrence was 2% vs. 17%, 17% vs. 31% and 29% vs. 34%, in tumors without and with gain of 5q, respectively. Gain of 5q was an independent prognostic factor in multivariable Cox analysis (HR=0.357, p=.027 with ISUP grade and HR=0.372, p=.033 with T-stage).

Conclusion: Gain of chromosome 5q is an independent prognostic factor associated with decreased risk of recurrence in patients with localized T1-2 renal cell carcinoma. Identifying patients with a gain of 5q will improve recurrence risk stratification and may help select appropriate patients for surveillance and adjuvant treatment protocols.
**Poster Session I – Full Abstracts**

**Poster #49**
IMMUNOLOGIC IMPACT OF THE SURGICAL RESECTION OF RENAL TUMORS: IMPLICATIONS FOR CYTOREDUCTION IN THE IMMUNE CHECKPOINT INHIBITOR ERA

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Presented By: Bimal Bhindi, MD, CM, MSc, FRCSC

**Introduction:** Immune-checkpoint inhibitors are increasingly being used for renal cell carcinoma (RCC). The role of nephrectomy in conjunction these agents remains unclear and the mechanisms of the potential benefit of cytoreduction require further exploration. We sought to evaluate whether surgical resection of renal tumors influences anti-tumor immune markers.

**Methods:** We prospectively enrolled 28 patients undergoing partial, radical, or cytoreductive nephrectomy for a unilateral primary renal tumor (2016-2018). Immunosuppressed patients were excluded. Blood was drawn preoperatively, on postoperative day-one (POD1), and at 3 months (3MO). Peripheral blood mononuclear cells (PBMCs) were isolated and flow cytometry was used to assess the percent of PMBCs that were CD11a+CD8+ (to identify tumor-reactive cytotoxic T-lymphocytes; CTLs), and the percent of CTLs that were Bim+ (downstream pro-apoptotic mediator of PD-1 pathway), CX3CR1+GZMB+ (to identify effector memory T-cells), and Ki67+ (marker of proliferation). Changes in immune markers at POD1 and 3MO were compared to preoperative measurements using Wilcoxon signed rank tests. Comparisons between aggressive (pT3-4, N1, M1, or aggressive histology (high-grade, coagulative necrosis, sarcomatoid dedifferentiation, or specific RCC-variant histologies)) versus indolent tumors were made using the Wilcoxon rank sum test.

**Results:** Ten, 13, and 5 patients underwent partial, radical and cytoreductive nephrectomy, respectively. Nineteen, 6 and 3 patients had clear-cell RCC, non-clear cell RCC, and oncocytoma, respectively. At 3MO, there was a significant rise in the percent of CTLs among PMBCs (median change: +1.6; p=0.008). On POD1, there was a significant rise in the percent of CTLs that were proliferating (median change: +0.7; p=0.02) and a significant decrease by 3MO versus preoperatively (median change: -1.8; p=0.001). There was a non-significant decline by 3MO in the percent of Bim+ CTLs (median change: -1.8; p=0.14). At 3MO, the percent of effector memory CTLs was increased among patients treated for aggressive tumors but not indolent tumors (median change: +2.7 versus -0.4; p=0.048).

**Conclusion:** These findings suggest potential beneficial effects on the anti-tumor immune response with surgical resection of the primary renal tumor. These data have important implications in an era when immune checkpoint inhibitors are being used in the metastatic setting and are being evaluated in the adjuvant setting.
Introduction: MicroRNAs (miRNAs) are small noncoding RNAs that negatively regulate gene expression. They are released from exosomes and can accumulate in early stage cancer. miR-210 is known to be transcriptionally induced by HIF-1-alpha and HIF-2-alpha and is overexpressed in ccRCC tissue. We hypothesize that the serum level of miR-210 will provide a highly specific marker for RCC because of its association with the molecular mechanism of carcinogenesis in this disease.

Methods: Using the BioRad QX100 Droplet Digital PCR system (ddPCR) we used an optimized protocol for qRT-PCR and amplification of miRNA targets in blood samples from 42 mixed RCC cases and 20 non-RCC controls. We used a synthetic miRNA target for miR-210 and diluted it to serve as standard curve for the assay. A concentration range between 5-5000 copies/20μL PCR reaction with nine intermediate twofold serial dilutions and no template controls (NTCs) were examined. This results in a final concentration of the templates of 0.25-250 copies/μl in the PCR reaction. qRT-PCR of the input templates was performed in triplicate and each reverse transcription reaction was amplified using ddPCR in triplicate. We performed these assays multiple times in order to evaluate reproducibility. The results of these assays indicated that we are able to reliably measure miRNAs at high sensitivity and precision.

Results: After RNA extraction and quality control, only 28 cases and 20 controls were used for analysis. In the qRT-PCR analysis there was a significantly higher raw miR-210 levels between the cases and controls (p=0.0008) as well as after normalization using the cel-miR-39 as normalizer (p=0.00009). When the data was further subdivided by RCC type, controls had a significantly lower miRNA-210 levels; ccRCC vs. control (p=<0.001), and non-ccRCC vs. control (p=0.048). Results were confirmed by digital PCR showing a significant difference in the level of miR-210 in cases vs. controls, with an average of about 2.5-fold greater serum miR-210 than controls. AUC for qRT-PCR is 0.85 and for digital PCR is 0.88.

Conclusion: In this discovery cohort we found that miRNA-210 levels are elevated in RCC by qRT-PCR and by dPCR establishing early evidence of its potential use as a biomarker in RCC. Further validation and expansion of this study is warranted.
Poster #51
THE ASSOCIATION OF ROBOTIC-ASSISTED VERSUS PURE LAPAROSCOPIC RADICAL NEPHRECTOMY WITH PERIOPERATIVE OUTCOMES AND HOSPITAL COSTS
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Presented By: Laura Bukavina, MD MPH

Introduction: Although robotic-assisted surgery facilitates the advantages of a minimally-invasive approach compared to established open surgical approaches, it is unclear whether it offers benefits in settings where laparoscopic surgery has been established as standard of care. We therefore examined the comparative effectiveness of robotic-assisted laparoscopic radical nephrectomy (RALRN) and laparoscopic radical nephrectomy (LRN) using a large nationwide dataset.

Methods: We identified 8,316 adults who underwent RALRN or LRN for non-urothelial renal cancer from the Nationwide Inpatient Sample (NIS) from 2010-2013. The associations of surgical approach with perioperative outcomes and total hospital costs were evaluated using multivariable logistic regression.

Results: Over the study period, utilization of RALRN increased from 46% to 69%. Compared to LRN, RALRN was associated with reduced rates of intraoperative (0.9% vs 1.8%, p<0.001) and postoperative complications (20.4% vs 27.2%, p<0.001), but no difference in perioperative blood transfusion (5.6% vs 6.2%, p=0.27) or prolonged hospitalization (7.2% vs 7.1%, p=0.81). RALRN was also significantly associated with higher total hospital costs (median $16,207 vs $15,037, p<0.001). On multivariable analyses adjusting for patient and hospital features, RALRN remained independently associated with a reduced risk of intraoperative (OR 0.50; 95% CI 0.33-0.76; p=0.001) and postoperative complications (OR 0.72; 95% CI 0.65-0.81; p<0.001), no difference in perioperative blood transfusion (OR 1.10; 95% CI 0.90-1.34; p=0.34), increased risk of prolonged hospitalization (OR 1.29; 95% CI 1.07-1.55; p=0.007), and higher mean total hospital costs (+$1468, 95% CI $1086-1850; p<0.001). There was no effect modification by hospital volume.

Conclusion: Although RALRN was independently associated with reductions in perioperative complications compared to LRN, it was associated with prolonged hospitalization and higher total hospital costs. These relationships were consistent across all hospital volume levels.
SUBTYPING OF CLEAR CELL RENAL CELL CARCINOMA PATIENTS TO DETERMINE FACTORS ASSOCIATED WITH OVERALL SURVIVAL

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Presented By: Jacob W. Greenberg

Introduction: In the formation of cancer, DNA alterations known as “driver mutations” promote carcinogenesis, giving cells an invasive and malignant phenotype. One of the most common mutations clear cell renal cell carcinoma patients is located in either mTOR or PTEN genes. These alterations have led to targeted therapies and FDA approved medications in the metastatic setting. However, these treatments are never curative and further sub-classification may provide additional diagnostic and or therapeutic assistance. The aim of this study is to identify subset populations in patients with clear cell renal cell carcinoma based on mTOR or PTEN mutational status to determine additional diagnostic criteria.

Methods: We used cBio Portal, an open genomic database compiled from the NIH-funded Cancer Genome Atlas (TCGA) to determine survivability, number of patients with alteration, and mRNA expression. Statistical analysis and graph creation was performed using R v3.4.2 injunction with R studio.

Results: As previously described we also found a substantial percentage of patients had PTEN or mTOR mutations, yet this did not affect overall survival (p=0.1). However in subset analysis, we identified that decreased expression in the nNOS Signaling pathway worsened overall survival in all patients (Figure 1a) and substantially pronounced in patients without an mTOR/PTEN mutations in specific nNOS pathway genes (Figure 1b). This was confirmed as we found with ccRCC, had greatly decreased expression in NOS1, a key player of the nNOS Pathway (Figure 2).

Conclusion: Patients with nNOS signaling pathway and wild type PTEN/mTOR have significantly worse survival than other kidney cancer patients. These mutations may be helpful biomarkers in the future for determining the risk of disease progression unique to mTOR or PTEN mutations. Moving forward, we plan to perform miRNA array, Western blot, and proliferation analysis to further understand the underlying causes.
Poster #53
SELF-REPORTED QUALITY OF LIFE AS A RISK PREDICTION TOOL IN RENAL CELL CARCINOMA
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Presented By: Ridwan Alam, MD, MPH

Introduction: With the rise of nephron-sparing management for renal cell carcinoma (RCC), quality of life (QOL) metrics may provide prognostic value above and beyond traditional clinicopathological parameters. We evaluate the utility of self-reported QOL in predicting mortality among RCC patients and test the findings in a prospectively-maintained external database.

Methods: Predictive variables were predefined and analyzed using the Surveillance, Epidemiology, and End Results – Medicare Health Outcomes Survey (SEER-MHOS) database. QOL metrics were comprised of mental component summary (MCS) and physical component summary (PCS) scores. For each multivariable Cox proportional hazards regression, the Harrell’s concordance statistic (C-index) and Akaike Information Criteria (AIC) were calculated to determine predictive accuracy and parsimony, respectively. A lower AIC indicates a more parsimonious model. Findings from the SEER-MHOS database were tested in the prospectively-maintained Delayed Intervention and Surveillance for Small Renal Masses (DISSRM) database.

Results: In SEER-MHOS, 1494 patients with a median age of 73.4 years and follow-up time of 5.6 years were included. There were 747 deaths, 139 of which were due to RCC. Cox regression demonstrated that each additional MCS and PCS point reduced the hazard of all-cause mortality by 1.3% (95% CI 0.981-0.993, P<0.001) and 2.3% (95% CI 0.971-0.984, P<0.001), respectively. Regression models with QOL metrics demonstrated higher predictive accuracy (C-index 72.3% vs 70.1%) and parsimony (AIC 9376.5 vs 9454.5) than models without QOL metrics. In DISSRM, 479 patients with a median age of 65.3 years and follow-up time of 3.9 years were included. There were 49 deaths, 2 of which were due to RCC. Similar to the SEER-MHOS analysis, regression models including QOL metrics demonstrated maximum predictive ability (C-index 77.8% vs 74.1%) and parsimony (AIC 494.9 vs 496.4) compared to those without QOL metrics. The single best question producing maximum predictive ability (C-index 76.9%) and parsimony (AIC 335.2) related to physical functioning limitations in the context of “moderate activities such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.”

Conclusion: Models with self-reported QOL metrics predict all-cause mortality in RCC patients with higher accuracy and parsimony than those without QOL metrics in two separate database tests. Physical health in particular was a stronger predictor of mortality than mental health.
OVERALL SURVIVAL OF BIOPSY CONFIRMED T1B and T2A KIDNEY CANCERS MANAGED WITH OBSERVATION: INFLUENCE OF TUMOR HISTOLOGY

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Presented By: Nermarie Velazquez, MD

Introduction: The natural history of observed large (T1b [4-7cm] or T2a [>7-10cm]) kidney cancers is not well known. Both increasing size and histologic subtype of renal cell carcinoma (RCC) may impact survival of those patients with large kidney cancers being observed. The aim of our study was to determine the overall survival of patients with biopsy proven, T1b and T2a RCC.

Methods: We queried the National Cancer Data Base for the years 2004 through 2015 for patients with biopsy proven RCC which was greater than 4cm and who were managed non-operatively. OS was estimated by Kaplan-Meier curves based on histologic subtype. Cox proportional regression models were used to determine whether histologic subtypes predicted survival for each stage. Our adjusted model used inverse probability weights for possible confounding factors including age, sex, race/ethnicity, insurance status, median income, proportion without high school diploma, urbanicity, Charlson-Deyo index, and tumor grade.

Results: A total of 645 patients with T1b and 81 with T2a were identified with biopsy confirmed RCC. Of those 445 were clear cell, 202 papillary, 70 chromophobe, 8 sarcomatoid, and 1 collecting duct. In patients with T1b kidney cancers adjusted Kaplan-Meier curves demonstrated a difference in OS between histologic subtypes (p=0.021, Figure 1). Cox proportional hazard ratios did not show a significant difference in median OS for patients with chromophobe (61.2 months, HR 0.68, p=0.142) and papillary (42.4 months, HR 0.77, p=0.098) compared to clear cell (38.3 months, reference group). In patients with T2a kidney cancers there was no significant difference in OS by either adjusted Kaplan-Meier (p=0.314) or Cox proportional hazards based on histology (Figure 2).

Conclusions: Histologic subtype appears to influence OS in observed T1b RCC, though our study lacked power to differentiate hazard ratios for specific subtype comparisons. No differences are noted for T2a tumors. At higher stages, tumor size may influence OS more so than histological variant, although our study was likely underpowered in this cohort given the rarity of observing these larger masses. The utility of obtaining histologic subtype information to guide decision making for observation of large renal masses appears limited and further prospective studies remain necessary.

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Figure 1. Kaplan-Meier Survival Curves. *Adjusted using inverse probability weights for confounding by age, race/ethnicity, insurance status, census median income, census proportion without high school diploma, urbanicity, Charson-Deyo index, center volume, and tumor grade.
LIMITED UTILITY OF ULTRASOUND SURVEILLANCE AFTER RADICAL AND PARTIAL NEPHRECTOMY FOR RENAL CELL CARCINOMA

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Presented By: Ahmad El-Arabi, MD

Introduction: We evaluated the utility of ultrasound in comparison to cross-sectional imaging in the detection of intra-abdominal recurrences after radical or partial nephrectomy of localized renal cell carcinoma.

Methods: We performed a retrospective review of 800 patients with clinically localized renal cell carcinoma having undergone a radical or partial nephrectomy between 2008 and 2015 at our institution. Patients had at minimum one-year of follow-up at our institution, at least one ultrasound during surveillance and no metastases at time of surgery. Our primary outcome was the rate of diagnosis of abdominal recurrence, based on modality of surveillance.

Results: The median follow-up for the entire cohort was 37.5 months (12 to 166 months). There were 396 and 404 patients who underwent radical and partial nephrectomy, respectively, for localized renal cell carcinoma. 224 (57%) and 234 (58%) patients in the radical and partial nephrectomy cohorts, respectively, had 2 or more ultrasounds performed during surveillance. Overall, in the radical and partial nephrectomy cohorts, a total of 149 abdominal recurrences were detected. The location of these of recurrences were 21 bone (14%), 16 liver (11%), 31 renal fossa (21%), 35 tumor bed/ipsilateral kidney (19%), 39 retroperitoneal lymph nodes (26%), 3 peritoneum/omentum (2%) and 4 adrenal gland (3%) with only 8 (19%). Of these recurrences, only 8 (19%) were initially detected by ultrasound. On the other hand, 15 (10%) recurrences were missed by a prior negative ultrasound. Furthermore, there were 8 false-positive ultrasound studies which cross-sectional imaging later ruled out.

Conclusion: Not only is ultrasound a poor choice for renal cell carcinoma because of its limited sensitivity but also because of the likely location of recurrences outside its abilities. Ultimately, the low yield of ultrasound in the detection of abdominal recurrences after radical or partial nephrectomy for renal cell carcinoma raises questions as to its utility and inclusion in routine surveillance.
Introduction: African-Americans have an increased incidence of real cortical tumor subtypes of lower oncological potential in the setting of lower risk disease when compared to other ethno-racial groups. On the other hand, survival outcomes are similar. We investigated impact of African-American race on overall survival, oncological outcomes, functional outcomes, and non-cancer mortality.

Methods: Multi-institutional (Emory, TMDU, UCSD) retrospective analysis of patients who underwent partial or radical nephrectomy between 1998-2018. The cohort was divided into African-American and Non-African American subgroups for descriptive analyses. Patients were analyzed for demographics, clinical parameters, and post-surgical outcomes. Primary outcome was overall survival (OS). Secondary outcomes included non-cancer mortality (NCM) and recurrence free survival (RFS), and estimated glomerular filtration rate (eGFR) decline. Multivariable logistic regression (MVA) were used to elucidate predictive factors for OS, NCM, and RFS, and estimated glomerular filtration rate (eGFR)<45 and <30 ml/min/1.73m2.

Results: 3088 patients who received either partial or radical nephrectomy for renal masses were grouped into African American (AA, n=353) and Non-African American (NAA, n=2735) sub-groups for analysis. No difference was noted between groups with respect to mean tumor size (p=0.211) or presence of metastases (p=0.846). African-Americans were an independent risk factor for functional decline to eGFR<45 (OR 4.43, p<0.001) and eGFR<30 (OR 5.15, p<0.001). MVA for worsened NCM demonstrated African-Americans (OR=1.72, p=0.042), increasing age (OR=1.03, p=0.001), radical nephrectomy (OR=2.96, p<0.001), and increasing tumor size (OR=1.28, p<0.001) to be independent risk factors. MVA for worsened OS included increasing age (OR=1.04, p=0.001), tumor size (OR=1.182, p<0.001), clear cell histology (OR=1.62, p<0.001), high tumor grade (OR=2.12, p<0.001), and post-operative eGFR <45 (OR=2.12, p<0.001). MVA for worsening RFS demonstrated high tumor grade (OR=2.38, p<0.001) and increasing clinical tumor size (OR=1.152, p=0.001) to be independent factors.

Conclusion: African Americans undergoing renal surgery for RCC appear to have similar OS and RFS, but poorer NCM than non-African American patients. The cause of these disparities is multi-faceted but likely is associated with functional decline. Nephron-sparing management when feasible and appropriate should be considered in African-Americans presenting with renal cortical tumors.
**Poster #57**

**CAN WE PREDICT FUNCTIONAL OUTCOMES AFTER PARTIAL NEPHRECTOMY?**

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Presented By: Hajime Tanaka, MD, PhD

**Introduction:** Percent parenchymal mass preserved (PPMP) is the primary determinant of functional outcomes after partial nephrectomy (PN). Accurate methods for predicting PPMP based on preoperative imaging could facilitate patient counseling.

**Methods:** 428 PN patients with necessary studies to assess ipsilateral parenchymal mass/function preserved were evaluated. Preoperative/postoperative ipsilateral parenchymal mass were measured from contrast-enhanced CT<2 months prior and 3-12 months after PN and actual PPMP was determined. Ipsilateral-PPMP and final global-GFR were estimated from preoperative imaging using subjective estimation (SE) based on surgeon’s prior experience, quantitative estimation (QE), or estimation derived from contact surface area (CSA) or R.E.N.A.L. QE-PPMP was derived from free-hand scripting on preoperative images, presuming that a 10 mm-rim around tumor and radially-located parenchyma would be excised/devascularized. CSA was estimated by $2\pi rd$ (r=tumor radius; d=intraperitoneal depth of tumor) and parenchymal mass excised/devascularized was estimated by multiplying CSA by a 10 mm-spherical cap. For R.E.N.A.L., parenchymal mass excised/devascularized was estimated using an equation derived from linear approximation. Final ipsilateral GFR was estimated: preoperative ipsilateral GFR × estimated PPMP. Final global GFR was estimated: preoperative contralateral GFR + estimated final ipsilateral GFR.

**Results:** Median tumor diameter was 3.5cm. Median CSA and R.E.N.A.L. were 24cm² and 8, respectively. Median actual ipsilateral-PPMP and percent global-GFR preserved were 84% and 89%, respectively. Median estimated ipsilateral-PPMP was 85%/87%/88%/83% based on SE/QE/CSA/R.E.N.A.L., respectively. Correlations between actual PPMP and estimated PPMP were relatively weak in all instances (all correlation-coefficients ≤ 0.46). Prediction of final global-GFR was strong for all 4 methods (all correlation-coefficients=0.91, Figure A-D); however, similarly strong correlation was also obtained when presuming that 89% of the preoperative global-GFR will be saved in each case, which was the median value (correlation-coefficient=0.91, Figure E). On multivariable analyses, solitary kidney, preoperative-GFR, and various estimates of PPMP significantly associated with final global-GFR. However, preoperative-GFR proved to be the strongest predictor; it was >10-fold more impactful than estimated PPMP or solitary kidney.

**Conclusions:** Currently available methods for estimating PPMP have important limitations. Final global-GFR, the most important functional outcome, can be predicted fairly accurately by all of the tested methods but none are better than simply presuming that 89% of function will be saved, due to strong anchoring to preoperative-GFR.
SURVEY OF RENAL MASS BIOPSY UTILIZATION AMONG UROLOGIC ONCOLOGISTS

*Tariq A. Khemees, MD1; Anthony Bui1; Daniel Shapiro1; Sara L. Best1 Shane Wells2; Timothy Ziemlewicz2; Meghan Lubner2; J. Louis Hinshaw2; Fred Lee Jr.;2 David F. Jarrard1; Kyle A. Richards1; Tracy M. Downs1; Stephen Nakada1 and E. Jason Abel1

1Department of Urology, University of Wisconsin; 2Department of Radiology, University of Wisconsin

Presented By: Tariq A. Khemees, MD

Introduction: Utilization of renal mass biopsy among different institutions has been variable. The purpose of this study was to evaluate urologic oncologist's perspectives about the utility of small renal mass (SRM) biopsy in their practice.

Method: After SUO committee approval, emails were sent to active members with a link to an electronic 10-question survey regarding their practice patterns and opinions on biopsy for small renal masses. Responders were categorized into groups based on date of completion of training, type of practice, and geographic location.

Results: A total of 111/717 (15.5%) of active SUO members completed the survey. Practice type included: academic (76%), private (18%) and military/government (6%). The median year when fellowship was completed was 2009 (IQR 2000-2015) and 62% of respondents evaluated at least 5 SRM patients per month. When asked how often biopsy is recommended for SRM, 4% never recommend biopsy, 56% recommend biopsy <25% of the time, 20% recommend biopsy around half of the time, 16% recommend biopsy greater for than 75% of SRM and 4% always recommended SRM biopsy. Training year (p=0.27) and type of practice setting (0.17) were not associated with response for how frequently biopsy was recommended. Common responses for the biggest advantage of using biopsy to evaluate SRM included: to identify benign tumors and avoid treatment (49%), to risk stratify renal cancer patients prior to treatment (21%), and to improve informed consent prior to treatment (14%). The most common response for why biopsy was not recommended is that it would not change management (86%). Approximately 93% of respondents estimated the major complications rate as 2% or less (defined as requiring additional procedure; Clavien-Dindo grade 3). Most (62%) respondents estimated the institutional SRM biopsy non-diagnostic rate as 5 or 10%.

Conclusion: Although practice patterns remain variable, biopsy is being utilized by Urological Oncologists, with 40% of respondents recommending biopsy for at least one in two patients evaluated with small renal masses.

How often do you recommend percutaneous renal mass biopsy for SRMs?
Poster #59
STAGE-SPECIFIC CONDITIONAL SURVIVAL IN RENAL CELL CARCINOMA AFTER NEPHRECTOMY
*Joseph Cheaib, MD, MPH ¹,²; Hiten Patel, MD, MPH ¹; Michael Johnson, MD ¹; Michael Gorin, MD ¹; Elliott Haut, MD, PhD³,⁴; Joseph Canner, MHS ³,²; Mohamad Allaf, MD ¹ and Phillip Pierorazio, MD ¹
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Presented By: Joseph Cheaib, MD, MPH

Introduction: Conditional survival (CS) estimates serve as better measures of survival probability compared to standard estimates as they incorporate patient survivorship. Stratification of CS estimates by pathologic TNM stage results in more individualized prognostic information for cancer patients. Stage-specific CS has not been widely investigated in the context of renal cell carcinoma (RCC) after nephrectomy.

Methods: We analyzed retrospective data on a population-based cohort of 87,225 surgically-treated RCC patients extracted from the Surveillance, Epidemiology, and End Results (SEER) database (2004-2015) and on a smaller validation cohort of 1,642 surgically-treated RCC patients at a single institution (1995-2015). 5-year cancer-specific CS estimates were obtained using the Kaplan-Meier method and stratified according to stage. Multivariable Cox regression analyses were performed to predict the hazard of cancer-specific mortality by stage at time of nephrectomy and at 1, 2, 3, 4, and 5 years after nephrectomy to evaluate the possible variation in risk of mortality with increasing postoperative survivorship.

Results: The 5-year cancer-specific survival rates at time of nephrectomy for stage I, II, III, and IV RCC patients in the SEER cohort were 97.4%(97.3-97.6%), 89.9%(89.1-90.6%), 77.9%(77.0-78.7%), and 26.7%(25.5-28.0%), respectively. Improvement in 5-year CS was noted only among surviving patients with advanced-stage disease; given 1, 2, 3, 4, and 5 years of survivorship after nephrectomy, the subsequent 5-year cancer-specific survival rates were, respectively, 79.3%(+1.8%), 81.3%(+2.5%), 83.3%(+2.5%), 84.3%(+1.2%), and 85.1%(+1.0%) for stage III, and 34.6%(+29.6%), 42.5%(+22.8%), 49.0%(+15.3%), 55.7%(+13.7%), and 58.6%(+5.2%) for stage IV. Findings were confirmed upon multivariable analyses. Relative to stage I RCC patients, the hazard ratio (HR) of cancer-specific mortality among patients with stage II disease remained relatively stable over time, ranging between 1.8 and 1.5 (all P <0.001). In stage III patients, the HR decreased from 4.0 at time of nephrectomy to 2.6 at 5 years (all P <0.001), and in stage IV patients, a larger decrease in the HR from 16.8 to 7.5 was observed (all P <0.001). Similar trends were established in the validation cohort.

Conclusions: CS after nephrectomy for RCC varies dramatically by stage of disease. Gains in CS over time occur primarily among patients with advanced-stage RCC. Stage-specific CS estimates can help urologists better plan postoperative surveillance for RCC patients.
Poster #60

PROGNOSTIC VALUE OF HISTOLOGIC SUBTYPE AND TREATMENT MODALITY FOR T1a KIDNEY CANCERS

*Michael Siev, MD1; Audrey Renson, MPH2; Stella Kang, MD3; William Huang, MD1 and Marc Bjurlin, DO1

1NYU Langone Medical Center, Department of Urology, New York, NY; 2NYU Langone Medical Center, Department of Epidemiology and Biostatistics, New York; 3NYU Langone Medical Center, Department of Radiology, New York, NY

Presented By: Michael Siev, MD

Introduction: Renal cell carcinoma (RCC) has several histologic subtypes, which have shown potential for differential clinical outcomes. Our study objective was to evaluate overall survival (OS) of T1a kidney cancers stratified by histologic subtype and treatment including partial nephrectomy (PN), percutaneous ablation (PA), and radical nephrectomy (RN).

Methods: We queried the National Cancer Data Base (2004 – 2015) for patients with T1a kidney cancers who were treated surgically. OS was estimated by Kaplan-Meier curves based on histologic subtype and management. Cox proportional regression models were used to determine whether histologic subtypes and management procedure predicted OS. Our adjusted model included age, sex, race/ethnicity, insurance status, median income, proportion without high school diploma, urbanicity, Charlson-Deyo index, tumor grade, and facility volume.

Results: Of the 52,245 T1a kidney cancers that met inclusion criteria, 51.1% were clear cell, followed by papillary (34.8%), chromophobe (11.8%), cystic (1.8%), sarcomatoid (0.4%) and collecting duct (0.2%). PN was performed in 51%, RN in 31%, and 18% had PA. Kaplan Meier curves demonstrated differences in survival by histology among clear cell, papillary, chromophobe, and cystic subtypes (all p<0.001), but not for sarcomatoid (p=0.110) or collecting duct (p=0.392) (Figure 1a). Adjusted Cox regression showed worse OS for PA than PN among patients with clear cell (HR 1.58, 95%CI [1.44-1.73], papillary RCC (1.53 [1.45-1.75]), and chromophobe RCC (2.19 [1.64-2.92]). OS was worse for RN than PN for clear cell (HR 1.38 [1.28-1.50]) papillary (1.34 [1.15-1.56]) and chromophobe RCC (1.92 [1.43-2.58]). Predictive models using cox proportional hazards incorporating histology and surgical procedure alone were limited (c-index 0.63) while adding demographics demonstrated fair predictive power for OS (c-index 0.73) (Figure 1b).

Conclusion: In patients with pathologic T1a RCC, OS differs by histologic subtype. PN appears to be superior to both PA and RN. Incorporating histologic subtype and treatment modality into a risk stratification model to predict OS appears to have limited utility compared with variables representing competing risks. Given the preponderance of T1a kidney cancers, more systematic methods of weighing competing risks are needed for deciding upon optimal surgical management.

![Figure 1a. Kaplan-Meier Survival Curves. Adjusted for age, sex, race/ethnicity, insurance status, median income quintile in 2000 and 2012, proportion without high school diploma quintile in 2000 and 2012, urbanicity in 2001 and 2013, Charlson-Deyo index, tumor grade, and facility volume. Key: Green – Partial nephrectomy; Blue – Radical nephrectomy; Red – Percutaneous ablation.](image)

![Figure 1b. Prediction performance of Cox proportional hazard models. Demographics include age, sex, race/ethnicity, insurance status, median income quintile in 2000 and 2012, proportion without high school diploma quintile in 2000 and 2012, urbanicity in 2001 and 2013, Charlson-Deyo index, and tumor grade.](image)
**Introduction:** Population-based studies have shown that renal cell carcinoma (RCC) occurs much less frequently in women than men; further, presenting at an older age, with smaller and lower-staged tumors. However, little is known about the emotional distress differences between men and women harboring RCC. Using a validated questionnaire at different time points we aimed to compare gender associated emotional distress differences among RCC patients.

**Methods:** The Edmonton Symptom Assessment System (ESAS) questionnaire has been validated for use in cancer patients. It consists of ten 11-point single Likert scale items with 0=no symptom and 10=the worst symptom. The psychological distress subscore (PDSS) is the sum of the scores of depression, anxiety, and feeling of not well-being (0-30). At our center, at each visit, patients are asked to fill out the ESAS questionnaire. We analyzed the ESAS questionnaires of all patients with non-metastatic RCC, between 2007 and 2017. Our goal was to assess gender differences manifested in the PDSS over different time points.

**Results:** A total of 495 patients (311 males, and 184 females) were analyzed and compared. Table 1 demonstrates the basic clinical, pathologic and follow-up details of all patients, showing no significant clinical differences between both groups. PDSS of men and women were compared at 5 different time points: before and after clinical diagnosis, after a renal mass biopsy, after surgery, and at last follow-up. While no difference was shown before diagnosis (10.5 vs 7.6, p=0.1), a higher mean PDSS for women was demonstrated after diagnosis (8.5 vs 5, p=0.018), after biopsy (8.9 vs 4.1, p=0.003), and after nephrectomy (6.5 vs 4.4, p=0.007). Eventually, at last follow-up, the mean PDSS had become similar (5.9 vs 5, p=0.379).

**Conclusion:** Psychological distress differences clearly exist between men and women with non-metastatic RCC, following diagnosis through treatment. These differences dissipate only at last follow-up. Thus, emphasis should be placed on screening for symptoms of distress and providing emotional and psychological support through all phases of RCC diagnosis and treatment, and this appears particularly true for female RCC patients.
Poster #62
IS PATIENT PSYCHOLOGICAL DISTRESS A DETERRING FACTOR FOR CHOOSING ACTIVE SURVEILLANCE FOR SMALL RENAL MASSES IN PATIENTS YOUNGER THAN 70?

*Hanan Goldberg, MD1; Jaime Omar Herrera Caceres1; Anika Petrella1; Thenappan Chandrasekar1; Zachary Klaassen1; Christopher Wall1; Dixon Woon1; Neil Fleschner1; Ginch Kulkarni1; Antonio Finelli1; Michael Jewett1 and Robert Hamilton1

Urology Division, Surgical Oncology Department, Princess Margaret Cancer Centre, University Health Network, University of Toronto, Toronto, Ontario, Canada

Presented By: Hanan Goldberg, MD

Introduction: Active surveillance (AS) for small renal masses (SRMs) in younger patients (<70) is still controversial. Opponents of this strategy cite patient psychological distress and anxiety as a major deterrent. In this retrospective study, using a symptom assessment questionnaire, we aimed to discover whether psychological distress symptoms differ between patients who were operated on vs. those who were managed with AS over time.

Methods: The Edmonton Symptom Assessment System (ESAS) is a ten-item patient-rated (0–none to 10 – significant) questionnaire developed and validated for cancer patients. At our center, at each visit in the kidney clinics, patients are asked to fill out the ESAS questionnaire. We analyzed the ESAS questionnaires of all patients younger than 70 who were seen in the clinic for an SRM (clinical stage T1a), and either treated with AS or surgery, between 2007 and 2017. The psychological distress subscore (PDSS) is the sum of the scores of depression, anxiety, and feeling of not well-being (0–30). The primary objective was to compare PDSS in both arms. Lastly, a multivariable linear regression model (MLRM) predicting PDSS score at last follow-up was performed, incorporating a-priori covariates including age, gender, disease laterality, whether a biopsy was performed, and treatment with either AS or surgery.

Results: A total of 454 patients were analyzed. Table 1 demonstrates all clinical data of both groups showing differences in mean age, biopsy results and mean follow-up time. The PDSS scores demonstrated no difference between the patients that filled out the questionnaires at all time points (diagnosis [6.65 vs. 8.47, p=0.303], after biopsy [9.76 vs. 5.6, p=0.058], and at last follow-up [6.53 vs. 5.9, p=0.06]). However, when specifically assessing patients with a biopsy-proven malignant lesion in both groups, PDSS scores for AS were significantly higher at last follow-up (13.18 vs. 5.97, p=0.005). The MLRM demonstrated that the only factor independently associated with higher distress scores was having a biopsy showing malignancy (Beta 2.855, 95% C.I. 0.373-5.33).

Conclusion: For patients <70 with SRMs, psychological distress is similar between those treated with AS or surgery. However, screening for distress and providing support might be more important for those with a biopsy proven malignancy managed with AS.

<table>
<thead>
<tr>
<th>Table 1 – Clinical, pathological and follow-up data of active surveillance and surgery patients:</th>
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<tr>
<td><strong>Surgery</strong></td>
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<tr>
<td><strong>Number of patients (%)</strong></td>
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<td><strong>Mean age at diagnosis, n (SD)</strong></td>
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<tr>
<td><strong>Gender, n (%)</strong></td>
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<tr>
<td>Males</td>
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<td><strong>Laterality</strong></td>
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<td><strong>Number of patients who underwent a biopsy, n (%)</strong></td>
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<td><strong>Type of surgery, n (%)</strong></td>
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<tr>
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<tr>
<td><strong>Surgical modality (%)</strong></td>
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<td><strong>Surgery pathology results, n (%)</strong></td>
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<td><strong>Mean follow-up time (years) (SD)</strong></td>
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<td><strong>Status at last follow-up, n (%)</strong></td>
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Poster Session I – Full Abstracts
Introduction: Functional decline is a sequela of extirpative renal surgery with potential for significant morbidity. While partial nephrectomy (PN) may be associated with a decreased risk of functional loss compared to radical nephrectomy (RN), the impact of surgical nephron loss may be variable. We utilized pre-operative patient demographics, C-reactive protein, and tumor size to design and validate a novel scoring index to predict functional decline post PN.

Methods: A multi-institutional dataset was utilized for analysis and validation (UC San Diego, Emory, Tokyo Medical Dental) of patients undergoing PN with pre-operative estimated glomerular filtration rate (eGFR) >60mL/min/1.73m² by CKD-EPI equation. Demographic and clinical parameters were analyzed for each patient, and logistic regression multivariable analysis (MVA) was carried out for potential variables associated with development of de-novo post-operative chronic kidney disease (CKD) stage IIIb at last follow-up (eGFR <45 mL/min/1.73m²). Significant variables were included in the predictive model and assigned an index score based on odds ratio. Receiver-operating-characteristic (ROC) analysis was employed to evaluate predictive validity, and bootstrapping technique was utilized to validate the model.

Results: 924 patients were analyzed. 826 patients had post-operative eGFR of >45 mL/min/1.73m², while 111 patients had eGFR <45mL/min/1.73m². Factors on MVA independently associated with increased risk of development of eGFR<45 included age 65+ (OR=2.6, p<0.001), African-American race (OR=2.3, p=0.006), C-reactive protein level >0.5mg/dL (OR=5.3, p<0.001), and tumor size >4 cm (OR=1.458, p=0.189). For CART (C-reactive protein, Age, Race, Tumor size) score, the following values were assigned: age (<65=1, age >65=3), race (non-African-American=1, African-American=2), tumor size (<4=1, >4cm=2), and CRP (<0.5mg/dL=1, >0.5mg/dL=4). Analysis demonstrated 2.6% (12/469) of patients with a low (4-6) score had de novo eGFR<45 postoperatively, while 35% (41/117) of patients with a high (10-11) score had de novo eGFR<45. ROC analysis revealed AUC of 0.778, and ROC bootstrapping validation of 95 randomly selected patients revealed an AUC of 0.808.

Conclusion: CART score represents a novel composite score of preoperative demographics, tumor size, and inflammation status that significantly predicts development of eGFR<45 after surgery. This scoring system may provide adjunctive information to inform patient counseling and clinical decision making, as well as an impetus to improve outcomes in at-risk patient subgroups.

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ROC Curve
Poster #64
TREATMENT TRENDS AND DISPARITIES IN USE OF PARTIAL NEPHRECTOMY FOR T1A RENAL MASSES
*Allison May, MD1; Johar Syed1; Facundo Davaro1; Sameer Siddiqui1 and Zachary Hamilton
1Saint Louis University
Presented By: Allison May, MD

Introduction: Renal masses can be surgically treated by partial nephrectomy (PN) or radical nephrectomy (RN). Data shows that RN is associated with increased risk of chronic kidney disease, cardiac morbidity, and mortality. This realization, along with data showing oncologic equivalence of PN, lead to the 2009 AUA guideline statement calling for PN to be considered standard of care for T1a renal masses. Despite the guideline changes, studies have suggested underutilization of PN. We evaluated national trends using the National Cancer Database (NCDB) in utilization of PN before and after guideline changes.

Methods: Through the NCDB, we identified 99,035 patients from 2004 to 2015 that underwent surgical resection of T1a (<4.1 cm) renal masses. We evaluated the treatment trends over time and proportion of patients treated with PN or RN based on age, sex, race, income, insurance status, treatment facility volume, and Charlson comorbidity.

Results: Treatment with PN increased from 40.2% in 2004 to 71.3% in 2015 (P<0.001). Older patients were more likely to be treated with RN (HR 1.018, P<0.001), as were those with Charlson score 2 or 3+ (HR 1.288 and 2.074, P<0.001). Patients with lower income were more likely to be treated with RN (HR 1.186, P<0.001) as were uninsured patients (HR 1.108, P=.018) and those treated at low volume centers (HR 1.063, P<0.001). Females were more likely to undergo RN (HR 1.123, P<0.001) as were blacks (HR 1.339, P<0.001). While all of these demographic trends persisted after the release of the AUA guidelines, all HR’s decreased except for those for Charlson score and race. Black patients became even more likely to undergo RN (HR 2004-2009 1.248, HR 2010-2015 1.474, P<0.001), and in 2015 were over 1.6 times as likely to undergo RN. Patients treated with RN spent more time in the hospital (4.1 days vs. 3.5 days, P<0.001) and had higher overall mortality (17.4% vs. 7.3%, P<0.001).

Conclusion: Although use of PN for T1a renal masses has increased over time, nearly 30% of patients with T1a masses still underwent RN in 2015. Socioeconomic disparities continue to exist. While most disparities have decreased over time, there has been a concerning increase in use of RN in black patients.
Introduction: Impact of positive surgical margins (PSM) in patients undergoing radical nephrectomy (RN) in localized renal cell carcinoma (RCC) is poorly understood. We sought to understand the impact of PSM for overall survival (OS) after RN in clinically localized RCC.

Methods: Retrospective analysis of patients from the US National Cancer Database who underwent radical (RN) for clinically localized (cT1a-cT2b cN0M0) renal cell carcinoma between 2003-13. Patients were stratified into their pathological stage group [pT1a, pT1b, pT2a, pT2b, and pT3a (=Upstaged)] and analyzed by final margin status. Cox Regression Multivariable analysis (MVA) was performed to investigate associations of PSM and covariates on OS. Kaplan-Meier analysis (KMA) of OS was performed for PSM versus NSM for the overall cohort and by stage.

Results: The study consisted of 37,656 RN events [14312 (38%) pT1a, 13598 (36.1%) pT1b, 6551 (17.4%) pT2a, 2937 (7.8%) pT2b, and 4286 (11.3%) with pT3a upstaging]. PSM rate was 0.9% overall (0.4% pT1a, 0.4% pT1b, 0.4% pT2a, 0.4% pT2b, and 4.7% pT3a upstaged). On MVA for all-cause mortality, PSM was independently predictive for decreased OS (HR 1.51, p <0.001), along with increasing age (HR 1.04, p<0.001), non-Caucasian race (HR 1.199, p<0.001), increasing Charlson score (HR 2.23, p<0.001), non-private insurance (HR 1.61, p=0.001), high grade histology (HR 1.21, p=0.001), and sarcomatoid histology (HR 3.61, p<0.001). Increasing pathologic T-stage was also predictive of decreased OS (Referent pT1a, HR 1.17, 1.47, 1.74, and 1.93, for pT1b, pT2a, pT2b, and pT3a, respectively; all p<0.001). KMA revealed worsened 5-year OS for PSM vs. NSM for the overall cohort (62.4% vs. 81%, p<0.001), pT2a (61% vs. 79.4%, p=0.013), and pT3a (50% vs. 68.3%, p<0.001) groups.

Conclusion: While PSM is a relatively rare event in the RN population, it is nonetheless independently associated with worsened survival outcomes, particularly in pT2 and pT3a upstaged patients. While mechanism of decreased OS cannot be clarified given limitations of the NCDB, these data suggest that PSM may pose increased oncologic risks in higher pathological stage. In such circumstances, consideration of further definitive strategies including pre-emptive wide field resection may be warranted in select circumstances. Furthermore, our findings call for re-consideration of active exclusion of PSM patients from adjuvant therapy trials.
Poster #66

USING COMPUTED TOMOGRAPHY (CT) SCAN FEATURES TO PREDICT AGGRESSIVE VERSUS INDOLENT RENAL TUMOR HISTOLOGY

*Bimal Bhindi, MD, CM, MSc, FRCS; Robert Hartman; Theodora Potretzke; R. Houston Thompson; Christine Lohse; Ross Mason; Brian Costello; Aaron Potretzke; Stephen Boorjian; John Cheville and Bradley Leibovich

1Mayo Clinic, Rochester, MN, USA; 2University of Calgary, Calgary, AB, Canada; 3Southern Alberta Institute of Urology, Calgary, AB, Canada

Presented By: Bimal Bhindi, MD, CM, MSc, FRCSC

Introduction: We sought to determine if tumor features on CT scan can be used to predict aggressive (versus indolent) renal tumor histology in a contemporary cohort.

Methods: We identified 369 patients who underwent radical or partial nephrectomy for a pT1-2 renal tumor. CT scans were reviewed by a genitourinary radiologist (RPH) for radiographic features and a global impression of aggressiveness on a 4-point scale. Pathology was classified by a genitourinary pathologist (JCC). The primary outcome was aggressive (high-grade clear-cell, high-grade papillary, collecting duct, translocation-associated, hereditary leiomyomatosis, and unclassified renal cell carcinoma (RCC), malignant non-RCC tumors, and tumors demonstrating coagulative necrosis or sarcomatoid differentiation) versus indolent histology. The secondary outcome was malignant versus benign histology. Logistic regression models were created and predictive ability was assessed using the area under the receiver operating characteristics curves (AUC).

Results: The cohort included 87 patients with aggressive malignant tumors and 282 with indolent tumors (76 benign;206 malignant). On univariable analysis, male sex, nephrometry score, heterogeneous enhancement, absence of a macroscopic fat-attenuating component, round vs. angular interface, calcifications, areas of non-enhancement suggestive of necrosis, absence of a central scar, endophytic location, and nearness to the collecting system were associated with malignant histology, while larger radiographic tumor size, lesser degree of enhancement, male sex, absence of a macroscopic fat-attenuating component, areas of non-enhancement suggestive of necrosis, ipsilateral perinephric stranding, prominent collateral vessels, and nearness to the collecting system were associated with aggressive histology. On multivariable analysis, only male sex (OR=2.31;95%CI=1.32-4.05;p=0.003), heterogeneous enhancement (OR=2.70;95%CI=1.52-4.79;p<0.001), and macroscopic fat-attenuating component (OR=15.3;95%CI=3.94-59.7;p<0.001) remained significantly associated with malignant histology, and only radiographic tumor size (OR[per 1cm]=1.13;95%CI 1.04-1.23;p=0.004) and male sex (OR=3.96;95%CI 2.20-7.12;p<0.001) remained significantly associated with aggressive histology. These multivariable models outperformed the global radiologist impression (malignant histology: AUC=0.71 vs. 0.63; aggressive histology: AUC=0.71 vs. 0.63).

Conclusion: We developed models with moderate predictive ability for malignancy and risk of aggressive histology for renal tumors. Of note, only radiographic tumor size and patient sex were independently associated with aggressive histology. Many radiographic features on CT cannot be independently relied upon to assess the risk of malignancy or tumor aggressiveness; alternative imaging approaches, renal mass biopsy, and/or biomarkers are needed.
Poster #67
PROPOSAL FOR TRIPARTITE RE-CLASSIFICATION OF T1 RENAL CELL CARCINOMA INTO cT1a (VERY LOW RISK), cT1b (LOW RISK) AND cT1c (INTERMEDIATE RISK) SUBSTAGES

Aaron Bradshaw, BS 1; Robert Uzzo, MD 2; Alessandro Larcher, MD 3; Ahmed Eldefrawy, MD 1; Umberto Capitanio; MD 3; Shreyas Joshi, MD 2; Stephen Ryan, MD 1; Margaret Meagher, BS 1; Brittney Cotta, MD 1; Addison Yee 1; Fang Wan, MS 1; Francesco Montorsi, MD 3 and Ithaar Derweesh, MD 1

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Presented By: Aaron Bradshaw, BS

Introduction: Criteria for staging of T1 renal tumors into T1a (≤4cm) and T1b (4cm< and ≤7cm) have remained unchanged since 1997. Advancements in tumor biology have led to greater understanding of the heterogeneous potential of T1 renal tumors. We hypothesized that a three-tier classification may more rationally risk stratify T1 renal masses than the current T1a/T1b system.

Methods: Multi-center, international (UCSD, Fox Chase Cancer Center, Ospedale San Raffaele) retrospective analysis of patients with cT1 renal cell carcinoma undergoing partial or radical nephrectomy between 1987 and 2018. Patients were stratified by tumor size into three groups cT1a (≤2cm, very low risk), cT1b (2cm< and ≤5cm, low risk), and cT1c (5cm< and ≤7cm, intermediate risk). Primary outcome was recurrence free survival (RFS). Secondary outcome was overall survival (OS). Multivariable Cox Regression analysis and Kaplan-Meier analyses were utilized for outcomes.

Results: 3324 patients were stratified into proposed T1 groups (T1a=578, T1b=2111, T1c=635; median follow-up 50 months). Mean age increased with tumor size (T1a 58.1 yrs, T1b 60.4 yrs, T1c 60.8yrs, p<0.001) as did total RENAL scores (T1a 6.5, T1b 7.6, T1c 9.0, p<0.001). For cT1a, cT1b and cT1c tumors, Kaplan-Meier analysis revealed 5 year RFS of 96.9%, 91.6%, and 80.6%, (p<0.001; Figure 1a) and 5 year OS of 91.9%, 86.3%, and 76.2% (p=0.002, Figure 1b). Cox Regression multivariable analysis of RFS revealed increasing age (HR=1.02, p<0.001), diabetes mellitus (HR=1.36, p=0.042), high tumor grade (HR=2.22, p<0.001) and increasing tumor stage (Referent T1a; cT1b HR=2.18 p=0.001, cT1c HR=5.01 p<0.001) as independent risk factors. Cox Regression of OS revealed increasing age (HR=1.05, p<0.001), diabetes mellitus (HR=1.57, p<0.001), high tumor grade (HR=1.34, p=0.002) and increasing tumor stage (Referent T1a; cT1b HR=1.26 p=0.1, cT1c HR=2.050 p<0.001) as independent risk factors.

Conclusion: Subclassification of cT1 renal cell carcinoma into three clinical stage categories corresponds to distinctive tumor groups whose biological potential varies significantly. Division into three distinct categories may enhance risk stratification, refine preoperative counseling, and augment postoperative follow-up protocols by delineating a very low risk and intermediate risk subset of renal tumors. Further investigation is requisite to validate our findings.
Introduction: To assess the long term outcomes of image guided Radiofrequency Ablation (RFA) in biopsy-proven renal cell carcinoma within 10 years follow up.

Methods: In this IRB approved retrospective study, 135 biopsy-proven renal tumors in 106 patients who underwent the renal RFA from 2004 to 2012 at our institution were recruited. Primary outcomes were assessed by technical success (TS), glomerular filtration rate (GFR) before and after RFA, local tumor progression (LTP) and complications. Overall survival (OS) and 10-year cancer-specific survival (CSS) rates are presented using the Kaplan-Meier curves. Technical success was evaluated with contrast-enhanced CT or MRI immediately after ablation procedure. Presence LTP was examined with Imaging from3-month postablation and thereafter.

Results: 106 patients with 135 biopsy-proven renal lesions with at least 10 years postablation follow up were included. The mean age was 68.6(34-89) years and 67.4% were male. The mean Imaging follow up was 89.8 month (30-120).The median tumor size was 2cm (0.5-8) and the median nephrometry score was 8(4-12). Among 135 tumors, 5.2% were oncocytoma while 94.8 % were RCC. The most common histologies were clear cell 68.1 %( 92/135), papillary 9.6 %(13/135), chromophobe 4.4 % (6/135), and 12.6% (17/135) epithelial neoplasm. The lesion location was 52.6% in Right kidney & was distributed 27.4% in the upper pole, 37.8% midpole & 34.8% lower pole. No change in eGFR before & after ablation. 123/135 lesions were ablated in a single session with 91.1% technical success & 8.9% (12/135) required a second encounter and 1 lesion ablated completely within third session which most were 91.6%( 11/12) CC & 8.4 %( 1/12) Oncocytoma with mean size of 3.3 cm. The primary, secondary technical & overall technical success rate was 91.1%, 81.4% &100% respectively. The local recurrence rate 6.6% (9/135) & complication rate was 4.4% (6/135) with mean size of 2.8cm, 50%(3/6) Interpole location & most were 83.3% CC, 16.4% Papillary. There were 3 patients with minor complication (hematoma & pain) & 3 with major complication (urinoma, granulomatous mass and retroperitoneal abscess that needed interventions).Overall and RCC specific survival rates (for subset of 87/106 patients) were 58% & 91% for 120 months.

Conclusion: Image-guided RFA is a safe and effective procedure in RCC treatment with low recurrence and complication rates in 10y postablation follow up.
**Poster #69**

**RE-THINKING “CASTRATION RESISTANCE”: NOVEL INSIGHTS USING AN INTEGRATED ADAPTATION-BASED MODEL TO QUANTIFY RESPONSE TO ANDROGEN TARGETED THERAPIES**  
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1Duke Urology  
Presented By: Andrew Chang, MD, PhD

**Introduction:** Androgen-deprivation therapy (ADT) remains the mainstay of treatment for advanced prostate cancer (PC). Inevitably, castration resistance will occur, presumably resulting from selection of resistant clones within a heterogeneous population of cancer cells. Yet PC cells may remain sensitive to further secondary hormonal manipulation. Thus, we take an alternative approach that resistance may reflect adaptation by the dominant clone in the population.

**Methods:** An integrated equation that models a dynamic adaptable response to ADT was derived with PC cell growth kinetics as functions of theoretical androgen receptor occupancy. The final model required 3 terms to fit: pre-ADT cancer growth rate (PSA doubling time), peak prostate cancer volume at ADT initiation (PSA peak), and PC-specific effective ADT (function of PSA decline and nadir). This equation was fit to longitudinal data from men that developed castration resistant PC using their PSA trajectories as surrogates for PC disease burden. All men were initially ADT-naïve and their PSA response trajectories were monitored serially through the development of castration resistance (PCWG3 criteria) and use of secondary hormonal therapies.

**Results:** A cohort of 101 men with median age of 70 years at ADT initiation and median follow-up of 5 years were included. 70% of men had prostate-targeted interventions (radiation or surgery) prior to ADT, and 33% received adjuvant or salvage therapy. Median time to radiographic progression and death after ADT was 2.1 and 4.7 years, respectively. Overall, our integrated model was able to fit pre-ADT growth, post-ADT decline, and emergence of castration resistance with very high precision (mean R2 = 0.75). The modeled metric of effective PC-specific ADT was a saturating function of PSA doubling time, consistent rate limiting androgen levels following ADT. We also quantified the effective ADT response to secondary anti-androgen therapies, including abiraterone and enzalutamide. Consistent with an adaptation-based mechanism, there was no significant difference in their sequence of use. Finally, we analyze cases of intermittent ADT, which represent the ultimate test of adaptation versus selection.

**Conclusion:** We have developed a novel adaptation-based mathematical model to analyze clinical response of PC to androgen-targeted therapies. The model is precise, reproducible and provides a more intuitive understanding of clinical response to therapy.
Poster #70
OBESITY AND METASTATIC CASTRATION RESISTANT PROSTATE CANCER: RESULTS FROM THE CONTROL ARMS OF ASCENT2, MAINSAIL AND VENICE TRIALS
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Presented By: Alberto Martini, MD

Introduction: Evidences concerning the role of body mass index (BMI) in metastatic castration resistant (mCRPC) patients are conflicting. We aimed to test whether BMI was associated with overall survival (OS) and occurrence of adverse events (AEs) amongst patients with mCRPC.

Methods: We identified 1577 patients with mCRPC from three phase III RCTs. The primary endpoint of this study was OS and the secondary endpoint being the occurrence of AEs during chemotherapy administration. The role of BMI in predicting OS and AEs was investigated by means of Cox regression after adjusting for age, PSA, ECOG, number of metastasis, prior treatment and chemotherapy dose. A BMI of >30 kg/m² was considered obese for this study. To exclude any effect attributable to the fact that patients with high BMI receive a higher dose of chemotherapy (titrated according to the body surface) we checked for eventual interactions between BMI and chemotherapy dose (both as a continuous-continuous and categorical-continuous interactions).

Results: The median (IQR) age for the patient population was 69 (63, 74) years with a median BMI of 27.7 kg/m². Overall, 6 patients had a BMI <20, 355 had BMI between 20-25, 732 between 25-30 and 474 had a BMI over 30 kg/m². Overall, 655 were deceased by the end of the study. The median follow up for survivors was 12 months. With respect to OS, BMI emerged as a protective factor on Cox analysis (HR:0.96; 95%CI: 0.94, 0.99; p=0.015). When considered as a categorical variable, obesity was a significant predictor of OS (HR:0.71, 95%CI: 0.53, 0.96; p=0.027). No interaction was detected when checking for a continuous-continuous interaction between BMI and dose (p=0.35) nor when checking for an interaction between the BMI categories and the Docetaxel dose (all p>=0.4). During therapy, 822 AEs occurred. BMI did not emerge as a significant predictor of AEs neither as continuous nor as categorical variable (p>0.7).

Conclusion: BMI is a significant predictor of OS in patients with mCRPC, but not of AEs. Specifically, obese patients with mCRPC present a higher survival probability with respect to overweight and normal weight patients. Additionally, we demonstrated that the protective effect of BMI is not related to the higher dose of chemotherapy.
Introduction: Sipuleucel-T, an FDA-approved autologous cellular immunotherapy, is recommended by NCCN and SITC guidelines as a frontline option in the treatment of metastatic castration-resistant prostate cancer (mCRPC) (NCCN Prostate Cancer v.3.2018; McNeel J Immunother Cancer 2016). Evidence of greater OS benefit versus placebo when sipuleucel-T was administered to mCRPC patients with lower baseline prostate-specific antigen (PSA) (Schellhammer Urol 2013) supports the timely application of immunotherapy when immunosuppressive pressures of the tumor are less onerous. While longer overall survival (OS) has been observed in lymph node (LN)-only mCRPC versus disease with bone or visceral involvement (Halabi J Clin Oncol 2016), LN-only disease represents less advanced mCRPC and a platform to assess whether early deployment of immunotherapy is associated with extended OS in mCRPC patients treated with sipuleucel-T in the real-world setting.

Methods: Men ≥ 18 years old with mCRPC receiving sipuleucel-T were eligible for PROCEED (NCT01306890), a registry. Sipuleucel-T treatment consisted of three biweekly infusions. Cerebrovascular event was the primary endpoint and the secondary endpoint was OS. Men were followed until death, study withdrawal, or a minimum of 3 years. The current subgroup analysis was conducted post-hoc.

Results: PROCEED enrolled 1976 mCRPC patients between 2011-2013. Of these, 1902 received at least 1 infusion of sipuleucel-T and 257 (13.5%) reported LN-only disease. Median age for the LN-only cohort (Table) was 70, with 86% Caucasian and 13% African American patients. The majority had good performance status. Gleason ≤ 7 and ≥ 8 were reported in 47% and 46%, respectively, and median baseline PSA was 12.5 ng/ml. After a median follow-up of 45 months, median OS was 41 months. Estimated survival rates at 3, 4 and 5 years were: 57%, 43%, and 33%. OS among the LN-only cohort was longer than the overall PROCEED population (median OS: 30.7 months) and patients with other patterns of metastatic spread.

Conclusion: As expected, mCRPC patients with LN-only pattern of spread treated with sipuleucel-T have longer OS compared with men with bone metastases who constitute the majority of the PROCEED population. The extent to which the excellent survival outcome seen in men with LN-only disease can be attributed to sipuleucel-T needs to be explored.
**Poster #72**

**INCORPORATING MPMRI BIOPSY DATA INTO ESTABLISHED PRE-RP NOMOGRAMS: POTENTIAL IMPACT OF AN INCREASINGLY COMMON CLINICAL SCENARIO**

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Presented By: Joon Yau Leong

**Introduction:** Current pre-radical prostatectomy (RP) nomograms predicting lymph node involvement (LNI) are based on systematic 12-core prostate biopsies (PBx). With the introduction of mpMRI (multiparametric MRI), cognitive or fusion biopsies have become prevalent, often in the absence of systematic cores. We examine the practical application of MR biopsy data using established pre-RP nomograms and the potential implications on RP intra-operative decision making.

**Methods:** Utilizing a prospectively maintained single institution database, all patients who underwent MRI-based PBx prior to RP were identified. Each patient was individually assessed using the MSKCC Kattan nomogram and the Briganti nomogram using the following iterations: 1) Targeted Alone [T] (targeted cores alone), 2) Targeted & Systematic [TS] and 3) Targeted Augmented [TA] (Figure 1). The TA iteration utilized targeted core data alone and assumed negative remaining systematic cores for a total 12 core. Nomogram outcomes, specifically risk of LNI, was compared across iterations. Clinically significant impact was defined as a change in risk above or below 2% (Δ2) or 5% (Δ5), based on current guidelines recommendations.

**Results:** 61 men met inclusion criteria (6 targeted, 55 systematic + targeted PBx). In the 6 men with targeted only biopsies, using the Kattan and Briganti nomograms, Δ2 occurred in 1 patient (16.7%) and Δ5 in 2 patients (16.7-33.3%); in all, TA iteration result was lower than the T iteration.

In the subsequent analysis of 50 patients with positive targeted biopsy cores, Δ2 and Δ5 were 10-36% and 28-36%, respectively. In the subset of 44 patients with both targeted and systematic biopsies, using their TS nomogram as an internal validation, the TA iteration was a better approximation of their TS iteration than their T iteration in 59% (Kattan) and 70% (Briganti) of patients.

**Conclusion:** mpMRI-based prostate biopsy results, and in particular those from targeted biopsy cores alone, can yield significantly different results using established pre-RP nomograms. Therefore, future nomograms must better incorporate MRI biopsy data and guidelines on how to account for them. In the interim, augmenting targeted biopsy data may serve to bridge the gap.

**Figure 1:**
QUESTIONING THE STATUS QUO: SHOULD GLEASON 3+3=6 PCA BE CONSIDERED A “NEGATIVE CORE” FOR PRE-RP RISK NOMOGRAMS?

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Presented By: Joon Yau Leong

Introduction: Unfortunately, current pre-radical prostatectomy (RP) nomograms predicting lymph node involvement (LNI) rarely differentiate between Gleason 6 prostate cancer (Gi6 PCa) and clinically significant Gleason 7-10 PCa. As such, practical utilization of these nomograms can be problematic. We aim to assess the impact of excluding Gi6 PCa cores on nomogram and RP outcomes.

Methods: Utilizing a prospectively maintained single institution database, all patients who underwent transrectal ultrasound (TRUS) guided PBx prior to RP and pelvic lymph node dissection (PLND) were identified. Each patient was individually assessed using the MSKCC Kattan nomogram and the Briganti nomogram using the following iterations: 1) “Original” [ORIG] (all available core data) and 2) “Selective” [SEL] (only cores Gleason score ≥7). Nomogram outcomes, specifically risk of LNI, was compared across iterations and stratified based on pre-RP risk classification (3+3 [low], 3+4, 4+3, and 8-10 [high]). Clinically significant impact on management [CSIM] was defined as a change in risk above or below 2% (Δ2) or 5% (Δ5), based on current guidelines recommendations, that may impact decision to complete PLND. RP pathology was used to calculate final node positive (pN+) status.

Results: 232 men met inclusion criteria (6 targeted, 171 systematic, 55 systematic & targeted PBx). Comparing ORIG and SEL for the entire cohort, there was no evident difference regarding LNI risk. In high risk patients, there was little discrepancy in LNI risk between iterations, and CSIM was uncommon (<5%). In low risk patients, Δ2 was 27.8-30.6% and Δ5 was 0%, due to predominantly Gleason 6 disease. In the 84 Gi3+4 patients, Δ2 was 8.3-27.4% and Δ5 was 8.3-11.9%, while in the 47 Gi4+3 patients, Δ5 was 12.8-14.9%; in all cases, the change favored decreased need for PLND. Subsequently, when compared against pN+ status, the mean/median SEL iteration values were better predictors of true LNI rates than the ORIG iteration (Figure 1).

Conclusion: As Gleason 3+3=6 PCa is increasingly being considered an insignificant prostate cancer, its inclusion in established PCa risk nomograms becomes problematic. We find that excluding Gi6 PCa cores from these nomograms can reduce the need to complete a PLND at the time of RP, and more importantly, may better reflect true node positive rates.

Figure 1:

Comparison of predicted LNI to actual LNI after risk stratification

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<th>Risk Level</th>
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<th>MSK SEL (%)</th>
<th>Brig ORIG (%)</th>
<th>Brig SEL (%)</th>
<th>pN+ (%)</th>
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<td>Intermediate risk (4+3)</td>
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<tr>
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Targeted Ablation Using Ultrasound-Guided Irreversible Electroporation of Index Tumors (Target Study): Prospective Development Study Evaluating Safety and Patient-Reported Functional and Sexual Outcomes

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Presented By: Taehyoung Lee, MD

Introduction: Partial gland ablation is an emerging investigative treatment for localized prostate cancer (PCa). Irreversible electroporation (IRE) is a non-thermal ablative technique utilizing electrical energy to create irreversible pores in the cell membrane. We prospectively studied the safety and patient-reported functional and sexual outcomes of focal IRE as a primary treatment for intermediate-risk PCa.

Methods: Between February 2015 and April 2017, 20 patients were enrolled and underwent 22 focal IRE procedures. Eligibility criteria were Gleason grade group (GG) II and III PCa in a maximum of 2 adjacent sextant prostate sectors confined to one prostate hemigland, without extraprostatic extension on multiparametric MRI. All patients underwent MRI-targeted and systematic transrectal biopsy. Ablation was performed with 5mm cancer margin and any GG I cancer outside of mapped index lesion was untreated. Outcome measures were Prostate Quality of Life Index, Male Sexual Health Questionnaires, Clavien classification of complications, and MRI-targeted and systematic biopsies at 3- and 12-months.

Results: One patient developed electrocardiogram changes and treatment was aborted. The remaining 19 underwent treatment. Median age was 64 (IQR61-68) and median PSA was 6.3ng/mL (IQR4.5-7.6). The index lesions were predominantly GG II (94.7%). Ten had multifocal GG I tumors; 6 and 7 had anterior and apical tumors, respectively. Six weeks after treatment, 5 patients developed grade I complications including hematuria and testicular pain; 2 patients developed grade II urinary retention requiring catheterization. All complications were resolved by 3 months. At 6-months, 1 patient developed grade II epididymitis which was treated with antibiotic therapy. There was no grade III or higher complications. At 6-months, no statistically significant deterioration was detected in IPSS (p=0.4), urinary (p=0.8), bowel (p=0.4), sexual (p=0.4) domains or health related quality of life index (p > 0.9). Ejaculation quality (p<0.01) and volume (p<0.01) were significantly reduced and ejaculation bother increased (p=0.031).

Conclusion: Focal IRE for primary treatment of intermediate-risk PCa is safe and associated with minimal impact on urinary, bowel, and sexual quality of life. Oncologic outcome data will be reported at 3- and 12-months post-treatment. Patients with intermediate-risk PCa with focal tumors can be offered focal IRE pending final oncologic outcome data.
Introduction: Wnt signaling is implicated in embryonic development, tissue homeostasis and with deregulation evident in disease. Wnt10b is expressed as an early marker of murine prostate buds. This study investigates the roles of Wnt10b in normal prostate development and in prostate cancer (PCa) progression.

Methods: In vitro organ culture: New born rat ventral prostate (VP) lobes were cultured in basal medium or Wnt10b protein for 6 days. PCR Array: VPs from SV40-Tag rats were harvested at 25 weeks. Utilized Wnt Expression PCR Array for gene expression. Immunohistochemistry: Archived benign and cancer RP specimens were compared for Wnt10b mRNA and protein levels. WNT10B and Control lentiviral constructs were used to create stable WNT10B knockdown in PC3 cells. Cell Proliferation Assay: MTT assay assessed proliferation. Side Population Analysis: Hoechst exclusion assay was used to assess stem-like cell population. Xenograft development: Primary xenografts were developed subcutaneously in nude mice and harvested at 30 days. Serial transplantation was performed subcutaneously and under the renal capsule with harvest at 9 weeks.

Results: Wnt10b ontogeny rapidly declines postnatally in rat VP. Exogenous Wnt10b in developing VPs decreased growth suggesting an antiproliferative role. VPs from PB-SV40 LTag rats with localized PCa showed 25 fold reduction in Wnt10b mRNA and protein levels. WNT10B protein levels in localized human PCa specimens ranging from Gleason grades 6-8 were reduced on IHC compared to benign regions. However, WNT10B levels were increased in metastatic cell line PC3 compared to benign epithelial cells suggesting cancer stage-specific roles. WNT10B knockdown in PC3 cells increased proliferation but reversed expression of EMT genes, reduced stemness and MMP genes, and reduced stem cell-like cells. Furthermore, loss of WNT10B abrogated ability of PC3 cells to propagate tumors via serial transplantation.

Conclusion: These results indicate dual and opposing roles for WNT10B in normal development and in PCa progression. Decreased WNT10B levels in localized cancer allow for a hyperproliferative state and increased levels in advanced disease confers stemness and malignant propensity which is mitigated by WNT10B knockdown. This identifies WNT10B as a potential target for therapeutic intervention in PCa.
Poster #76
PROSPECTIVE EVALUATION OF A NEW PATIENT DECISION AID TO ENHANCE PROSTATE CANCER SCREENING DECISION-MAKING

*Michael A. Brooks, MD1; Anita Misra-Hebert2; Alexander Zajichek2; Sigrid Carlsson3,4; Jonas Hugosson4; Michael Kattan2 and Andrew Stephenson1
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Presented By: Michael A. Brooks, MD

Introduction: Patient decision aids (PtDA) improve decision quality in a wide variety of treatment and screening decision contexts. We previously developed screening nomograms to predict 15-year risk of all-cause mortality, prostate cancer diagnosis, and prostate cancer mortality, and incorporated them into a graphical patient decision aid.

Objective: Prospectively recruit primary care patients interested in shared-decision making regarding prostate specific antigen (PSA) screening. Using validated questionnaires, assess the impact of standardized counseling, followed by individualized counseling using our new PtDA, on PSA screening decisions.

Methods: We performed a single-arm sequential trial design, with face-to-face clinician counseling and questionnaires. Based on a preliminary sample-size calculation, 50 patients from one internal medicine practice were recruited. Eligibility criteria included men age 50-69 years old, life expectancy >10 years, and ability to read English. Patients with a personal history of prostate cancer or PSA screening within one year prior to the study date were excluded. Participants filled out baseline questionnaires regarding prior PSA testing, demographic information, health literacy, and the Control Preferences Scale (CPS). They then received standardized counseling (based on large trial and epidemiologic data) regarding PSA screening, followed by individualized counseling using our new PtDA. Participants then made a screening decision, and filled out a post decision questionnaire including a Decisional Conflict Scale.

Results: The median age was 60 (IQR 54; 65). 42 (84%) participants had undergone prior PSA screening, while 8 (16%) had not. 41 (82%) participants received some education beyond high school, 41 (82%) demonstrated high health literacy, and 45 (90%) desired to have an active role in decision-making based on the CPS. After undergoing counseling, 35 (70%) participants chose to undergo initial or repeat PSA screening, 8 (16%) chose against screening, and 7 (14%) remained uncertain. 45 (90%) participants found individualized counseling using the PtDA more useful than standardized counseling. Finally, the combination of standardized counseling and individualized counseling using the patient decision aid significantly reduced decisional conflict compared to historical controls (P<0.001).

Conclusion: Our process of standardized counseling followed by individualized counseling using our new PtDA was effective in reducing decisional conflict. The majority of participants found the PtDA more useful in making a screening decision than standardized counseling.
Poster #77
PROSPECTIVE EVALUATION OF HIGH INTENSITY FOCUSED ULTRASOUND (HIFU) FOR PATIENTS FOR FOCAL PROSTATE CANCER IN ALL GRADE GROUPS
Bruno Nahar1; *Abhishek Bhat, MD1; Maria Becerra1; Diana Lopategui2; Nachiketh Soodana1; Mark Gonzalgo1; Chad Ritch1; Sanoj Punnen1 and Dipen Parekh1
1University of Miami Hospital; 2Mount Sinai Medical Center
Presented By: Abhishek Bhat, MD

Introduction: FocalHIFU reduces the morbidity associated with radical therapy while maintaining cancer control in localized prostate cancer (PCa). We report outcomes of focal HIFU for primary treatment of localized PCa in the first prospective cohort of patients in the United States.

Methods: Patients who underwent primary focal HIFU from January 2016 to July 2018 were included. All patients underwent a 12 core TRUS-guided biopsy, in addition to MRI-US fusion biopsy if a targetable lesion was identified. Any Gleason grade was considered, however patients with very-low risk or high-risk and high-volume PCa were excluded. Only patients eligible for focal (<50% of prostate volume) or subtotal (>50% but less than whole-gland) HIFU ablation were included. Follow-up protocol included 3-monthly PSA, functional outcomes recorded with validated questionnaires and and fusion biopsy at 6 or 12 months for high-risk and low-intermediate risk PCa, respectively.

Results: 50 men were included in the analysis of which 17(34%), 23(46%), 5(10%), 3 (6%), 2(4%) were from grade groups 1 through 5, respectively. Mean age was 68 years, mean baseline PSA of 6.51 ng/mL and mean prostate size was 35.82cc. 43(86%) men underwent focal ablation and 7(13.2%) subtotal ablation. IPSS went back to baseline at 3-6 months in 68% of men. 88% of patients maintained the erectile function, while 12% reported de-novo erectile dysfunction at 12 months. The overall complications rate was 45%. However, major complications were seen in only 4(6%) patients, who required TURP due to urinary retention post HIFU. Mean follow-up was 16.3 months (range 3-31). At 3 months follow-up, nadir PSA below 2ng/mL was achieved in 39(78%). Among 18(36%) patients who underwent a control biopsy, 16 (88%) had negative infield biopsies and 6 (33%) had low-risk outfield biopsies. Out of the two patients with positive infield biopsy, one had very-low risk PCa and continues to be on active surveillance. The other underwent salvage RALP for intermediate-risk PCa.

Conclusion: FocalHIFU is a safe procedure for localized PCa with acceptable complications and excellent functional outcomes. Short-term oncological outcomes are promising but longer follow-up is needed for oncologic control.
INTRODUCTION: Prostate Cancer (PCa) is the most commonly diagnosed and the leading cause of cancer death in Mexico. PSA screening is not widely used and many men are never diagnosed with PCa. Thus, the true incidence of PCa is unknown and yet it is the number one cause of cancer morbidity and mortality in men. The current study was designed to evaluate the incidence of PCa.

METHODS: Prospective enrollment of 3,837 men >50 years and <75 years old without previous history of PCa underwent PSA testing. Men with confirmed elevated PSA are being invited to further evaluation and possible biopsy by a urologist. For the transrectal prostate biopsy, we used 5ml of local lidocaine 2% to block periprostatic nerves. We obtained 12 fragments (6 of each lobe).

RESULTS: Median age was 59 years. In this cohort 412/3837 (10.7%) had a total PSA >4ng/ml and 229/412 (55.5%) had a second PSA >4ng/ml. 156 (68%) had PSA <10 ng/ml, 48 (12%) PSA 10-20 ng/mL, and 25 (6%) PSA ≥20 ng/mL. Transrectal prostate biopsy was offered and accepted in 127/229 (55.4%). Prostate cancer detection rate was 42.5% (n=54/127), in whose histology results were: Gleason 6 (66.3% n=36) with a mean PSA 7.4ng/ml; Gleason 7 (25.9% n=14) with a mean PSA 11.5ng/ml; Gleason ≥8 (7.4% n=4) with a mean PSA 17.5ng/ml.

CONCLUSION: The PSA as screening, could give us a tool to detect prostate cancer in an early fashion. One third of our patients presented with a clinically significant disease, which denote the importance of early detection in our country. In Mexico, there aren’t big prospective poblational studies, so the true incidence of prostate cancer could be misleading. Gomez-Guerra et al, gave us a glimpse in his poblational study (n=973) that the histology of prostate cancer in Mexico could be different of what big poblational studies have found in their respective countries. In our study we found that 33.3% had a Gleason score ≥ 7 in contrast to PLCO (9.4%) and ERSPC (28.9%). This increase in detection of clinically significant disease could be one of the reasons of why prostate cancer still is the leading cause of cancer death in Mexico.
Poster Session I – Full Abstracts

Poster #79
TOWARDS A RAPID DIAGNOSIS OF PROSTATE CANCER WITH OPEN-TOP LIGHT-SHEET MICROSCOPY
Weisi Xie¹; Adam Glaser¹; Nicholas Reder²; Jonathan Liu¹ and *Lawrence True²
¹University of Washington, Dept Mechanical Engineering; ²University of Washington, Dept Pathology
Presented By: Lawrence True

Introduction: Pathologists are challenged with providing a timely diagnosis. Standard practice in pathology labs is batching process specimens, a practice taking at least 12 hours. A procedure which provides a preliminary diagnosis to the urologist within hours would enable the urologist to talk with the patient shortly after the biopsy procedure, avoiding the anxiety associated with diagnostic delays.

Methods: We have built an open-top light-sheet (OTLS) microscope which provides images of fresh prostate biopsies without consuming any tissue. Enabling this procedure are optical-clearing methods that minimize light scattering, small-molecule fluorescent agents that rapidly diffuse into and label intact biopsies, and the OTLS platform on which 12 core biopsies may be rapidly imaged. We assessed the molecular quality of the tissue by RIN values. The histologic quality was compared with traditional FFPE histology. Using these procedures, we processed 3 prostate needle core biopsies obtained from radical prostatectomy specimens from patients who consented for research. Digital images were viewed using Image J. The quality of the images and of histology after OTLS examination was assessed by two pathologists. The time from tissue receipt to image viewing was recorded.

Results: For all 3 biopsies the pathologists could diagnose carcinoma in the generated digital images within an hour of tissue receipt. They confirmed the diagnosis in sections of the subsequent sections of FFPE tissue. Neither the histology quality nor the quality of immunostains for low and high MW keratin was compromised by OTLS microscopy.

Conclusion: We have demonstrated the feasibility of diagnosing prostate carcinoma within an hour of obtaining core-needle biopsies. This could enable clinicians to communicate a diagnosis to a patient the day of the biopsy. In addition to a short turnaround time, nondestructive OTLS microscopy conserves tissue, and has the ability to preserve RNA better than formalin fixation. This can be of great value for downstream molecular characterization. Furthermore, the digital images (these average 500 MB) can be archived for quicker retrieval than is usual for retrieving glass slides. We are expanding our work to assess more biopsies, to optimize OTLS (resolution and imaging depth), and to assess the ability of OTLS images to differentiate prostate carcinoma from its prostate pathological mimics.
Poster #80
NATIONAL TRENDS AND PERIOPERATIVE OUTCOMES OF PELVIC LYMPHADENECTOMY DURING RADICAL PROSTATECTOMY
Alejandro Abello, MD1; Kamyar Ghabili1; Patrick Kenney1; Preston Sprenkle1 and Michael Leapman
1Yale School of Medicine
Presented By: Alejandro Abello, MD

Introduction: The optimal extent of pelvic lymph node dissection (PLND) at the time of radical prostatectomy (RP) has not been definitively assessed. We aimed to evaluate trend changes in the number of lymph nodes removed at the time of RP and the association of lymph node count with perioperative outcomes using national cancer registry data.

Methods: We queried the National Cancer Database (NCDB) to identify patients diagnosed with clinically localized prostate cancer from 2004 to 2014 who underwent treatment with RP. We extracted and compiled patient clinical and demographic characteristics, including the lymph node status and count. We examined the trends in the performance of lymphadenectomy, and count of lymph nodes removed. We used multivariable logistic regression to assess the association of lymph node dissection and lymph node count with 30-day readmission.

Results: We identified 1,294,217 men diagnosed with prostate cancer in 2004-2014, including 670,370 (51.8%) treated with RP. Of patients treated with RP, PLND was performed in 54.5%. Among patients who received lymphadenectomy, the median number of lymph nodes examined was 5 (IQR: 2-9). Considering trend changes, PLND of 10-30 lymph nodes steadily and significantly increased over time while > 30 nodes significantly decreased over time. (Table 1). Lymphadenectomy was not performed in 62.3%, 33.9%, and 46.1% of patients with D’Amico low, intermediate or high-risk disease, respectively. A total of 2.6% of patients were readmitted within 30 days post-RP. On multivariable regression adjusted for clinical, demographic, and pathologic variables, PLND was associated to increase odds for readmission (OR: 1.13, 95% CI: 1.09-1.17, P < 0.001). Increasing lymph node count was also associated with increased odds of readmission for: 1-10 nodes (OR: 1.06, 95% CI: 1.02-1.10; P <0.001) and > 30 nodes (OR: 1.82, 95% CI: 1.61-2.05; P <0.001). This study is limited by absent data regarding the anatomic boundaries of lymph node dissection, and variation in pathologic review.

Conclusion: PLND dissection continues to be omitted in a proportion of patients with intermediate and high-risk prostate cancer. Despite enthusiasm for extended dissection templates, pathologic lymph node counts at prostatectomy have not changed substantially.

Table 1: Proportion of lymph nodes resected from 2004 to 2014

<table>
<thead>
<tr>
<th>Year</th>
<th>1-10</th>
<th>11-20</th>
<th>21-30</th>
<th>&gt;30</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>70.14</td>
<td>9.97</td>
<td>1.6</td>
<td>9.3</td>
<td>31,557</td>
</tr>
<tr>
<td>2005</td>
<td>78.14</td>
<td>10.88</td>
<td>1.89</td>
<td>9.09</td>
<td>30,435</td>
</tr>
<tr>
<td>2006</td>
<td>79.13</td>
<td>10.8</td>
<td>1.85</td>
<td>8.22</td>
<td>32,340</td>
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<tr>
<td>2007</td>
<td>79.7</td>
<td>11.18</td>
<td>2.11</td>
<td>7.02</td>
<td>35,233</td>
</tr>
<tr>
<td>2008</td>
<td>79.39</td>
<td>12.37</td>
<td>2.39</td>
<td>5.86</td>
<td>35,281</td>
</tr>
<tr>
<td>2009</td>
<td>78.58</td>
<td>13.06</td>
<td>2.69</td>
<td>5.67</td>
<td>35,306</td>
</tr>
<tr>
<td>2010</td>
<td>77.4</td>
<td>14.8</td>
<td>3.05</td>
<td>4.75</td>
<td>34,886</td>
</tr>
<tr>
<td>2011</td>
<td>77.97</td>
<td>14.64</td>
<td>3.32</td>
<td>4.07</td>
<td>36,457</td>
</tr>
<tr>
<td>2012</td>
<td>75.68</td>
<td>16.27</td>
<td>3.94</td>
<td>4.1</td>
<td>31,332</td>
</tr>
<tr>
<td>2013</td>
<td>74.85</td>
<td>17.19</td>
<td>4.19</td>
<td>3.77</td>
<td>31,678</td>
</tr>
<tr>
<td>2014</td>
<td>73.93</td>
<td>18</td>
<td>4.43</td>
<td>3.64</td>
<td>30,769</td>
</tr>
</tbody>
</table>
Introduction: Since the early 1990’s, PSA screening has resulted in a 45% reduction in prostate cancer mortality. Despite this, there has been a lack of consensus among policy panels about the optimal PSA threshold for biopsy recommendations. Hence, there have been efforts to risk-stratify patients with abnormal PSA values to better guide biopsy decisions. The 4Kscore® is a novel test which predicts the percentage risk of clinically significant prostate cancer. While there have been validation studies regarding use of the 4Kscore, there is limited data on how this test impacts clinical practice. We aimed to assess how the 4Kscore influenced biopsy related decisions in men evaluated in an academic urology practice.

Methods: We retrospectively reviewed our electronic medical records for all patients who underwent a 4Kscore at our institution. Since the implementation of the 4Kscore® at our institution in 2015, all of our practitioners have implemented it using their own clinical judgement without restrictions.

Results: Our analysis included a total of 308 men. The most common indications for 4Kscore testing were elevated PSA (58%), and abnormal digital rectal exam (34%). The rate of transrectal ultrasound (TRUS) guided prostate biopsy within 6 months of 4Kscore testing was 142/308 (46%). The mean 4Kscore was 26.4% in the biopsy group, while the mean 4Kscore in the non-biopsy group was 6% (p<0.0001) (Fig 1). Clinically significant disease was found in 36/142 (25%) of biopsies. Treatment consisted of radical prostatectomy in 19/36 (53%) patients, while 5/19 (26%) opted for radiation therapy. Fifty patients that underwent TRUS biopsy had a PSA <4 ng/mL, and 6/50 (12%) were found to have clinically significant disease. A total of 54 patients had a PSA>4 ng/mL and 4Kscore <7.5%, with a TRUS biopsy rate of 15/54 (28%).

Conclusion: Use of the 4Kscore in conjunction with other clinical factors in an academic urology practice resulted in a reduction in the number of prostate biopsies by over 50%. A significant difference was seen in the 4Kscore of patients who underwent TRUS biopsy and those who did not. Based on our data, the 4Kscore is a beneficial adjunct screening tool to prevent unneeded prostate biopsies and diagnosis of men with clinically insignificant disease.
Poster #82
LIFE TABLES TO OPTIMIZE PROSTATE CANCER TREATMENT IN THE VHA
*Ericka Sohlberg, MD1; I-Chun Thomas, MS2; Timothy Daskivich, MD MSHPM3; Ted Skolarus, MD MPH4,5; Jeremy Shelton, MD MSHPM6; Danil Makarov, MD MS8; Jonathan Bergman, MD MPH8,9; Kristopher Kapphahn, MS10; Jaden Yang, MS9; James Brooks, MD1; Manisha Desai, PhD9 and John T Leppert, MD MS10
1Department of Urology, Stanford University, Stanford, CA; 2Division of Urology, VA Palo Alto Healthcare System, Palo Alto, CA; 3Division of Urology, Cedars-Sinai Medical Center, Los Angeles, CA; 4Department of Urology, University of Michigan, Ann Arbor, MI; 5VA Ann Arbor Healthcare System, Ann Arbor, MI; 6Department of Urology, University of California-Los Angeles, Los Angeles, CA; 7Veterans Administration Greater Los Angeles Healthcare System, Los Angeles, CA; 8Department of Urology, NYU Langone Hospital-Brooklyn, Brooklyn, NY; 9Quantitative Sciences Unit, Department of Medicine, Stanford University, Stanford, CA; 10Departments of Urology and Medicine, Stanford University, Stanford, CA
Presented By: Ericka Sohlberg, MD

Introduction: Accurate predictions of baseline life expectancy are required to better inform prostate cancer treatment decisions and avoid over- and under-treatment. The Veterans Health Administration (VHA) cares for a large number of patients with prostate cancer, many of whom carry a higher burden of comorbidity than seen in the community. Although numerous models exist to predict life expectancy in men with prostate cancer, few are specific to the VHA population or easily applicable in the clinic setting. We sought to create a life expectancy estimator for Veterans diagnosed with prostate cancer that can be implemented into routine clinical practice to inform treatment decisions.

Methods: Using the national VHA electronic health records, we identified all patients 18 years or older diagnosed with prostate cancer between 2000 and 2013. We abstracted patient demographics, comorbidities, and tumor staging information. The pre-diagnosis PSA was identified directly from the electronic health record when available. We calculated overall survival information using the VA National Death Index with follow-up through 2015. We applied life table methods to report overall survival in table format and plotted visual estimates of overall survival using Kaplan-Meier methods stratified by Charlson Comorbidity Index and D’Amico Risk Classification.

Results: Our analytic cohort included 181,009 patients, of which 97,734 had complete oncologic data available. The majority of patients were 60-74 years of age with a Charlson score between 2-5. More than one third of Veterans diagnosed with prostate cancer met low-risk criteria. Kaplan-Meier analysis (Figure) illustrated the negative impact of increasing Charlson Comorbidity Index and cancer risk on survival, summarized further in life table format.

Conclusion: Life expectancy predictions are essential to providing patient-centered prostate cancer care. We have developed a life expectancy prediction tool that can be applied to Veterans diagnosed with prostate cancer receiving care in the VHA in an accessible form that is easily implemented into routine clinical use.
**Poster Session I – Full Abstracts**

Poster #83
**PROSTATE BIOPSY TRENDS AND RESULTS OVER A 20-YEAR PERIOD IN A HIGH-VOLUME TERTIARY CENTER**
*Jaime O. Herrera-Caceres, MD*; Hanan Goldberg; Dixon T.S. Woon; Thenappan Chandrasekar; Omar Alhunaidi; Zachary Klaassen; Alexandra Gleave; Ants Toi and Neil Fleshner

**Presented By:** Jaime O. Herrera-Caceres, MD

**Introduction:** Prostate biopsies (PBx) are the gold standard for the diagnosis of prostate cancer (PCa) Nonetheless, the usage and optimal timing of this procedure has evolved over time, especially with the introduction of prostate specific antigen (PSA), magnetic resonance imaging (MRI), additional biomarkers, and genomic classifiers. We present the diagnosis and rate of positive biopsies over 20 years in a high volume tertiary center.

**Methods:** Our institutional database of PBx was queried and the indications and rate of positive PBx was analyzed over time. Only patients undergoing a first PBx with a PSA <10 ng/dl in our center were included. Patients were stratified into 4 groups (Group 1, Jan 1998-Dec 2002; Group 2, Jan 2003-Dec 2007; Group 3, Jan 2008-Dec 2012; Group 4, Jan 2013-Jun 2018). Furthermore, in an attempt to discover the predictors of a positive PBx, a multivariable logistic regression model was performed.

**Results:** A total of 13343 patients were analyzed, with a mean age 62.7 (SD 8.34) years, PSA 5.38 (2.25) ng/dl and prostate volume 48.32 (SD 24.65) cc. Table 1 shows changes in Age, PSA, indications for PBx, PV, digital rectal examination (DRE), TRUS, clinically significant PCa (Gleason score >7) and percentage of positive PBx over the different periods of time. Less than 1% of the patients had an MRI (Canadian Health System does not cover MRI for primary PBx).

In the multivariable model age (Beta 0.178, 95% CI 0.10 - 0.012, p< 0.001), PSA (Beta 0.221, 95% CI 0.045 - 0.053, p< 0.001), suspicious DRE (Beta 0.036, 95% CI 0.021 - 0.056, p< 0.001), PV (Beta -0.277, 95% CI (-)0.006 – (-)0.005, p< 0.001), suspicious TRUS (Beta 0.190, 95% CI 0.175, - 0.206, p< 0.001) and time period (Beta 0.079, 95% CI 0.030 – 0.045, p< 0.001) were all predictors of a positive PBx.

**Conclusion:** Rate of PCa diagnosis (and clinically significant PCa) in PBx has increased over time reaching more than 60% in the most recent time period. Currently more than half of the diagnoses correspond to Gleason >7. This could be driven by an increased usage of PSA, additional biomarkers and new imaging modalities.

### Table 1: Changes over time

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<tbody>
<tr>
<td>Age (mean [SD])</td>
<td>63.48 (8.38)</td>
<td>62.52 (8.28)</td>
<td>62.37 (8.34)</td>
<td>62.87 (8.33)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PSA (mean [SD])</td>
<td>5.65 (2.37)</td>
<td>5.16 (2.24)</td>
<td>5.24 (2.17)</td>
<td>5.58 (2.18)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Indication for PBx (PSA, %)</td>
<td>65.8%</td>
<td>71.7%</td>
<td>74.5%</td>
<td>72.1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Prostate Volume (mean [SD])</td>
<td>58.20 (29.30)</td>
<td>47.27 (24.23)</td>
<td>44.12 (20.84)</td>
<td>44.11 (20.69)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Suspicious DRE (%)</td>
<td>48.6%</td>
<td>34.8%</td>
<td>26.9%</td>
<td>26.8%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Suspicious TRUS (%)</td>
<td>51.0%</td>
<td>45.8%</td>
<td>46.2%</td>
<td>55.3%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PCa Diagnosis (%)</td>
<td>45.0%</td>
<td>47.5%</td>
<td>52.2%</td>
<td>62.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Clinically Significant PCa (Gleason &gt;7, %)</td>
<td>67.4%</td>
<td>46.3%</td>
<td>61.8%</td>
<td>67.4%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Introduction: There are few long-term survival studies following radical prostatectomy (RP) in the modern era of PSA screening. This study aims to determine the factors associated with overall survival (OS) and prostate cancer specific survival (PCSS) in a large cohort of men undergoing RP and followed for up to 18 years.

Methods: Between October 2000 and September 2017, 1992 men consented to participate in a prospective outcomes study following RP by a single surgeon (HL). Men lost to follow-up were queried by the National Death Index (NDI) to maximize follow-up for survival outcomes. Kaplan-Meier estimates of time-to-event outcomes are described with 95% confidence intervals (CI) for 5, 10, and 15-year OS and PCSS. Binary logistic regressions were performed to characterize the contributing role of several baseline factors to both OS and PCSS at 10 and 15-year time points (significance = p<0.025 after Bonferroni correction) (Table 1).

Results: Over 18 years of follow-up, there was a significant trend to perform RP on men with more advanced disease based on biopsy Gleason score, baseline PSA, pathological Gleason score and pathological stage. Overall, the OS and PCSS was 91.1% (CI: 89.367%-92.557%) and 98.4% (97.5%-98.9%), respectively. The OS at 5, 10 and 15 years was 98.7% (CI: 98.1%-99.2%), 95.2% (93.9%-96.2%), and 91.2% (88.3%-93.4%) while PCSS at 5, 10, and 15 years was 99.8% (99.5%-99.9%), 98.9% (98.2%-99.4%), and 98.5% (96.9%-99.3%), respectively. Due to the low rates of mortality at 5 years, factors associated with OS and PCSS were examined only at 10 and 15 years. Factors significantly predicting both 10 and 15-year OS were age and post-operative Gleason score. The factors significantly predicting both 10 and 15-year PCSS were pathological stage and post-operative Gleason Score. Clinical T stage was also significant for only 10-year PCSS (Table 1).

Conclusion: Both 15-year OS and PCSS following RP exceed 90%, suggesting that surgical intervention favorably impacts the long-term natural history of clinically localized prostate cancer. Unlike post-operative disease characteristics (specimen Gleason score and pathological stage), pre-operative characteristics including PSA and biopsy Gleason score were not predictive of survival outcomes. This suggests a need to better define lethality of disease pre-operatively via MRI guided biopsy and molecular subtyping.
Introduction: Prior work has questioned the safety of active surveillance (AS) for African-American (AA) patients. However, direct studies of AA patients on AS regimens are rare, and some show contradictory results attributed to a “Will-Rogers phenomenon,” where more AA patients undergo definitive therapy leaving a well-selected AS population. To overcome these limitations we performed a retrospective matched cohort study of AA patients on AS.

Methods: We queried our AS database (2000-2016) for all AA patients. AA patients were matched to non-AA patients using a 1:1 algorithm based on National Comprehensive Cancer Network (NCCN) risk categorization, age at diagnosis, and year of diagnosis. Cohorts were compared on outcomes of NCCN risk reclassification, receipt of treatment, post-treatment recurrence, development of metastases, and prostate cancer specific mortality.

Results: Fifty-nine AA patients were identified and matched. This included 18 very –low risk (31%), 24 low risk (41%), and 17 intermediate risk patients (29%). Groups were equally matched based on NCCN risk group, year of diagnosis, and had similar ages at diagnosis (65.6 years AA, 65.9 years non-AA, p=0.97). Initial PSA values were similar between groups (5.2 AA versus 5.1 non-AA, p=0.77). Rates of risk reclassification during AS were higher among AA patients (54% versus 39% p=0.09), though receipt of treatment (46% vs 44%) and post-treatment recurrence (11% vs 19%) rates were similar between the two groups. While AA patients were more frequently reclassified, many were due to increases in PSA (40% AA, 8% non-AA upgraded by PSA alone) rather than pathologic upgrading. AA patients had a longer time to reclassification and treatment than non-AA patients (2.9 and 2.8 years versus 0.9 and 1.0 years, p=0.14). Similar time of follow-up was noted (AA 6.0 years versus non-AA 6.4 years, p=0.91). One patient in each group developed metastases. No cancer specific mortalities occurred.

Conclusion: In a matched analysis of AA versus non-AA patients on AS, rates of risk reclassification were higher among AA patients, though receipt of treatment and treatment outcomes were similar between groups. Metastatic progression and prostate cancer mortality were rare in both groups. AS appears to be a reasonable option for AA patients with long treatment free periods and reasonable post-treatment outcomes.
UPGRADING RATES OF A Racially DIVERSE GROUP OF VETERANS ON ACTIVE SURVEILLANCE
Jacob W. Greenberg1; Allison H. Feibus, MS1; Gabriel Z. Leinwand, MD1; L. Spencer Krane, MD1 and *Jonathan L. Silberstein, MD, MBA, FACS
Tulane University School of Medicine
Presented By: Jonathan L. Silberstein, MD, MBA, FACS

Introduction: Prostate cancer (PCa) is the most common malignancy in men and the second leading cause of cancer-related death. African Americans (AA) are known to have more advanced PCa features and are more likely to die from PCa. It remains unclear if active surveillance (AS), a strategy intended to prevent overtreatment of low-risk prostate cancer, is safe for AA men.

Methods: A prospective database study was performed at the South Louisiana Veterans Administration Medical Center (SLVHCS), New Orleans, LA. Included in this study were Men who elected for AS as their primary with low- and very low-risk PCa (Gleason 3+3, PSA<10, ≤CT2a) who have undergone at least one biopsy (Bx) subsequent to their diagnostic Bx. Data analysis was performed using through R 3.5.1 (Berkeley, CA).

Results: Our database included 222 men on AS, 150 met inclusion criteria: 102 AA and 48 CA (Caucasian) subjects. Within this group, men were on AS for average of 1057 days, with no differences between AA and CA (p=0.5). The average time to second Bx was 446 days with no significant difference between races (p=0.5). When comparing Age, BMI, PSA, PSA density, prostate volume, and baseline testosterone level at first and second Bx among the AA and CA men, no statistical differences were found. AA men had a greater volume of disease based on the number of positive cores, both on their initial diagnostic Bx (1.99 vs 1.56; p=.031) and subsequent Bx (2.42 vs 1.54; p=.009). At second Bx, 27% AA vs 39% CA were found to have no malignancy, 44% AA vs 38% CA consistent disease (3+3) and 29% AA vs 23% CA had any upgrading. Subjects who upgraded on second Bx, most had 3+4 disease; 50% AA vs 72% CA. Of the 44 men who received a third Bx, no differences in upgrading were noted; 19% AA and 24% CA with one patient having ISUP grade 3,4,5.

Conclusion: At subsequent prostate Bx, AA men have a similar rate of upgrading to CA men; however, upgrading and AA with ISUP grade 3,4,5 may correlate. When considering AS for AA men, early confirmatory Bx may be of particular value to rule out higher-risk disease.
Poster #87  
EVALUATING PERCEIVED SUGGESTION OF TREATMENT RECOMMENDATION FOR MEN WITH LOW RISK PROSTATE CANCER  
*Behfar Ehdaie, MD, MPH1; Elizabeth Schofield2; Lauren Gelfarb2; Michael Diefenbach3 and Christian Nelson2  
1Division of Urology, Memorial Sloan Kettering Cancer Center, NY NY; 2Psychiatry Service, Department of Psychiatry and Behavioral Sciences, Memorial Sloan Kettering Cancer Center, NY, NY; 3Department of Medicine and Urology, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell  
Presented By: Behfar Ehdaie, MD, MPH  

Introduction: Active surveillance is a viable option for men with low risk prostate cancer. The perception of a physician's recommendation impacts the patient's final decision. We sought to evaluate patient factors associated with the perceived suggestion of immediate treatment.  

Methods: Since 2011, men with Gleason grade group 1 (GG1) prostate cancer were enrolled in a prospective study to evaluate psychologic factors associated with active surveillance decision making for patients and their spouses. Patients completed a survey evaluating various psychologic measures prior to making their final decision (baseline) and during follow-up after choosing treatment or AS. We studied the association between patient characteristics and baseline psychologic measures with perceived suggestion of immediate treatment using a validated scale. T-tests were used for continuous variables and chi-square for categorical variables. Our outcome measures were based on any perceived suggestion of immediate treatment or a strong perceived suggestion of treatment.  

Results: Between 2011 and 2018, 189 men with GG1 were enrolled in the study. 174 men had completed the baseline survey and made a treatment decision. 102 men were classified with very low risk prostate cancer (<3 cores and <50% in any core) and 51 were classified as low risk. 31 (18%) selected immediate treatment. Overall, 38 (22%) perceived the physician's suggestion to treatment. On univariate analysis, only younger age was associated with the perceived suggestion of immediate treatment (p=0.02). We did not find a statistically significant association with patient characteristics including education level and ethnicity or baseline psychologic measures including anxiety (Memorial Anxiety Scale for Prostate Cancer), mood (Profile of Mood Status scale), and sense of optimism (Life Orientation Test-Revised). We did not find statistically significant differences in the distributions of patient perceptions of treatment among surgeons (n=7). The results did not change when we assessed the outcome as a strong perceived suggestion to treatment.  

Conclusion: Despite a standardized recommendation for AS for men with low risk prostate cancer, we identified varied perceptions of patients' assessment of surgeon's suggestion to immediate treatment vs AS. Physicians who recommend AS for men with low risk prostate cancer should be aware that a significant proportion of patients, especially younger men, perceive their suggestion to immediate treatment.
THREE-DIMENSIONAL PROSTATE MODELING AND PROCEDURE PLANNING FOR PROSTATE PARTIAL GLAND CRYOABLATION

Nicole Wake, PhD; Andrew Rosenkrantz, MD; Daniel Sodickson, MD, PhD; Hersh Chandarana, MD and *James S. Wysock, MD, MS

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Presented By: James S. Wysock, MD, MS

Introduction: A critical challenge for prostate partial gland cryoablation (cPGA) is achieving a confluent treatment volume (CTV) that covers both tumor volume and treatment margin. Three-dimensional prostate modeling (3DPM) based upon magnetic resonance imaging (MRI) offers a novel tool for estimation of CTV. This study describes the use of pre-treatment 3DPM to guide cryotherapy probe number and placement.

Methods: Forty patients with MRI-visible (PI-RADSv2 score≥2), biopsy confirmed prostate cancer underwent cPGA. 20 underwent pre-treatment 3DPM and procedure planning and 20 underwent conventional 2D planning. 3DPM was performed by first segmenting the prostatic capsule, dominant lesion, urethra, and rectal wall using multi-parametric MRI data. Segmented data was converted to 3D, and 3D prostate models were viewed in computer-aided design (CAD) software (3-matic, Materialise, Leuven, BE). Virtual cryotherapy probes with -40°C isotherm volumes were created to emulate the 1.5cm, 2.5cm, 3.0cm, 4.0cm, and 5.0cm probes (HealthTronics Inc, Austin, TX). Pre-treatment 3DPM was utilized to predict number of and placement of cryotherapy probes to achieve CTV with a 10mm treatment margin. (Figure 1). For the 2D planning group, a retrospective 3DPM treatment plan was created to determine the number of probes necessary to create CTV coverage with a 10mm treatment margin. Unpaired t-tests were used to compare continuous variables and Fisher’s exact test was used to establish whether there was any significant difference in categorical variables including number of planned probes and probes utilized for the retrospective and prospective 3DPM groups. Post-treatment MRI at 6-months, PSA at 3- and 6-months, and 6-month surveillance biopsy results were evaluated.

Results: Table 1 illustrates the patient characteristics for the two groups. The planned number of cryotherapy probes matched the actual number used in a greater number of patients with prospective 3DPM, 16/20 (80%) as compared to 11/20 (55%) patients with retrospective 3DPM, although this did not reach statistical significance (p=0.98). The number of patients with Gleason ≥ 6 in the ablation zone at 6-month biopsy was 0/6 with 3DPM and 2/14 (14.3%) with 2D planning.

Conclusion: MRI guided 3DPM planning data offers unique treatment guidance to assist with developing CTV for cPGA. Longer term data is needed to further assess the impact of 3DPM on ablation efficacy.

Figure 1: (A) Inferior and (B) sagittal views of 3D prostate model with the prostate –clear lesion – blue, urethra – yellow, rectal wall – gray, and 1cm treatment margin - green. (C) Inferior and (D) sagittal views with the cryoablation probes placed to cover the CTV.

Table 1: Pre – and post – treatment patient characteristics for the two cohorts.

<table>
<thead>
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<th>3DPM Planning</th>
<th>2DPM Planning</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-treatment PSA (mg/ml)</td>
<td>6.23 ± 3.72 (n=20)</td>
<td>8.86 ± 8.86 (n=20)</td>
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<td>Pre-treatment PSA (mg/ml)</td>
<td>6.78 ± 4.02 (n=20)</td>
<td>6.78 ± 4.02 (n=20)</td>
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<td>Post-treatment PSA (mg/ml)</td>
<td>3.90 ± 1.12 (n=18)</td>
<td>1.93 ± 1.03 (n=18)</td>
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<tr>
<td>Post-treatment PSA (mg/ml)</td>
<td>2.87 ± 1.27 (n=18)</td>
<td>1.06 ± 1.25 (n=18)</td>
<td>0.54</td>
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<tr>
<td># with Gleason ≥ 6 in the ablation zone</td>
<td>1/20 (5.0%)</td>
<td>0/16 (0.0%)</td>
<td>0.12</td>
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<tr>
<td># with negative biopsy</td>
<td>5/20 (25.0%)</td>
<td>5/12 (41.7%)</td>
<td>0.39</td>
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<tr>
<td># with Gleason ≥ 6 outside ablation zone</td>
<td>7/19 (36.8%)</td>
<td>1/12 (8.3%)</td>
<td>0.04</td>
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</table>

Amount of text: 3331
Poster #89
RACIAL DIFFERENCES IN PATIENT-REPORTED OUTCOMES OF MEN TREATED FOR LOCALIZED PROSTATE CANCER
*Pauline L. Filippou, MD1; Cleo Samuel, PhD2; Antonia Bennett, PhD2; Mian Wang, PhD2; Arlene Chung, MD2; Ethan Basch, MD, MSc2; Ronald Chen, MD, MPH2; Bryce Reeve, PhD2 and Angela Smith, MD, MS1
1Department of Urology, University of North Carolina, Chapel Hill, North Carolina; 2Lineberger Comprehensive Cancer Center, Chapel Hill, North Carolina
Presented By: Pauline L. Filippou, MD

Introduction: Patient reported outcomes (PROs) more accurately capture patient symptoms than physician assessment. Studies have examined racial differences among patients following prostate cancer treatment using a urologic symptom-specific PRO measure. However, no study has examined racial differences among more generalized patient-reported symptoms of men undergoing prostate cancer treatment. Our objective was to evaluate the racial differences among generalized PROs in men prior to, during and following localized prostate cancer treatment.

Methods: Men at a single institution who self identified as African American or white and received surgical or radiation treatment for localized prostate cancer were included. Several PRO questionnaires were administered prior to, during, and 3 months following completion of oncologic treatment. Questionnaires included the PROMIS sleep disturbance, fatigue, anxiety, depression, GI-constipation, GI-diarrhea, sexual function and satisfaction profile, and expanded prostate cancer index composite (EPIC) urinary domain. Bivariable analysis was used to determine racial differences between PROs at the different assessment time points.

Results: 48 men were included in our study, of which 21 self identified as African American. Half (n=24) of the cohort was treated with surgery, and the other half with radiation. African American men had significantly higher anxiety and depression scores at baseline and during treatment when compared to white men (p=0.03, p<0.01 and p<0.01, p<0.01 respectively). Overall fatigue scores worsened during and after treatment compared to baseline for both groups, with African American men reporting significantly more fatigue following completion of treatment compared to white men (p=0.04). Overall sleep disturbance did not differ between the two groups, nor at the different time points assessed. Sexual function worsened during and after treatment compared to baseline for both groups, however did not differ between the two groups. EPIC scores did not differ between the two groups at the differing time points.

Conclusion: Generalized PRO measurement tools identify racial differences in the patient experience not captured by more commonly used urologic PRO assessments. Future studies could further advance our understanding of racial differences in post-treatment recovery, with the potential for improved patient decision-making and quality of care.
Poster #90
CAN URINARY BIOMARKERS FROM EPIGENETIC ALTERATIONS IN NON-TUMOR PROSTATE CELLS DETECT THE PRESENCE OF PROSTATE CANCER?
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¹Department of Urology, University of Wisconsin
Presented By: Tariq A. Khemees, MD

Introduction: Prostate cancer development and progression are driven by the interplay of genetic and epigenetic changes that include DNA methylation. Detection of prostate cancer cells in urine has been hindered by their infrequent shedding. Nontumor prostate cells are found more frequently (14-20%) in the urine, and contain DNA methylation alterations associated with a cancer field defect. In the current study, we analyzed a series of DNA methylation markers to determine if they could predict the presence of prostate cancer using urine samples of patients undergoing biopsy for prostate cancer screening.

Methods: Following IRB approval, urine samples were collected after a prostate biopsy procedure done for patients who presented with an elevated PSA from 2012 to 2016. Ninety urine samples were collected from patients with biopsy proven prostate cancer, and 77 urine samples were collected from patients without prostate cancer. We purified genomic DNA using a kit from IBI Scientific (Valley Park, MO). Methylated DNA was detected across several regions using bisulfite treatment and pyrosequencing.

Results: The mean patient age was 64yr and mean PSA was 13ng/ml. Methylation changes in urine cell pellets showed significantly increased methylation at CpG shores associated with EVX1, CAV1 and PLA2G16 genes from patients who had PCa compared to those without PCa. EVX1 methylation to detect prostate cancer revealed a AUC of 0.75 (OR 1.09; 95% CI 0.94-1.25), CAV1 an AUC of 0.75 (OR 1.07; 95% CI 0.96-1.2) and PLA2G16 0.75 (OR 1.19; 95% CI 1.02-1.38). PSA AUC was 0.61. The combined three-marker assay performed better than PSA with AUC of 0.76 vs PSA AUC of 0.61 (P value=0.01) (Figure 1).

Conclusion: Genes methylated in a field defect in normal prostate cells can be detected in urine and may be utilized as a biomarker to detect PCa. Urine holds promise for further development of this novel assay platform.

![ROC curve image](image-url)
Poster #91
POOLED RESULTS FROM TWO PROSPECTIVE VALIDATION STUDIES OF THE EPI TEST DEMONSTRATES CONSISTENT PERFORMANCE TO PREDICT HIGH-GRADE PROSTATE CANCER AT INITIAL BIOPSY

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Presented By: Michael Donovan, MD, PhD

Introduction: Discriminating indolent from clinically significant prostate cancer (PCa) prior to initial biopsy remains an important clinical and health economic issue. Diagnostic assays that have been extensively evaluated in a prospective setting are necessary for efficacy and clinical adoption. We combined two independent validation cohorts to assess outcome and cut-point performance of the ExoDx Prostate(IntelliScore) (EPI) urine exosome assay vs. optimized standard of care models (SOCm) (i.e. prostate-specific antigen [PSA], age, race, and family history) and the Prostate Cancer Prevention Trial-Risk Calculator 2.0 (PCPT-RC) for discriminating Gleason score (GS)≥7 (Grade group, GG2) from GS6 (GG1) PCa and benign disease on initial biopsy.

Methods: We merged the original (McKiernan, et. al., JAM A Oncol 2016, 2(7), 882-889) and second (McKiernan, et.al., Eur Urol., 2018, in press) validation cohorts (N=519 and 503, respectively) representing 1022 subjects and compared EPI test results with biopsy outcomes. Eligible subjects: >50-years, PSA 2-10 ng/mL, scheduled for initial prostate needle biopsy. Test performance is reported using the area under the receiver operating characteristic curve (AUC), Negative predictive value (NPV), Positive predictive value (PPV), Sensitivity, and Specificity for discriminating ≥GS7(GG2) from GS6 (GG1) PCa and benign disease on initial biopsy.

Results: Pooled cohort: N=1022 biopsy naïve patients: Mean age 64 years, mean PSA 5.6 ng/mL, 16% African heritage, 71% Caucasian, 51% positive biopsy rate (30% ≥GS7(GG2), 13% ≥GS4+3 (GG3). EPI AUC=0.70 was superior to SOcm AUC=0.62, PSA AUC=0.56 and PCPT-RC AUC=0.62 (all p-values<0.001) for discriminating ≥GS7 (GG2) PCa from benign and GS6 (GG1). Using the previously validated cut-point of 15.6 (or alternative 20) would avoid 23% (or 34%) of all prostate biopsies and 30% (or 43%) of unnecessary biopsies, with an NPV of 90% for both cut-points and mis only 7.5% (or 12%) of ≥GG2, respectively.

Conclusion: EPI is a non-invasive, easy to use, first in class 3-gene urine exosome RNA expression assay, which has now been successfully validated in over 1000 patients to discriminate high-grade (≥GS7, GG2) from low-grade (GS6, GG1) PCa and benign disease. The test improves identification of patients with higher grade disease, providing a tool for shared decision making and should reduce the total number of unnecessary biopsies.
Poster #92
MOLECULAR DISSECTION OF MAGNETIC RESONANCE IMAGING VISIBLE AND INVISIBLE PROSTATE CANCER
*Simpa Salami, MD, MPH 1; Jeremy Kaplan 1; Srinivas Nallandhighal, MS 1; Matthew Lee, MD 1; Junhee Yoon, MSc 2; Daniel Hovelson, PhD 3; Komal Plouffe, MS 1; Arvin George, MD 1; Matthew Davenport, MD 1; Sungyong You, PhD 2; Scott Tomlins, MD, PhD 1; Nicole Curci, MD 1; Hyung Kim, MD 2; Daniel Spratt, MD 1; Aaron Udager, MD, PhD 1; and Ganesh Palapattu, MD 1
1University of Michigan, Ann Arbor, MI; 2Cedars-Sinai Medical Center, Los Angeles, CA; 3Strata Oncology, Ann Arbor, MI
Presented By: Simpa Samuel Salami, MD, MPH

Introduction: Up to 20% of patients with negative multiparametric magnetic resonance imaging (mpMRI) harbor high grade prostate cancer. In this study, we sought to characterize and compare the molecular profiles of multiparametric magnetic resonance imaging (mpMRI) visible and invisible prostate cancer to elucidate the molecular basis of cancer visibility on mpMRI.

Methods: Patients who underwent mpMRI prior to radical prostatectomy were identified for this IRB-approved study. mpMRI for each patient was re-reviewed by a radiologist with expertise in prostate mpMRI and histopathology was re-reviewed by a genitourinary pathologist. Whole-mount histopathology was co-registered with axial mpMRI images. DNA and RNA were co-isolated from all tumor foci pre-identified on formalin-fixed paraffin-embedded specimens. High depth, targeted DNA and RNA next generation sequencing was performed to characterize the molecular profile of each tumor focus using the Oncomine Comprehensive Panel (DNA) and a custom targeted RNAseq panel assessing prostate cancer relevant genes. A multigene RNAseq model was developed and validated to predict MRI visible prostate cancer.

Results: A total of 26 primary tumor foci from 10 patients were analyzed. The median number of prostate cancer foci was 3. Of the 14 (54%) invisible lesions on mpMRI, 5 (36%) were Gleason 3+4=7. We detected high-confidence prioritized genetic mutations in 54% (14/26) of tumor foci, 43% (6/14) of which were in mpMRI invisible lesions. Additionally, 64% (9/14) of lesions exhibiting prioritized mutations were Gleason 7. Notable point mutations were in APC, AR, ARID1B, ATM, ATRX, BRCA2, FAT1, MAP3K1, NF1, SPEN, SPOP, TP53, and a frameshift mutation was detected in SOX2. A multiplex model, composed of 9 genes (Figure), majority of which are involved in cellular organization and structure, was developed to predict MRI visible tumor with an AUC of 0.89. Validation of this model in an independent data set (n = 16) yielded an AUC of 0.88.

Conclusion: Prostate cancer lesions visible on mpMRI exhibited differential expression in cellular organization and structural genes. More work is needed to discern the significance of this model and mpMRI to predict prostate cancer oncological outcomes.
**Poster #93**

**THE PROGNOSTIC IMPORTANCE OF SPOP MUTATION IN PROSTATE CANCER**

*Jonathan E. Shoag, MD*; Deli Liu, Elai Davicioni; Seagle Liu; Yang Liu; Xiyaoe Ma; Clara Oromendia and Christopher Barbieri

Weill Cornell Medicine; GenomeDx

Presented By: Jonathan E. Shoag, MD

**Introduction:** Mutation in SPOP defines a unique molecular subclass of prostate cancer. The prognostic implications of SPOP mutation are incompletely characterized. We recently reported on the development of a highly accurate classification of the SPOP mutant subclass using gene expression data. Here, we attempt to determine the prognostic importance of SPOP mutation in various prostate cancer disease states.

**Methods:** We have previously developed an SPOP mutant prediction model that can be applied to RNA expression data based on the transcriptional signature of SPOP mutant tumors. Using gene expression data from 1,538 subjects in the Decipher (GenomeDx) retrospective cohort we previously reported univariate associations between SPOP mutation and prostate specific antigen (PSA) levels, adverse pathology, and clinical outcomes. Here, we analyzed the independent impact of SPOP mutation on clinical outcomes, including the frequency of adverse pathology on prostatectomy and biochemical recurrence after prostatectomy using multivariable Cox models and receiver operating characteristics to determine the predictive accuracy of the models generated.

**Results:** When adjusting for patient age, race, and PSA, we found that SPOP mutation was associated with a decreased risk of adverse pathology, defined as T3 or greater or node positivity, at prostatectomy, OR 0.45 p=0.003. SPOP mutation was also associated with a decreased risk of biochemical recurrence HR 0.75 p=0.017, which remained significant when controlling for prostatectomy Gleason score, HR 0.78 p=0.037. However SPOP mutation status added no prognostic information when incorporating pathologic stage using the CAPRA-S postoperative risk model, HR 0.93 p=0.61 for biochemical recurrence and HR 0.82 p=0.25 for development of metastases, and did not improve recurrence prediction, Chi square test to compare improvement of area under the curve (CAPRA-S alone vs. CAPRA-S +SPOP) 0.001, p=0.98.

**Conclusion:** SPOP mutation status was associated with favorable pathologic features at prostatectomy, but conferred no additive predictive value in addition to known post-operative prognostic models. Future studies delineating SPOP mutation status on biopsy may be important, as SPOP mutation appears to be associated with a lower likelihood of adverse pathology.
Introduction: The clinical utility of extraprostatic extension (EPE) on multi-parametric magnetic resonance imaging (mpMRI) is unknown. We sought to investigate the rate of benign or clinically-insignificant prostate cancer (PCa) in biopsy of PI-RADS 5 lesions with EPE, and to identify clinical and imaging parameters associated with these findings.

Methods: We retrospectively queried our institutional mpMRI-ultrasound fusion (targeted) biopsy database to identify patients with EPE detected on mpMRI along with a PI-RADS 5 lesion who underwent targeted biopsy during Oct 2014-Apr 2018. mpMRI findings were assessed, including prostate and lesion volumes, and zonal location of the lesion (peripheral or transition). We measured the rate of benign or clinically-insignificant PCa (defined as Gleason score (GS) 3+3=6) detected on the targeted biopsy of those lesions. Logistic regression and receiver operating characteristics curves with an area under the curve (AUC) were used to assess the ability of clinical and mpMRI characteristics to predict GS≥7 PCa on the targeted biopsy of those lesions.

Results: Of 300 PI-RADS 5 lesions that underwent targeted biopsy during the study period, 117 (39%) were associated with EPE on mpMRI. On targeted biopsy of those 117 lesions, 5 (4.3%), 14 (12%), and 98 (83.7%) lesions harbored benign pathology, GS6, and GS≥7 PCa, respectively. Benign or GS6 PCa was detected in 32% of lesions in the first quartile of prostate-specific antigen (PSA) density (<0.13), 16.7% of lesions in the interquartile range of PSA density (0.13-0.30), and 3.1% of lesions with PSA density >0.30 (p=0.003). Using a threshold of 0.13, PSA density was 82.6% sensitive and 42.1% specific for detecting GS≥7 PCa on PI-RADS 5 lesions with EPE. On multivariable analysis, PSA density (OR 2.5 per 0.1 decrease in unit, 95%CI 1.14-5.26, p=0.02) was associated with an increased likelihood of benign or GS6 PCa in those lesions. Compared with lesion volume and PSA, PSA density had the highest discriminative ability for GS≥7 PCa in those lesions (AUC 0.71).

Conclusion: Clinically-insignificant findings (benign or GS6 PCa) were identified in a minority of PI-RADS 5 lesions with EPE. In this setting, patients with PSA density <0.13 could be more frequently detected with clinically-insignificant PCa on the targeted biopsy.
ASSOCIATIONS BETWEEN HOSPITAL VOLUME AND OUTCOMES OF ROBOT-ASSISTED RADICAL PROSTATECTOMY

Leilei Xia, MD1; Benjamin Taylor2; Ruchika Talwar1; Raju Chelluri1; Jay Raman3 and Thomas Guzzo1
1University of Pennsylvania; 2Weill Cornell Medicine; 3Penn State Health - Milton S. Hershey Medical Center
Presented By: Leilei Xia, MD

Introduction: Robot-assisted radical prostatectomy (RARP) has been expanding rapidly in recent years and has become the predominant surgical management for localized prostate cancer in the US. However, there is still a paucity of data on the associations between hospital volume and outcomes of RARP.

Methods: We identified RARPs for clinically localized (cT1-2N0M0) prostate cancer diagnosed between 2010 and 2014 in the National Cancer Database. Hospital volume (cases/year) was defined as the average annual hospital RARP volume over the five-year duration. We categorized hospital volume into very low, low, medium, high, and very high by most closely sorting final included patients into five equal-sized groups (quintiles). Outcomes included 30-day mortality, 90-day mortality, conversion (to open), prolonged length of stay (PLOS, >2 d), 30-day (unplanned) readmission, positive surgical margin (PSM), and lymph node dissection (LND) rates. PSM was analyzed in the overall cohort and intermediate/high-risk cohort and LND was analyzed in the intermediate/high-risk cohort only.

Results: A total of 114,957 patients were included in the final cohort and 75,241 (65%) patients had clinical intermediate/high-risk disease. Cut-off values of hospital volume and crude comparison of outcomes by RARP hospital volumes are shown in the Figure. Overall 30-day mortality (0.12%), 90-day mortality (0.16%), and conversion rate (0.65%) were very low. No difference was found in 30-day or 90-day mortality between the five groups. Multivariable logistic regression results showing the associations between hospital volume and outcomes of RARP are shown in the Table. Higher hospital volume was associated with lower rates of conversion, PLOS, 30-day readmission, and PSM. LND was more often performed for intermediate/high-risk disease in the higher volume hospitals.

Conclusion: Patients undergoing RARP at higher volume hospitals are likely to have better perioperative and oncologic outcomes than lower volume hospitals.
Poster #96
DO THE NUMBER OF TARGETED CORES AND PROSTATE VOLUME AFFECT THE PROSTATE CANCER YIELD OF MRI-US FUSION BIOPSIES?

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1Mayo Clinic Urology; 2Mayo Clinic Radiology
Presented By: Vidit Sharma, MD

Introduction: Increasing the number of cores in non-targeted template biopsies may increase prostate cancer (PCa) detection. However, in MRI-US fusion biopsies, the impact of additional targeted cores per lesion on PCa detection remains understudied. We hypothesize that the number of targeted cores may be more relevant in larger prostates.

Methods: Years 2010-2017 of an institutional dataset of Uronav guided MRI-US fusion biopsies were queried for treatment naïve men. Analyses were conducted on a per-lesion basis. The relationship between prostate volume, number of targeted cores and prostate cancer detection rates were modeled using interaction analyses and multivariable logistic regressions.

Results: In the cohort of 710 men, there were 888 PIRADSv2 lesions targeted for biopsy. Median prostate volume was 47cc and median number of targeted cores per lesion was 6. On logistic regression with an interaction term: increasing prostate volume (OR 0.97, 0.95-0.98,p<0.01) was associated with lower prostate cancer yield on targeted cores. The interaction term between number of targeted cores and prostate volume (OR 1.003,1.000-1.005,p=0.053) suggested that the number of cores may be associated with prostate cancer for certain prostate volumes. A Youden’s J statistic determined that a prostate volume cutoff of 49cc’s provided the most discriminatory value with respect to prostate cancer detection rates. When prostate volume <49cc (N=498), increasing number of targeted cores was not associated with improved prostate cancer detection on logistic regression analysis (OR 1.03, 0.92-1.16,p=0.57); but when prostate volume was 49cc or more (N=390), increasing number of targeted cores was associated with more prostate cancer detection (OR 1.15, 1.04-1.28,p<0.01). Increased number of targeted cores remained associated with increased prostate cancer detection in prostates >=49cc (OR 1.14, 1.003-1.30,p=0.04) on multivariable logistic regression adjusting for age, family history, PSA, cT stage, prior biopsy, and PIRADS v2 score.

Conclusion: Increased prostate volume is associated with reduced prostate cancer detection rates at MRI-US fusion biopsy. This may be counterbalanced by increasing the number of targeted cores when prostate volume is 49cc or more. On the other hand, increasing the number of targeted cores does not seem to increase prostate cancer detection when prostate volume is less than 49cc.
EVALUATION OF ESCHERICHIA COLI RESISTANCE TO FLUOROQUINOLONES IN MEN UNDERGOING PROSTATE PROCEDURES: IT’S TIME TO CHANGE PREOPERATIVE PROPHYLAXIS

*Colin Sperling, BA1; Lucia Rose, PharmD2; Hailiu Yang, MD3; Dana Byrne, MD4; Henry Fraimow, MD4; Jeffrey Tomaszewski, MD3 and Allen Seftel, MD3

1Cooper Medical School of Rowan University; 2Cooper University Hospital, Department of Pharmacy; 3Cooper University Hospital Department of Surgery, Division of Urology; 4Cooper University Hospital Department of Medicine, Division of Infectious Diseases

Presented By: Colin Sperling, BA

Introduction: The AUA recommends fluoroquinolones (FQ) as primary perioperative prophylaxis for many urologic procedures. However, the Infectious Disease Society of America (IDSA) recommends avoiding empiric FQ use in genitourinary (GU) infections due to rising Gram-negative resistance. FQ resistance to the most common GU pathogen, *E. coli*, has reached 50% in some U.S. regions. While our hospital reports ~ 30% FQ resistance to *E. coli*, we are unsure of the generalizability in men undergoing prostate procedures. Many institutions, including ours, have used FQ perioperatively due to lack of data supporting alternative agents. We aimed to evaluate FQ resistance among *E. coli* isolates in this population at Cooper University Hospital.

Methods: We utilized TheraDoc® to retrospectively review men > 18 years of age who underwent a primary prostate procedure between 2014 and 2017. All patients had a positive *E. coli* isolate from urine or blood within 12 months of the procedure. The primary endpoint was the prevalence of FQ resistant *E. coli* in men undergoing prostate procedures. This study was approved by the IRB on December 19, 2017.

Results: Fifty-seven men met criteria for chart evaluation. The most common procedure identified was radical prostatectomy (44%), followed by prostate photovaporization (23%). Preoperative antibiotics were administered to all patients and most received a single agent. Cefazolin or FQ were administered to 49% and 26%, respectively. Of 57 *E. coli* isolates, 31/57 (54%) were FQ resistant; while 8/57 (14%) were ceftriaxone resistant. Rates of FQ resistant *E. coli* from the hospital antibiogram (32%) were significantly lower than our study population (54%) (P=0.0010). Forty-one patients (72%) received prior FQ within 1 year of the procedure. FQ resistance was significantly associated with prior FQ usage (P=0.0091).

Conclusion: FQ resistance to *E. coli* was unacceptably high (53%) in this urologic population. If pre-procedure culture data are unavailable, an alternative agent such as ceftriaxone should be considered for trans-urethral or trans-rectal prostate procedures. 1st generation cephalosporins remain 1st choice for radical prostatectomy. Based on our internal data, we now currently recommend ceftriaxone for prostate biopsy and prostate resection. Lastly, whole hospital antibiograms may not be reliable to predict resistance in this patient population.
Introduction: The PRECISION trial recently demonstrated the superiority of a novel algorithm over traditional systematic biopsy for the detection of clinically significant (CS) prostate cancer in biopsy-naive men. In this algorithm, all men with clinically suspected disease undergo prostate MRI followed by MRI fusion biopsy (MRF) if a lesion is detected. Systematic biopsy is omitted entirely. Concerns remain regarding the safety this algorithm, especially at centers inexperienced with MRF.

Methods: We retrospectively reviewed all biopsy-naive men who underwent prostate MRI followed by 12-core sextant biopsy following initiation of an MRF program at our institution. All men with a PIRADS 3 or greater lesion also underwent concurrent software-assisted MRF biopsy. The proportion of men who would have been diagnosed with CS (Gleason score ≥3+4) disease by the PRECISION algorithm was compared to systematic biopsy alone using McNemar’s test. Characteristics of men diagnosed with CS disease on systematic biopsy but not the PRECISION algorithm (PRECISION failures) were examined.

Results: 143 biopsy-naive men underwent biopsy between August 2016 and June 2018. 98 men had positive MRIs, and 84 were diagnosed with CS cancer. Concordance between systematic biopsies and the PRECISION algorithm is shown in Table 1. Systematic biopsies detected significantly more CS disease (80/143 vs. 58/143, p<0.005). PRECISION failures with positive MRIs (n=11) had statistically smaller lesions on MRI (58 vs 162 mm², p<0.005). Lesion size was the most predictive variable on multivariate logistic regression but did not achieve significance (p=0.163). PRECISION failures with negative MRIs (n=14) had higher PSAs (9.1 vs 5.0, p=0.042), smaller prostates (35.1 vs 61.6, p<0.005), and more family history (7/14 vs 3/31 p=.005), but only prostate size approached significance on multivariate analysis (p=0.061). Control chart analysis demonstrated no outliers or evidence of a learning curve.

Conclusion: The PRECISION algorithm missed 25/84 CS cancers at our institution and was inferior to systematic biopsy alone. Men with small lesions on MRI and men with small prostates and negative MRIs were especially at risk for failure. MRF-based screening algorithms should be validated at individual institutions prior to adoption.
Poster #99

SETTING THE BAR: A 4KSCORE OF 7.5% PROVIDES HIGH SENSITIVITY AND NEGATIVE PREDICTIVE VALUE FOR DETECTING AND RULING OUT SIGNIFICANT PROSTATE CANCER

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Andover Urology; 3Chairman,Professor, Department of Urology, University of Miami, Miller school of medicine; 4Chairman,Professor, Department of Urology, University of Miami, Miller school of medicine
Presented By: Amit S. Bhattu

Introduction: Two independent prospective trials have validated the 4Kscore test for predicting clinically significant cancer. However, both these studies assessed the test as a continuous score. The objective of this study was to illustrate the use of a 7.5% probability of cancer as a cut off for deciding the need for prostate biopsy using combined data from both trials.

Methods: This study pooled data from two prospective multi-institutional trials. One was conducted in 26 primarily community-based urology practices around the U.S., and the other was conducted at 8 U.S. Veterans Affairs Medical Centers. All men in both the trials were 40-80 years old and referred for biopsy by a urologist regardless of age or PSA levels. All men had minimum 10 core biopsy and phlebotomy was done prior to biopsy for 4Kscore assessment. Biopsy was reported according to the standards of care at each site. The primary outcome was presence of Gleasons score ≥7 on biopsy. We performed exploratory analysis to evaluate the number of biopsies avoided and cancers detected using a 4Kscore cut off of 7.5%.

Results: This analysis included 1378 patients who had a 4Kscore and biopsy results, of which 1012 patients were from the original 26 site validation study and 366 were from Veterans Affairs study. The analysis showed that 32.2% of biopsies would have been avoided by applying a 4Kscore threshold of 7.5% for doing a prostate biopsy. The sensitivity for detecting Gleason ≥7 cancer using a 7.5% cut-off was 94%, while the negative predictive value for ruling it out was 95%. There were no Gleasons 8 or higher prostate cancers missed when using this cut off to decide on the need for a biopsy. Among patients with a 4Kscore less than 7.5%, prostate biopsy findings were negative for malignancy in 76.1% patients, revealed a Gleasons 6 in 19.1%, Gleasons 3+4=7 in 3.4% patients, and Gleasons 4+3=7 in 1.4% patients. (Figure1)

Conclusion: The 4Kscore is noninvasive biomarker that helps to facilitate biopsy decision-making. We found that using a 7.5% cut-off allowed a significant biopsy reduction with high sensitivity for detection, and a high negative predictive value for ruling out aggressive prostate cancer.

4Kscore Test: Metanalysis of two US Validation Studies

<table>
<thead>
<tr>
<th>All study subjects were scheduled to have prostate biopsies</th>
<th>At 4Kscore 7.5% cut off:</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=444 (22.1%)</td>
<td>* Sensitivity = 94%</td>
</tr>
<tr>
<td>N=534 (7.8%)</td>
<td>* NPV = 95%</td>
</tr>
<tr>
<td>N=1378</td>
<td>* Missed No Gleason ≥8</td>
</tr>
</tbody>
</table>

32.2% Biopsy Reduction

4Kscore US & VA Validation Studies Combined

N=1378

4Kscore < 7.5%
N=444 (22.1%)

- N=330
- (23.7%) (76.1%)
- N=135
- (9.2%) (90.8%)
- N=15
- (1.1%) (98.9%)

4Kscore ≥ 7.5%
N=534 (7.8%)

- N=385
- (71.9%) (28.1%)
- N=228
- (42.5%) (57.5%)
- N=132
- (24.9%) (75.1%)
- N=135
- (25.0%) (75.0%)
- N=137
- (25.0%) (75.0%)

168

^Table of Contents^
Poster Session I — Full Abstracts

Poster #100
RADICAL PROSTATECTOMY FOLLOWING A PERIOD OF ACTIVE SURVEILLANCE
Ashwin S. Balakrishnan1,2; Janet Cowan1,2 and Peter Carroll1,2
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Presented By: Ashwin S. Balakrishnan

Introduction: As enrollment in active surveillance (AS) expands, it is increasingly important to assess potential risks of deferred treatment. We evaluate the risk of prostate specific antigen (PSA) recurrence in a large cohort of men undergoing radical prostatectomy (RP) after initial AS.

Methods: The study included men undergoing RP after a period of AS with Gleason score (GS) 3+3 or 3+4 at diagnosis, clinical stage ≤T2, and low or intermediate risk disease at diagnosis. Men were substratified by a composite variable of GS and volume of high grade (HG) cores at diagnosis. Primary outcome was recurrence after RP, defined as two consecutive PSAs ≥0.2 ng/ml or any secondary treatment.

Results: Of 1,812 men enrolled in AS between 1994 and 2018, 431 (23.8%) underwent deferred RP. Mean age at diagnosis was 60.6 years (SD 6.7) and median PSA density at diagnosis was 0.15 ng/ml (IQR 0.11-0.22). Median time between diagnosis and RP was 26 months (IQR 15-46). At diagnosis, 378 men (87.7%) had GS 3+3 disease, 25 men (5.8%) had GS 3+4 disease with one HG core, and 28 men (6.5%) had GS 3+4 with two or more HG cores. At surgery, 92 (21.3%) had GS ≥4+3 tumors, 169 (39.2%) had pT3/4 disease, and 10 (2.3%) had positive lymph nodes. Among men with PSA recurrence, median time to recurrence was 15 months (IQR 6-40). Kaplan-Meier analysis showed a significant difference in the risk of recurrence between patients with GS 3+3, 3+4 with one HG core, and 3+4 with two or more HG cores at diagnosis (log-rank p=0.02). On multivariate analysis adjusted for age and PSA density, GS 3+4 with two or more HG cores at diagnosis was associated with risk of recurrence when compared to GS 3+3 disease (HR 2.65, 95%CI 1.23-5.69), while GS 3+4 with one HG core did not differ from GS 3+3.

Conclusion: These results support the careful use of AS in men with low grade cancer (GS 3+3) and those with very limited GS 3+4 disease. Men with GS 3+4 and two or more HG cores at diagnosis likely benefit from immediate treatment.
Poster #101
SPINK1 EXPRESSION IS NOT ASSOCIATED WITH PATHOLOGIC OR ONCOLOGIC OUTCOMES POST-PROSTATECTOMY IN RACE-SPECIFIC COHORTS
*Farzana Faisal, MD1; Harsimar Kaur2; Jeffrey Tosoian3; Edward Schaeffer4 and Tamara Lotan2
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Presented By: Farzana Faisal, MD

Introduction: The SPINK1 molecular subtype has been shown to be more common in African American (AA) men with prostatic adenocarcinoma (PCa) than European Americans (EA). Other studies have suggested that SPINK1 expression is associated with more aggressive disease. However, there have been limited studies examining clinical outcomes by SPINK1 status in racially diverse cohorts.

Methods: The objective was to determine the associations between SPINK1 subtype, race, and clinical and pathologic outcomes after radical prostatectomy (RP). A total of 186 AA and 206 EA men who underwent RP at Johns Hopkins were matched according to pathologic Gleason grade. We examined SPINK1 status by immunohistochemistry on tissue microarrays using a genetically validated assay. ERG and PTEN were assessed previously using validated immunohistochemistry assays. SPINK1 prevalence was compared between races. Logistic regression and Cox proportional hazard analyses assessed the association of SPINK1 status with pathologic and oncologic outcomes in race-specific multivariate models.

Results: SPINK1-positive status was present in 25% (45/186) of AA and 15% (30/206) of EA men (p=0.013). SPINK1-positive status was generally mutually exclusive with the ERG-positive and PTEN-loss subtypes in both racial cohorts. There were no differences in pathologic grade group (GG), pathologic stage, biochemical recurrence (BCR)-free survival, or metastasis-free survival between SPINK1-positive and SPINK1-negative tumors in the overall cohort or by race. AA race was a predictor of SPINK1-positive status on multivariate analysis (OR 2.07, 95% CI 1.22-3.49, p=0.007). However, SPINK1-positive status was not associated with pathologic GG≥3 (AA: OR 0.71, 95% CI 0.35-1.44, p=0.341; EA: OR 0.98, 95% CI 0.42-2.28, p=0.960), pathologic stage>T2 (AA: OR 0.77, 95% CI 0.39-1.51, p=0.450; EA: OR 1.04, 95% CI 0.48-2.27, p=0.920), BCR (AA: HR 0.99, 95% CI 0.56-1.75, p=0.976; EA: HR 0.88, 95% CI 0.43-1.77, p=0.720), or metastasis (AA: HR 0.79, 95% CI 0.25-2.49, p=0.691; EA: HR 1.55, 95% CI 0.58-4.11, p=0.381) in either the AA or the EA cohort.

Conclusion: SPINK1-positive status is more prevalent in AA than EA men with PCa. While previous studies showed that SPINK1 may be associated with more aggressive PCa, we found that SPINK1 expression was not associated with worse pathologic or oncologic outcomes including BCR and metastasis after RP in either AA men or EA men.
Poster #102
EARLY ONCOLOGIC AND FUNCTIONAL OUTCOMES OF MR-GUIDED FOCAL HIFU FOR INTERMEDIATE-RISK PROSTATE CANCER
Nathan Perlis1; *Guan H. Tan, MBBS, MS, FRCS (Urol); Antonio Finelli1; Eugen Hlasney1; Robert Hamilton1; Alexandre Zlotta2,1; Girish Kulkarni1; Kateri Corr1; Rosanna Chan1; Stuart McCluskey1; Walter Kucharczyk1 and Sangeet Ghai1
1University Health Network; 2Mount Sinai Hospital
Presented By: Guan H. Tan, MBBS, MS, FRCS (Urol)

Introduction: Prostate cancer (PC) treatment with surgery or radiotherapy can be associated with significant functional morbidities. Focal therapy with high intensity focused ultrasound (HIFU) reduces functional complications with promising oncological results. Magnetic resonance image (MRI)-guided HIFU (MRgFUS) with MR-thermometry allows real-time temperature and energy monitoring therefore potentially maximizing precision compared to ultrasound-guided HIFU. The purpose of our study was to determine the oncologic and functional outcomes of MRgFUS in intermediate-risk localized prostate cancer and we present our early results in the largest series of patients treated with the ExAblate 2100 device.

Methods: This study enrolled patients with grade group 2 or 3 PC, PSA ≤20ng/mL, and ≤ cT2a. Procedures were performed using an endorectal focused ultrasound ablation system (ExAblate 2100, InSightec, Haifa, Israel) guided by a 1.5T MRI scanner (GE Healthcare, Waukesha, USA). Patients are followed for 2 years on trial with scheduled early (5 months) and intermediate (24 months) oncologic follow-up. At 5 months following treatment, oncologic outcomes were evaluated with multiparametric MRI, PSA and 4-8 targeted biopsies from the ablation site (Artemis, Eigen). Functional parameters were evaluated using the International Prostate Symptom Score (IPSS), International Index of Erectile Function (IIEF-15) and International Consultation on Incontinence Questionnaire Short Form (ICIQ-UI-SF) questionnaires at baseline and follow-up.

Results: Between July 2016 and July 2018, 32 patients had undergone MRgFUS. At time of data cut-off, 24 patients completed their 5-month follow-up. The mean age was 65.8 years (range 57-78), and the mean PSA at baseline and 5 months were 7.71 ng/mL (range 2.04-20.75) and 4.01 ng/mL (range 0.64-18.43) respectively. At 5 months, there were no men with evidence of disease at the ablation site on MRI, and 22 of 24 (91.7%) men had no persistent disease on biopsy. Of the two patients with persistent disease, one had low volume grade group 1 and the other had low volume grade group 2 PC. Both were treated with active surveillance. The trend of the functional outcomes between baseline and 5 months are as shown in Figure 1.

Conclusion: MRgFUS shows encouraging short-term oncologic and functional outcomes for the treatment of intermediate-risk prostate cancer. However, the long-term efficacy will be determined in the coming years.

Figure 1 – PSA and functional scores at baseline, 6 weeks and 5 months follow up. The graphic trend of (A) PSA, IPSS and ICIQ-UI-SF, and (B) IIEF-15 domain scores during this time period.
Introduction: Prostatic ductal adenocarcinoma (DPca) and intraductal carcinoma of the prostate (IDC-P) are uncommon and aggressive subtypes of prostate cancer. They typically present at an advanced clinicopathological stage and are associated with a poor prognosis. We compared oncological outcomes for patients undergoing prostatectomy at a single Australian institution with either DPca or IDC-P against high Gleason Score (GS) prostate cancer (8-10).

Methods: We reviewed 2288 patients who underwent robotically-assisted radical prostatectomies between 2004 and 2017. Pathological review was undertaken and 310 patients with GS >7 or with identifiable DPCa or IDC-P were included in the study cohort. Patient demographics, pathology and serial PSA levels were recorded. Men were followed up for biochemical recurrence; this is defined as PSA ≥0.2ng/mL, or those who had initiation of salvage therapy for a rising PSA below this level. The Kaplan Meier method was used to estimate recurrence free survival. A multivariable cox regression analysis was undertaken to determine predictors for recurrence free survival.

Results: The study cohort consisted of 310 men at a median age of 65.6 (IQR: 60.6-69.6). The DPca group were older than both the IDC-P and High GS men (69.9, 66.9, and 64.3 years; p=0.001). Pre-operative PSAs were comparable at baseline (7.8, 8.1, and 8.5 ng/mL; p=0.37). The median follow up time for the whole cohort was 32 months. On multivariable Cox regression model, IDC-P (HR 5.24 95%CI [2.98, 9.21]; p<0.001), seminal vesical invasion (HR1.52 95%CI [1.06, 2.17]; p=0.022) and pT stage, when divided into pT1/2 and pT3/4 (HR 1.74 95%CI [1.01, 2.98]; p=0.046) were statistically significant predictors of recurrence. Age <70 was a protective factor (HR 0.58 95%CI [0.40, 0.84]; p=0.004).

When grouped by histopathological subtypes on Kaplan Meier analysis, IDC-P had worse progression free survival than DPca and high GS (p<0.001). (Figure 1)

Conclusion: Ductal and intraductal are rare but aggressive subtypes of prostate cancer. These entities recur earlier, with IDC-P variants developing disease progression significantly earlier than GS>7 prostate cancer. Future studies focusing on the genetic profile of DPca and IDC-P may further elucidate the mechanism of oncogenesis and therapeutic targets.
Poster #104
CLINICAL, PATHOLOGIC, AND ONCOLOGIC FINDINGS OF RADICAL PROSTATECTOMY PATIENTS WITH EXTRAPROSTATIC EXTENSION DIAGNOSED ON PRE-OPERATIVE PROSTATE BIOPSY
Farzana Faisal, MD1; Jeffrey Tosoian2; Christian Pavlovich1 and Tamara Lotan3
1Department of Urology, Johns Hopkins School of Medicine, Baltimore, MD; 2Department of Urology, University of Michigan, Ann Arbor, MI; 3Department of Pathology, Johns Hopkins School of Medicine, Baltimore, MD
Presented By: Farzana Faisal, MD

Introduction: Prostatic adenocarcinoma (PCa) with extraprostatic extension (EPE) detected on prostate needle biopsy (PNB) is uncommon and associated with other adverse features. As increasingly high risk patients undergo radical prostatectomy (RP), understanding the clinical and pathologic implications of findings such as EPE on PNB is important. The objective of this study was to describe the clinical, histopathologic, and oncologic findings in the largest cohort to date of PCa patients who had EPE identified on PNB and underwent subsequent RP.

Methods: Using our institutional pathology database, we retrieved 83 cases of PCa patients with EPE on PNB between 2000 and 2018 who underwent subsequent treatment with RP and had clinical follow-up information. Clinical and pathologic outcomes were examined.

Results: Median PSA (IQR) at time of PNB was 6.0 ng/ml (3.9-10.8). Sixty-five percent of patients had clinical stage T2 or higher disease. The median number of biopsy cores positive for cancer was 8 (IQR 6-11), and the median percentage of cancer in each core was 90% (IQR 80-100). Sixty percent (50/83) of patients had biopsy grade group (GG) 4-5, and 81% (66/83) had perineural invasion on biopsy. EPE was confirmed in the RP specimen in 98% (81/83) of cases. Over 50% of patients had final GG 4-5, 45% (37/83) had seminal vesicle invasion, 37% (30/83) had lymph node involvement, and 59% (49/83) had positive surgical margins. Median length of follow-up after RP was 2 years (IQR 1-3). Overall, 45% (34/76) of patients received post-operative radiation at a median of 1 year after RP, and 11% (8/73) received chemotherapy at a median of 2 years after RP. To date, 48% (37/77) have developed biochemical recurrence (BCR); the 3-year BCR-free survival rate was 48.4% (95% CI 0.345-0.610), and the 3-year metastasis-free survival rate was 75.2% (95% CI 0.603-0.851).

Conclusion: Patients with EPE detected on PNB almost always have extraprostatic disease and other extremely adverse pathology at RP. Extensive high grade disease was the norm, and the majority had positive surgical margins. Half of these patients experienced early BCR, and most eventually required multi-modal therapy. These data can be useful in counseling such patients with regards to management approach and expected outcomes after surgery.
Poster #105
CLINICALLY SIGNIFICANT GLEASON 8 DOWNGRADING IN SUB-STRATIFIED HIGH RISK PROSTATE CANCER OCCURS INFREQUENTLY

*Chad Reichard, MD 1; Jonathan Duplisea 1; Yaw Nyame 2; Debasis Sundi 3; Jeffrey Tosojian 4; Mary Achim 1; Lamont Wilkins 5; Ridwan Alam 6; Andrew Stephenson 7; Eric Klein 7; Ashley Ross 8; Mohamad Allaf 6; John Davis 1 and Brian Chapin 1
1 UT MD Anderson Cancer Center, Houston, TX; 2 UW Medicine, Seattle, WA; 3 The Ohio State University Wexner Medical Center, Columbus, OH; 4 University of Michigan Medical Center, Ann Arbor, MI; 5 Cleveland Clinic Lerner College of Medicine, Cleveland, OH; 6 Johns Hopkins Medicine, Baltimore, MD; 7 Cleveland Clinic, Cleveland, OH; 8 Texas Oncology, Dallas, TX
Presented By: Chad Reichard, MD

Introduction: Previous reports have indicated a substantial number of patients with biopsy Gleason 8 prostate cancer (PCa) are subsequently downgraded at prostatectomy (RP). Data is limited regarding rate of Gleason 8 downgrading in very high risk (VHR) prostate cancer. We assessed rate of downgrading from Gleason 8 PCa at biopsy and associated factors in a multi-institutional cohort of high and VHR PCa patients undergoing RP.

Methods: 1776 patients from three tertiary centers that underwent RP for either NCCN high risk or VHR disease from 2005-2015 were reviewed. 893 patients with Gleason 8 cancer on biopsy were identified. 132 patients that received neoadjuvant ADT, and 35 patients with unavailable RP pathology were excluded. 726 patients were available for analysis. Student's t test, chi-square test, and multivariate logistic regression models were used to test for association of downgrading from biopsy Gleason 8 with patient and disease characteristics.

Results: 326 (45%) patients were downgraded to Gleason 7 at RP. (Gleason 4+3 tertiary pattern 5, n=38; Gleason 4+3, n=184; Gleason 3+4 tertiary pattern 5, n=5; Gleason 3+4, n=99). 7 (1%) were downgraded to Gleason 6. 198 (27%) patients had concordant Gleason 8 biopsy and RP pathology and 195 (27%) were upgraded at RP to Gleason 9 or 10. 49% of high risk patients with biopsy Gleason 8 had any downgrading versus 29% of VHR patients (p<.0001). Downgrading to Gleason ≤ 3+4=7 occurred in 16% (98/604) of high risk and 7% (8/122) of VHR patients. Downgraded patients had a lower PSA, fewer positive biopsy cores, and lower clinical stage. On multivariable analysis, fewer number of positive biopsy cores was significantly associated with downgrading (p<0.0001). Limitations include retrospective review and lack of data regarding number of cases that underwent review of biopsy pathology at the treating institution.

Conclusion: In this cohort of high or VHR PCa, downgrading from biopsy Gleason 8 at prostatectomy occurred less frequently than in other published reports. Any downgrading was significantly less common in VHR compared to high-risk patients, and downgrading to Gleason ≤ 3+4=7 occurred in a minority of cases in both high risk and VHR patients. While overall downgrading was common in this cohort, clinically significant downgrading occurred infrequently.
Poster #106

ADT-FREE SURVIVAL AFTER INDUCTION ADT FOR RADICAL PROSTATECTOMY RECURRENT PROSTATE CANCER

*Daniel C. Edwards, DO1; Gaybrielle James2; Khurshid Guru2; Eric Kauffman2 and James Mohler2

1Hahnemann University Hospital/Drexel University College of Medicine; 2Roswell Park Cancer Institute

Presented By: Daniel C. Edwards, DO

Introduction: Androgen deprivation therapy (ADT) remains the cornerstone of treatment for advanced prostate cancer, but continuous ADT is associated with decreased quality of life and increased all-cause mortality. Induction ADT (iADT) for 12 to 18 months for biochemical failure (BCF) and prior to radiographic metastasis may be associated with prolonged freedom from further ADT, but this use of ADT has not been characterized well.

Methods: We retrospectively queried a prospectively maintained radical prostatectomy database for all patients with clinically localized prostate cancer who suffered PSA persistence or recurrence using NCCN definitions. Patients were included if they received 12 to 18 months of iADT and had at least one year of follow-up after conclusion of iADT. Patients were excluded if iADT was performed concurrent with salvage radiotherapy or if radiographic evaluation revealed evidence of metastasis. Primary outcome was median ADT-free survival (mAFS), the time from conclusion of iADT to initiation of subsequent ADT. Secondary outcomes included mAFS by nodal status and overall survival (OS). Statistical analysis was performed using Fisher’s exact test and logistic regression to compare patient, disease and treatment factors. Survival was estimated using the Kaplan-Meier method.

Results: 46 patients from 1997-2017 met inclusion criteria. Patients were pT2c (35%), pT3a (33%), pT3b (30%), pT4 (2%), pN1 (35%) and margin positive (46%). Median post-iADT follow-up was 35 months (IQR 23-62). Undetectable PSA (<0.2 ng/dL) was present 41%, 6% and 4% of patients at 1, 3 and 5 years of follow-up, respectively. ADT freedom was present in 87%, 68%, and 44% of patients at 1, 3 and 5 years of follow-up, respectively (Figure 1a). Many patients with node-positive disease (pN1) remained ADT free at 5 years (Figure 1b). Age, BMI, race, pathological characteristics and rates of salvage radiotherapy were similar among those patients with or without undetectable PSA and those who did and did not remain ADT free. mAFS post-induction was 6 years (Figure 1a), while mOS was not reached (Figure 1c).

Conclusion: iADT may produce durable periods of AFS. Current and future prospective randomized trials examining this concept may allow selection of patients who will experience prolonged responses to iADT and thereby avoid the side effects of continuous ADT.
**Poster Session I – Full Abstracts**

**Poster #107**  
**INSIGHT INTO THE GENOMIC BASIS FOR TERTIARY GLEASON 5 COMPONENT AND WORSE CLINICOPATHOLOGICAL OUTCOME**  
*Alberto Martini, MD1; Joanna Wang, MD1; Nicholas M. Brown, BSv; Zeynep Gul, MD1; John P Sfakianos, MD1; Sujit S. Nair, PhD1 and Ashutosh K. Tewari, MD1*  
1Department of Urology, Icahn School of Medicine at Mount Sinai  
Presented By: Alberto Martini, MD

**Introduction:** The presence of tertiary pattern 5 (TP5) on radical prostatectomy specimens (RP) has been associated with worse long-term outcomes. We sought to characterize the molecular differences between specimens with and without TP5 that are responsible for the poorer clinical findings.

**Methods:** Data from 159 men who underwent RP and had Gleason Grade Group (GGG) 3 or 4 without primary or secondary pattern 5 on final pathology were considered. All patients had available mRNA expression data from the RP specimen. The relationship between the results of Decipher test and the presence of TP5 was investigated by means of linear and binary logistic regression. A differential transcriptomic analysis between patients with and without TP5 was conducted in order to identify the genes associated with TP5 as a proxy of early de-differentiation. The prognostic role of those genes in identifying patients with worse progression-free survival (PFS) and overall survival (OS) was then evaluated by relying on The Cancer Genome Atlas provisional (TCGAp).

**Results:** Overall, 59 (33%) patients had GGG 3-4 disease with TP5 while 107 (67%) did not. The presence of TP5 was associated with a higher Decipher score (B: 0.07 95% CI: 0.02,0.13, \(p=0.04\)) and a higher likelihood of falling within the intermediate- or high-risk categories (OR:3.34, 95% CI: 1.34,8.35, \(p=0.01\)) rather than the low-risk category.

Overall, 18 genes were identified as being differently expressed in patients with TP5. By relying on the TCGAp it emerged that the overexpression of CDKN2B, PLK1 and CDC20 was associated with worse PFS. When combined together, the group harboring overexpression of at least one of those genes had a 5-year PFS of 50% vs. 74% of the group who did not, \(p<0.0001\).

**Conclusion:** We have demonstrated that patients harboring a TP5 tend to have higher Decipher test scores, confirming previous clinical findings. Moreover, we identified 18 genes that were differently expressed in patients with TP5. Three of them, namely CDKN2B, PLK1 and CDC20 were associated with worse PFS when over-expressed. All of them are implicated in the cell cycle. To the best of our knowledge this is the first time that CDKN2B has been associated with worse clinic-pathological outcomes in patients with prostate cancer.
Introduction: There is increasing recognition of the role inherited germline mutations play in prostate cancer (PC). We evaluated genetic testing with a multi-gene hereditary cancer panel among men with a personal history of prostate cancer.

Methods: Men with PC who underwent testing with a multi-gene hereditary cancer test between September 2013 and December 2017 (Myriad Genetic Laboratories, Inc) were included. Genetic testing included 28 genes associated with hereditary and familial cancer in eight cancer types. Clinical information was obtained from provider-completed test request forms. Men with a history of PC only were evaluated separately from men who had PC and ≥1 additional cancer(s).

Results: 1,240 men with a personal history of PC underwent multi-gene hereditary cancer testing. More than 50% of men had a family history of breast or prostate cancer and 26% had a family history or colorectal cancer. There were 446 men (36%) with PC plus additional cancer(s). PC was the primary cancer diagnosis for 48.0% of these men and a secondary or later cancer in 52.0%. The most common additional cancers were colorectal (33.6%), male breast cancer (31.8%), melanoma (13.5%) and pancreatic (7.8%). The overall mutation rate was 12.1%. The most common mutations were in the \textit{BRCA1/2} genes (5.2%), the MMR genes (2.2%), \textit{CHEK2} (1.8%), and \textit{ATM} (1.5%). Four men had two pathogenic variants including \textit{BRCA2} or \textit{ATM} genes. There were significant differences in the mutation rate between men with only PC (10.6%) and men with PC plus additional cancer(s) (14.7%), primarily in the MMR, \textit{ATM}, \textit{CHEK2} and \textit{PALB2} genes. In men who had multiple cancers, the mutation rate was 12.7% when PC was the primary cancer and 16.5% when PC was a secondary or later cancer.

Conclusion: Approximately 12% of men with PC in this cohort had a pathogenic variant in a cancer-risk gene, including a broad range of genes involved in DNA repair. Mutation rates varied between men with only PC, men with PC and other cancers and men with PC as a later cancer. Hereditary cancer genetic testing in men with PC may aid in earlier identification of men who may benefit from specific changes in medical management decision-making to reduce overall cancer risk.
Poster #109
PROVENT: A PHASE 3 STUDY OF SIPULEUCEL-T THERAPY IN SUBJECTS WITH LOCALIZED PROSTATE CANCER FOLLOWED BY ACTIVE SURVEILLANCE
*Neal D. Shore, MD, FACS1; Andrew J. Armstrong, MD2; Matthew R. Cooperberg, MD, MPH3; Joseph F. Renzulli, MD4; Nadeem Sheikh, PhD5; Robert Tyler, PhD5; Matthew Harmon5; Bruce Brown, MD5 and David F. Penson, MD, MPH6
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Presented By: Neal D. Shore, MD, FACS

Introduction: A challenge with low-risk prostate cancer (PCa) detected by PSA screening is differentiating truly indolent cases from those that will progress. Active surveillance (AS) aims to reduce overtreatment while reserving the option of treating those who develop high-risk features. Definitive treatment with radical prostatectomy or radiation therapy is associated with short and long-term side effects including sexual dysfunction, urinary incontinence and bowel issues. There is interest in alternative therapies as 25% to 45% drop out from AS after 5-15 years of follow-up (Klotz J Clin Oncol 2015). No treatments have been approved in the AS space to date Sipuleucel-T, an autologous cellular immunotherapy indicated for asymptomatic or minimally symptomatic metastatic castration-resistant PCa, resulted in a 22.5% reduction in risk of death vs placebo and was generally well-tolerated (Kantoff New Engl J Med 2010). A small study suggested that cytolytic T cell responses may correlate with overall survival (Antonarakis Clin Cancer Res 2018). Furthermore, in localized PCa, neoadjuvant sipuleucel-T has been shown to increase cytotoxic T-cell infiltration at the tumor rim (Fong J Natl Cancer Inst 2014). The primary objective of ProVent is to determine if sipuleucel-T will decrease the development of histopathologic progression upon subsequent prostate biopsies for subjects on AS.

Methods: ProVent is an open-label, Phase 3 multicenter trial that will enroll at least 450 patients (pts) over approximately 1 year. Eligible pts with International Society of Urological Pathology (ISUP) Grade Group 1 (Gleason 3+3, ≥3 positive cores) or 2 (Gleason 3+4) diagnosed within the previous 12 months will be randomized 2:1 to receive sipuleucel-T or AS. Pts randomized to sipuleucel-T will receive 3 biweekly infusions and be followed for immune responses. Both groups will be followed every 6 months for a minimum of 3 years for PSA and clinical disease changes. On-study biopsies (between 12-18 mos. and 33-39 mos. post randomization) will be centrally assessed for histological reclassification relative to baseline. The primary end point will be the proportion of subjects without an ISUP upgrade at year 3. Secondary endpoints include: the number of subjects with subsequent PCa treatment, patient-reported outcomes, and safety. Exploratory end points include genomic analysis and prostate tissue immunohistochemistry.
Poster #110
PREDICTORS OF CLINICALLY SIGNIFICANT PROSTATE CANCER IN ANTERIOR FIBROMUSCULAR STROMA LESIONS ON MULTI-PARAMETRIC MAGNETIC RESONANCE IMAGING
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Presented By: Kamyar Ghabili Amirkhiz, MD

Introduction: Multi-parametric magnetic resonance imaging (mpMRI) improves prostate cancer detection in difficult anatomical areas such as anterior fibromuscular stroma (AFMS). We aimed to investigate clinical and imaging parameters that may assist in identifying patients with AFMS lesions harboring clinically-significant prostate cancer (csPCa).

Methods: We retrospectively queried our institutional MRI-ultrasound fusion biopsy database to identify patients with at least one region of interest (ROI) located in the AFMS on mpMRI who underwent fusion biopsy between March 2015 and December 2017. mpMRI findings were assessed, including prostate and ROI volumes, PI-RADS score, and the ROI location. Logistic regression and receiver operating characteristics curves with an area under the curve (AUC) were used to assess the ability of clinical and mpMRI characteristics to predict csPCa (Grade Group (GG)≥2) in any core from a targeted biopsy of the ASMS lesion.

Results: Of 756 men who underwent MRI-ultrasound fusion biopsy during the study period, 104 (13.7%) had at least one ROI in the AFMS. Of total 109 ROIs detected on mpMRI, 55 (50.4%) had csPCa on the biopsy of AFMS lesions. Detection of csPCa increased with the PI-RADS score (p<0.001). Patients with csPCa in AFMS lesions were older (69 vs 63 years, p<0.001), had smaller prostate volumes (44mL vs 55.1mL, p=0.04), larger ROI sizes (1.24mL vs 0.61mL, p=0.005), and higher PSA density (0.23 vs 0.12, p<0.001). AFMS lesions positive for csPCa were less frequently located in the midgland (30.9% vs 57.4%, p=0.003). PSA density (AUC 0.80) was superior to PSA (AUC 0.74) for the prediction of csPCa in AFMS lesions. Lowering the PSA density threshold from 0.15 to 0.10 resulted in an increase in a negative predictive value (74.5% to 85.7%). On multivariable analysis, older age (OR1.12, p=0.008), higher PSA density (OR2.38, p=0.01), higher PI-RADS score (5 vs 2-3, OR10.48, p=0.01), and location (apex vs midgland, OR4.76, p=0.02) were associated with an increased risk of csPCa in AFMS lesions.

Conclusion: In patients with AFMS lesions on mpMRI, age, PSA density, PI-RADS score, and apical lesion are predictors of csPCa. Moreover, lowering the PSA density cutoff value from 0.15 to 0.10 in this setting may lead to better selection of patients for targeted biopsy.
Introduction: Statins are thought to possess anti-neoplastic properties related to their effect on cell proliferation and steroidogenesis. Progression to castrate resistant prostate cancer is due to de-regulation of androgen synthesis suggesting a role for statins in this setting. Our goal was to assess the role of statin use on oncologic outcomes in patients with advanced prostate cancer being treated with androgen deprivation therapy (ADT).

Methods: The national VA database was used to identify men diagnosed with prostate cancer from 2000-2008 with follow-up through May 2016 who were treated with ADT for at least 6 months. Our cohort was stratified based on statin use of at least 6 months duration during the same time period. Primary outcomes measured included prostate cancer specific survival (PCSS), overall survival (OS) and skeletal related events (SREs).

Results: A total of 87,346 patients on ADT were included in the study cohort, 53,360 patients used statins and 33,986 did not. Statin users were younger in age (median 73 vs. 76, p<0.001), more likely to have Charlson Comorbidity Index >3 (3.1% vs 2.5%, p<0.001) and more likely to have a high grade (Gleason score 8-10) cancer (12.3% vs. 10.9%, p<0.001). Statin users had longer OS (median 6.50 vs. 3.95 yrs in the statin and non-statin group, p<0.001) and decreased death from prostate cancer (9.0% vs. 12.7%, p<0.001). Statin use was also associated with longer time to a SRE (median 5.9 vs. 3.7 years, p<0.001). On multivariable Cox proportional hazards analysis, statin use was an independent predictor of improved OS (HR = 0.69, CI 0.66-0.72; p<0.001), PCSS (HR = 0.58, 95% CI 0.54-0.63; p<0.001), and SREs (HR = 0.64, 95%CI 0.57-0.73; p<0.001) when controlling for age, race, CCI, PSA, and Gleason score.

Conclusion: Statin use in conjunction with ADT for prostate cancer is associated with improved oncological outcomes in the largest study to date. Prospective clinical trials should investigate statins as adjunctive therapies for advanced prostate cancer.
Introduction: With the increasing importance of Value Based Medicine (VBM), we created a standardized pathway for patients undergoing robotic partial nephrectomy (RPN). We hypothesized that adapting these pathways improves patient care by enhancing consistency and VBM measures. Our objective was to assess the impact of this pathway on RPN outcomes.

Methods: A standardized treatment pathway was developed for patients undergoing RPN at our institution and implemented by our care team in December 2015. To allow time for adoption, patients were excluded from analysis for one month after the pathway was rolled out. The post-pathway group included patients over a period of 20 months (2/2016-9/2017). The outcomes of this group were compared to the outcomes of the pre-pathway group for the 28 months prior (9/2013-12/2016). With IRB approval to query our institution’s Renal Tumor Database (RTD), we compared the pre and post-pathway groups. The outcomes of interest were length of stay (LOS), discharge before noon (DBN), and readmissions. Total variable cost (TVC) was also assessed. Multivariate linear regression analysis was performed to assess predictors of LOS and TVC.

Results: Over the study period, 459 patients underwent a RPN (327 pre-pathway and 132 post-pathway). The patients’ characteristics and outcomes are summarized in table 1. The patients’ characteristics did not differ significantly, but surgeon experience was higher in the post-pathway era (8.1 vs. 7.2 years of RPN surgery; p=0.01). The mean length of stay was shorter in the post-pathway group (1.2 vs. 2.1 days; p<0.0001). There was a trend towards a higher readmission rate in the post-pathway group, but it did not reach statistical significance (3% vs. 0.6%; p=0.06). In multivariate linear analysis adjusting for gender, BMI, age, tumor size, and surgeon’s experience, the NYU RPN Pathway remained significantly associated with both decreased LOS (p=0.0001) and TVC (p<0.0001).

Conclusion: Our RPN pathway lead to statistically significant decreases in LOS and TVC. With the implementation of this pathway, there was a slight increase in readmissions that approached statistical significance; this demonstrates the importance of identifying patients that should have RPN performed as an inpatient procedure. Our RPN pathway exemplifies VBM in Urology.
**Poster #113**

**REGIONAL VARIATION IN THE “DIFFUSION” OF RADICAL PROSTATECTOMY**

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Presented By: Kevin J. Chua, BS  

**Introduction:** Volumes of radical prostatectomy (RP) have decreased in recent years for a variety of reasons, including greater use of expectant management and decreased screening and diagnosis. It is not clear, however, how changes in surgical practice have varied across healthcare regions. In this study, we 1) investigated regional variation in changes in RP volume, and 2) hypothesized that high initial volume was associated with a greater decrease over time, assuming that high volume may represent overtreatment of older patients.

**Methods:** Using publicly available longitudinal research files (http://www.dartmouthdiffusion.org/index.php#) from The Dartmouth Atlas, we examined annual incidence of RP across hospital referral regions (HRRs) between 2004-2014 in a Medicare population. RP rates were adjusted for age and race, and procedure codes included both open and laparoscopic/robotic surgery. Regional rates of RP per year, and absolute and percent changes over time were identified. Pearson correlations were calculated to determine whether baseline regional volume was associated with the magnitude of change.

**Results:** The mean rate of RP per 1,000 male Medicare beneficiaries was 1.33 (standard deviation=0.58) per HRR in 2004, with a range of 0.39-3.14. The mean absolute decrease in volume was -0.41 (median 0.37), range -2.20 to +1.15. There was a mean change of -20% (range -73% to +140%) between 2004-2014; median change was -27%. Regional volume in 2004 was significant correlated with the absolute decrease in RP volume in the ensuing 10 years (r=-0.82, p<0.001), as well as the percent decrease (r=-0.60, p<0.001). Despite the overall trend of decreased volume, some regions with low baseline practices had an increase in volume during the study period.

**Conclusion:** There is substantial regional variation in both rates of RP, and in the magnitude of change over time. High baseline surgery volume was associated with a greater decrease in volume, possibly reflecting “overuse” of RP that decreased over time. Interestingly, a subset of regions with low baseline volume had increases in volume during the study period. The range of baseline practices and changes over time was striking, and requires additional explanation in future study.

Figure 1. Changes in radical prostatectomy (RP) volume by hospital referral region (HRR) from 2004-2014, per 1,000 male Medicare beneficiaries
Poster #114
PRIMARY CARE PERSPECTIVE AND IMPLEMENTATION OF A MULTI-DISCIPLINARY, INSTITUTIONAL PROSTATE CANCER SCREENING ALGORITHM EMBEDDED IN THE ELECTRONIC HEALTH RECORD (EHR)

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Presented By: Alireza Aminsharifi, MD, PhD

**Introduction:** In response to controversy regarding prostate cancer (PCa) screening recommendations, a consolidated Duke Cancer Institute (DCI) multi-disciplinary algorithm (Figure-1) for PCa screening was developed and implemented. We conducted an online survey within the year following its implementation to assess primary care provider (PCP) attitudes and adoption as well as to evaluate how this program affects screening rates.

**Methods:** A web-based 18-item survey was programmed and was electronically mailed to practicing PCPs. The survey assessed provider practices and attitudes regarding PCa screening, factors that influenced their general screening recommendations and the confidence related to communicating with patients about screening. The rate of PSA screening before and after implementation of the algorithm was reported across age and race categories.

**Results:** In sum, 94 of 106 respondents (88.6%) reported discussing the benefits and harms of screening and let their patients decide (52.8%) or recommended for (31.1%) or against (4.7%) screening. Three-fourths of respondents followed a specific panel recommendation such as the United States Preventative Services Task Force (USPSTF) (48.1%), DCI (20%) or the American Urological Association (AU) (7.4%) guidelines. After integrating the DCI PCa screening algorithm into the EHR, PCP rate of prostate screening increased between 11-20.4% among all age groups (Figure-1). The rate of screening in the “target age group” (50-69 years) increased from 60.7% to 73%. Furthermore, when stratified by race, the rate of screening was increased in both non-African Americans (from 50.1% to 65.7%; ∆ +15.6%) and in African-Americans (from 54.7% to 71.1%; ∆ +16.4%). If PCPs did not recommend screening, the three most important reasons were: (i) feeling that harms of screening outweigh its benefits (44/99), (ii) overtreatment is associated with significant side effects (68/99), and (iii) screening leads to costly follow-up (66/99). Overall, 79.2% of PCPs felt very confident regarding their ability to communicate the topic of PCa screening with patients.

**Conclusion:** The DCI multidisciplinary PCa screening algorithm was well adopted among PCPs shortly after its implementation. The rate of screening increased among all age and race categories thereafter. The majority of PCPs involved in this survey felt confident regarding their PCa screening knowledge and most discuss this topic with patients in a shared decision-making model.

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**Figure 1: Left** - Duke Cancer Institute (DCI) prostate cancer screening algorithm. A single prostate-specific antigen (PSA) test for men in their 50s is sufficient to establish the baseline level. **Right** - The rate of prostate cancer screening performed by primary care providers before and after implementation of the Duke Cancer Institute (DCI) prostate cancer screening algorithm among different age groups.

*e.g., African-Americans with family history of prostate cancer/ abnormal genetic evaluation*
Poster #115
THE ASSOCIATION OF BROADBAND INTERNET ACCESS WITH UROLOGIC CANCER MORTALITY IN THE UNITED STATES
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Presented By: Paige E. Nichols, MD

Introduction: Poor access to urology care has been associated with high urologic cancer mortality rates in rural communities. Internet-based telemedicine interventions have been suggested to improve cancer outcomes and increase access to healthcare. However, internet availability is not consistent across the United States (US). This study aims to better understand the interplay of county-level internet access, rurality and cancer mortality.

Methods: US county bladder (BC), kidney (KC), prostate (PC), and testis cancer (TC) age-adjusted mortality rates (deaths per 100,000 population in 2014) were calculated via a validated small-area estimation model that utilized death records from the National Center for Health Statistics. Internet access rates (IAR) in 2015 (percentage of county with broadband internet speeds ≥ 25 mbps download/3 mbps upload) were obtained from the Federal Communications Commission. A low IAR was defined as <20% and a high IAR was defined as >80%. Rural status was determined by 2013 USDA Rural-Urban Continuum Codes. ANOVA and multivariate regression analyses were performed to assess associations between county IAR, rurality, and cancer mortality rates while controlling for other demographic variables.

Results: 458 counties had IAR <20% and 1348 counties had IAR >80% (51.7% vs 9.6% rural; p<0.01). 37.8% of all rural counties (n=627) had IAR <20%. Counties with IAR <20% had higher mortality rates than counties with IAR >80% for KC (5.4 vs 4.9; p<0.01), PC (27.1 vs 25.5; p<0.01), and TC (0.29 vs 0.26; p<0.01). BC mortality rates were lower in counties with <20% IAR than >80% IAR (4.9 vs 5.1; p<0.01). Rurality and IAR <20% were both predictive of higher KC and PC mortality rates (p<0.01), but lower BC mortality rates (p<0.01). Only IAR <20% was predictive of higher TC mortality rates (p<0.01).

Conclusion: Over a third of rural counties have little to no internet access. Counties with low IAR are more likely to be rural with higher KC, PC, and TC mortality rates. Further research should explore why higher mortality rates are seen in counties with poor internet availability for the majority of urologic cancers, but not BC. In order for telemedicine services to address disproportionately high urologic cancer mortality rates in rural communities, broadband internet infrastructure in the US should be expanded.
Utilization of Psychiatric Resources Prior to Genitourinary (GU) Cancer Diagnosis: Implications for Survival Outcomes

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Presented By: Zachary Klaassen, MD

Introduction: There is emerging evidence that oncology patients with pre-existing mental illness may have poorer survival compared to patients without psychiatric disease. Furthermore, cancer diagnosis may be associated with an increased risk of suicide. However, studies published thus far have failed to account for utilization of psychiatric resources, which may confound this relationship. The objective of this study was to (i) assess the impact of psychiatric utilization (PU) prior to cancer diagnosis on cancer-specific mortality (CSM), and (ii) to assess the effect of cancer diagnosis on suicide risk compared to the general population, accounting for pre-diagnosis PU.

Methods: All residents of Ontario, Canada diagnosed with either prostate, bladder or kidney cancer (1997-2014) were included. Each patient was assigned a psychiatric utilization gradient (PUG) score in the five years prior to cancer diagnosis: 0 – none, 1 – outpatient, 2 – emergency department, 3 – hospital admission. First, a multivariable cause-specific hazard model was used to assess the effect of PUG score on CSM. Second, non-cancer controls were matched 4:1 to cancer patients based on sociodemographic variables and a marginal cause-specific hazard model was used to assess the effect of cancer on the risk of suicidal death.

Results: 191,068 patients were included (137,699 prostate, 29,884 bladder, 23,485 kidney cancer): 109,154 (57.1%) with PUG score 0, 79,553 (41.6%) PUG score 1, 1,596 (0.84%) PUG score 2, and 765 (0.40%) PUG score 3. Increasing pre-diagnosis PU was associated with increased CSM: HR 1.78 (95%CI 1.47-2.14) among patients with PUG score 3 (vs 0) and HR 1.14 (95%CI 0.99-1.32) among those with PUG score 2. These patients with GU malignancies were then matched to 528,387 controls without any cancer diagnosis. Patients with GU cancer had a higher risk of dying of suicide compared to controls (HR 1.16, 95%CI 1.00-1.36). Specifically, among individuals with PUG score 0, those with cancer were significantly more likely to die of suicide compared to patients without cancer (HR 1.39, 95%CI 1.12-1.74).

Conclusion: Pre-cancer diagnosis PU is associated with worse CSM following diagnosis among patients with GU malignancies, with a graded effect. Additionally, the cancer diagnosis confers an increased risk of suicide, compared to the general population, even after accounting for pre-cancer diagnosis PU.
Poster #117
QUALITY OF CANCER SURVEILLANCE CARE AFTER PROSTATE CANCER SURGERY
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Presented By: Christina H. Chapman, MD, MS

Introduction: According to guidelines, men treated for prostate cancer should undergo prostate-specific antigen (PSA) surveillance at least annually after surgery. Adherence to and quality of surveillance for this common malignancy are poorly understood. For these reasons, we examined national trends in the quality of PSA surveillance after prostate cancer surgery.

Methods: We identified 9,648 patients treated with radical prostatectomy from 2005-2008 using the Veterans Affairs Central Cancer Registry. We defined guideline-concordant PSA surveillance as receipt of at least one PSA annually through 2012. We examined associations between guideline concordance and clinical and facility factors, including PSA values in the preceding year, using multivariable and multilevel regression models.

Results: During 35,718 person-years of prostate cancer surveillance after surgery, we found decreasing guideline concordance from 96% in year 1 to 80% in year 7, with 70% five-year guideline concordance and wide variation across facilities. After adjustment, guideline concordance was lower for the youngest and oldest men, black and unmarried men, and in cases of negative surgical margins. Comorbidity was not associated with guideline concordance. Guideline concordance significantly increased as PSA exceeded 4 ng/mL, a threshold traditionally associated with early detection (i.e., screening).

Conclusion: The majority of patients receive guideline-concordant PSA surveillance after prostate cancer surgery in this national delivery system. Guideline concordance sharply increased when PSA values exceeded 4 ng/mL suggesting a screening threshold, not relevant in the post-prostatectomy setting where 0.2 ng/mL is considered treatment failure, is impacting surveillance quality. Survivorship care plans should clarify PSA thresholds for early detection versus cancer surveillance and emphasize adherence for younger and black men to improve quality of care.
ASSESSING THE QUALITY OF SURGICAL CARE FOR CLINICALLY LOCALIZED PROSTATE CANCER: RESULTS FROM THE CEASAR STUDY

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Presented By: Peter A. Reisz, MD

Introduction: Previous studies have suggested that there is racial, geographic, and socioeconomic variation in outcomes for localized prostate cancer, which raises concern for disparities in quality of care. Using a prospective, population-based cohort, we sought to measure clinically relevant variation in structure, process, and outcome measures across racial groups, age groups, surgical approach, and surgeon volume.

Methods: The Comparative Effectiveness Analysis of Surgery and Radiation (CEASAR) Study enrolled 1,523 men with clinically localized prostate cancer diagnosed between 2011 and 2012 who underwent radical prostatectomy, of whom 1,069 met final inclusion criteria. Quality of life was assessed longitudinally using the Expanded Prostate Index Composite (EPIC-26), and clinical data was collected by chart review. Six quality measures were assessed: pelvic lymphadenectomy when risk of lymph node involvement ≥ 2%, nerve-sparing among men with D’Amico low-risk disease and good baseline sexual function (EPIC sexual function domain score > 80), negative surgical margins, urinary and sexual function outcomes, treatment by a high-volume surgeon (>10 cases in cohort), and 30-day and one-year complications. Receipt of high quality care was compared across categories of race, age, surgeon volume, and surgical approach.

Results: Table 1 shows the proportion meeting each dichotomous quality measure across exposure groups. There were no significant differences in quality between white and African-American patients, among age groups, or across strata of surgeon volume. However, the robotic surgery patients were less likely to undergo lymphadenectomy when indicated, and less likely to be treated by a high-volume surgeon. Patients undergoing open surgery had significantly more short and long term complications and had worse sexual function over time (functional data not shown).

Conclusions: In this cohort, we found no evidence of variation in surgical quality of care across racial groups, age groups or surgeon volume strata. However, we did find variation between open and robotic surgery. We found lower use of indicated lymphadenectomy in the robotic group, possibly reflecting a quality deficit, a difference in practice pattern, or early adoption of higher thresholds for lymphadenectomy. Lower use of high-volume surgeons in the robotic group may reflect the wide dissemination of this technique, with few high-volume surgeons still performing open prostatectomy.
Introduction: Mucosal melanoma involving the urethra is a rare disease with distinct characteristics and a poor outcome compared to cutaneous melanoma. We aimed to describe the clinical, pathological and molecular characteristics of urethral melanoma.

Methods: Following IRB approval, we identified 32 patients treated at our institution for urethral melanoma between 1986–2017. Clinical and pathological characteristic were obtained from the patients’ medical records. The results of targeted exome sequencing using MSK IMPACT (n=7) or targeted gene sequencing of BRAF, KIT and/or NRAS (n=7) were summarized and compared to the results of MSK IMPACT testing of cutaneous melanomas (n=190). Recurrence-free and disease-specific survival were calculated by the Kaplan-Meier method.

Results: The study cohort included 30 females and 2 males with a median age of 73 years (IQR 59-79). Charlson Comorbidity Index was >3 in 24 patients (75%). A urethral/ vulvar mass was apparent in 66% of patients and 44% had hematuria or vaginal bleeding. Stage at diagnosis was localized in 21 patients (66%), regional/ nodal in 8 (25%) and distant/ metastatic in 3 (9%). Mutations in CDKN2B, PAK1, and KIT were more prevalent in urethral melanomas while TERT and BRAF mutations were more frequent in cutaneous melanomas (Figure 1). Initial treatment included surgery in 25/31 patients; 8/31 patients received multiple treatment modalities as their initial therapy. Median follow-up for survivors was 30 months (IQR 25-81); 27 patients recurred at a median time of 11 months (IQR 7-30). Treatment for recurrent disease included surgery (14/27 patients), radiotherapy (8/27), chemotherapy (11/27), targeted therapy (2/27) and immunotherapy (15/27). 23 patients died during follow-up, 16 from metastatic melanoma. Two- and 5-year cancer specific survival rates were 79% and 48%, respectively. No significant change in treatment outcome was observed based on year of diagnosis (HR=1.036 per year; 95% CI (0.96 – 1.12); p=0.371).

Conclusion: Treatment outcomes remain poor for patients with advanced urethral melanoma and are unchanged over the time period studied. The mutational landscape of urethral melanoma varies from that of cutaneous melanoma. Future studies are needed to validate the role of CDKN2B, PAK1 and KIT in urethral melanoma.
Introduction: Upper tract urothelial carcinoma (UTUC) with clinically positive regional lymph nodes (cN+) is an aggressive disease state with a high propensity for metastases and death. Current literature regarding treatment group outcomes and national practice patterns for this patient population is limited. Our primary objective was to examine current practice patterns and analyze the effect of sequencing of chemotherapy on overall survival in this population.

Methods: 1,658 patients were identified in the National Cancer Database with cN+M0 UTUC. Patients were stratified into treatment groups based on sequencing of chemotherapy. We compared baseline patient and tumor characteristics between groups, and completed a survival analysis using a multivariate Cox regression model.

Results: There were 1,658 patients in the final study population. Neoadjuvant chemotherapy (NAC) was the least utilized treatment group, comprising 6.8% of the overall population, and was associated with the highest median overall survival (OS) (36 months; Adjuvant chemotherapy: 22 mo.; Chemotherapy only: 14 mo.; Surgery only: 10 mo.; No treatment: 5 mo. (Figure 1)). On multivariate analysis NAC was associated with improved median OS as compared to the adjuvant chemotherapy (AC) group (HR 0.47 (0.30 – 0.74)). There was no statistically significant difference in survival between the chemotherapy only and surgery only groups. 34.6% of patients in the NAC group achieved pN0 as compared to 10.3% of those who underwent surgery as initial therapy.

Conclusion: NAC was the least utilized treatment strategy in the management of cN+M0 UTUC but was associated with the highest median OS; a 14 month survival benefit over the AC group. There was no difference in survival between the chemotherapy only and surgery only groups. Overall these results suggest that initial chemotherapy is appropriate in this population unless contraindicated.

Figure 1. Kaplan Meier analysis for overall survival by treatment group
Poster #121

TIME FROM DIAGNOSIS TO CHEMOTHERAPY AS A PREDICTOR OF OVERALL SURVIVAL IN UPPER TRACT UROTHELIAL CARCINOMA PATIENTS WITH CLINICALLY POSITIVE LYMPH NODES

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Introduction: The prognosis and optimal management of upper tract urothelial carcinoma (UTUC) with clinical evidence of lymph node metastasis (cN+) is not well-established. We hypothesize that delayed administration of systemic chemotherapy (SC) in cN+ patients will adversely affect overall survival (OS).

Methods: We identified patients within the National Cancer Data Base with UTUC and cN+ (N1-N3) without visceral metastasis (M0/MX) who received multi-agent chemotherapy. Time from diagnosis to chemotherapy (TTC) was analyzed both as a continuous and categorical variable. Kaplan-Meier (KM) and Cox regression analyses were used to compare OS of patients based on TTC. Multivariate analysis adjusted for age, race, Charleston comorbidity index, insurance type, income, facility type, clinical T stage, clinical N stage, and treatment group.

Results: The cohort included 1,285 patents. Overall median TTC was 50 days. TTC was stratified into quartiles (Quartile 1: < 31 days, Q2: 31-50 days, Q3: 50-77 days, Q4: > 77 days). Delayed TTC was associated with male gender (HR 0.69, CI 0.43 - 0.91; p < 0.01) and patients in the adjuvant chemotherapy group (HR 0.47, CI 0.38 – 0.59; p < 0.01). On multivariate analysis, the top quartile of delayed TTC was associated with decreased overall survival (HR 1.51, CI 1.01 – 2.27; p = 0.04).

Conclusion: In cN+ UTUC, receipt of chemotherapy beyond 77 days from diagnosis was associated with decreased overall survival regardless of surgical management.
**Poster #122**

**PREOPERATIVE PREDICTIVE MODEL FOR SYSTEMIC DISEASE RECURRENCE FOLLOWING RADICAL NEPHROURETERECTOMY FOR HIGH GRADE UPPER TRACT UROTHELIAL CARCINOMA**

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Presented By: Yuval Freifeld

**Introduction:** Systemic perioperative chemotherapy can be of benefit in patients with locally advanced non-metastatic upper tract urothelial carcinoma (UTUC), unlikely to be cured by surgery alone. Optimal systemic chemotherapy regimen may best be delivered in a neoadjuvant setting (NAC) due to decline in renal function after surgery. However, currently there are no efficient tools to predict systemic recurrence (SR) following radical nephroureterectomy (RNU). The aim of this study was to identify specific risk factors for SR following RNU.

**Methods:** We retrospectively evaluated data from a multi-center database of UTUC patients who underwent RNU. Patients with HG disease proven by either biopsy or positive cytology, who did not receive NAC were included in the analysis. SR was defined as any recurrence outside the urinary tract - urothelial carcinoma of the bladder or contralateral UTUC were not considered as SR. After multiple imputations for missing data, Cox regression model was used to determine the effect of different pre-operative patient, tumor, and imaging characteristics as predictors of SR. Variables with p value < 0.1 on univariable analysis were included in a multivariable model (MVA), C-index was calculated to evaluate the predictive accuracy of the model.

**Results:** 245 patients were included in the analysis according to the criteria listed above. 2 and 5 years recurrence rates were 16.3% and 19.2%, respectively. On univariable analysis, sessile architecture HR 3.16 (95% CI, 1.38-7.26), infiltrative component HR 2.30 (95% CI, 1.12-4.72), age >=65 HR 2.02 (95% CI, 1.00-4.05), ECOG>0 HR 1.98 (95% CI, 1.09-3.57), hydronephrosis HR 1.93 (95% CI, 1.04-3.57), hemoglobin level HR 0.81 (95% CI, 0.69-0.96) and pre-operative eGFR>50 HR 0.48 (95% CI, 0.25-0.92) were found to be significant factors associated with SR. MVA identified sessile architecture as the most significant predictor of recurrence HR 2.52 (95% CI, 1.09-5.86). A C-index of 0.71 was calculated including all variables in the MVA indicating good predictive accuracy for the model. A nomogram predicting 2 and 5 year relapse free probability was developed accordingly (Figure 1).

**Conclusion:** Based on a comprehensive multicenter database, we developed a nomogram with good predictive accuracy for SR following RNU. This may serve as an aid in decision making regarding the use of NAC.
Poster #123
OUTCOMES OF MICROPAPILLARY VARIANT UPPER TRACT UROTHELIAL CARCINOMA
*Jonathan Duplisea, MD1; Firas Petros, MD2; Roger Li, MD3; Bryan Fellman, PhD2; Charles Guo, MD3; Bogdan Czerniak, MD PhD3; Arlene Sieker-Radtke, MD3; John Araujo, MD3; Colin Dinney, MD1 and Surena Matin, MD1
1Department of Urology, The University of Texas MD Anderson Cancer Center; 2Department of Biostatistics, The University of Texas MD Anderson Cancer Center; 3Department of Pathology, The University of Texas MD Anderson Cancer Center; 4Department of Genitourinary Medical Oncology, The University of Texas MD Anderson Cancer Center
Presented By: Jonathan Duplisea, MD

Introduction: Micropapillary variant (MP) upper tract urothelial cancer (MP-UTUC) is a rare malignancy with little known regarding its clinical course and/or optimal treatment. In this single center case series, we describe patient characteristics at disease presentation, surgical treatment, oncologic outcomes, and response to perioperative chemotherapy.

Methods: We conducted a retrospective review to identify all patients with MP-UTUC treated at our center between January 1994 and October 2017. Clinicopathologic data was obtained for all patients. Descriptive statistics, Kaplan-Meier analysis, Cox proportional hazards model, and nearest neighbor matching were used to examine the cohort.

Results: Eighteen, (4.3%) of 416 patients were found to have MP-UTUC at our institution over a twenty-three year period. The majority of patients had ≥pT3 disease at the time of extirpative surgery (13/18, 72%) and 1 was identified as MP prior to surgery. Seven patients received neoadjuvant chemotherapy (NAC) and six patients received adjuvant chemotherapy (AC). Median overall, cancer specific, and recurrence free survival were 3.29, 3.29, and 1.69 years, respectively for MP-UTUC. There was no survival difference between C-UTUC and MP-UTUC when matched for age, stage, grade, LVI, and margins (HR 1.18, p=0.567). No MP-UTUC patients receiving NAC had apparent pathologic down staging, and of those receiving AC two-thirds died of disease within two years.

Conclusion: MP-UTUC is a rare, and in most cases aggressive malignancy that commonly presents as locally advanced disease. In this small case series, MP-UTUC does not appear to respond to perioperative chemotherapy as NAC did not result in apparent pathologic down staging and the majority of those receiving AC died from MP-UTUC.
Poster Session I — Full Abstracts

Poster #124
PREDICTING OVERALL SURVIVAL (OS) IN PATIENTS (PTS) WITH PENILE SQUAMOUS CELL CARCINOMA (PSCC) UNDERGOING REGIONAL LYMPH NODE DISSECTION (LND) ± MULTIMODAL THERAPY

*Andrea Necchi, MD1; Luigi Mariani1; Yao Zhu5; Ding-Wei Ye6; Antonio Ornellas3; Nick Watkin4; Michael Ager4; Salvatore Lo Vullo1; Oliver Hakenberg5; Axel Heidenreich6; Daniele Raggi1; Mario Catanzaro1; Paulo Ornellas3; Mounsif Azizi7 and Philippe Spiess7

1Fondazione IRCCS Istituto Nazionale dei Tumori, Milano, Italy; 2Fudan University Shanghai Cancer Center; 3Hospital Mário Kröeff and Brazilian Cancer Institute, Rio de Janeiro, Brazil; 4St. George’s University Hospitals, NHS Foundation Trust, London, United Kingdom; 5University Hospital Rostock, Rostock, Germany; 6Universitätsklinikum Köln, Köln, Germany; 7Moffitt Cancer Center and Research Institute, Tampa, FL, USA

Presented By: Andrea Necchi, MD

Introduction: Outcomes with multimodality therapy for locally-advanced (LA) PSCC, along with the role of pelvic or bilateral LND, still need to be reliably assessed, and large retrospective datasets are suitable for such purposes in an uncommon disease. We aimed to provide a tool to quantify the benefit from different therapeutic modalities in PSCC pts.

Methods: An international, multicenter, retrospective database was queried for all pts with PSCC who had received inguinal ± pelvic LND from 1980 to 2017. We classified or re-classified pts according to the 2009 TNM classification system. The primary endpoint was OS. Survival analysis methods were adopted for the purpose of detecting and modeling putative prognostic factors, and develop a prognostic stratification tool. The analysis was performed in two steps: first, we modeled outcome data and covariates by resorting to a random forest (RF) method (an “ensemble” machine-learning approach, with an ad hoc approach incorporating missing data imputation). Second, data was modeled using Cox proportional hazard regression. In addition, a “clinically-driven” Cox model was fit including pre-specified variables.

Results: 743 pts were identified from 7 referral centers from Europe, USA, Brazil, and China; of these pts, 689 had suitable data for OS analyses. 343 pts (49.8%) had clinical N+ (77 had N3). 86 (12.4%) had received neoadjuvant chemotherapy (NAC), 275 (39.9%) pelvic LND, 574 (83.3%) bilateral LND, 171 (24.8%) had received adjuvant chemotherapy (AC), and 74 (10.7%) adjuvant RT. The median follow-up was 50 months (IQR: 22.4-94.1). Variables significantly associated with OS were: age (p<0.001), smoking status (p=0.003), pathologically-involved/total removed LN ratio (p<0.001), pN stage (overall p<0.001) and NAC (HR: 1.61, 95%CI: 1.12-2.31, p=0.011).

NAC and AC provided a numerically, not statistically significant, OS benefit in cN3 and pN3 pts only, respectively. Then we developed a nomogram for 12- and 24-month OS based on pre-specified variables as shown in the Figure (bias-corrected c-index for this model: 0.757).

Conclusion: In the largest analysis of LND and perioperative therapy for PSCC presented to date we propose a tool that may be offered as an aid to physicians to enhance decision-making, clinical research, and patient counseling. The administration of NAC and AC should be restricted to N3 pts.

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**Points**

<table>
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<th>Variable</th>
<th>Score</th>
</tr>
</thead>
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<td>-6 to +6</td>
</tr>
<tr>
<td>Positive LN ratio</td>
<td>-5 to +5</td>
</tr>
<tr>
<td>Path N stage</td>
<td>-4 to +4</td>
</tr>
<tr>
<td>Smoking status</td>
<td>-3 to +3</td>
</tr>
<tr>
<td>Neadjuvant CT</td>
<td>-2 to +2</td>
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<td>Pelvic LND</td>
<td>-1 to +1</td>
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<tr>
<td>Bilateral LND</td>
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</tr>
<tr>
<td>Adjuvant CT</td>
<td>0</td>
</tr>
<tr>
<td>Total Points</td>
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</table>

**12-month Survival Probability**

[Percentage chart]

**24-month Survival Probability**

[Percentage chart]
INTRODUCTION: Penile squamous cell carcinoma (pSCC) is uncommon in developed countries, but portends significant treatment-related morbidity and mortality. Little is known regarding clinical, socioeconomic, and demographic risk factors for pSCC. This study investigates the disparities in demographic distribution and outcomes of pSCC in Appalachian Kentucky (KY), a region characterized by poor healthcare literacy and access.

METHODS: The KY Cancer Registry (KCR) is a prospectively maintained database and was one of the founding expansion registries to comprise the SEER database. Appalachian counties are defined by the Appalachian Regional Commission. Blinded data were retrieved for patients with pSCC from 1995-2015 from KCR and SEER. Proportions were analyzed using Chi-Square tests and continuous variables by T-tests.

RESULTS: From 1995-2015 there were 700 cases of pSCC diagnosed in KY. While KY comprised only 1% of the US population in 2015, the state comprised 8% of pSCC diagnoses during the study period (SEER data). The Appalachian population at risk during that time included 12.1 million men with rate of 2.6 cases per 100,000 persons (non-Appalachian rate 1.6 cases/100,000 persons). This is in contrast to the relatively equivocal Appalachian and non-Appalachian incidence of other GU malignancies, including prostate, kidney and bladder cancers.

Nearly 40% of patients were from Appalachian counties and these patients were predominantly Caucasian (P<0.001), were more likely to undergo LND and have N+ disease (See Table, P=0.016 and <0.001, respectively). African Americans (AA) comprised only 5% of patients and exhibited high pathologic stage at presentation (P=0.041) compared to Caucasians. In patients with cancer-specific mortality (CSM), survival interval from diagnosis was shorter in Appalachian (20.7 vs. 26.0 mo, P=0.016) and AAs (23.1 vs. 12.2 mo, P=0.023). Predictors of CSM included increased age, poor differentiation, higher T stage, and LN involvement (P<0.001 for all). Treatment modality (surgery +/- chemoradiation) did not differ with regards to Appalachian status, race or clinical outcomes.

CONCLUSION: There is a disproportionally high rate of pSCC in Kentucky with relative predominance in Appalachian counties. Both Appalachian and African-American men exhibited more advanced disease at presentation and shorter survival, highlighting socioeconomic and racial disparities which can be exploited to improve health literacy, timely diagnosis and access to care in high risk individuals.
Poster #126
PRIMARY TESTICULAR LYMPHOMA: TREATMENT PATTERNS AND SURVIVAL OF 1740 MEN FROM THE NATIONAL CANCER DATABASE
*Fernando Caumont, MD1; John Burns1; Sydney Akapame2; Jing Xie1; Christopher Porter1 and John Paul Flores3
1Section of Urology and Renal Transplantation, Virginia Mason Medical Center, Seattle, WA; 2Axio Research, Seattle, WA; 3Section of Hematology and Oncology, Virginia Mason Medical Center, Seattle, WA
Presented By: Fernando Caumont, MD

Introduction: The standard of care (SOC) for primary testicular lymphoma (PTL) is orchiectomy, chemotherapy (CHT) and radiation (RT) of the contralateral testis regardless of stage. PTL is rare and usually presents in elderly men; we hypothesized that men may not receive SOC and may have worse outcomes. To assess this, we queried the National Cancer Database (NCDB) which includes 70% of newly diagnosed US cancers, to analyze treatment patterns and survival of men with PTL in the rituximab era.

Methods: Using NCDB data (2006 to 2013), we searched for men diagnosed with extra nodal lymphoma (N=109210), primary site testis (N=1865). Patients were analyzed in 2 treatment groups: 1) CHT + RT (SOC group); and 2) CHT alone, RT alone and orchiectomy alone, grouped as no-SOC. Kaplan-Meier (KM) survival plots were used to investigate 5-year overall survival (OS). Log rank test was used to estimate survival differences between treatments.

Results: 1740 men with PTL underwent orchiectomy. Median age was 69. 794 (45.6%) were Stage 1, 217 (12.5%) were Stage 2, 88 (5.1%) were Stage 3, 274 (15.7%) were Stage 4. 367 men (21.1%) had no staging or survival information available and were not included in the survival analysis. 619 (35.5%) received SOC, 692 (39.8%) had CHT alone, RT alone and orchiectomy alone, grouped as no-SOC. Kaplan-Meier (KM) survival plots were used to investigate 5-year overall survival (OS). Log rank test was used to estimate survival differences between treatments.

Table 1: 5-year overall survival analysis by stage. SOC: Standard of Care. Boldface means statistical significant difference

<table>
<thead>
<tr>
<th>Stage</th>
<th>SOC Survival (%)</th>
<th>Alive (N)</th>
<th>Dead (N)</th>
<th>Non-SOC Survival (%)</th>
<th>Alive (N)</th>
<th>Dead (N)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>83.9%</td>
<td>260</td>
<td>50</td>
<td>66.1%</td>
<td>320</td>
<td>164</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>II</td>
<td>78.3%</td>
<td>54</td>
<td>15</td>
<td>58.8%</td>
<td>87</td>
<td>61</td>
<td>0.003</td>
</tr>
<tr>
<td>III</td>
<td>74.1%</td>
<td>20</td>
<td>7</td>
<td>60.7%</td>
<td>37</td>
<td>24</td>
<td>0.07</td>
</tr>
<tr>
<td>IV</td>
<td>64.4%</td>
<td>56</td>
<td>31</td>
<td>45.4%</td>
<td>85</td>
<td>102</td>
<td>0.001</td>
</tr>
<tr>
<td>All</td>
<td>79.11%</td>
<td>390</td>
<td>103</td>
<td>60.11%</td>
<td>529</td>
<td>351</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Conclusion: This study represents one of the largest PTL cohort reported to date and is reflective of current treatments. These data show that most US PTL patients do not receive guideline-recommended SOC, and OS is significantly worse across stages for those that do not receive SOC, highlighting the need for improved management of PTL.
Poster #127
NATIONWIDE PATTERNS OF CARE FOR STAGE II NON-SEMINOMATOUS GERM CELL TUMOR: RPLND AND CHEMOTHERAPY UTILIZATION
*Rashed Ghandour, MD1; Caleb Ashbrook, BA1; Yuval Freifeld, MD1; Nirmish Singla, MD1; Yair Lotan, MD1; Vitaly Margulis, MD1; Solomon Woldu, MD1 and Aditya Bagrodia, MD
1University of Texas Southwestern Medical Center
Presented By: Rashed Ghandour, MD

Introduction: Although the most common solid-organ malignancy in young men, testicular cancer is rare. Most publications come from a few, high-volume clinical centers whose practice patterns may not be generalizable. We review a nationwide, cancer registry to discern treatment patterns for patients presenting with retroperitoneal involvement of non-seminomatous germ cell tumor (NSGCT).

Methods: The NCDB was queried for patients with AJCC stage II NSGCT from 2004-2014. Patients were excluded if incorrectly classified as stage II (serum tumor marker elevation to S2 or S3, presence of non-nodal metastases, lack of retroperitoneal lymph node involvement), if all treatment decisions were made outside of the reporting facility, or if treatment was unknown. Hospital volumes were stratified according to GCT case volume: low (bottom 25%), low-intermediate (25-75%), intermediate (75-95%), high-intermediate (95-99%), and high volume (top 99%). Patients were stratified by clinical nodal status and corresponding AJCC sub-staging: cN0/AJCC Stage IIA, cN2/AJCC Stage IIB, and cN3/AJCC Stage IIIC. Logistic regression was performed to determine factors independently associated with primary RPLND and post- chemotherapy RPLND.

Results: A total of 2,408 patients met the inclusion criteria: Stage IIA (n=1,060), IIB (n=869), IIC (n=274). The mean patient age was 29.5 (SD 9.4) years. Racial breakdown was: white (non-Hispanic): 83.1%, Hispanic: 10.7%, black 2.1%, other 2.7%, and unknown 1.4%. Overall, 82.6% of patients underwent primary chemotherapy, while 17.4% underwent upfront RPLND. Stratified by stage, use of primary chemotherapy was 77.5%, 87.7%, and 86.1% for stages IIA, IIB, and IIC, respectively. Overall, 24.4% of patients underwent PC-RPLND. Longitudinal data, stratified by stage, is provided in Figures 1-2. Factors independently associated with a lower likelihood of undergoing primary RPLND were more recent diagnosis, high clinical nodal stage. Conversely, patients treated at high-volume facilities were more likely to receive primary RPLND. Factors associated with higher likelihood of undergoing PC-RPLND included higher clinical nodal stage, treatment at a high-volume center, and the distance a patient traveled to seek care.

Conclusion: The nationwide utilization of primary chemotherapy is increasing compared to RPLND for stage II NSGCT, and is the preferred therapy for more advanced nodal disease. PC-RPLND, whenever performed, is driven by the nodal stage as well as the accessibility of a high-volume center.

Figure 1: Bar graph of the nationwide utilization of RPLND from 2004 to 2014. (A) shows the primary treatment modality: RPLND vs. chemotherapy. (B) represents RPLND following chemotherapy. (C) shows the chemotherapy-alone. Y-axis represents the year of diagnosis and the X-axis represents the percentage of cases.
Poster #128
DOES PRIOR INGUINOSCROTAL SURGERY ALTER RECURRENCE PATTERNS AND SURVIVAL OUTCOME FOR PATIENTS WITH TESTICULAR CANCER? THE PRINCESS MARGARET CANCER CENTRE EXPERIENCE
Thenappan Chandrasekar, MD1,2; Dixon T.S. Woon2; Jaime O. Herrera-Caceres2; Hanan Goldberg2; Zachary Klaassen2; Neil E. Fleshner3; Michael A.S. Jewett2 and Robert J. Hamilton2
1Thomas Jefferson University, Dept. of Urology, Philadelphia; PAI 2University of Toronto, Department of Surgical Oncology, Division of Urology, Toronto, Canada
Presented By: Thenappan Chandrasekar, MD

Introduction:
Inguinoscrotal surgery (ISS) prior to testicular cancer diagnosis has historically been associated with altered lymphatic drainage patterns and atypical relapse locations.

Methods: To utilize the largest contemporary series of patients with prior ISS to determine impact on TCa recurrence and outcomes. A retrospective review of a prospectively maintained database of patients diagnosed with TCa at The Princess Margaret Cancer Centre between 1981 and 2016 was performed. Data on all patients with TCa and history of prior ISS was analyzed.

Results: 267 patients with TCa and prior ISS were identified; 141 seminoma and 126 nonseminoma (NSGCT). Among the seminomas, 114 (80.9%) presented with clinical stage 1 (CSI) disease and were put on active surveillance (AS) with 23 (20%) relapsing, including 3 (2.6%) with inguinoscrotal relapse. Twenty-four (%) presented with metastatic disease, while 3 (12.5%) presented with inguinoscrotal disease. Among the NSGCTs, 50 (39.7%) presented with CSI and were put on AS with 14 (28%) relapsing, including 1 (2%) inguinal relapse. Sixty-six (%) presented with metastases, while 6 (9.1%) presented with inguinoscrotal disease. Recurrence patterns are shown in Fig. 1. While inguinoscrotal and overall recurrence rates amongst AS patients is consistent with prior series, overall recurrence rates exceeded historical series in ‘low-risk’ patients, suggesting risk-adapted surveillance may not be sufficient in this population. Systemic chemotherapy was utilized primarily for treatment of inguinoscrotal recurrence.

Conclusion: The risk of inguinoscrotal recurrence for patients with prior ISS on surveillance for TCa remains low, consistent with historical series, and disease-specific survival remains high. As inguinoscrotal recurrence may be an early harbinger of systemic spread, pelvic imaging on surveillance protocols should be maintained for patients with prior ISS and consideration should be given to systemic chemotherapy in cases of recurrence.

Figure 1A&B:
Introduction: Retroperitoneal lymph node dissection (RPLND; NCCN category 2a) or chemotherapy (NCCN category 2b) are recommended as first line treatment for clinical stage (CS) IIA NSGCT and are both associated with excellent long-term survival. RPLND cures 70-90% of pN1 patients, eliminating the need for chemotherapy and the potential associated morbidity. Therefore, surveillance is the preferred option after RPLND for pN1 patients. We aimed to determine national practice patterns in the management of CSIIA NSGCT and adherence to NCCN guidelines.

Methods: The National Cancer Data Base (NCDB) was used to identify 1,547 men diagnosed with CSIIA NSGCT with negative serum tumor markers between 2004 and 2016. Trends in the utilization of initial and adjuvant treatment [(chemotherapy only, RPLND only, RPLND with adjuvant chemotherapy (all receiving both chemotherapy and RPLND), and post chemotherapy RPLND)] were analyzed. Opportunities to avoid chemotherapy were analyzed according to final pathologic N stage (pN).

Results: Of the 1,547 men with clinical stage IIA, 18% (273) had RPLND alone, 51% (786) chemotherapy alone, 28% (438) RPLND and adjuvant chemotherapy, and 3% (50) had a post chemotherapy RPLND. In patients with RPLND alone, 32% (88) were pN0, 57% (155) were pN1, 9.5% (26) pN2, and 1.5% (26) pN3. In the RPLND and adjuvant chemotherapy group, 25% (110) were pN0, 59.8% (262) were pN1, 13.2% (58) were pN2, and 1.8% (58) were pN3. There was no association between National Cancer Institute (NCI) status and deliverance of non-guideline based adjuvant chemotherapy (p=0.35)

Conclusion: Induction chemotherapy as first line treatment in clinical stage IIA NSGCT patients was the most common treatment choice despite NCCN guidelines recommending RPLND as the preferred option. In the RPLND and adjuvant chemotherapy group, 85% of patients were pN1 or less yet all received additional chemotherapy, despite surveillance being the preferred NCCN option.
SURVIVAL RATES AFTER RETROPERITONEAL LYMPH NODE DISSECTION (RPLND) FOR TESTICULAR SEMINOMA

Alexandra Tabakin, MD; Sinae Kim, PhD; Charles Polotti, MD; Brian Shinder, MD, MS; Zorimar Rivera-Núñez, PhD; Joshua Sterling, MD, MS; Nicholas Farber, MD; Kushan Radadia, MD; Isaac Kim, MD, PhD; Eric Singer, MD, MA; and Thomas Jang, MD, MPH

1Rutgers Robert Wood Johnson Medical School, Division of Urology, New Brunswick, NJ; 2Rutgers Cancer Institute of New Jersey, Department of Radiation Oncology, New Brunswick, NJ; 3Section of Urologic Oncology, Rutgers Cancer Institute of New Jersey, New Brunswick, NJ

Presented By: Alexandra Tabakin, MD

Introduction: RPLND as first-line treatment for testicular seminoma is less well defined than for testicular nonseminomas. Furthermore, RPLND performed in the post-chemotherapy (PC) setting for seminoma patients with a PET avid residual mass > 3cm can be technically challenging. We describe utilization of RPLND in the primary and PC settings and report on overall survival rates following surgery for these men.

Methods: Using 2004-2014 data from the National Cancer Database, we identified 62,727 men with 1° testicular cancer, of which 31,068 men were diagnosed as having seminoma. After excluding men with benign, non-germ cell, and nonseminoma histologies, those who did not undergo RPLND, and those whose clinical stage (CS) or survival data were unavailable, 412 men comprised our final cohort. Men were further stratified according to whether they had 1° RPLND vs PC-RPLND, with 1° RPLND defined as RPLND performed for CS IIA-IIB without prior chemotherapy, and PC-RPLND classified as RPLND performed for CS IIA-IIIC after chemotherapy. Descriptive statistics were used to summarize clinical and demographic factors. The Kaplan-Meier method was used to determine overall survival.

Results: From 2004-2014, 412 men with testicular seminoma underwent RPLND, of which 89% and 11% were in the 1° and PC settings, respectively. There were no significant differences in clinical or demographic characteristics when comparing men in these 2 groups. The majority of men with testicular seminoma undergoing PC-RPLND were treated at an academic center (63.8%) or comprehensive community cancer program (21.3%). The median follow-up was 4.1 years. Of 372 patients with available survival data, five-year overall survival was 94.2% and 89.0% in the 1° RPLND and PC-RPLND groups, respectively (Figure 1a and 1b).

Conclusion: Though RPLND is rarely used as 1° therapy in testicular seminoma, overall survival rates appear to be excellent, as they do for men with testicular seminoma after PC-RPLND. Ongoing trials evaluating the use of RPLND for early metastatic, low-volume disease will clarify its role in the management of testicular seminoma.
Poster #131
A RETROSPECTIVE REVIEW OF PARTIAL ORCHIECTOMY AT THE PRINCESS MARGARET CANCER CENTRE
*Gregory J. Nason, MSc, FRCS Urol, FEBU1; Lynn Cartwright-Anson1; Michael Jewett1; Martin O’Malley2; Joan Sweet3 and Robert Hamilton1
1Division of Urology, Department of Surgical Oncology, Princess Margaret Cancer Centre, University Health Network and University of Toronto; 2Department of Medical Imaging, Princess Margaret Cancer Centre, University Health Network and University of Toronto; 3Department of Pathology, Laboratory Medicine and Pathology, University Health Network and University of Toronto
Presented By: Gregory J. Nason, MSc, FRCS Urol, FEBU

Introduction: Radical orchiectomy (RO) is the gold standard treatment for a suspicious testicular lesion. Organ sparing surgery can be considered in the setting of a solitary functioning unit or bilateral tumors. It has also been suggested as an alternative to radical orchiectomy for small lesions. The aim of this study was to report the experience of partial orchiectomy (PO) at our centre.

Methods: We performed a retrospective review of our prospectively maintained testicular cancer database at the Princess Margaret Cancer Centre analyzing PO.

Results: A total of 77 patients underwent a PO between 1983 and 2018. The mean age was 31.3 years (range 17-56 years). A lesion was palpable in 70 (90.9%) patients. The mean size of lesion was 14.1mm (Range 3 -35mm). 39 (50.6%) patients underwent a PO due a small lesion, 30 (39%) to a solitary functioning testis, 6 (7.8%) due to bilateral lesions, 1 (1.3%) for an assumed benign lesion and 1 (1.3%) was not documented. The mean follow up was 55 months (Range 1-258).

Histological analysis revealed a benign lesion in 25 (32.5%) patients. A positive surgical margin was noted in 6 patients (7.8%). None of these patients developed a local or distant recurrence.

16 (20.8%) patients subsequently had a RO following an initial PO at a mean interval of 9.8 months (Range 0-46 months). The reasons for subsequent RO included a radiologically detected lesion in 7 patients, a palpable lesion in 4 patients, a positive surgical margin in 3 patients and a pathological finding in 2 patients. Malignant histology was present in 12 (75%) of the RO specimens. Of the patients who initially presented with no metastatic disease (n=57), 7 (12.3%) patients subsequently developed a nodal recurrence. None of these had a positive margin at PO. All were salvaged with adjuvant treatment and are currently disease free. There have been two disease-specific deaths in the series- both, however, initially presented with widespread metastatic disease. There were no reported Clavien-Dindo Grade 3-5 complications.

Conclusion: Organ sparing surgery is a safe and feasible approach to small testicular lesions. A proportion of small testicular lesions are benign and it can potentially avoid the necessity for a radical orchietomy.
Introduction: The use of Alvimopan and multi-modality pain management in enhanced recovery after surgery (ERAS) protocols has improved outcomes after numerous surgical procedures. We sought to determine the benefits of these medications in men undergoing retroperitoneal lymph node dissection (RPLND) for testicular cancer.

Methods: A prospective pilot study of consecutive patients undergoing RPLND at a single high-volume tertiary referral center. Patients were placed in one of three interventional groups based on chronological date of the operation. The 3-drug group were managed using Alvimopan 12 mg PO prior to OR then BID until bowel movement (BM), Gabapentin 300 mg QD and Acetaminophen 1,000 q6H. The 2-drug group were managed with the above regimen excluding Alvimopan. The control group was treated per our standard peri-operative pathway. Our primary outcomes were length of stay, volume of IV narcotic consumed, bowel movement during hospitalization and time to resumption of bowel function. Multivariable regression models were fit to examine the association between treatment group and our primary outcomes. All the regression models included operation time (minutes), concomitant surgery (yes/no), chemotherapy (yes/no) and size of the mass (cm) as covariates. Kaplan-Meier plots were graphed for the time to bowel movement.

Results: One-hundred and fifty-two consecutive patients underwent RPLND between January 2017 and May 2018 (42 in 3-drug, 38 in 2-drug and 72 controls). Multivariable models indicated that the 3-drug (IRR 0.89, p<0.0001) and 2-drug group (IRR 0.87, p=0.209) had shorter hospital stays than the control group. Men in the 3-drug group required less narcotic pain medication than the 2-drug (-8.16, p=0.0405) and the control (-8.16, p=0.0302) group. Men receiving Alvimopan (3-drug) were almost 6-times more likely than the 2-drug group and 4-times more likely than the control group to resume bowel function during hospitalization. If bowel function returned during hospitalization, men in the 3-drug group had a quicker return of bowel function (p=0.0045) (Figure 1).

Conclusion: The use of Alvimopan and multi-modality pain management demonstrated modest improvement in outcomes in men undergoing RPLND for testis cancer.
Poster Session II
Thursday, November 29, 2018
1:00 p.m. - 5:30 p.m.
Poster Walks
Valley of the Sun Ballroom AB and Foyer
See page 223 for full abstracts

Poster #133
COMPARATIVE ANALYSIS OF BIOPSY PROVEN LYMPH NODE POSITIVE BLADDER CANCER TO THOSE WITH BIOPSY PROVEN NODE NEGATIVE DISEASE PRIOR TREATMENT
*Amy Lim, MD, PhD; Vikram Narayan, MD; Mohamed Seif, MD; Colin Dinney, MD and Neema Navai, MD
1MD Anderson Dept of Urology
Presented By: Amy Lim, MD, PhD

Poster #134
A COMPARISON OF DECIPHER RESULTS TO NEOADJUVANT CHEMOTHERAPY RESPONSE RATES IN PATIENTS WITH MUSCLE-INVASIVE BLADDER CANCER
*Heiko H. Yang, MD; Maxwell Meng; Terence Friedlander; Mohamed Alshalahfa; Felix Feng and Sima Porten
1UCSF Department of Urology; 2UCSF Department of Hematology-Oncology; 3UCSF Department of Radiation Oncology
Presented By: Heiko H. Yang, MD

Poster #135
COMPARATIVE ANALYSIS OF THREE VERSUS FOUR CYCLES OF NEOADJUVENT GEMCITABINE AND CISPLATIN FOR MUSCLE INVASIVE BLADDER CANCER
*Salim Cheriyan, MD; Charles Peyton; Mounsif Azizi; William Fulp; Michael Poch; Philippe Spiess; Wade Sexton and Scott Gilbert
1Moffitt Cancer Center
Presented By: Salim Cheriyan, MD

Poster #136
PATHOLOGICAL RESPONSE AT RADICAL CYSTECTOMY WITH CISPLATIN-BASED CHEMOTHERAPY: DOES VARIANT HISTOLOGY MATTER?
*Ryan W. Speir, MD; Adam Calaway, MD; Elhaam Bandali; Naveen Krishnan, MD; Clint Cary, MD; Timothy Masterson, MD; Tom Gardner, MD; Richard Bihrl, MD; Richard Foster, MD; Michael Koch, MD and Hristos Kaimakiotis, MD
1Mayo Clinic
Presented By: Ryan W. Speir, MD

Poster #137
SARCOPENIA AND RESPONSE TO NEOADJUVANT CHEMOTHERAPY FOR BLADDER CANCER
*Timothy D. Lyon, MD; Igor Frank, MD; Naoki Takahashi, MD; Stephen Boorjian, MD; Michael Moynagh, MD; Paras Shah, MD; Robert Tarrell, MD; John Cheville, MD; Boyd Viers, MD and Matthew Tollefson, MD
1Mayo Clinic
Presented By: Timothy D. Lyon, MD

Poster #138
NOVEL SIGNATURES PREDICT RESPONSE OF BLADDER CANCER TO CISPLATIN-BASED NEOADJUVANT CHEMOTHERAPY
*Patrick Hensley, MD; Matthew Purdom; Daheng He; Vincent DiCarlo; Natasha Kyprianou; Chi Wang and Andrew James
1Department of Urolog; University of Kentucky College of Medicine; 2Department of Pathology; University of Kentucky College of Medicine; 3Department of Cancer Biostatistics; University of Kentucky College of Medicine
Presented By: Patrick Hensley, MD
Poster #139
DISTINCT GENOMIC HETEROGENEITY DISTINGUISHES BETWEEN METASTATIC UPPER AND LOWER TRACT UROTHELIAL CARCINOMA

*Brian R. Winters, MD 1; Navonil De Sarker, PhD1; Sonali Arora, PhD1; Hamid Bolouri, PhD1; Funda Vakar-Lopez, MD1; Heather Cheng, MD1; Michael Schweizer, MD1; Evan Yu, MD1; Lori Kollath, BS1; Petros Grivas, MD, PhD1; Lisa McFerrin, PhD1; Bruce Montgomery, MD1; Jonathan Wright, MD, MS1; Hung-Ming Lam, PhD1 and Andrew Hsieh, MD1

1University of Washington
Presented By: Brian R. Winters, MD

Poster #140
DOWNSTAGING IN UPPER TRACT UROTHELIAL CARCINOMA AFTER NEOADYUVANT CHEMOTHERAPY AS A POSITIVE PREDICTOR OF OVERALL SURVIVAL

*Jorge A. Daza, MD1; Alberto Martini1; Matt Galsky2; Nikhil Waingankar1; Ketan Badani1 and John Sfakianos1

1Department of Urology, Icahn medical school; 2Department of Hematology and Medical Oncology; Mount Sinai Medical Center, New York, New York
Presented By: Jorge A. Daza, MD

Poster #141
GRADE OBTAINED ON URETEROSCOPIC BIOPSY FOR UPPER TRACT UROTHELIAL CARCINOMA - CAN WE RELY ON IT FOR FINAL TREATMENT DECISIONS?

*Timothy Clinton, MD, MPH1; Laura-Maria Krabbe, MD1; Stephen Ryan, MD2; Zachary Hamilton, MD2; Justin Matulay, MD2; Nirmish Singla, MD1; Solomon Woldu, MD1; Yuval Freifeld, MD1; Aditya Bagrodia, MD1; Ithaar Derweesh, MD2; Jay Raman, MD2; Jose Karam, MD2; Suren Matin, MD2; Christopher Wood, MD2 and Vitaly Margulis, MD1

1UT Southwestern; 2UC San Diego; 3Columbia; 4Penn State; 5MD Anderson
Presented By: Timothy Clinton, MD, MPH

Poster #142
FACTORS THAT DETERMINE PALLIATIVE CARE IN BLADDER CANCER PATIENTS

*Jesse Ory1; Michael Vaculik1; David M Golombos2; Chris Wallis3; Stephen B Williams4; Kara Matheson1; Jim C Hu5 and Padriac O’Malley1

1Dalhousie University; 2Stony Brook University Hospital; 3University of Toronto; 4University of Texas Medical Branch; 5Weil Cornell Medical College
Presented By: Jesse Ory

Poster #143
PROGNOSTIC UTILITY OF PD-L1 IN SQUAMOUS CELL CARCINOMA OF THE BLADDER

*Ramy Youssef, Yaacoub MBBCh, MD5; Michael Owyong, BA1; Melissa Huang, BS2; Yair Lotan3 and Payal Kapur1

1University of Miami School of Medicine; 2University of California, Irvine, School of Medicine; 3Urology, University of Texas Southwestern Medical Center, Dallas, Texas; 4Pathology, University of Texas Southwestern Medical Center, Dallas, Texas; 5Urology, University of California, Irvine, California
Presented By: Ramy Youssef Yaacoub, MBBCh, MD

Poster #144
LATE SOFT-TISSUE RECURRENCES FOLLOWING RADICAL CYSTECTOMY HAVE DISTINCT PROGNOSTIC AND MANAGEMENT CONSIDERATIONS

*Shawn Dason, MD, FRCSC1; Eugene K. Cha1; Emily A. Vertosick1; Cristina Falavolti1; Lucas W. Dean1; Victor A. McPherson1; Daniel D. Sjoberg1; Nicole E. Bentfante1; Timothy F. Donahue1; Guido Dalbagni1 and Bernard H. Bochner1

1Memorial Sloan Kettering Cancer Center, New York, NY
Presented By: Shawn Dason, MD, FRCSC
Poster #145
CIRCULATING TUMOR DNA ALTERATIONS IN ADVANCED UROTHELIAL CARCINOMA AND ASSOCIATION WITH CLINICAL OUTCOMES
*Guru Sonpavde, MD1; Gregory Pond, PhD2; Rebecca Nagy, MS, LGC3; Aly-Khan Lalani, MD2; Bishoy Faltas, MD4; Neeraj Agarwal, MD4; Sumati Gupta, MD6; Alexandra Drakaki, MD, PhD6; Ulka Vaishampayan, MD6; Jue Wang, MD4; Pedro Barata, MD5; Dharmesh Gopalakrishnan, MD10; Gurudatta Naik, MD11; Bradley McGregor, MD11; Richard Lanman, MD, PhD11 and Petros Grivas, MD, PhD12
1Dana-Farber Cancer Institute, Boston, MA; 2McMaster University, Hamilton, Ontario, Canada; 3Guardant Health, Inc.; 4Weill Cornell Medicine, New York, NY; 5University of Utah Huntsman Cancer Institute, Salt Lake City, Utah; 6UCLA Medical Center, Los Angeles, CA; 7Wayne State Karmanos Cancer Institute; 8University of Arizona Cancer Center; 9Tulane University; 10Roswell Park Cancer Institute; 11University of Alabama at Birmingham; 12University of Washington Cancer Center
Presented By: Guru Sonpavde, MD

Poster #146
INCIDENCE OF OCCULT NODAL METASTASES IN PATIENTS WITH COMPLETE RESPONSE OR DOWNSTAGING OF DISEASE AFTER NEOADJUVANT CHEMOTHERAPY FOR BLADDER CANCER
*Saum B. Ghodoussipour, MD1; Shane Pearce, MD1; Azadeh Nazemi1; Zhoobin Bateni1; Sumeet Bhanvadia, MD1; Hooman Djaladat, MD1; Anne Schuckman, MD1 and Siamak Daneshmand, MD1
1University of Southern California
Presented By: Saum B. Ghodoussipour, MD

Poster #147
TIMELY TREATMENT WITH RADICAL CYSTECTOMY AND INFUSION CHEMOTHERAPY AMONG 1,364 PATIENTS WITH MUSCLE-INVASIVE BLADDER CANCER
*Kim Danforth, ScD, MPH1; Margo Sidell, ScD, MSPH1; David Yi, MPH1; Tiffany Luong, MPH1; Ayae Yamamoto, SM1; Aniket Kawatkar, PhD2; Ronald Loo, MD2; Philip Kim, MD, MPH3; Helen Moon, MD4 and Stephen Williams, MD5
1Department of Research Evaluation, Kaiser Permanente Southern California, Pasadena, CA; 2Department of Urology, Southern California Permanente Medical Group, Downey, CA; 3Department of Urology, Southern California Permanente Medical Group, San Diego, CA; 4Department of Hematology Oncology, Southern California Permanente Medical Group, Riverside, CA; 5Department of Urology, Southern California Permanente Medical Group, Riverside, CA
Presented By: Kim Danforth, ScD, MPH

Poster #148
BIOMARKERS OF THE MAMMALIAN TARGET OF RAPAMYCIN PATHWAY: IMPLICATIONS ON AGGRESSIVENESS OF SQUAMOUS CELL CARCINOMA OF THE BLADDER
*Ramy Youssef Yaacoub, MBBCh, MD7; Michael Owyong, BA1; Melissa Huang, BS2; Yair Lotan3; Payal Kapur4; David DeGraff5; Joshua Warrick6 and Jay Raman7
1University of Miami, School of Medicine; 2University of California, Irvine, School of Medicine; 3Urology, University of Texas Southwestern medical center, Dallas, Texas; 4Pathology, University of Texas Southwestern medical center, Dallas, Texas; 5Department of Surgery, Division of Urology, Pennsylvania State University College of Medicine, PA; 6Department of Pathology, Pennsylvania State University Milton S. Hershey Medical Center, Hershey, PA; 7Urology, University of California, Irvine, California
Presented By: Ramy Youssef Yaacoub, MBBCh, MD

Poster #149
ACCURATE QUANTIFICATION OF RESIDUAL CANCER CELLS AT SURGICAL MARGIN REVEALS ASSOCIATION WITH CANCER RECURRENCE FOLLOWING ROBOT-ASSISTED RADICAL CYSTECTOMY
*Ahmed A. Hussein, MD1; Qiang Li1; Yingu Ma1; Paul May1; Youssef Ahmed1; Gissou Azabdaftari1; Lai Ping Wong1; Qiang Hu2; Wei Luo2; Victoria N. Cranwell1; Brittany L. Bunch2; Justen Kozlowski2; Prashant K. Singh3; Sean T. Glenn3; David Goodrich2; Wendy Huss3; Gary Smith3; Candac S. Johnson3; Liu Song3 and Kurshid Guru1
1Roswell Park Comprehensive Cancer Center, Dept. of Urology, Buffalo, NY; 2Roswell Park Comprehensive Cancer Center, Dept. of Pharmacology Therapeutics, Buffalo, NY; 3Roswell Park Comprehensive Cancer Center, Dept. of Biostatistics and Bioinformatics, Buffalo, NY; 4Roswell Park Comprehensive Cancer Center, Dept. of Pathology, Buffalo, NY; 5Roswell Park Comprehensive Cancer Center, Center for Personalized Medicine, Buffalo, NY; 6Roswell Park Comprehensive Cancer Center, Executive Office, Buffalo, NY
Presented By: Ahmed A. Hussein, MD
Poster #150
RISK OF INTRA-ABDOMINAL RECURRENCE OF UROTHELIAL CARCINOMA FOLLOWING EXTIRPATIVE SURGERY BASED ON DISEASE STAGE AND OPERATIVE APPROACH: A POPULATION-BASED STUDY
Matthew B. Clements, MD, MS; Tracey Krupski and Stephen Culp
University of Virginia
Presented By: Matthew B. Clements, MD, MS

Poster #151
POPULATION-BASED SURVIVAL OUTCOMES AND TREATMENT COSTS COMPARING RADICAL CYSTECTOMY WITH TRIMODAL THERAPY FOR PATIENTS DIAGNOSED WITH LOCALIZED MUSCLE-INVASIVE BLADDER CANCER
*Mohamed Danny Ray-Zack, MBBS; Yong Shan; Preston Kerr; Christopher Kosarek; Hogan Hudgins; Usama Jazzar; Sapna Kaul; Ashish Karmat; Douglas Tyler; Todd Swanson; Hemalkumar Mehta and Stephen Williams
UTMB; MD Anderson Cancer Center
Presented By: Mohamed Danny Ray-Zack, MBBS

Poster #152
A MULTI-INSTITUTIONAL INVESTIGATION OF THE INFLUENCE OF MICROPAPILLARY UROTHELIAL CARCINOMA VARIANT ON PROGNOSIS AFTER RADICAL CYSTECTOMY
*Anirban P. Mitra, MD, PhD; Adrian S. Fairey; Ella C. Skinner; Stephen A. Boorjian; Igor Frank; Mark P. Schoenberg; Trinity J. Bivalacqua; M. Eric Hyndman; Adam C. Reese; Gary D. Steinberg; Michael C. Large; Harman M. Bruins and Siamak Daneshmand
1Institute of Urology, University of Southern California, Los Angeles, CA; 2Division of Urology, Department of Surgery, University of Alberta, Edmonton, AB; 3Department of Urology, Stanford University, Stanford, CA; 4Department of Urology, Mayo Clinic, Rochester, MN; 5Department of Urology, Albert Einstein College of Medicine and Montefiore Medical Center, Bronx, NY; 6The James Buchanan Brady Urological Institute, Johns Hopkins University, Baltimore, MD; 7Southern Alberta Institute of Urology, Calgary, AB; 8Department of Urology, Temple University, Philadelphia, PA; 9Section of Urology, Department of Surgery, University of Chicago, Chicago, IL; 10Urology of Indiana, Indianapolis, IN; 11Department of Urology, Radboud University Medical Centre, Nijmegen, the Netherlands
Presented By: Anirban P. Mitra, MD, PhD

Poster #153
DEVELOPMENT AND VALIDATION OF AN IMPROVED PATHOLOGICAL NODAL STAGING SYSTEM FOR UROTHELIAL CARCINOMA OF THE BLADDE
*Devin Patel, MD; Michael Luu, MPH; Zachary Zumsteg, MD and Timothy Daskivich, MD
Cedars-Sinai
Presented By: Devin Patel, MD

Poster #154
MOLECULAR CHARACTERIZATION OF NEUROENDOCRINE-LIKE BLADDER CANCER
*Trinity J. Bivalacqua, MD, PhD; José Batista da Costa; Ewan Gibb; Yang Liu; David Miyamoto; Htoo Zarni Oo; Mohammed Alshalahfa; Elai Davicioni; Jonathan Wright; Marc Dall’Era; James Douglas; Joost Boormans; Michiel Van der Heijden; Bas van Rijn; Shilpa Gupta; Roland Seiler; Kent Mouw; Paari Murugan; Ladan Fazli; Seong Ra; Badrinath Konety; Siamak Daneshmand; Omar Mian; Jason Efstathiou; Yair Lotan and Peter Black
1Johns Hopkins Medical Institution, Baltimore, USA; 2Department of Urologic Sciences, University of British Columbia; 3CHU Henri Mondor, Créteil, Assistance publique – Hôpitaux de Paris; 4GenomeDx Biosciences, Inc., Vancouver, British Columbia, Canada; 5Massachusetts General Hospital, Boston, USA; 6Department of Urology, University of Washington School of Medicine, Seattle, Washington, USA; 7UC Davis Comprehensive Cancer Center, Sacramento, CA, USA; 8Department of Urology, University Hospital of Southampton, Hampshire, UK; 9Erasmus University Medical Center, Rotterdam, Netherlands; 10Netherlands Cancer Institute, Amsterdam, Netherlands; 11Department of Urology, University of Minnesota, USA; 12Department of Urology, University of Bern, Bern, Switzerland; 13Dana-Farber Cancer Institute, Boston, USA; 14San Diego Pathologist Medical group, San Diego, USA; 15Urology Department, University of Southern California, Los Angeles, California, USA; 16Cleveland Clinic, Cleveland, Ohio, USA; 17UT Southwestern Medical Center, Dallas, USA
Presented By: Trinity J. Bivalacqua, MD, PhD
Poster Session II – Summary

**Poster #155**
THE COST TO MEDICARE OF BLADDER CANCER SURVIVORSHIP
*Wei Phin Tan, MD1; Gregory Barton1; Frank Sloan1; Arseniy Yashkin1; Igor Akushevich1 and Brant Inman1
'Duke University
Presented By: Wei Phin Tan, MD

**Poster #156**
TUMOR-PRODUCED HYALURONAN SUPPORTS EXPANSION OF MYELOID DERIVED SUPPRESSOR CELLS AND PROMOTES DEVELOPMENT OF PD-L1+ MACROPHAGES IN BLADDER CANCER MICROENVIRONMENT
*Paul L. Crispen, MD1; Paul Dominguez Gutierrez1 and Sergei Kusmartsev1
'University of Florida
Presented By: Paul L. Crispen, MD

**Poster #157**
PAN CARCINOMA ARTIFICIAL NEURAL NETWORK ALGORITHM FOR PREDICTION OF HIGH DOCETAXEL SENSITIVITY IN UROTHELIAL CARCINOMA
*Thomas Sanford, MD1; Reema Railkar1; Stephanie Harmon1 and Piyush Agarwal1
'NCI
Presented By: Thomas Sanford, MD

**Poster #158**
USING METAGENOMICS TO IDENTIFY PROGNOSTIC BIOMARKERS THAT INFLUENCE CELLULAR NETWORKS IN BLADDER CANCER
*Anirban P. Mitra, MD, PhD1; Sheelatal A. Mitra2 and Siamak Daneshmand1
1Institute of Urology, University of Southern California, Los Angeles, CA; 2Department of Pathology and Laboratory Medicine, Children’s Hospital Los Angeles, Los Angeles, CA
Presented By: Anirban P. Mitra, MD, PhD

**Poster #159**
PRESENCE OF PIK3CA MUTATIONS IN ARID1A WILD TYPE, HIGH-GRADE BLADDER CANCER IS ASSOCIATED WITH REDUCED INCIDENCE OF RECURRENCE AFTER INTRAVESICAL BACILLUS CALMETTE-GUERIN THERAPY
*Nima Almassi, MD1; Victor McPherson1; Shawn Dason1; Aditya Bagrodia1; Ahmet Zehir1; Eugene Cha1; Mike Berger2; Niklaus Schultz2; Guido Dalbagni2; David Solit4;5; Gopa Iyer4; Hikmat Al-Ahmadie1; Bernard Bochner1 and Eugene Pietzak1
1Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center; 2Department of Urology, University of Texas Southwestern Medical Center; 3Department of Pathology, Memorial Sloan Kettering Cancer Center; 4Human Oncology and Pathogenesis Program, Memorial Sloan Kettering Cancer Center; 5Genitourinary Oncology Service, Department of Medicine, Memorial Sloan Kettering Cancer Center
Presented By: Nima Almassi, MD

**Poster #160**
FAMILIAL BLADDER CANCER: INCIDENCE AND GERMLINE MUTATION PREVALENCE
*Guru Sonpavde, MD1; Amin Nassar, MD2; Samantha Stokes, MPA1; Nieves Martinez-Chanza, MD1; Vivek Kumar, MD2; Pier Nuzzo, MD1; David Kwiatkowski, MD, PhD1; Judy Garber, MD1; Catherine Curran, BS1; Matthew Mossanen, MD2; Mark Preston, MD, MPH2; Kent Mouw, MD, PhD1; Toni Choueiri, MD1 and Huma Rana, MD1
1Dana-Farber Cancer Institute, Boston, MA; 2Brigham and Women’s Hospital, Boston, MA
Presented By: Guru Sonpavde, MD

**Poster #161**
COMPREHENSIVE RADIOGENOMIC ANALYSIS OF QUALITATIVE AND QUANTITATIVE FEATURES OF CROSS-SECTIONAL IMAGING IN THE TCGA PROJECT IN MIBC
*Seth P. Lerner, MD1; Eric Huang2; Ersan Altun3; Tharakeswara Bathala4; Vinay Duddalwar5; Juan Ibarra1; Fabiano Lucchesi2; Steven Kennish1; Valdair Francisco Muglia1; Stephen Thomas1; Raghu Vikram1; Hebert Vargas Alvarez10; Brenda Fevrier-Sullivan1; Justin Kirby2; Carl Jaffe11 and John Freymann11
1Baylor College of Medicine; 2NIH/NCI; 3University of North Carolina; 4MD Anderson Cancer Center; 5Norris Comprehensive Cancer Center at USC Keck Medical Center; 6Barretos Cancer Hospital; 7University of Sheffield; 8Ribeirao Preto School of Medicine; 9University of Chicago; 10Memorial-Sloan-Kettering Cancer Center; 11TCIA
Presented By: Seth P. Lerner, MD
Poster #162
TRENDS AND MORBIDITY FOR MINIMALLY INVASIVE VERSUS OPEN CYTOREDUCTIVE NEPHRECTOMY IN THE MANAGEMENT OF METASTATIC RENAL CELL CARCINOMA
*Dimitar V. Zlatev, MD, MS; Manuel Ozambela, MD MS; Ye Wang, PhD; Daniel Pucheril, MD; Melissa Huynh, MD; Alice Yu, MD; Benjamin Chung, MD MS and Steven Chang, MD MS*
1Brigham and Women’s Hospital, Division of Urologic Surgery, Boston, MA, USA; 2Brigham and Women’s Hospital, Center for Surgery and Public Health, Boston, MA, USA; 3Stanford University Medical Center, Department of Urology, Stanford, CA, USA
Presented By: Dimitar V. Zlatev, MD, MS

Poster #163
THE ARROWHEAD SIGN (AS): A NOVEL, REPRODUCIBLE RADIOGRAPHIC INDICATOR OF INTRAMUSCULAR VENOUS BRANCH INVASION (PT3A) IN PATIENTS WITH RENAL CELL CARCINOMA (RCC)
*Brian Kadow, MD; Alexander Kutikov; Laura Levin; Jordan Anaokar; Tianyu Li; Rosalia Viterbo; David Chen; Marc Smaldone; Robert Uzzo; Richard Greenberg and Rosaleen Parsons*
1Division of Urologic Oncology, Fox Chase Cancer Center, Philadelphia PA; 2Department of Radiology, Fox Chase Cancer Center, Philadelphia PA; 3Department of Biostatistics, Fox Chase Cancer Center, Philadelphia PA
Presented By: Brian Kadow, MD

Poster #164
CHARACTERISTICS OF LONG-TERM SURVIVORS WITH SARCOMATOID RENAL CELL CARCINOMA
*Kyle A. Blum, MD, MSc; Renzo G. DiNatale; Andrew W. Silagy; Julian Marcon; Sounak Gupta; Paul Russo; Satish K. Tickoo and A. Ari Hakimi*
1Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center; 2Department of Pathology, Memorial Sloan Kettering Cancer Center
Presented By: Kyle A. Blum, MD, MSc

Poster #165
PRE-OPERATIVE SITES OF METASTASES IMPACTS SURVIVAL AFTER CYTOREDUCTIVE NEPHRECTOMY IN PATIENTS WITH SARCOMATOID RCC
*Andrew W. Silagy; Kyle Blum; Roy Mano; Sounak Gupta; Julian Marcon; Renzo Dinatale; Satish Tickoo; Jonathan Coleman; Paul Russo and Ari Hakimi*
1Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center
Presented By: Andrew W. Silagy

Poster #166
CYTOREDUCTIVE NEPHRECTOMY FOR NON-CLEAR CELL RCC: NLR PREDICTS SURVIVAL OUTCOMES
*Andrew W. Silagy; Yingbei Chen; Roy Mano; Renzo Dinatale; Kyle Blum; Julian Marcon; Alejandro Sanchez; Jonathan Coleman; Paul Russo and Ari Hakimi*
1Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center
Presented By: Andrew W. Silagy

Poster #167
A MULTICENTER INTERNATIONAL EXPERIENCE WITH NEPHRON-SPARING SURGERY FOR PATIENTS WITH RENAL MASSES AND PREOPERATIVELY KNOWN VENOUS TUMOR THROMBUS
*Firas G. Petros, MD; Justin Nguyen; Steven Babitz; Michael Sourial; Masatoshi Eto; John Anema; Jose Karam; Christopher Wood; Brian Lane; Geoffrey Box and Surena Matin*
1Department of Urology, The University of Texas MD Anderson Cancer Center, Houston, Texas; 2Spectrum Health Medical Group, Spectrum Health Cancer Center, Grand Rapids, Michigan; 3Department of Urology, The Ohio State University Wexner Medical Center, Columbus, Ohio; 4Department of Urology, Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan.
Presented By: Firas G. Petros, MD
Poster #168
TIMING AND DISTRIBUTION OF EARLY RENAL CELL CARCINOMA METASTASES STRATIFIED BY PATHOLOGIC NODAL STATUS IN M0 PATIENTS AT TIME OF NEPHRECTOMY
*Tanner Miest, MD, PhD1; David Yang, MD2; Theordora Potretzke, MD2; Bimal Bhindi, MD1; Christine Lohse3; John Cheville, MD4; Bernard King, MD5; Bradley Leibovich, MD, FACS1; R. Houston Thompson, MD1 and Aaron Potretzke, MD1
1Mayo Clinic Department of Urology; 2Mayo Clinic Department of Radiology; 3Mayo Clinic Division of Biomedical Statistics and Informatics; 4Mayo Clinic Department of Pathology
Presented By: Tanner Miest, MD, PhD

Poster #169
UNDERSTANDING THE EFFECTIVENESS OF RPLND IN NODE ONLY RECURRENCES AFTER NEPHRECTOMY FOR RCC
*Marcelo Panizzutti Barboza, MD1; Ryan Speir, MD1; Adam Calaway, MD1; Hristos Kaimakliotis, MD1; Timothy Masterson, MD1; Richard Foster, MD1; Ronald Boris, MD1 and Clint Cary, MD1
1IU School of Medicine, Department of Urology
Presented By: Marcelo Panizzutti Barboza, MD

Poster #170
A HIGH-THROUGHPUT BLOOD BASED PLATFORM FOR ASSESSMENT OF PD-L1/PD-1 POSITIVITY IN PATIENTS WITH METASTATIC CLEAR CELL RENAL CELL CARCINOMA
*Paras Shah, MD1; Mario Cepeda, PhD1; Vidhu Joshi, BS1; Bradley Leibovich, MD, FACS1; Stephen Boorjian, MD1 and Brian Costello, MD1
1Mayo Clinic
Presented By: Paras Shah, MD

Poster #171
SARCOPENIA IS INDEPENDENTLY ASSOCIATED WITH DECREASED OVERALL SURVIVAL AFTER SURGERY FOR INFERIOR VENA CAVA TUMOR THROMBUS PATIENTS
*Milton A’Keem Williams1; Amir Khan1; Dattatraya Patil, MBBS, MPH2; Reza Nabavizadeh, MD2; Sarah Psutka, MD, MSCR3; Aarti Sekhar, MD4; Kenneth Ogan, MD2; Mehmet Bilen, MD2 and Viraj Master, MD2
1Department of Urology, Emory University School of Medicine; 2Department of Urology, Emory University School of Medicine, Atlanta, GA, USA; 3Department of Urology, University of Washington School of Medicine, Seattle, WA, USA; 4Department of Radiology, Emory University School of Medicine, Atlanta, GA, USA; 5Department of Hematology and Medical Oncology, Emory University School of Medicine, Atlanta, GA, USA
Presented By: Milton A’Keem Williams

Poster #172
THREE DIMENSIONAL VOLUMETRICS OF INFERIOR VENA CAVA TUMOR THROMBUS PREDICTS SURGICAL OUTCOMES
*Matthew Winter, BMBS (Hons), FRACS1; Alessandro Tafuru1; Marielena Rivasz; Giovanni Cacciamani; Shane Pearce1; Aliasger Shakir1; Luis Medina1; Akbar Ashrafi1; Michele Gallucci1; Walter Artabani1; Rene Solelo1; Monish Aron1; Mihir Desai1; Vinay Duddalwar1 and Inderbir Gill1
1University of Southern California, Institute of Urology
Presented By: Matthew Winter, BMBS (Hons), FRACS

Poster #173
USE OF AUTOMATION AND COMPUTER VISION IN DIFFERENTIATING BENIGN RENAL ONCOCYTOMA FROM CHROMOPHOBE RENAL CELL CARCINOMA: PROOF OF CONCEPT
*Amir Baghdadi, PhD1,2,3; Ahmed A. Hussein1; Lora A. Cauvuto2; Eric Kauffman1,4,5 and Khurshid A. Guru1
1Roswell Park Comprehensive Cancer Center, Dept. of Urology, Buffalo, NY; 2University at Buffalo, Dept. of Industrial and Systems Eng., Buffalo, NY; 3University at Buffalo, Dept. of Mechanical and Aerospace Eng., Buffalo, NY; 4University at Buffalo, Dept. of Urology, Buffalo, NY; 5Roswell Park Comprehensive Cancer Center, Dept. of Cancer Genetics, Buffalo, NY
Presented By: Amir Baghdadi, PhD
**Poster #174**
**CLONALITY ESTIMATES OF ONCOGENIC EVENTS TO IDENTIFY CLEAR-CELL RENAL CELL CARCINOMA SUBTYPES WITH DIFFERING CLINICAL OUTCOMES**
*Renzo Giuseppe Di Natale, MD 1; Edward Reznik, PhD 1; Angela Yoo, BSc 2; Julian Marcon, MD 1; Andrew Silagy, MD 1; Roy Mano, MD 1; Kyle Blum, MD 1; Jonathan Coleman, MD 1; Paul Russo, MD 1 and Ari Hakimi, MD 1*
1Urology Department, Memorial Sloan Kettering Cancer Center, New York, USA; 2Urology Department, SUNY Downstate Medical Center
Presented By: Renzo Giuseppe Di Natale, MD

**Poster #175**
**ONE IN THE SAME? THE HISTOPATHOLOGICAL DIFFERENCES IN RADICAL VS DONOR NEPHRECTOMY SPECIMENS**
*Deepak Kumar Pruthi, MD, MSCI-TS, FRCSC 1; Vivian Lu, MD 2; Ian Gibson, MBBS 2; Johnathan Gelfond, MD, PhD 1 and Tom McGregor, MD, FRCSC 3*
1University of Texas Health San Antonio; 2University of Manitoba; 3Queen’s University
Presented By: Deepak Kumar Pruthi, MD, MSCI-TS, FRCSC

**Poster #176**
**PROGNOSTIC VALUE OF LOSS OF CHROMOSOME 10Q IN LOCALIZED RENAL CELL CARCINOMA**
*Aydin Pooli, MD 1; Cedric Lebacle, MD 1,2; Nils Kroeger, MD 3; Izak Faiena, MD 1; Sandy T Liu, MD 4; Karim Chamiie, MD 1; Arie S Beldegrun, MD 1; Alexandra Drakaki, MD 1,4 and Allan Pantuck, MD 1*
1Institute of Urologic Oncology, Department of Urology, David Geffen School of Medicine at UCLA, Los Angeles, CA; 2Department of Urology, University Hospital Bicetre, APHP, University Paris-Saclay, Le Kremlin Bicetre, France; 3Department of Urology, University Medicine Greifswald, Germany; 4Department of Hematology and Oncology, David Geffen School of Medicine at University of California, Los Angeles, CA
Presented By: Aydin Pooli, MD

**Poster #177**
**A MACHINE LEARNING ALGORITHM IDENTIFIES TRANSCRIPTOMIC FEATURES OF SARCOMATOID RENAL TUMORS**
*Heinric Williams, MD 3; Manoharan Manoharan1; Mridul Chaudhary 1; Ravi Gupta 1; Rohit Gupta 1; Amit Chaudhuri 1 and Raghu Metpally 2*
1MedGenome; 2Weis Center for Research; 3Geisinger Medical Center
Presented By: Heinric Williams, MD

**Poster #178**
**PRIMARY RENAL CELL CARCINOMA XENOGRAFTS GROWN ON AVIAN CHORIOALLANTOIC MEMBRANES FOR PRECLINICAL CHARACTERIZATION OF ONCOLYTIC VIROTHERAPY: PROOF-OF-PRINCIPLE FOR HIGH-THROUGHPUT THERAPEUTIC SCREENING**
*Tanner Miest, MD, PhD 1; Yaroslav Fedyshyn 1; Pierce Reynolds 1; Eva Galanis, MD 2 and Bradley Leibovich, MD, FACS 1*
1Mayo Clinic Department of Urology; 2Mayo Clinic Department of Molecular Medicine
Presented By: Tanner Miest, MD, PhD

**Poster #179**
**CD-70 BLOCKADE AS A NOVEL IMMUNOTHERAPY FOR THE TREATMENT OF CLEAR-CELL RENAL CELL CARCINOMA**
*Paras Shah, MD 1; Mario Cepeda, PhD 1; Vidhu Joshi, BS 1; Stephen Boorjian, MD 1; Brian Costello, MD 1; John Cheville, MD 1; R. Houston Thompson, MD 1 and Bradley Leibovich, MD, FACS 1*
1Mayo Clinic
Presented By: Paras Shah, MD

**Poster #180**
**THREE-YEAR RENAL FUNCTION OUTCOMES OF PATIENTS ENROLLED IN THE INTRAVENOUS MANNITOL VERSUS PLACEBO DURING PARTIAL NEPHRECTOMY RANDOMIZED CONTROLLED TRIAL**
*Nathan C. Wong, MD 1; Gregory Chesnut 1; Ricardo G. Alvim 1; Paul Russo 1; A. Ari Hakimi 1 and Jonathan A. Coleman 1*
1Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY, USA
Presented By: Nathan C. Wong, MD
Poster #181
ELEVATED C-REACTIVE PROTEIN IS INDEPENDENTLY ASSOCIATED WITH PROGRESSIVE RENAL FUNCTIONAL DECLINE AFTER SURGERY FOR RENAL CELL CARCINOMA: RESULTS OF AN INTERNATIONAL COHORT STUDY
*Brittney Cotta, MD; Kazutaka Saito, MD; Margaret Meagher, BS; Dattatraya Patil, MBBS, MPH; Ahmed Eldefrawy, MD; Yosuke Yosuda, MD, PhD; Aaron Bradshaw, BS; Stephen Ryan, MD; David Anyakora; Addison Yee; Juliana Alksne; Fang Wan; Viraj Master, MD, PhD; Yasuhisa Fujii, MD, PhD and Ithaar Derweesh, MD
1UC San Diego School of Medicine; 2Tokyo Medical and Dental University; 3Emory University School of Medicine
Presented By: Brittney Cotta, MD

Poster #182
COMPARISON OF LONG-TERM SYMPTOMS BETWEEN OPEN AND MINIMALLY INVASIVE NEPHRECTOMIES
*Jaime O. Herrera-Caceres, MD; Hanan Goldberg; Dixon T.S. Woon; Thenappan Chandrasekar; Omar Alhunaidiv; Zachary Klaasen; Michael Jewett; Neil Fleshner; Robert Hamilton; and Antonio Finelli
1Princess Margaret Cancer Centre, University of Toronto, University Health Network
Presented By: Jaime O. Herrera-Caceres, MD

Poster #183
THE IMPACT OF INSTITUTIONAL AND INDIVIDUAL EXPERIENCE ON COMPLICATIONS AND NON-DIAGNOSTIC RATES FOLLOWING CORE RENAL MASS BIOPSY
*Natasza Posieliski, MD; Anthony Bui; Shane Wells, MD; Sara Best, MD; Lori Mankowski Gettle, MD, MBA; Timothy Ziemlewicz, MD; Meghan Lubner, MD; J. Louis Hinshaw, MD; Fred Lee Jr., MD; Glenn Allen, MPH; Stephen Nakada, MD FACS FRCS and E. Jason Abel, MD FACS
1University of Wisconsin
Presented By: Natasza Posieliski, MD

Poster #184
PERCUTANEOUS BIOPSY FOR UPPER TRACT UROTHELIAL CARCINOMA – SAFETY AND DIAGNOSTIC ACCURACY
*Tanner Miest, MD, PhD; Jason Joseph, MD; Amir Toussi, MD; Theodora Potretzke, MD; Thomas Atwell, MD; Bradley Leibovich, MD, FACS; Matthew Tolleson, MD and Aaron Potretzke, MD
1Mayo Clinic Department of Urology; 2Mayo Clinic Department of Radiology
Presented By: Tanner Miest, MD, PhD

Poster #185
ASSOCIATION OF ELEVATED C-REACTIVE PROTEIN WITH ONCOLOGIC OUTCOMES IN RENAL CELL CARCINOMA: A MULTICENTER ANALYSIS
*Sunil H. Patel, MD, MA; Margaret Meagher, BS; Kazutaka Saito, MD; Dattatraya Patil, MD; Ahmet Bindayi, MD; Ahmed Eldefrawy, MD; Stephen Ryan, MD; Brittney Cotta, MD; Kendrick Yim, BS; Ryan Nasser, BS; Zach Hamilton, MD; Yosuke Yasuda; Yasuhisa Fujii; Ithaar Derweesh, MD and Viraj Master, MD
1University of California San Diego; 2Tokyo Medical and Dental University; 3Emory University; 4University of California, San Diego
Presented By: Sunil H. Patel, MD, MA

Poster #186
ENHANCED RECOVERY AFTER RENAL SURGERY: INITIAL RESULTS
*Daniel Sverdloff, MD; Rachel Smith; Kanwaldeep Williams; Paul Feustel; Michael Sverdloff; Donald Lee; Demetri Podolski; Igor Galay and Ronald Kaufman
1Albany Medical Center
Presented By: Daniel Sverdloff, MD

Poster #187
HISTOLOGIC VARIANTS OF UPPER TRACT UROTHELIAL CARCINOMA INFLUENCE SURVIVAL AFTER RADICAL NEPHROURETERECTOMY
*Shane M. Pearce, MD; Daniel Oberlin; Monish Aron; Inderbir Gill; Mihir Desai; Anne Schuckman; Siamak Daneshmand and Hooman Djaladat
1USC Institute of Urology, Los Angeles, CA; 2Golden Gate Urology, San Francisco, CA
Presented By: Shane M. Pearce, MD
Poster #188
PREDICTING SIGNIFICANT ESTIMATED GLOMERULAR FILTRATION RATE (EGFR) DECLINE FOLLOWING RENAL UNIT REMOVAL TO AID IN THE CHOICE BETWEEN RADICAL (RN) AND PARTIAL NEPHRECTOMY (PN)
*Andrew McIntosh, MD; Robert Uzzo, MD, FACS; Brian Egleston, PhD; David Chen, MD, FACS; Richard Greenberg, MD, FACS; Rosalia Viterbo, MD, FACS; Shreyas Joshi, MD; Daniel Parker, MD; Mohammed Haseebuddin, MD; Marc Smaldone, MD, MSHP, FACS and Alexander Kutikov, MD, FACS
Fox Chase Cancer Center; Temple Health
Presented By: Andrew McIntosh, MD

Poster #189
PREDICTORS OF RENAL TRANSPLANTATION AMONG PATIENTS RENDERED SURGICALLY ANEPHRIC FOR RENAL CANCER
*Vidit Sharma, MD; Timothy C Boswell, MD; Mary E Westerman, MD; R. Houston Thompson, MD; Bradley C Leibovich, MD, FACS and Stephen A Boorjian, MD
Mayo Clinic Urology
Presented By: Vidit Sharma, MD

Poster #190
ASSOCIATION OF PARTIAL VERSUS RADICAL NEPHRECTOMY WITH SUBSEQUENT HYPERTENSION RISK FOLLOWING RENAL TUMOR RESECTION
*Paras Shah, MD; Bradley Leibovich, MD, FACS; Holly Van Houten, MD; Tim Lyon, MD; Meghan Knoledler; Lindsey Sangaralingham; Xiaoli Yao, PhD; Andrea Kattah, MD; R. Houston Thompson, MD; Nilay Shah, PhD and Stephen Boorjian, MD
Mayo Clinic
Presented By: Paras Shah, MD

Poster #191
DO POSITIVE MARGINS FOR PARTIAL NEPHRECTOMY MATTER IN CLINICAL T1A RENAL CELL CARCINOMA? A MULTICENTER ANALYSIS
Ahmed Eldefrawy, DM; Umberto Capitanio; Shreyas Joshi; Alessandro Larcher; Stephen Ryan; Margaret Meaghar; Aaron Bradshaw; Britney Cotta; Addison Yee; Fang Wan; Francesco Montorsi; Robert Uzzo and Ithaar Derweesh
University of California San Diego; Ospadele San Rafaele; Foc Chase Cancer Center
Presented By: Ahmed Eldefrawy, DM

Poster #192
A STATEWIDE QUALITY IMPROVEMENT COLLABORATIVE’S ADHERENCE TO 2017 AUA GUIDELINES REGARDING INITIAL EVALUATION OF SMALL RENAL MASSES
*Alon Z. Weizer, MD, MS; Craig Rogers; Tae Kim; Ji Qi; Sanjeev Kaul; Michael Traver; Tony Pinson and Brian Lane
Department of Urology, University of Michigan, Ann Arbor, MI; Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI; Comprehensive Urology, Royal Oak, MI; Western Michigan Urological Associates, Holland, MI; Pinson Urology, Jackson, MI; Department of Urology, Spectrum Health Medical Group, Grand Rapids, MI for the Michigan Urological Surgery Improvement Collaborative, Ann Arbor, MI
Presented By: Alon Z. Weizer, MD, MS

Poster #193
USE OF SURVEILLANCE VERSUS ACTIVE TREATMENT FOR RENAL MASSES < 7 CM: RESULTS FROM THE MUSIC KIDNEY REGIONAL COLLABORATIVE
*Alon Z. Weizer, MD, MS; Craig Rogers; Tae Kim; Ji Qi; Sanjeev Kaul; Edward Schervish; Benjamin Stockton and Brian Lane
Department of Urology, University of Michigan, Ann Arbor, MI; Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI; Department of Urology, University of Michigan; Comprehensive Urology, Royal Oak, MI; Michigan Institute of Urology, Detroit, MI; Lakeside Urology, St. Joseph, MI; Department of Urology, Spectrum Health Medical Group, Grand Rapids, MI for the Michigan Urological Surgery Improvement Collaborative, Ann Arbor, MI
Presented By: Alon Z. Weizer, MD, MS
**Poster #194**

**COMPARATIVE ANALYSIS OF MINIMALLY INVASIVE RADICAL AND PARTIAL NEPHRECTOMY FOR CLINICAL T2 RENAL MASS: ANALYSIS OF THE ROBOTIC SURGERY FOR LARGE RENAL MASS (ROSULA) GROUP**

*Ahmet Bindayi, MD; Ricardo Autorino; Francesco Porpiglia; Giuseppe Simone; Juan D. Garisto; Andrea Minervini; Daniel Eun; Giuseppe Quarto; James Porter; Koon Rha; Alexander Mottrie; Wesley M. White; Luigi Schips; Bo Yang; Riccardo Bertolo; Kenneth Jacobsohn; Alexander Kutikov; Ben Challacombe; Matteo Ferro; Jay Sulek; Umberto Capitanio; Uzoma Anele; Gabriele Tuderti; Manuela Constantini; Stephen Ryan; Andrea Mari; Marco Carini; Aryeh Keehn; Giuseppe Quarto; Michael Liao; Kidon Chang; Alessandro Larcher; Geert De Naeyer; Ottavio De Cobelli; Francesco Berardinelli; Chao Zhang; Peter Langenstroer; David Chen; Nicolo De Luyk; Chandru P. Sundaram; Lance J. Hampton; Robert J. Stein; Georges Pascal-Haber; Michele Gallucci; Prokar Dasgupta; Francesco Montorsi; Robert G. Uzzo; Jihad Kaouk and Ithaar Derweesh

1 Department of Urology, UCSD Health System, La Jolla, CA, USA; 2 Division of Urology, VCU Health, Richmond, VA, USA; 3 Dept of Urology, San Luigi Gonzaga Hospital, University of Turin, Orbassano, Italy; 4 Dept of Urology, “Regina Elena” National Cancer Institute, Rome, Italy; 5 Dept of Urology, Cleveland Clinic, Cleveland, OH, USA; 6 Department of Urology, University of Florence, Careggi Hospital, Firenze, Italy; 7 Dept. of Urology, Lewis Katz School of Medicine at Temple University, Philadelphia, PA, USA; 8 Division of Urology, Pascale Foundation, Institute for Cancer Research and Care, Napoli, Italy; 9 Swedish Urology Group, Seattle, WA, USA; 10 Urological Science Institute, Yonsei University College of Medicine, Seoul, Korea; 11 Department of Urology, OLV Hospital, Aalst, Belgium; 12 Dept of Urology, University of Tennessee Medical Center, Knoxville, TN, USA; 13 Department of Urology, Anunziata Hospital, Dept. of Urology, Chieti, Italy; 14 Dept. of Urology, Changhi Hospital, Shanghai, China; 15 Dept. of Urology, Medical College Wisconsin, Milwaukee, WA, USA; 16 Department of Urology, Fox Chase Cancer Center, Philadelphia, PA, USA; 17 Dept. of Urology, Guy’s Hospital, King’s College, London, UK; 18 Dept of Urology, IEO, Milan, Italy; 19 Dept of Urology, Indiana University, Indianapolis, IN, USA; 20 Unit of Urology, Division of Oncology, Urological Research Institute, IRCCS Ospedale San Raffaele, Milan, Italy

Presented By: Ahmet Bindayi, MD

**Poster #195**

**IRON SUPPLEMENTATION AND ANEMIA HAVE INDEPENDENT PROGNOSTIC VALUE IN LOCALIZED RENAL CELL CARCINOMA PATIENTS UNDERGOING NEPHRECTOMY**

*Ahmed A. Hussein, MD; Michelle Raduluff; Ramkishen Narayanan; Abid Khairy; Kristopher Atwood; Elena Pop; Tashionna White; Benjamin Balderman; Gaybrielle James; Nitika Sharma; Christopher Greene and Eric Kauffman

1 Roswell Park Comprehensive Cancer Center, Dept. of Urology, Buffalo, NY; 2 Roswell Park Comprehensive Cancer Center, Dept. of Biostatistics, Buffalo, NY; 3 Roswell Park Comprehensive Cancer Center, Dept. of Clinical Research Services, Buffalo, NY

Presented By: Ahmed A. Hussein, MD

**Poster #196**

**GROWTH RATES OF BIRT-HOGG-DUBÉ-ASSOCIATED RENAL TUMORS**

*Mark W. Ball, MD; Rabindra Gautam; Laura Schmidt and W. Marston Linehan

1 National Cancer Institute, Bethesda, MD

Presented By: Mark W. Ball, MD

**Poster #197**

**DOES INCREASING TIME TO SURGERY AFFECT SURVIVAL IN STAGE 1 RENAL CELL CARCINOMA? AN ANALYSIS OF THE NATIONAL CANCER DATABASE**

*Brittney Cotta, MD; Stephen Ryan, MD; Ahmed Eldefrawy, MD; Reith Sarkar, BS; Aaron Bradshaw, BS; Margaret Meagher, BS; Zachary Hamilton, MD; James Murphy, MD and Ithaar Derweesh

1 UC San Diego School of Medicine

Presented By: Brittney Cotta, MD

**Poster #198**

**SPONTANEOUS REGRESSION OF RENAL CELL CARCINOMA TUMORS ON ACTIVE SURVEILLANCE.**

*Shervin Badkhshan, MD; Ahmed Aly; Arun Menon; Tashionna White; Gaybrielle James; Paul May; Qiang Li; Tom Schwaab and Eric Kauffman

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Presented By: Shervin Badkhshan, MD
Poster #200

GENOMIC PROFILING OF METASTATIC CASTRATION-RESISTANT PROSTATE CANCER (MCRPC) PATIENTS FOR THE EVALUATION OF RUCAPARIB: NEXT-GENERATION SEQUENCING (NGS) OF CELL-FREE DNA (CFDNA) AND TUMOR TISSUE

*David S. Morris, MD; Ray McDermott; Josep Maria Puiuats; Jeremy D. Shapiro; Peter Ostler; M. Neil Reaume; Inge Melholm; Ian Byard; Arif Hussain; David Campbell; John Burke; Brigitte Laguerre; Alison Reid; Eric Voog; Ali Benjelloun; Evan R. Goldfischer; Andrea Loehr; Andrew D. Simmons; Tony Golsorkhi; Simon P. Watkins; Simon Chowdhury; Charles Ryan and Wassim Abida

1Urology Associates Clinical Research, Nashville, TN, USA; 2Adelaide and Meath Hospital, Dublin, UK; 3Instituto Catalan de Oncologia, Barcelona, Spain; 4Cabrini Hospital, Malvern, VIC, Australia; 5Mount Vernon Cancer Centre, Northwood, UK; 6The Ottawa Hospital Cancer Centre, Ottawa, Ontario, Canada; 7Veje Sygehus, Veje, Denmark; 8Royal Hobart Hospital, Hobart, TAS, Australia; 9University of Maryland Greenebaum Cancer Center, Baltimore, MD, USA; 10University Hospital Geelong (Barwon Health), Geelong, VIC, Australia; 11Rocky Mountain Cancer Centers – USOR, Aurora, CO, USA; 12Centre Eugène Marquis, Rennes, France; 13Royal Marsden Hospital, London, UK; 14Clinique Victor Hugo Centre Jean Bernard, Le Mans, France; 15Centre Hospitalier Universitaire Dr-Georges-L.-Dumont, Moncton, NB, Canada; 16Premier Medical Group of the Hudson Valley, Poughkeepsie, NY, USA; 17Clovis Oncology, Inc., Boulder, CO, USA; 18Guy’s Hospital, London, UK, and Sarah Cannon Research Institute, London, UK; 19University of Minnesota, Minneapolis, MN, USA; 20Memorial Sloan Kettering Cancer Center, New York, NY, USA

Presented By: David S. Morris, MD

Poster #201

A PHASE 3, RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY OF ENZALUTAMIDE IN MEN WITH NONMETASTATIC CASTRATION-RESISTANT PROSTATE CANCER: POST HOC ANALYSIS OF PROSPER BY PRIOR DEFINITIVE SURGERY

Paul R. Sieber, MD; David F. Penson; Neal Shore; Maha Hussain; Fred Saad; Joyce Steinberg; Jennifer Sugg; Katharina Modelska; Suha Sari and Cora N. Stemberg

1Vanderbilt University Medical Center, Nashville, TN, USA; 2Lancaster Urology, Lancaster, PA, USA; 3Carolina Urologic Research Center, Myrtle Beach, SC, USA; 4Robert H. Lurie Comprehensive Cancer Center, Northwestern University, Chicago, IL, USA; 5University of Montreal Hospital Center, Montreal, QC, Canada; 6Astellas Pharma, Inc., Northbrook, IL, USA; 7Pfizer Inc., San Francisco, CA, USA; 8Pfizer Inc., Cambridge, MA, USA; 9San Camillo Forlanini Hospital, Rome, Italy

Presented By: Paul R. Sieber, MD

Poster #202

PSMA-PET RESULTS IN A NONMETASTATIC CASTRATION-RESISTANT PROSTATE CANCER SPARTAN-LIKE POPULATION THAT IS NEGATIVE BY CONVENTIONAL IMAGING

*Wolfgang P. Fendler, MD; Manuel Weber; Amir Irvani; Michael S. Hofman; Jérémie Calais; Johannes Czernin; Harun Ilhan; Eric J. Small; Matthew R. Smith; Tobias Maurer; Ken Herrmann; Paola M. Perez; Thomas A. Hope; Isabel Rauscher; Anil Londeh; Angela Lopez-Giltiltz; Shinta Cheng; Matthias Eiber and Boris Hadachik

1University of Duisburg-Essen and German Cancer Consortium - University Hospital Essen, Essen, Germany; 2University of California Los Angeles, Los Angeles, CA, USA; 3Peter MacCallum Cancer Centre, Melbourne, Victoria, Australia; 4LMU, Munich, Germany; 5Helen Diller Family Comprehensive Cancer Center, University of California San Francisco, San Francisco, CA, USA; 6Massachusetts General Hospital Cancer Center and Harvard Medical School, Boston, MA, USA; 7Martini-Klinik Prostate Cancer Center University Medical Center Hamburg-Eppendorf, Hamburg, Germany; 8Klinikum Rechts der Isar, Technical University of Munich, Munich Germany; 9Janssen Research and Development, Titusville, NJ, USA; 10Janssen Research and Development, Los Angeles, CA, USA; 11Janssen Research and Development, Raritan, NJ, USA

Presented By: Wolfgang P. Fendler, MD
Poster #203
PREDICTING PATHOLOGIC TUMOR SIZE IN PROSTATE CANCER BASED ON PREOPERATIVE FINDINGS.
*Aydin Pooli, MD; David C. Johnson, MD, MPH; Taylor Y. Sadun, MD; Anthony E. JR. Sisk, DO; Ely R. Felker, MD; Steven S. Raman, MD; and Robert E. Reiter, MD
1UCLA Institute of Urologic Oncology, Department of Urology, David Geffen School of Medicine at UCLA, Los Angeles, California; 2Genitourinary Pathology, Department of Pathology, David Geffen School of Medicine at UCLA, Los Angeles, California; 3Diagnostic and Interventional Radiology, Department of Radiology, David Geffen School of Medicine at UCLA, Los Angeles, California
Presented By: Aydin Pooli, MD

Poster #204
INCREASED DETECTION RATES OF INTERMEDIATE AND HIGH-GRADE PROSTATE CANCER IN AFRICAN-AMERICAN MEN AFTER 2012 USPSTF RECOMMENDATION AGAINST PSA SCREENING
*Jeffrey Arace; Viktor Flores; Dennis Robins; Andrew Winer; and Jeffrey Weiss
1SUNY Downstate Medical Center; 2Department of Veterans Affairs, New York Harbor Healthcare System
Presented By: Jeffrey Arace

Poster #205
SURGICAL PERFORMANCE EVALUATION AND PATIENT OUTCOMES COMPARISON UTILIZING AUTOMATIC PERFORMANCE METRICS DURING ROBOTIC-ASSISTED RADICAL PROSTATECTOMY
*Andrew Hung, MD; Jian Chen; Paul Oh; Jessica Nguyen; Devin Stewart; Daphne Remulla; Tiffany Chu; Ryan Lee; Yan Liu; and Inderbir Gill
1USC Institute of Urology
Presented By: Andrew Hung, MD

Poster #206
APPLYING DEEP LEARNING TO MULTIPARAMETRIC MRI TO PREDICT CORE-LEVEL BIOPSY PATHOLOGY
*Leo C. Chen, MD; Nicholas Bien; Richard Fan, PhD; Robin Cheong; Pranav Rajpurkar; Alan Thong, MD; Nancy Wang, MD; Sarir Ahmadi; Mirabela Rusu, PhD; James Brooks, MD; Andrew Ng, PhD and Geoffrey Sonn, MD
1Department of Urology, Stanford School of Medicine, Stanford, C; 2Department of Computer Science, Stanford University, Stanford, CA; 3Department of Radiology, Stanford School of Medicine, Stanford, CA
Presented By: Leo C. Chen, MD

Poster #207
A RISK CALCULATOR INTERFACE AND PREDICTION MODEL FOR UPGRADING ON ACTIVE SURVEILLANCE FOR PROSTATE CANCER: RESULTS FROM THE CANARY PROSTATE ACTIVE SURVEILLANCE STUDY
*James T. Kearns, MD; Marshall Brown; Anna Faino; Matthew Cooperberg; Yingye Zheng; Lisa Newcomb; Daniel Lin; and John Gore
1Atrium Health, Charlotte, NC; 2Fred Hutchinson Cancer Research Center, Seattle, WA; 3University of California San Francisco, San Francisco, CA; 4University of Washington, Seattle, WA
Presented By: James T. Kearns, MD

Poster #208
PROSPECTIVE CLINICAL VALIDATION OF A MOLECULAR URINE TEST FOR DETECTION OF HIGH-GRADE PROSTATE CANCER
*Paul M. Yonover, MD, FACS; Sandra Steyaert, PhD; Celeste Ruiz, RN; Karolina Grafczynska, RN; Jessica DeHart; Michael Brawer, MD; Jack Schalken, MD, PhD; Jack Groskopf, PhD and Wim Wim Van Criekinge, PhD
1UroPartners, Chicago, IL; 2MDxHealth, Irvine, CA; 3Radboud University Medical Center, Nijmegen, The Netherlands; 4Ghent University, Ghent, Belgium
Presented By: Paul M. Yonover, MD, FACS
Poster #208
PROSPECTIVE CLINICAL VALIDATION OF A MOLECULAR URINE TEST FOR DETECTION OF HIGH-GRADE PROSTATE CANCER
*Paul M. Yonover, MD, FACS; Sandra Steyaert, PhD; Celeste Ruiz, RN; Karolina Grafczynska, RN; Jessica DeHart; Michael Brawer, MD; Jack Schalken, MD, PhD; Jack Groskopf, PhD and Wim Wim Van Criekinge, PhD
1UroPartners, Chicago, IL; 2MDxHealth, Irvine, CA; 3Radboud University Medical Center, Nijmegen, The Netherlands; 4Ghent University, Ghent, Belgium
Presented By: Paul M. Yonover, MD, FACS

Poster #210
EVALUATING THE IMPACT OF LENGTH OF TIME FROM DIAGNOSIS TO SURGERY IN INTERMEDIATE TO VERY HIGH RISK PROSTATE CANCER PATIENTS
*Natasha Gupta, MD; Trinity Bivalacqua, MD PhD; Misop Han, MD; Alan Partin, MD PhD and Mufaddal Mamawala, MBBS MPH
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Presented By: Natasha Gupta, MD

Poster #211
INTERPRETATION OF DOMAIN SCORES ON THE EXPANDED PROSTATE CANCER INDEX COMPOSITE: HOW DOES THE DOMAIN SCORE TRANSLATE INTO FUNCTIONAL OUTCOME?
*Aaron A. Laviana, MD; Agustin Hernandez; Li-ching Huang; Zhiguozhao; Tatsuki Koyama; Karen Hoffman; Irene Feurer; Ralph Conwill; David Benson and Daniel Barocas
1Department of Urology, Vanderbilt University Medical Center; 2Center for Quantitative Sciences and Department of Biostatistics Vanderbilt University School of Medicine; 3Department of Radiation Oncology, Division of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX; 4Prostate Cancer Patient Advocate, Vanderbilt University School of Medicine, Nashville, TN, USA
Presented By: Aaron A. Laviana, MD

Poster #212
CREATION OF A PERSONALIZED PREDICTION TOOL AND ONLINE NOMOGRAM TO PREDICT SEXUAL, URINARY, AND BOWEL FUNCTION LONGITUDINALLY AFTER RADIATION THERAPY, SURGERY, OR OBSERVATION
*Aaron A. Laviana, MD; Li-ching Huang; Zhao Zhiguo; Tatsuki Koyama; Karen Hoffman; Irene Feurer; Ralph Conwill; David Benson and Daniel Barocas
1Department of Urology, Vanderbilt University Medical Center; 2Center for Quantitative Sciences and Department of Biostatistics Vanderbilt University School of Medicine; 3Department of Radiation Oncology, Division of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX; 4Prostate Cancer Patient Advocate, Vanderbilt University School of Medicine, Nashville, TN, USA
Presented By: Aaron A. Laviana, MD

Poster #213
A FRAMEWORK FOR AUTOMATED CO-REGISTRATION OF PROSTATE MRI AND DIGITAL WHOLE MOUNT PATHOLOGY IMAGES
Geoffrey A. Sonn, MD; Christian Kunder; Richard Fan; Leo Chen; Nancy Wang; Pejman Ghanouni; Andreas Loening; James Brooks; Robert West and Mirabela Rusu
1Stanford University Department of Urology; 2Stanford University Department of Pathology; 3Stanford University Department of Radiology
Presented By: Geoffrey A. Sonn, MD

Poster #214
DIAGNOSTIC PROPERTIES OF PROSTATE-SPECIFIC ANTIGEN TO PREDICT PROSTATE CANCER AMONG MEN WITH ANDROGEN DEFICIENCY
Daniel M. Moreira, MD MHS; Rodrigo Pagani, MD; Samuel Ohlander, MD; Michael Abern, MD; Gerald Andriole, MD and Stephen Freedland, MD
1UIC; 2Washington University in St. Louis; 3Cedars-Sinai Health System
Presented By: Daniel M. Moreira, MD, MHS
Poster #215
PATIENT REPORTED FUNCTIONAL OUTCOMES AFTER 5 YEARS IN MEN WITH LOW-RISK AND FAVORABLE INTERMEDIATE-RISK PROSTATE CANCER
Daniel D. Joyce, MD; Zhiphuo Zhao, PhD; Karen E. Hoffman, MD, MHSc, MPH; Li-Ching Huang, PhD; Tatsuki Koyama, PhD; Ralph Conwill, BS; David F. Penson, MD, MPH and Daniel A. Barocas, MD, MPH
1Department of Urologic Surgery, Vanderbilt University Medical Center; 2Department of Biostatistics, Vanderbilt University Medical Center; 3Department of Radiation Oncology, The University of Texas, MD Anderson Cancer Center
Presented By: Daniel D. Joyce, MD

Poster #216
COMPARISON OF TRUS-TARGETED VS. MRI-TARGETED VS. SYSTEMATIC PROSTATE BIOPSY IN DETECTING PROSTATE CANCER
Annika Herlemann, MD; Matthew Cooperberg, MD, MPH; Maya Overland, MD, PhD; Samuel Washington, MD; Peter Carroll, MD, MPH; Hao Nguyen, MD, PhD and Katsuto Shinohara, MD
1University of California, San Francisco, Helen Diller Family Comprehensive Cancer Center, Dept. of Urology, San Francisco, CA
Presented By: Annika Herlemann, MD

Poster #217
UROLOGY PRACTICE CHARACTERISTICS INFLUENCE THE USE OF ACTIVE SURVEILLANCE FOR PROSTATE CANCER
Parth K. Modi, MD, MS; Samuel Kaufman, MS; Mary Oerline, MS; Megan Caram, MD, MS; Vahakn Shahinian, MD, MS and Brent Hollenbeck, MD, MS
1University of Michigan
Presented By: Parth K. Modi, MD, MS

Poster #218
DIET QUALITY AND DISEASE PROGRESSION AMONG LOCALIZED PROSTATE CANCER PATIENTS ON ACTIVE SURVEILLANCE
Justin R. Gregg, MD; Jiali Zheng, PhD; David Lopez, PhD; Chad Reichard, MD; Brian Chapin, MD; Jeri Kim, MD; John Davis, MD and Carrie Daniel, PhD
1University of Texas MD Anderson Cancer Center; 2University of Texas Houston Medical School; 3Merck Co., Inc.
Presented By: Justin R. Gregg, MD

Poster #219
PHASE I STUDY EVALUATING LITHIUM IN LOCALIZED PROSTATE CANCER
Derek Jensen, MD; Na Yu, PhD; Haixia Xu, MD, PhD; Gregory Reed, PhD; Eugene Lee, MD; J Brantley Thrasher, MD; Benyi Li, MD, PhD and Moben Mirza, MD
1University of Kansas, Department of Urology; 2University of Kansas, Department of Clinical Pharmacology
Presented By: Derek Jensen

Poster #220
A GENOMIC CLASSIFIER SHOWS IMPROVED PREDICTION OF ONCOLOGIC OUTCOMES IN AFRICAN-AMERICAN MEN TREATED WITH RADICAL PROSTATECTOMY
Stephen J. Freedland, MD; Marguerite du Plessis; Ivy Zhang; Lauren Howard; Amanda De Hoedt and Elai Davicioni
1Division of Urology, Cedars-Sinai Department of Surgery, Los Angeles; 2Urology Research, Veteran Affairs Medical Center, Durham; 3GenomeDx Biosciences; 4Duke Cancer Institute, Duke University School of Medicine, Durham
Presented By: Stephen J. Freedland, MD

Poster #221
DO ELDERLY MEN (>75) HARBOR MORE AGGRESSIVE PROSTATE CANCER? COMPARISON OF DECIPHER AND PAM50 TESTS AMONG DIFFERENT AGE GROUPS
Hanan Goldberg, MD; Jaime Omar Herrera Cáceres; Maria Santiago-Jiminez; Nick Fishbane; Elai Davicioni; Zachary Klaassen; Thenappan Chandrasekar; Christopher Wallis; Dixon Woon; Robert Hamilton; Girish Kulkarni; Alejandro Berlin and Neil Fleshner
1Princess Margaret Cancer Center, University Health Network, University of Toronto, Toronto, Ontario, Canada; 2GenomeDx Biosciences, San Diego, CA, USA
Presented By: Hanan Goldberg, MD
Poster #222
DEVELOPMENT OF A CLINICAL TOOL TO PREDICT TREATMENT SPECIFIC OUTCOMES OF SURGERY AND RADIATION IN CLINICALLY LOCALIZED PROSTATE CANCER
*Udit Singhal, MD1; Lauren J. Beesley, PhD2; Ganesh S. Palapattu, MD1; Jeffrey S. Montgomery, MD1; Alon Z. Weizer, MD1; Brent K. Hollenbeck, MD1; David C. Miller, MD1; Rohit Mehra, MD2; Scott A. Tomlins, MD3; Daniel E. Spratt, MD4; Allison Furgal5; Stephanie Daignault-Newton, MS6; Jeremy M.G. Taylor, PhD2 and Todd M. Morgan, MD1
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Presented By: Udit Singhal, MD

Poster #223
LONG-TERM RISK OF METASTATIC PROSTATE CANCER IN MEN WITH GRADE GROUP 2 MANAGED WITH ACTIVE SURVEILLANCE
*Sigrid Carlsson, MD, PhD, MPH1,2,3; Nicole Benfante4; Ricardo Alvim5; Daniel Sjoberg6; Behfar Ehdai6; Peter Scardino7; James Eastham1 and Karim Touijer1
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Presented By: Sigrid Carlsson, MD, PhD, MPH

Poster #224
IMPACT OF PUTATIVE CHEMOPREVENTATIVE AGENTS ON PROSTATE CANCER DIAGNOSIS
*Hanan Goldberg, MD1; Zachary Klaassen1; Thenappan Chandrasekar1; Christopher Wallis1; Jaime Omar Herrera Caceres1; Ardalan Ahmed2; Dixon Woon1; Shabbir Alihaji1; Alejandro Berlin2; Refik Saskin3; Robert Hamilton1; Girish Kulkarni4 and Neil Fleshner4
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Presented By: Hanan Goldberg, MD

Poster #225
ASSOCIATIONS OF 5α-REDUCTASE INHIBITORS WITH DELAYED PROSTATE CANCER DIAGNOSIS AND INCREASED PROSTATE CANCER MORTALITY
*J. Kellogg Parsons, MD, MHS2; Reith Sarkar1; Alex Bryant1; Stephen Ryan2; Andrew Kader2; Rana McKay3; Anthony D’Amico4; Paul Nguyen4; John Einck1; Arno Mundt1; Christopher Kane, MD, FACS5; James Murphy1 and Brent Rose1
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Presented By: J. Kellogg Parsons, MD, MHS

Poster #226
18-YEAR PROSTATE CANCER-SPECIFIC MORTALITY AFTER PROSTATECTOMY, EXTERNAL BEAM RADIATION THERAPY, BRACHYTHERAPY, HORMONAL THERAPY, OR MONITORING FOR LOCALIZED PROSTATE CANCER
*Annika Herlemann, MD1; Janet Cowan, MA1; Samuel Washington III, MD1; Jeanette Broering, PhD, MPH, RN1; Peter Carroll, MD, MPH1 and Matthew Cooperberg, MD, MPH1
1University of California, San Francisco, Helen Diller Family Comprehensive Cancer Center, Dept. of Urology, San Francisco, CA
Presented By: Annika Herlemann, MD

Poster #227
EVALUATING MRI FUSION BIOPSY VS SYSTEMATIC ULTRASOUND GUIDED BIOPSY IN PREDICTING HIGH GRADE CANCER AT TIME OF RADICAL PROSTATECTOMY
*Hao Gia Nguyen, MD, PhD1; Katsuto Shinohara, MD1; Janet Cowan, MS1; Niloufar Ameli, MS1; Antonio Westphalen, MD1; Jeff Simko, MD1; Matthew Cooperberg, MD,MPh1 and Peter Carroll, MD, MPH1
1UCSF
Presented By: Hao Gia Nguyen, MD PhD
Poster #228
PATHOLOGIC PROGRESSION IS THE DOMINANT DRIVER OF CONVERSION TO RADICAL THERAPY POST VASCULAR TARGETED PHOTO-THERAPY AND ACTIVE SURVEILLANCE: FOLLOW-UP OF A PROSPECTIVE PHASE-3 RANDOMIZED TRIAL
*Inderbir S. Gill, MD; Mark Emberton; Abdel Azzouzi; Emmanuel Coeytaux; Avigdor Scherz and Peter Scardino
1University of Southern California, Institute of Urology; 2London; 3Angers, France; 4New York; 5Rehovot, Israel
Presented By: Inderbir S. Gill, MD

Poster #229
PROSPECTIVE RANDOMIZED TRIAL OF GENE EXRESSION CLASSIFIER UTILITY IN MEN AT HIGH RISK OF RECURRENCE FOLLOWING RADICAL PROSTATECTOMY (G-MINOR)
*Todd M. Morgan, MD; Linda Okoth, MPH; Felix Feng, MD; Anna Johnson, MS; Brian Lane, MD, PhD; Susan Linsell, MHSA; Khurshid Ghani, MD; James Montie, MD; Nick Fishbane, MSc; Tara Marti, BS; Marguerite du Plessis, BSc; Elai Davicioni, PhD; Thomas Maatman, DO; Kirk Wojno, MD; Frank Burks, MD; Paul Rodriguez, MD; Nick Liu, MD; Richard Sarle, MD; David Miller, MD, MPH and Michael Cher, MD
1Michigan Medicine, Department of Urology, Ann Arbor, MI; 2University of California, San Francisco, CA; 3Spectrum Health Medical Group, Grand Rapids, MI; 4GenomeDx Biosciences, Vancouver, BC, Canada; 5Michigan Urological Clinic, Grand Rapids, MI; 6Comprehensive Urology, Royal Oak, MI; 7Urology Associates of Grand Rapids P.C, Grand Rapids, MI; 8IHA Urology, Ypsilanti, MI; 9Michigan Institute of Urology, Troy, MI; 10Wayne State University, Detroit, MI
Presented By: Todd M. Morgan, MD

Poster #230
 PROTUX CLINICAL TRIAL: OPEN LABEL, SINGLE INSTITUTION PILOT STUDY OF RITUXIMAB NEOADJUVANT THERAPY IN HIGH RISK PROSTATE CANCER PATIENTS SCHEDULED TO UNDERGO RADICAL PROSTATECTOMY
*Stephen T. Ryan; Michael Liss; Ahmed Shabaik; Emily Pittman; Jing Zhang; Michelle Muldong; Johnathan Cunha, MS; Nicole Basler, MS; Shabnam Shalapour; Michael Karin; Karen Messer; Stephen Howell; Christopher Kane, MD, FACS and Christina Jamieson
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Presented By: Stephen T. Ryan

Poster #231
HIGH PERCENT-FREE PSA IN THE SETTING OF BIOCHEMICAL RECURRENCE AFTER RADICAL PROSTATECTOMY IS ASSOCIATED WITH POORER OUTCOMES: A VALIDATION STUDY USING PROSPECTIVELY COLLECTED BIOBANK SPECIMENS.
*Dixon T.S. Woon, MBBS; Hanan Goldberg; Jaime O. Herrera-Cáceres; Hina Shiakh; Emily A. Whelan; Khaled Ajib; Gregory J. Nason; Robert J. Hamilton; Alexandre Zlotta; Girish Kurkarni; Antonio Finelli and Neil Fleshner
1Princess Margaret Cancer Centre, University of Toronto, Toronto, ON, Canada
Presented By: Dixon T.S. Woon, MBBS

Poster #232
THE IMPACT OF CLINICAL FACTORS AND INTER-SITE VARIATION ON 18F-FLUCICLOVINE PET/CT IN BIOCHEMICAL RECURRENCE OF PROSTATE CANCER: DATA FROM THE LOCATE TRIAL
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Presented By: Ashutosh K. Tewari, MBBS
Poster #233
IS 68Ga-PSMA-11 PET-CT ACCURATE IN EXCLUDING PELVIC LYMPH NODE METASTASIS IN PATIENTS WITH INTERMEDIATE AND HIGH-RISK PROSTATE CANCER?
*Taylor Y. Sadun, MD¹; Aydin Pooli, MD¹; David C. Johnson, MD, MPH¹; Wolfgang P. Fendler, MD²; Matthias Eiber, MD²; Johannes Czernin, MD²; Robert E. Reiter, MD¹ and Jeremie Calais, MD²
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Presented By: Taylor Y. Sadun, MD

Poster #234
DURATION OF PSA SURVEILLANCE AFTER RADICAL PROSTATECTOMY: A RISK ADAPTED APPROACH
*Mary E. Westerman, MD¹; Matthew T. Gettman, MD¹; Philip Schulte, PhD²; Vidit Sharma, MD¹; R. Jeffrey Karnes, MD¹; Rachel Carlson, BS³; William Parker, MD³ and Igor Frank, MD¹
¹Mayo Clinic Department of Urology; ²Mayo Clinic Department of Health Sciences; ³University of Kansas Department of Urology
Presented By: Mary E. Westerman, MD

Poster #235
ASSOCIATION BETWEEN RADICAL PROSTATECTOMY AND SURVIVAL IN MEN WITH CLINICALLY NODE-POSITIVE PROSTATE CANCER
*J. Kellog Parsons, MD, MHS²; Reith Sarkar¹; Alex Bryant¹; Stephen Ryan²; Andrew Kader²; Christopher Kane, MD, FACS²; Rana McKay³; Ajay Sandhu¹; James Murphy¹ and Brent Rose¹
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Presented By: J. Kellogg Parsons, MD, MHS

Poster #236
PSMA-11 PET STAGING ACCURACY IN INTERMEDIATE AND HIGH-RISK PROSTATE CANCER
*Adam J. Gadzinski, MD, MS¹; Samuel Washington¹; Thomas Hope²; Kirsten Greene¹; Hao Nguyen¹; Dora Tao²; Raven Smith²; Robert Hicks²; Robert Flavell²; Antonio Westphalen² and Peter Carroll¹
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Presented By: Adam J. Gadzinski, MD, MS

Poster #237
LOCATION OF PROSTATE CANCER RECURRENCE DETECTED BY GALLIUM-68 PSMA-11 PET IN MEN ELIGIBLE FOR SALVAGE RADIATION THERAPY
*Adam J. Gadzinski, MD, MS¹; Lauren Boreta¹; Susan Wu¹; Melody Xu¹; Hao Nguyen³; Mack Roach¹; Felix Feng¹; Peter Carroll² and Thomas Hope³
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Presented By: Adam J. Gadzinski, MD, MS

Poster #238
THE ROLE OF 68Ga-PSMA PET/CT IN INITIAL STAGING OF TREATMENT-NAÏVE HIGH RISK PROSTATE CANCER.
*Aydin Pooli, MD¹; Taylor Y. Sadun, MD¹; David C. Johnson, MD, MPH¹; Wolfgang P. Fendler, MD²; Matthias Eiber, MD²; Johannes Czernin, MD²; Robert E. Reiter, MD¹ and Jeremie Calais, MD²
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Presented By: Aydin Pooli, MD
Poster #239
ESTIMATES OF UNDERSTAGING FOR LYMPH NODE POSITIVE PROSTATE CANCER: ANALYSIS FROM THE NATIONAL CANCER DATABASE
*Nicholas Chakiryan, MD; Ann Martinez Acevedo, MPH; Michael Conlin, MD 1,2; Mark Garzotto, MD 1,2; Yiyi Chen, PhD; Jen Jane Liu, MD 1; Christopher Amling, MD 1 and Ryan Kopp, MD 1,2
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Presented By: Nicholas Chakiryan, MD

Poster #240
DEFINITIVE AND SUSTAINED INCREASE IN PROSTATE CANCER METASTASES IN THE UNITED STATES
*Jonathan E. Shoag, MD1; Neal Patel1; Art Sedrakyan1; Fernando Bianco2; Ruth Etzioni2; Michael Gorin2; We-Chun Hsu1; Jilain Mao1; Paul Nguyen5; Edward Schaeffer6; Andrew Vickers and Jim Hu1
1Well Cornell Medicine; 2Nova Southeastern University; 3Fred Hutchinson Cancer Research Center; 4Johns Hopkins University School of Medicine; 5Dana Farber Cancer Institute; 6Feinberg School of Medicine, Northwestern University; 7Memorial Sloan-Kettering Cancer Center
Presented By: Jonathan E. Shoag, MD

Poster #241
CREATING PATIENT-CENTRED RADIOLOGY REPORTS (PACERR) TO EMPOWER PATIENTS UNDERGOING PROSTATE MRI
*Guan Hee Tan, MBBS, MS, FRCS(Urol); Nathan Perlis1; Antonio Finelli1; Amelia Di Meo1; Michael Nesbitt5; Odelia Lee2; Adam Badzynski2; Mike Lovas2; Kristin Foster2; Joseph Cafa2o2; Janet Papadakos2; Vasiliki Bakas2; Alejandro Berlin1; David Wiljer4; Sangeet Ghar1 and Masoom Haider8
1University Health Network; 2Health Human Factors, UHN; 3Patient Engagement Innovations, UHN; 4Centre for Global eHealth Innovation and Healthcare Human Factors; 5Patient Education, Cancer Care Ontario; 6myUHN Patient Portal; 7Education Technology and Innovation; 8Mount Sinai Hospital
Presented By: Guan Hee Tan, MBBS, MS, FRCS(Urol)

Poster #242
UTILIZATION OF AN INTERNET OF THINGS (IoT) INDOOR GPS SYSTEM TO CHARACTERIZE INEFFECTIVENESS IN A UROLOGIC ONCOLOGY CLINIC
*Aaron A. Laviana, MD1; Jackson Cabo1; Valeria Tringali2; David Penson1 and Matthew Resnick1
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Presented By: Aaron A. Laviana, MD

Poster #243
AN SMS-BASED PERI-PROCEDURAL INTERVENTION FOR PATIENTS UNDERGOING PROSTATE BIOPSY: IMPACT ON CLINIC UTILIZATION, PATIENT/PROVIDER COMMUNICATION, AND PATIENT SATISFACTION
Anobel Y. Odisho, MD, MPH1,2; Ashwin Balakrishnan1,2; Hao Nguyen1,2; Katsuto Shinohara1,2 and Peter Carroll1,2
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Presented By: Anobel Y. Odisho, MD, MPH

Poster #244
THE COST OF OBESITY IN RADICAL CYSTECTOMY
*Melissa J. Huynh, MD; Ye Wang, PhD; Daniel Pucheril, MD; Dimitar Zlatev, MD MS; Alice Yu, MD; Steven Chang, MD, MS and Matthew Mossanen, MD 1,2
1Division of Urologic Surgery, Brigham and Women’s Hospital; 2Center for Surgery and Public Health, Brigham and Women’s Hospital
Presented By: Melissa J. Huynh, MD

Poster #245
READMISSION COSTS TO INDEX VS. NON-INDEX HOSPITALS FOLLOWING MAJOR UROLOGIC ONCOLOGY SURGERIES: IDENTIFYING SOURCES OF COST Variability
*Meera R. Chappidi, MD, MPH; Anobel Odisho, MD, MPH
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Presented By: Meera R. Chappidi, MD, MPH

Poster session ii – summary
Poster #246
IMPACT OF INSURANCE STATUS ON CLINICAL PRESENTATION, TREATMENT PATTERNS AND SURVIVAL IN BLADDER CANCER
*Akbar Ashrafi, BHB, MBChB, FRACS (Urol)\(^1\); Shane Pearce\(^1\); Jamal Nabhani\(^1\); Aliasger Shakir\(^1\); Monish Aron\(^1\); Inderbir Gill\(^1\); Sumeet Syan-Bhanvadia\(^1\) and Mihir Desai\(^1\)
\(^1\)USC Institute of Urology
Presented By: Akbar Ashrafi, BHB, MBChB, FRACS (Urol)

Poster #247
“FAKE NEWS” IN UROLOGIC ONCOLOGY: ANALYZING THE ACCURACY OF SOCIAL MEDIA CONTENT
*Muhannad Alsyouf, MD\(^1\); Phillip Stokes\(^1\); Akin Amasyali\(^1\); Herbert Ruckle\(^1\) and Brian Hu\(^1\)
\(^1\)Loma Linda University Health
Presented By: Muhannad Alsyouf, MD

Poster #248
THE OUTCOMES OF UROTHELIAL CARCINOMA MANAGED BY NON-OPERATIVE MANAGEMENT: A NATIONAL CANCER DATABASE STUDY
*Jamil Syed\(^1\); Kevin Nguyen\(^1\); Alfredo Suarez-Sarmiento\(^1\); Cynthia Leung\(^1\); Marianne Casilla-Lennon\(^1\); Jay Raman\(^2\) and Brian Shuch\(^1\)
\(^1\)Yale School of Medicine; \(^2\)Pennsylvania State University
Presented By: Jamil Syed

Poster #249
REDUCING OPIOID UTILIZATION AFTER UROLOGIC ONCOLOGY SURGERY
*Kris Prado, MD\(^1\); Jessica Kee, PA\(^1\); Kerri Stevenson, PA\(^1\); Eliza Van Zyl\(^1\); Anisia Dugala\(^1\); Daniel Greenberg\(^1\); Rustin Massoudi, MD\(^1\); Benjamin Chung, MD\(^1\); Geoffrey Sonn, MD\(^1\); Alan Thong, MD\(^1\); Harcharan Gill, MD\(^1\); Eila Skinner, MD\(^1\) and Jay Shah, MD\(^1\)
\(^1\)Stanford University, Department of Urology, Stanford, CA; \(^2\)Stanford Health Care, Stanford, CA; \(^3\)Stanford University School of Medicine, Stanford, CA
Presented By: Kris Prado, MD

Poster #250
UROLOGIC MALIGNANCIES: A COMPARISON OF OUTCOMES AFTER INDEX SURGERY BETWEEN ACADEMIC AND COMMUNITY HOSPITALS.
*Jamil Syed\(^1\); Alejandro Abello\(^1\); Michael Leapman\(^1\) and Patrick Kenney\(^1\)
\(^1\)Yale School of Medicine
Presented By: Jamil Syed

Poster #251
WHAT IS THE CLINICAL UTILITY OF NEXT GENERATION SEQUENCING (NGS) IN ADVANCED UROLOGIC MALIGNANCIES?
*Victor Kucherov, MD\(^2\); James Ryan Mark, MD\(^1\); Michael Pintauro\(^3\); Mark Mann, MD\(^1\); Edouard Trabulsi, MD\(^1\); Costas Lallas, MD\(^1\); Thenappan Chandrasekar, MD\(^1\); Nathan Handley, MD\(^1\); W. Kevin Kelly, MD\(^1\) and Leonard Gomella, MD\(^1\)
\(^1\)Sidney Kimmel Cancer Center, Thomas Jefferson University, Philadelphia; \(^2\)Department Of Urology, Thomas Jefferson University, Philadelphia; \(^3\)Sidney Kimmel Medical College At Thomas Jefferson University, Philadelphia
Presented By: Victor Kucherov, MD

Poster #252
ASSOCIATIONS OF RURALITY AND DISEASE OUTCOME IN UROLOGIC MALIGNANCY
*Alejandro Abello, MD\(^1\); Marianne Casilla-Lennon\(^1\); Patrick Kenney\(^1\) and Michael Leapman\(^1\)
\(^1\)Yale School of Medicine
Presented By: Alejandro Abello, MD

Poster #253
ONCOLOGIC OUTCOMES FOLLOWING SURGICAL MANAGEMENT OF CLINICAL STAGE II SEX CORD STROMAL TUMORS
*Adam C. Calaway\(^1\); Isamu Tachibana\(^1\); Rich Foster\(^1\); Timothy Masterson\(^1\) and Clint Cary\(^1\)
\(^1\)Indiana University School of Medicine, Department of Urology
Presented By: Adam C. Calaway, MD
POSTER SESSION II — SUMMARY

Poster #254
POST-ORCHIECTOMY HORMONE LEVELS IN TESTICULAR GERM CELL TUMORS
*Madeleine L. Burg, BA1; Zhoobin H. Bateni, MD1; Shane M. Pearce, MD1; Jamal Nabhani, MD1; Hooman Djaladat, MD, MS1; Anne K. Schuckman, MD1 and Siamak Daneshmand, MD1
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Presented By: Madeleine L. Burg, BA

Poster #255
PRIMARY TUMOR SIZE THRESHOLDS IN STAGE IA TESTICULAR SEMINOMA: IMPLICATIONS FOR ADJUVANT THERAPY AFTER ORCHIECTOMY AND SURVIVAL
*Mounsif Azizi1; Charles C. Peyton1; David C. Boulware2; Scott M. Gilbert1,3 and Wade J. Sexton1
1Department of Genitourinary Oncology, H. Lee Moffitt Cancer Center and Research Institute, Tampa; 2Department of Biostatistics, H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL; 3Department of Health Outcomes and Behavior, H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL
Presented By: Mounsif Azizi

Poster #256
TRENDS AND QUALITY OF INITIAL TESTIS CANCER CARE IN NORTH CAROLINA
*Benjamin J. McCormick, MD1; Stephen McMahon, BS1; Josy Zhou, MS1; Chris Bagget, PhD1; Michael Woods, MD2; Mark Litwin, MD3; Ronald Chen, MD1; Matthew Milowsky, MD1; Eric Wallen, MD1 and Hung-Jui Tan, MD1
1UNC; 2Loyola; 3UCLA
Presented By: Benjamin J. McCormick, MD

Poster #257
A HISTOLOGIC COMPARISON OF PATIENTS PRESENTING WITH PURE CHORIOCARCINOMA VS MIXED NSGCT WITH SERUM HCG LEVELS >20,000 IN PATIENTS UNDERGOING PC-RPLND
*Ryan W. Speir, MD1; Adam Calaway, MD1; Marcelo Barboza, MD1; Richard Foster, MD1 and Clint Cary, MD1
1IU School of Medicine, Department of Urology
Presented By: Ryan W. Speir, MD

Poster #258
INCIDENCE AND MORTALITY FROM INTERMEDIATE AND HIGH-GRADE PROSTATE CANCER IN MEN WITH A HISTORY OF TESTICULAR CANCER
*Matthew Chu1; Andrew Riggin2; Michael Naslund3; Hubert Huang1 and M. Minhaj Siddiqui1
1University of Maryland School of Medicine; 2University of Maryland Shore Medical Center; 3University of Maryland Medical Center
Presented By: Matthew Chu

Poster #259
RACIAL DISPARITIES BETWEEN BLACK AND WHITE MEN WITH TESTICULAR CANCER
*Jeffrey P. Johnson, MD1; Alexandr Pinkhasov, MD, MPH1; Garrett Smith, MD1; Michael Daneshvar, MD1; Alexandra Weston1; Ruben Pinkhasov, MD, MPH1; Elizabeth Ferry, MD1; Oleg Shapiro, MD1; Gennady Bratslavsky, MD1 and Joseph Jacob, MD, MCR1
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Presented By: Jeffrey P. Johnson, MD
COMPARATIVE ANALYSIS OF BIOPSY PROVEN LYMPH NODE POSITIVE BLADDER CANCER TO THOSE WITH BIOPSY PROVEN NODE NEGATIVE DISEASE PRIOR TREATMENT

*Amy Lim, MD, PhD1; Vikram Narayan, MD1; Mohamed Seif, MD1; Colin Dinney, MD1 and Neema Navai, MD1

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Presented By: Amy Lim, MD, PhD

Introduction: Most studies assessing the efficacy of neoadjuvant chemotherapy (NAC) and cystectomy in bladder cancer patients include very few clinically node positive patients or completely exclude them, which make nodal response rates difficult to determine. Further, in studies that include clinically node positive patients, their true nodal status is often unknown. We report a descriptive analysis of patients with clinically node positive disease who underwent pelvic lymph node biopsy prior to treatment and their outcomes.

Methods: Data was collected retrospectively from patients with cTxN1-3M0 bladder cancer from 2006-2018 who underwent radical cystectomy at MD Anderson. SPSS was used for analysis.

Results: Among the 130 patients with cTxN1-3M0 (94M:36F, median age of 68 years, age range of 28-85, average follow up of 929 days), 42 underwent pelvic lymph node biopsy (PLNBx). 27 (64.3%) patients had positive PLNBx, 15 (35.7%) were negative. Of patients with positive PLNBx, 22 (81.4%) were cN1, 1 (3.7%) was cN2 and 4 (14.8%) were cN3. Of patients with negative PLNBx, 10 (66.7%) were cN1, 1 (6.7%) was cN2, 4 (26.7%) were cN3. Of patients with PLNBx positive disease, 27 (100%) underwent NAC. 18 (66.7%) of these patients had persistent positive nodal disease at time of cystectomy. Of the 15 patients that had a negative PLNBx, 12 (80%) received NAC and 4 (33.3%) had positive nodal disease at time of cystectomy.

Patients with a positive PLNBx treated with NAC and were N+ at time of cystectomy, the average time to recurrence was 365 days (std dev 651) and the average time to death was 664 days (std dev 782). Patients with a negative PLNBx treated with NAC and were N+ time of cystectomy, the average time to recurrence was 123 days (std dev 257) and the average time to death was 540 days (std dev 95). Fischer's exact test did not reveal a statistical significance of recurrence or death between these two groups (p=0.6).

Conclusion: Clinical node positive disease is likely over staged. However, the significance of this is unknown. 33.3% of patients with biopsy proven nodal disease achieved complete pathologic response after NAC. The role PLNBx in clinically node positive bladder cancer is yet to be determined.
**Poster #134**

**A COMPARISON OF DECIPHER RESULTS TO NEOADJUVANT CHEMOTHERAPY RESPONSE RATES IN PATIENTS WITH MUSCLE-INVASIVE BLADDER CANCER**

*Heiko H. Yang, MD; Maxwell Meng; Terence Friedlander; Mohamed Alshalalfa; Felix Feng and Sima Porten*

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Presented By: Heiko H. Yang, MD

**Introduction:** Tumor genome profiling has emerged as a powerful tool in the management of cancer patients. The Database of genomic variation and Phenotype in Humans using Ensembl Resources (DECIPHER) has recently developed an assay to classify muscle-invasive bladder cancer (MIBC) into four molecular subtypes to predict response to neoadjuvant chemotherapy. Here we report the first single center experience correlating DECIPHER results with clinical outcome in bladder cancer patients.

**Methods:** Twenty-two patients with MIBC undergoing treatment were enrolled in the study over a 10-month period. Pathology slides from transurethral resection of bladder tumor (TURBT) at the time of diagnosis were sent to GenomeDX Biosciences Laboratory for DECIPHER genomic analysis. Treatment decisions were made according to current practice guidelines from the American Urologic Association and National Comprehensive Cancer Network. DECIPHER results were not used to guide management, so decisions were retrospectively categorized as concordant or discordant according to DECIPHER recommendations. Patients were followed for one year. For patients who underwent neoadjuvant chemotherapy prior to cystectomy, outcomes were categorized according to presence of residual tumor (T2 or greater), presence of node-positive disease at time of cystectomy, and whether these measures were consistent with the DECIPHER phenotype.

**Results:** DECIPHER results were obtained for 12 of the 22 samples sent for analysis. The test was unable to be performed in 10 samples. Of the 12 patients for whom DECIPHER results were available, 7 underwent cystectomy and 5 elected for systemic therapy. The use of neoadjuvant chemotherapy prior to cystectomy was concordant with DECIPHER recommendations in only 2/7 cases. Pathologic staging at time of cystectomy was consistent with the DECIPHER phenotype in 4/6 cases (pathology currently pending for 1 case).

**Conclusion:** The use of genomic analysis in MIBC in the clinical setting is a promising new front for investigation. Our study suggests that DECIPHER results can potentially change clinical decision-making and has reasonable value for predicting response. The high rate of assay failure presents a significant obstacle for more widespread clinical use.
COMPARATIVE ANALYSIS OF THREE VERSUS FOUR CYCLES OF NEOADJUVENT GEMCITABINE AND CISPLATIN FOR MUSCLE INVASIVE BLADDER CANCER

Salim Cheriyan, MD1; Charles Peyton1; Mounsif Azizi1; William Fulp1; Michael Poch1; Philippe Spiess1; Wade Sexton1 and Scott Gilbert1
1Moffitt Cancer Center

Presented By: Salim Cheriyan, MD

Introduction: Current treatment guidelines for muscle-invasive bladder cancer recommend 4 cycles of chemotherapy when gemcitabine combined with cisplatin is used in the neoadjuvant setting. However, empirical evidence supporting 4 cycles compared to an alternative cycle number is limited. Furthermore, a significant proportion of patients cannot tolerate full-course neoadjuvant chemotherapy because of treatment-related toxicity. In this context, we aimed to compare pathologic and survival outcomes of patients who received either 3 or 4 courses of neoadjuvant gemcitabine and cisplatin.

Methods: An institutional cystectomy data registry was merged with a health research informatics data system to identify patients who underwent radical cystectomy and received neoadjuvant chemotherapy between 2007 and 2017. Cases in which 3 or 4 cycles of neoadjuvant gemcitabine and cisplatin was used were then selected for analysis. Patient characteristics were summarized using descriptive statistics, and associations between variables and end points were evaluated using Kruskal-Wallis tests for categorical variables. Adjusted logistic regression models were constructed for complete pathologic response (pCR, e.g. pT0) and any downstaging end points. Kaplan-Meier estimates and Cox Proportional Hazard models were used to examine for overall survival between 3 and 4 cycle groups.

Results: A total of 166 patients met inclusion criteria for study analysis. Median overall survival was 21.8 months. Fifty-nine patients received 4 cycles of GC (35.5%) whereas 107 received 3 cycles (64.5%). There was no statistical difference between these two groups in terms of clinical or demographic variables. Rates of pCR were similar between the two groups (20.3% in the 4 cycle cohort vs. 21.5% in the 3 cycle cohort, p = 1.000), as were any downstaging rates (44.1% vs. 40.2%, respectively, p=0.748). Number of chemotherapy cycles (3 vs 4) was not significantly associated with downstaging or survival outcomes in multivariable logistic regression or Cox Proportional Hazard models. Kaplan-Meier survival estimates are shown in the Figure 1.

Conclusion: Our analysis did not demonstrate superior pathologic downstaging or survival outcomes favoring 4 vs. 3 cycles of neoadjuvant gemcitabine and cisplatin. Potential benefits of planning for 3 cycles of neoadjuvant gemcitabine and cisplatin include expedited time to surgery, reduced chemotherapy-associated toxicity, and lower treatment costs. Future studies are needed to confirm these findings.

Figure 1: Overall Survival KM Curves by Number of Cycles
Introduction: Neoadjuvant chemotherapy (NACT) prior to radical cystectomy improves survival in patients with urothelial carcinoma (UC). The benefit in patients with variant histologies is unknown. We sought to assess the pathological response rate of histological variants to NACT and compare to patients with pure UC.

Methods: Our prospectively maintained bladder cancer database was queried to identify all patients who were treated with cisplatin-based NACT prior to radical cystectomy from 2008 until June 2018. Patients with small cell histology were excluded. Pathological response after chemotherapy was defined as complete response (pT0N0), any response (<pT2N0) and no response (≥pT2Nany) based on cystectomy pathology. Based on our goal of assessing the index tumor response to NACT and consistent with prior studies, pTis in the cystectomy pathology was included as complete response of the index tumor. Chi-square tests were used to compare pathological response. A logistic regression model estimated the odds of chemotherapy response based on preoperative variables.

Results: One-hundred and sixty-eight patients met inclusion criteria. Eighty-two (48.8%) patients had variant histology on TURBT or cystectomy pathology. The median percentage of variant histology within the pathologic specimens in this group was 20% (IQR 5%-80%). The overall cohort pT0/pTisN0 and <pT2N0 rates were 45.2% and 51.8%, respectively. Variant histology pT0/pTisN0 and <pT2N0 rates were 40.2% and 42.7%, respectively. The complete response rate (p=0.20) did not differ based on the presence of variant histology; however, those patients with any response were more likely to have pure urothelial carcinoma compared to variant histology (59.7 vs 40%, p=0.02). The response rates to NACT based on histologic variants groupings are depicted in Figure 1. Suspected high-risk variants (micropapillary, plasmacytoid, and sarcomatoid) were less likely to demonstrate complete response (27 vs 50%, p=0.01) or any response (29.4 vs 60.5%, p<0.01) to NACT when compared to pure UC. High-risk variant histology was associated with lower likelihood of complete (OR 0.259, p < 0.01) or any (OR 0.35, p=0.01) pathological response when controlling for age and chemotherapy regimen.

Conclusion: Presence of variant histology may influence response to NACT. Aggressive variants are less likely to respond to NACT, perhaps necessitating enrollment in novel NACT trials or early surgical intervention.
**Poster #137**

**SARCOPENIA AND RESPONSE TO NEOADJUVANT CHEMOTHERAPY FOR BLADDER CANCER**

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1Mayo Clinic

Presented By: Timothy D. Lyon, MD

**Introduction:** Sarcopenia has been associated with increased mortality following radical cystectomy (RC) for muscle-invasive bladder cancer (MIBC); however, previous studies have included few patients treated with neoadjuvant chemotherapy (NAC). As data in patients with other malignancies has suggested that skeletal muscle changes are associated with response to chemotherapy, we investigated whether sarcopenia was associated with pathologic and survival outcomes among patients treated with NAC and RC.

**Materials and Methods:** We identified patients with MIBC treated with cisplatin-based NAC in our institutional cystectomy registry from 2000-2016. Pre- and post- NAC CT images were analyzed with BodyCompSlicer, a validated body composition assessment tool, to quantify skeletal muscle mass. Sarcopenia was defined as a skeletal muscle index (SMI) below gender-specific international consensus values. Associations of clinical features with pathologic downstaging (pathologic T stage ≤0) were assessed using multivariable logistic regression. Post-NAC sarcopenia (HR 1.90, 95% CI 1.02-3.56, p=0.04) but not pre-NAC sarcopenia (HR 1.60, 95% CI 0.89-2.87, p=0.12) was independently associated with an increased risk of cancer-specific mortality, although the association between sarcopenia and overall mortality was not statistically significant (p>0.05).

**Results:** A total of 183 patients were identified. Median follow up was 3.0 years (IQR 1.8-5.0), during which time 79 patients died, including 62 from bladder cancer. SMI declined by a mean of -1.7 cm²/m² during NAC treatment (p < 0.001). On multivariable logistic regression, neither pretreatment sarcopenia nor the amount skeletal muscle mass loss during NAC was significantly associated with downstaging to 0.05). At the same time, increasing clinical T stage (OR 0.59, 95% CI 0.40-0.88), Charlson comorbidity index ≥ 1 (OR 0.62, 95% CI 0.42-0.92), and female sex (OR 0.37, 95% CI 0.14-0.97) were associated with decreased odds of pathologic downstaging (all p<0.05). Meanwhile, post-NAC sarcopenia (HR 1.90, 95% CI 1.02-3.56, p=0.04) but not pre-NAC sarcopenia (HR 1.60, 95% CI 0.89-2.87, p=0.12) was independently associated with an increased risk of cancer-specific mortality, although the association between sarcopenia and overall mortality was not statistically significant (p>0.05).

**Conclusion:** Skeletal muscle mass declined significantly during NAC; nevertheless, neither the degree of muscle loss nor the presence of pretreatment sarcopenia were significantly associated with downstaging or survival following NAC and RC. These data do not support the use of sarcopenia as a tool for predicting or monitoring response to NAC for MIBC.
Poster #138

NOVEL SIGNATURES PREDICT RESPONSE OF BLADDER CANCER TO CISPLATIN-BASED NEOADJUVANT CHEMOTHERAPY

*Patrick Hensley, MD1; Matthew Purdom2; Daheng He3; Vincent DiCarlo1; Natasha Kyprianou1; Chi Wang3 and Andrew James1

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Presented By: Patrick Hensley, MD

Introduction: Cisplatin-based neoadjuvant chemotherapy (NC) before radical cystectomy (RC) has become standard practice in the management of muscle-invasive urothelial carcinoma of the bladder, but it confers only a modest survival advantage. Patients with pathologic progression on NC have poor outcomes, possibly related to a delay in definitive surgical management. Our group has previously shown that advanced stage and grade disease is associated with an epithelial-mesenchymal transition (EMT) phenotype. The goal of this study is to characterize the value of EMT effectors, actin-cytoskeleton remodeling proteins and apoptosis markers as biomarkers in transurethral resection (TUR) specimens to predict response to NC.

Methods: A tissue microarray (TMA) was constructed with matched pre-NC transurethral resection (TUR) specimens and post-NC cystectomy specimens from the same patients (N=69). TMA sections were immunostained for the EMT biomarkers, proteins involved in actin-cytoskeleton organization, and markers of apoptosis. Quantification of staining was performed by calculating a Quick Score (QS). Logistical regression models were used to study the association between expression and response to NC. For each biomarker, Kaplan-Meier curves and log-rank tests were used to compare the survival/disease-free probabilities between high (>median) and low (≤median) biomarker expression.

Results: Increased expression of mesenchymal markers (Vimentin P=0.028, N-cadherin P=0.004 and β-catenin P=0.019), actin-cytoskeleton markers (P-Cofilin P=0.036 and Tubulin P=0.007) as well as increased TUNEL (apoptosis) index (P=0.001) on TUR specimen was associated with extravesical disease at the time of cystectomy in patients treated with NC (Table). Low expression of Vimentin, N-cadherin, Zeb-1 and P-Cofilin on TUR specimens were statistically predictive of ypT0 disease at cystectomy (data not shown in Table).

Increased expression of N-cadherin (P=0.016) and high TUNEL index were associated with cancer-specific mortality (P=0.003). None of the biomarkers studied were predictive of disease recurrence (Table).

Conclusion: Expression profile of markers of the EMT landscape, effectors of actin-cytoskeleton remodeling and apoptosis regulators have predictive value for pathologic response to cisplatin-based NC. Furthermore, expression of select biomarkers are associated with disease-specific mortality. Further validation of our findings towards establishing these as novel biomarkers of adverse response to NC is of major clinical significance for optimizing patient selection for NC.

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DISTINCT GENOMIC HETEROGENEITY DISTINGUISHES BETWEEN METASTATIC UPPER AND LOWER TRACT UROTHELIAL CARCINOMA

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1University of Washington

Presented By: Brian R. Winters, MD

**Introduction:** The evolution of the mutational and genomic landscape of upper tract urothelial carcinoma (UTUC) from localized to metastatic disease has never been systematically studied. We evaluated the genomic features of multiple tumors from metastatic UTUC and more traditional lower tract urothelial carcinoma (LTUC) patients along with their matched primary tumors.

**Methods:** We performed whole exome sequencing on 37 specimens, including matched primary and metastatic tumor samples from 7 rapid autopsy patients. Predicted deleterious mutations (somatic single nucleotide variants, frameshift, and insertions and deletions) were identified using Mutect and Strelka with focus on mutations predicted to have deleterious impact using a battery of 11 mutation assessors. Genome scale somatic copy number variation was estimated using Sequenza to derive gene definition restricted copy number estimation outcomes. Multi-dimensional scaling (MDS) was used to visualize how copy number and high impact mutation-derived genomic distances differ between LTUC and UTUC patients. Mutations were assessed using dgdib/OncoKB to evaluate therapeutic implications.

**Results:** Mutational burden (mutation per megabase) was significantly higher in LTUC vs. UTUC overall (mean 6.6 vs. 3.8, p<0.001). Mutational signature analysis revealed higher proportion of APOBEC signature in LTUC vs. UTUC. Predicted deleterious mutations were consistently shared across primary LTUC and metastases within a patient, while there was more variability in UTUC. Gene set enrichment analysis revealed p53 and KRAS pathway mutations were enriched in LTUC vs. UTUC whereas EMT, MAPK signaling, chromatin remodeling, and DNA repair pathway mutations were represented in both cancer types. Copy number analysis revealed unexpectedly large inter- and intra-individual genomic distances between primary and metastatic UTUC tissues compared to LTUC. MDM2 amplification was exclusively detected in all UTUC tumors along with robust amplification of cell cycle and FGF pathway genes. Interestingly, analysis of putative drug targets revealed stark differences across various tumors within the same patient predicting a non-uniform response to specific targeted therapeutics.

**Conclusion:** Our results demonstrate that metastatic UTUC displays a lower overall mutational burden, but greater genomic structural variability compared to LTUC. Differences in pathway signatures between UTUC and LTUC suggest unique therapeutic vulnerabilities, however, tumor heterogeneity within the same patient may limit the efficacy of some targeted therapeutics.
Poster #140
DOWNSTAGING IN UPPER TRACT UROTHELIAL CARCINOMA AFTER NEOADYUVANT CHEMOTHERAPY AS A POSITIVE PREDICTOR OF OVERALL SURVIVAL

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Presented By: Jorge A. Daza, MD

Introduction: Neoadjuvant chemotherapy (NAC) has shown to determine significant rates of downstaging and pathological complete response in patients with upper tract urothelial carcinoma (UTUC). Moreover, NAC is associated with an overall survival (OS) improvement in patients with advanced UTUC. We aim to evaluate the impact of downstaging on OS of UTUC patients treated with NAC.

Methods: The National Cancer Database was queried for patients who underwent nephroureterectomy as definitive treatment for UTUC treated NAC and surgery. Patients were included if found to have cT2-4N0M0 disease, had not received radiation as part of the primary treatment and their pathology demonstrated transitional cell carcinoma. Downstaging was defined as the decrease of at least one stage from clinical T stage to pathological T stage.

First, the OS rate was estimated with the Kaplan-Meier method. Second, we assessed the role of downstaging on OS using the semi-parametric Cox proportional hazard model. The analysis was adjusted for age, sex, race, year of diagnosis, pN stage and surgical margins status. Finally, the analysis was repeated after excluding patients diagnosed as cT2.

Results: 128 patients met the inclusion criteria. Median follow-up for survivors was 27.3 months. Overall, 48 (38%) patients achieved downstaging after NAC, precisely 10, 32 and 6 presented with clinical T stage of 2, 3 and 4, respectively, which were found to be downstaged at time of surgery. The 5-year OS rate was 42% (95% CI: 31%, 53%). On Cox multivariable analysis, downstaging emerged as the sole predictor of overall survival (HR: 0.29, 95%CI: 0.14, 0.57; p<0.001). After the exclusion of cT2 patients the effect of downstaging as a predictor was confirmed (HR: 0.21, 95%CI: 0.10, 0.45, p<0.001).

Conclusion: Downstaging after NAC is a significant predictor of overall survival in patients with muscle invasive upper tract urothelial carcinoma.
Poster #141
GRADE OBTAINED ON URETEROSCOPIC BIOPSY FOR UPPER TRACT UROTHELIAL CARCINOMA - CAN WE RELY ON IT FOR FINAL TREATMENT DECISIONS?
*Timothy Clinton, MD, MPH1; Laura-Maria Krabbe, MD1; Stephen Ryan, MD2; Zachary Hamilton, MD2; Justin Matulay, MD3; Nirmish Singla, MD1; Solomon Woldu, MD1; Yuval Freifeld, MD1; Aditya Bagrodia, MD1; Ithaaar Derweesh, MD2; Jay Raman, MD1; Jose Karam, MD1; Surena Matin, MD1; Christopher Wood, MD1 and Vitaly Margulis, MD1
1UT Southwestern; 2UC San Diego; 3Columbia; 4Penn State; 5MD Anderson
Presented By: Timothy Clinton, MD, MPH

Introduction: Due to the shortcomings of endoscopic and clinical staging for upper tract urothelial carcinoma (UTUC), tumor grade obtained by ureteroscopic (URS) biopsy provides important information. This is intensified by the current attempt to treat more patients with low-grade disease with conservative, endoscopic management instead of extirpative surgery. Further, there has been evidence that patients with high-grade disease might benefit from presurgical chemotherapy (CTX). Therefore the accuracy of grade determination by URS biopsy for UTUC as well as predictive factors of upgrading at extirpative surgery have significant implications.

Methods: Multicenter retrospective analysis of UTUC patients undergoing extirpative surgery with a preoperative low grade (LG) UTUC on URS biopsy. The rate of upgrading was determined. Baseline demographics, comorbidities, pre-operative imaging, hematologic parameters and pathologic features were evaluated to identify predictors of upgrading. Outcomes included cancer-specific (CSS) and overall survival (OS).

Results: 921 patients were identified with 222 having LG UTUC on URS biopsy. Of those with LG biopsy, 97 (45.1%) were upgraded to high-grade at time of extirpative surgery with median follow-up 37 (IQR 15.6-64.7) months. The only preoperative clinical features significantly associated with upgrading were better ASA classification (p<0.01) and lower BMI (p=0.049). None of the patients had clinically infiltrative components on preoperative imaging. Of those upgraded, 27 (27.8%) were ≥pT2 (p<0.01) and 1 patient was pN1 and might have benefited from preoperative CTX. CSS and OS (Figure) demonstrate no significant difference in outcomes.

Conclusion: Low-grade pathology on URS biopsy may be often undergraded as demonstrated in this temporary cohort, which can have detrimental implications on the clinical management of patients. Despite advances in tools for ureteroscopic biopsy, improved imaging modalities and expert pathologists, there remains significant uncertainty. Thus in patients with endoscopically low-grade UTUC it is important to note that extensive tumor heterogeneity exists despite unsuspicious imaging for an infiltrative component as well as clinical parameters.
INTRODUCTION: In patients with advanced malignancies, palliative care has been shown to improve quality of life, mood, reduce hospital admissions, and improve survival (1,2). In 2016 the American College of Clinical Oncologists recommended that all patients with advanced malignancies receive palliative care (3). This study investigates factors that determine which bladder cancer patients receive palliative care.

METHODS: Retrospective data were collected from the National Cancer Database. 91994 patients were identified in the database with bladder cancer and at least AJCC cancer stage 2. 4139 of these patients received palliative care. Multivariable logistic regression models were used to test for association between independent predictors and receiving palliative care. Predictors included age, gender, race, comorbidities, insured status, socioeconomic status, education level, and location.

RESULTS: Independent predictors of receiving palliative care included: Asian race vs Caucasian (OR 1.345, p=0.01), living in a less educated area (OR 1.49, p<0.001), living in a rural area (OR 1.25, p<0.001), and having a higher Charlson-Deyo score (OR 1.28, p<0.001). There was a significant interaction between age, gender, and stage of disease. In patients with stage 4 disease, patients under 80 were more likely to receive palliative care compared to those 80 and over (OR 1.18, p=0.004). Additionally, women with stage 2 or 3 cancer (OR 1.28; 1.45, p<0.007) were more likely to receive palliative care than men while there was no difference between men and woman for those with stage 4 cancer.

CONCLUSION: In patients with a bladder malignancy, individuals who are uneducated, comorbid, of Asian descent, or live in a city under 20,000 have an increased probability of receiving palliative care. Gender was only a factor in lower stage disease, while younger age in higher stage of disease increased odds of palliative care. Insurance status and income did not influence the odds of palliative care. Limitations of this study include unmeasured confounders such as palliative care refusal or lack of referral. Regardless, this study demonstrates that variables often associated with decreased social privilege unexpectedly increase the likelihood of receiving palliative care. These findings provide a unique perspective towards access to healthcare resources, which are often underutilized in underprivileged individuals.
PROGNOSTIC UTILITY OF PD-L1 IN SQUAMOUS CELL CARCINOMA OF THE BLADDER

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Presented By: Ramy Youssef Yaacoub, MBBCh, MD

Introduction: There is growing interest in immunotherapy utilizing checkpoint inhibitors for treatment of bladder cancer. There have been no reports on the expression of programmed death ligand 1 (PD-L1) in squamous cell carcinoma (SCC) of the bladder. Herein, we assessed the relationship between PD-L1 expression and clinicopathological features and oncological outcomes in SCC.

Methods: Immunohistochemistry of PD-L1 was performed on 151 radical cystectomy specimens with pure SCC treated with radical cystectomy (RC) in Mansoura, Egypt from 1997 to 2003 with long term oncological outcomes. The relationship between PD-L1, pathological features, and oncological outcomes was analyzed.

Results: The study included 151 cases of SCC (98 men) with a median age of 52 years (range: 36-74 years). Schistosoma was associated with 81% of SCC cases. Overall, 141 (93%) patients presented with ≥ T2 stage and 47% had high grade carcinoma. Positive expression of PD-L1 was found in 101 (67%) specimens. Negative expression of PD-L1 was associated with higher pathological T stage (p = 0.04) and grade (p = 0.01). The median length of follow-up after RC was 63 months (range: 1-100 months). Kaplan-Meier analyses (see Figures) showed that negative expression of PD-L1 is associated with both disease recurrence (p = 0.01) and bladder cancer-specific mortality (p = 0.01). In multivariate Cox proportional hazards regression analyses, negative expression of PD-L1 was an independent predictor of disease recurrence (HR 2.05, 95% CI 1.06 - 3.96, p = 0.03) and bladder cancer-specific mortality (HR 2.89, 95% CI 1.22 - 6.82, p = 0.02), after adjusting for tumor grade, pathologic tumor stage, lymph node involvement, and lymphovascular invasion.

Conclusion: Negative expression of PD-L1 is associated with higher tumor stage, tumor grade, and worse oncological outcomes after RC for SCC. This study suggests that higher expression of PD-L1 may be part of the immune response associated with better outcomes in SCC. Further studies are needed to elucidate if PD-L1 can be a predictor of response to immunotherapy for SCC.

Figure 1: Kaplan-Meier Analysis Comparing Positive and Negative PD-L1 Expression
A. Recurrence-Free Survival
B. Cancer-Specific Survival
Poster #144
LATE SOFT-TISSUE RECURRENCES FOLLOWING RADICAL CYSTECTOMY HAVE DISTINCT PROGNOSTIC AND MANAGEMENT CONSIDERATIONS

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Presented By: Shawn Dason, MD, FRCSC

Introduction: Little is known about the prognosis and management of patients that experience a late soft-tissue recurrence (STR; >3 years after radical cystectomy (RC)). In this study, we report our institutional experience with late STR after RC with the goal of describing the relationship of recurrence timing with post-recurrence survival and characterizing our post-recurrence management strategy.

Methods: The study cohort comprised 2315 patients that underwent RC at our center between 2000-2014 and had a subsequent STR. Soft-tissue recurrence was defined as any urothelial carcinoma recurrence outside the urinary tract. We compared baseline characteristics and post-recurrence management between those with a soft tissue recurrence ≤3 and >3 years after RC. We created logistic regression models for the outcome of cancer-specific death at 1 year after first recurrence adjusting for time from radical cystectomy to first recurrence.

Results: We identified 617 patients that had a soft-tissue recurrence (STR). 344/617 (56%) patients died of bladder cancer within 1 year of STR. Median follow up for survivors was 2.6 years post-recurrence (IQR 0.95, 4.5). Compared to those with earlier recurrences, the 58 patients with late STR had a significantly lower consensus T stage, rate nodal involvement, and rate of multiple recurrence sites (Table). The 1-year bladder cancer death rate declined from 66% to 50% to 33% for the average patient experiencing recurrence 6 months, 2 years, and 5 years after RC, respectively. The estimated conditional survival for patients alive 1 year after a late recurrence was 45% at 5 years vs 21% after an early recurrence. Although salvage chemotherapy rates did not differ between early and late recurrences (p=0.5), more late recurrences received local consolidative therapy (metastasectomy or radiation; 19% late vs 3.6% early, p<0.0001). Late recurrence patients receiving local consolidation had a longer median disease-specific survival time from recurrence than early recurrences receiving local consolidation (114 months vs. 57 months, p=0.03).

Conclusion: The favorable prognosis of patients experiencing a late recurrence can be leveraged to individualize management in patients who recur after radical cystectomy. A significant subset of late recurrences will survive long term, providing a strong impetus for considering local consolidation of these recurrences in the appropriately selected patient.
UTEROTHelial CARCINOMA AND ASSOCIATION WITH CLINICAL OUTCOMES

Poster #145

CIRCULATING TUMOR DNA ALTERATIONS IN ADVANCED UROTHELIAL CARCINOMA AND ASSOCIATION WITH CLINICAL OUTCOMES

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1 Dana-Farber Cancer Institute, Boston, MA; 2 McMaster University, Hamilton, Ontario, Canada; 3 Guardant Health, Inc.; 4 Weill Cornell Medicine, New York, NY; 5 University of Utah Huntsman Cancer Institute, Salt Lake City, Utah; 6 UCLA Medical Center, Los Angeles, CA; 7 Wayne State Karmanos Cancer Institute; 8 University of Arizona Cancer Center; 9 Tulane University; 10 Roswell Park Cancer Institute; 11 University of Alabama at Birmingham; 12 University of Washington Cancer Center

Presented By: Guru Sonpavde, MD

Introduction: Cell-free circulating tumor (ct)-DNA profiling can noninvasively profile somatic genomic alterations in advanced urothelial carcinoma (aUC). We hypothesized that non-synonymous ctDNA alterations may inform prognostication.

Methods: Patients (pts) with aUC who underwent ctDNA analysis using Guardant360 were identified. A 73-gene ctDNA next generation sequencing panel from a CLIA-licensed, CAP-accredited laboratory (Guardant Health, Inc.) offers complete exon sequencing for 29 cancer genes, critical exons in 39 genes and amplifications (16 genes), fusions (6 genes) and indels (3 genes) harvested from 10 mL of peripheral blood. The Kaplan-Meier method was used to estimate overall survival (OS) and failure-free-survival (FFS). Cox proportional hazards regression was used to investigate the association of non-synonymous ctDNA alterations and clinical factors with OS and FFS in univariable analyses. All tests were two-sided and statistical significance was defined as a p ≤0.05.

Results: There were 124 evaluable pts with a median age at time of ctDNA collection of 72 years; 65 pts (52.4%) had prior platinum, 21 (17.1%) had prior taxane and 10 (8.1%) had prior PD1/PD-L1 inhibitor. At least 1 non-synonymous alteration was detected in 112 (90.3%) pts: 110 (88.7%) had mutations, 39 (31.5%) had copy number variations, 14 (11.3%) had indels, and 3 (2.4%) had fusions. The median number of alterations per sample was 4 (range 0-80). The most commonly altered genes were TP53 (54.8%), PIK3CA (24.2%), ARID1A (22.6%), ERBB2 (19.4%), EGFR (16.1%), NF1 (13.7%), RB1 (12.9%), FGFR3 (11.3%), BRAF (10.5%), BRCA1 (10.5%) and BRCA2 (9.7%). On univariable analyses, alterations of BRCA1 (HR for FFS: 2.35, p=0.016; HR for OS: 2.48, p=0.047) and RAF1 (HR for FFS: 2.40, p=0.047; HR for OS: 4.87, p=0.007) were associated with worse FFS and OS. ECOG-PS and visceral metastasis were associated with worse OS but not FFS. Heterogeneity was observed in serial assays with disappearance of some and emergence of new alterations.

Conclusion: Non-synonymous ctDNA alterations were detected in most pts with aUC and alterations appear similar to those reported in prior studies using tumor tissue. BRCA1 and RAF1 alterations were associated with worse outcomes, suggesting that inhibitors of DNA damage response and RAF kinase may yield clinical benefit. The dynamic nature of ctDNA clonal evolution merits further assessment.
INCIDENCE OF OCCULT NODAL METASTASES IN PATIENTS WITH COMPLETE RESPONSE OR DOWNSTAGING OF DISEASE AFTER NEOADJUVANT CHEMOTHERAPY FOR BLADDER CANCER

*Saum B. Ghodoussipour, MD; Shane Pearce, MD; Azadeh Nazemi; Zhoobin Bateni; Sumeet Bhanvadia, MD; Hooman Djaladat, MD; Anne Schuckman, MD and Siamak Daneshmand, MD*

1University of Southern California

Presented By: Saum B. Ghodoussipour, MD

**Introduction:** The gold standard therapy for muscle invasive bladder cancer remains radical cystectomy (RC) with pelvic lymphadenectomy. The addition of neoadjuvant chemotherapy (NAC) has demonstrated a survival benefit. Patients with a complete response (i.e. ypT0) have an excellent prognosis, which has led some to question the utility of surgery. However, previous studies have suggested an unacceptably high relapse rate with an intact bladder. We sought to determine the incidence of subclinical nodal metastases in patients who would have been considered complete responders to NAC.

**Methods:** We queried the National Cancer Database to identify all patients with urothelial predominant, clinically localized (cM0), node negative (cN0) muscle invasive bladder cancer (cT2-T4) who underwent RC following NAC. Our primary outcome was the identification of patients with complete response but nodal metastases (ypT0N+) or downstage of disease but nodal metastases (ypTa/Tis/T1N+) on final pathology. Results were stratified by demographic and pathologic variables including age, sex, ethnicity, comorbidities, lymphovascular invasion (LVI) and variant histology.

**Results:** We identified 16,245 patients who underwent RC from 2004-2013 after meeting inclusion criteria. Of these, 3,401 received neoadjuvant chemotherapy. Complete response (ypT0) occurred in 315 patients (9.3%), of which 14 (4.4%) had positive nodal disease. Downstaging to non-muscle invasive pathology (ypTa/Tis/T1) was identified in 365 patients (10.7%) and 21 (5.8%) had nodal metastases on final pathology. Age, sex, ethnicity, comorbidities, LVI and variant histology were not predictive of nodal metastases on final pathology.

**Conclusion:** A small but clinically significant number of patients will have nodal micro-metastases at the time of radical cystectomy despite a complete pathologic response or downstaging to non-muscle invasive disease in the bladder. Institutional studies are required to further investigate factors that may predict such adverse pathology.
Poster #147
TIMELY TREATMENT WITH RADICAL CYSTECTOMY AND INFUSION CHEMOTHERAPY AMONG 1,364 PATIENTS WITH MUSCLE-INVASIVE BLADDER CANCER

*Kim Danforth, ScD, MPH; Margo Sidell, ScD, MSPH; David Yi, MPH; Tiffany Luong, MPH; Ayaé Yamamoto, SM; Aniket Kawatkar, PhD; Ronald Loo, MD; Philip Kim, MD, MPH; Helen Moon, MD and Stephen Williams, MD*

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Presented By: Kim Danforth, ScD, MPH

Introduction: Recommended treatment for muscle-invasive bladder cancer (MIBC) consists of radical cystectomy (RC) with or without neoadjuvant chemotherapy, and timeliness of treatment has been associated with improved survival. We sought to identify factors associated with timely treatment – and to assess disparities in treatment by sex, race/ethnicity, and age – among a large diverse population of MIBC patients.

Methods: We created a retrospective cohort of all patients diagnosed with MIBC without distant metastases between 2001--2015 within a large, integrated delivery system. Timely treatment was defined as patients who had a RC within 12 weeks of diagnosis or those who started infusion chemotherapy preceding RC within 12 weeks. Generalized linear mixed models with a random effect for provider were used to estimate odds ratios (OR) and 95% confidence intervals (CIs), accounting for clustering of patients within providers.

Results: Among 1,364 MIBC patients, 40% received timely treatment. Patients with later-stage disease were more likely to receive timely treatment (stage 3 vs. 2, OR=2.06, 95% CI: 1.42-2.99; stage 4 vs. 2, OR=3.41, 95% CI: 2.25-5.18). Patient sex was not associated with timely treatment (female vs. male, OR=1.16, 95% CI: 0.82-1.65). Hispanic patients were less likely than non-Hispanic white patients to receive timely treatment (OR=0.47, 95% CI: 0.29-0.76), and there was some suggestion that non-Hispanic black patients might also be less likely to receive timely treatment (OR=0.59, 95% CI: 0.35-1.01). Compared to patients age 70-79, patients ≥80 were less likely to receive treatment (OR=0.27, 95% CI: 0.17-0.42). Patients with higher comorbidities were less likely to receive timely treatment than those without comorbidities (OR=0.42 for ≥2 vs. 0, 95% CI: 0.26-0.68). Urologist experience with RC surgery was associated with timely treatment (OR=1.03, 95% CI: 1.001-1.06 per surgery).

Conclusion: In this retrospective cohort spanning 15 years, a majority of patients with non-metastatic MIBC did not receive timely gold-standard treatment. Lack of timely treatment may partially reflect an inability to use recommended therapies or lack of treatment acceptance, highlighting the importance of continued research on alternative treatment strategies. Disparities were not observed by patient sex but were observed by race/ethnicity and age. These disparities should be considered in developing strategies for improving care quality.
BIOMARKERS OF THE MAMMALIAN TARGET OF RAPAMYCIN PATHWAY: IMPLICATIONS ON AGGRESSIVENESS OF SQUAMOUS CELL CARCINOMA OF THE BLADDER

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Presented By: Ramy Youssef Yaacoub, MBBCh, MD

Introduction: The mammalian target of rapamycin (mTOR) pathway is highly implicated in tumor growth and progression. We evaluated the association of altered expression of mTOR pathway components with pathological features and biomarkers of other known cancer pathways in squamous cell carcinoma (SCC) of the urinary bladder.

Methods: Immunohistochemistry (IHC) staining of HIF-1 and PhosS6 as constituents of the mTOR pathway and over 20 other biomarkers from known tumorigenic pathways was performed on radical cystectomy (RC) specimens with pure SCC from 1997-2003. IHC staining was done using an automated staining instrument (Dako Autostainer, Dako, USA) and evaluated by an experienced genitourinary pathologist for the extent and intensity of staining. Alterations of HIF-1 and PhosS6 were defined as negative expression. Pearson’s chi-square test was used to evaluate the relationship between mTOR constituents and pathological parameters, as well as markers of other cancer pathways.

Results: This study included 151 SCC patients with a median age of 52 years (range: 36 - 74 years). Table 1 shows the demographic, clinical, and pathological characteristics of this cohort. Altered HIF-1 expression was associated with high tumor grade and pathologic tumor stage (p < 0.05). Altered PhosS6 expression was associated with high tumor grade and lymph node involvement (p < 0.05). HIF-1 was associated with COX-2, p53, and markers of the FOXA1 pathway, such as CK5/6 and CK14 (p < 0.05). PhosS6 was associated with COX-2, Bax, and markers of the FOXA1 pathway, such as CK5/6, CK14 and UPK (p < 0.05). Neither HIF-1 nor PhosS6 were significantly correlated with disease recurrence or cancer-specific mortality.

Conclusion: Alteration of mTOR constituents is associated with aggressive pathological features of SCC. There seem to be significant interactions between the mTOR pathway and other cancer pathways implicated in the carcinogenesis and aggressiveness of SCC. Our results suggest a potential therapeutic role of targeting the mTOR pathway for treatment of SCC.
ACCURATE QUANTIFICATION OF RESIDUAL CANCER CELLS AT SURGICAL MARGIN REVEALS ASSOCIATION WITH CANCER RECURRENCE FOLLOWING ROBOT-ASSISTED RADICAL CYSTECTOMY

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Presented By: Ahmed A. Hussein, MD

Introduction: Local recurrence of bladder cancer following cystectomy remains a significant cause of bladder cancer-specific mortality. Residual cancer cells (RCCs) contribute to cancer recurrence and progression due either to tumor spillage or undetectable pre-existing micrometastatic tumor clones. Therefore the goal of the study was to detect and quantify RCCs using ultra-deep targeted sequencing (UTS) and compare the levels of RCCs with clinical variables and cancer recurrence.

Methods: This study enrolled 17 patients that underwent robotic-assisted radical cystectomy (RARC). Matched pelvic washings and blood were collected intra-operatively: before RARC, after RARC, after pelvic lymph node dissection (PLND), and in the suction fluid collected during the entire procedure. Two-step sequencing, including whole-exome sequencing (WES) followed by UTS (>50,000X), was used to quantify RCCs in each sample. Eight patients were excluded due to sample quality issues; analyses were finished in nine patients. RCC level was quantified for each sample as the relative cancer cell fraction (RCCF), and compared between different time points. The peak RCCF (pRCCF) of each patient was correlated with clinical and pathological variables.

Results: In the nine patients analyzed, RCCs were undetectable in all available before-RARC pelvic wash samples (0/7), but were present in half (14/26) of the other pelvic washings, with RCCFs ranging from 0.02-0.64% (median=0.19%). More pelvic washings were positive for RCCs in after-RARC (7/8) than after-PLND specimens (3/9) or in the suction fluid (4/9). Almost all blood samples were negative except for one sample that demonstrated an extremely low RCCF (0.02%). An association was found between pRCCF and cancer recurrence status: most patients (6/7) with high-pRCCF (>0.1%) developed recurrence with a median of 5.5 months, while none of the low-pRCCF (0/2) patients had recurrence during 18-24 months of followup. Furthermore, the five patients with highest pRCCFs demonstrated aggressive histologies.

Conclusion: This study demonstrated the feasibility of quantifying RCCs in intra-operative samples using ultra-deep sequencing, suggesting RCCs probably are caused by a biological mechanism rather than random spillage, and that pRCCF might be more sensitive than conventional markers such as tumor stage, histology, surgical margin or lymph node status for predicting recurrence.
Poster #150
RISK OF INTRA-ABDOMINAL RECURRENCE OF UROTHELIAL CARCINOMA FOLLOWING EXTIRPATIVE SURGERY BASED ON DISEASE STAGE AND OPERATIVE APPROACH: A POPULATION-BASED STUDY
Matthew B. Clements, MD, MS1; Tracey Krupski1 and Stephen Culp1
1University of Virginia
Presented By: Matthew B. Clements, MD, MS

Introduction: Minimally invasive surgery for bladder and upper tract urothelial carcinoma for high risk or muscle invasive disease has increased over the past decade. Studies that examine intra-abdominal recurrence of disease (IAR) following extirpative surgery for urothelial carcinoma (UC) and based on operative approach are limited. Our objective was to evaluate IAR based on operative approach in patients undergoing radical cystectomy (RC) for bladder cancer (open or robotic-assisted laparoscopic (RAL)) or extirpative surgery for upper tract urothelial carcinoma (UTUC) (open, laparoscopic, or RAL).

Methods: Patients with non-metastatic UC undergoing definitive RC or UTUC surgery were identified using Medicare-linked data from the Surveillance Epidemiology and End Results Program (2004-2013). Patients were categorized based on operative approach using CPT codes, and IAR was defined using ICD-9 code 197.6. Kaplan-Meier methods were used to evaluate time to development of IAR. Independent predictors of IAR were determined using multivariable Cox proportional hazards regression analysis. We performed subset analyses to determine differences in locally-advanced (≥T3 or N+) or organ-confined (≤T2, N-) cohorts.

Results: A total of 6,444 and 4,257 patients met inclusion criteria for the RC and UTUC cohorts, respectively. On time to event analyses, RAL was associated with an increased rate of IAR in both RC (p=0.037) and UTUC (p=0.012). On multivariable analysis, RAL was associated with an increased risk of IAR compared to open surgery in RC (Hazard Ratio (HR) 1.63, p=0.018) and also in UTUC surgery (HR 2.27, p=0.005). There was no difference in IAR risk in laparoscopic vs. open UTUC surgery (HR 0.96, p=0.838). These findings appeared to be driven by patients with locally-advanced disease. In the locally-advanced subset, the risk of IAR in RAL compared to open was significantly higher for RC (HR 2.32, p=0.001) and UTUC surgery (HR 3.32, p=0.001). No difference was seen in either analysis of the organ-confined subsets.

Conclusion: Exirpative robotic-assisted surgery for bladder cancer or UTUC was associated with a higher risk of IAR. These findings appeared to be driven by locally-advanced cases, suggesting that the RAL approach may be better utilized in non-advanced cases. Further studies are needed to validate these findings given the increased use of RAL in the surgical management of UC.
Poster #151
POPULATION-BASED SURVIVAL OUTCOMES AND TREATMENT COSTS COMPARING RADICAL CYSTECTOMY WITH TRIMODAL THERAPY FOR PATIENTS DIAGNOSED WITH LOCALIZED MUSCLE-INVASIVE BLADDER CANCER

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1UTMB; 2MD Anderson Cancer Center

Presented By: Mohamed Danny Ray-Zack, MBBS

Introduction: Treatment guidelines for muscle-invasive bladder cancer recommend radical cystectomy (RC). However, use of trimodal therapy (TMT) has increased in recent years with conflicting survival outcomes. The aim of this study was to compare RC and TMT in terms of survival outcomes and cost of treatment.

Methods: Patients aged 66 years or older diagnosed with clinical stage T2-4a bladder cancer from January 1, 2002-December 31, 2011 were included from the Surveillance, Epidemiology, and End Results (SEER)-Medicare database. Outcomes included cancer-specific survival, overall survival, and 6-month costs. Cox proportional hazards regression, propensity score matching (PSM) and inverse probability of treatment weighting (IPTW) were used to control for baseline differences between patients undergoing RC vs. TMT, and to determine predictors for overall and cancer-specific survival.

Results: A total of 2,963 patients were included: 728 (24.6%) who underwent TMT were compared to 2,235 (75.4%) who underwent RC. In all adjusted analyses (Table 1), patients who underwent TMT had significantly decreased cancer-specific survival (Cox regression: Hazard Ratio (HR) 1.51, 95% Confidence Interval (CI) 1.40-1.63; PSM: HR 1.55, 95% CI 1.32-1.83; IPTW: HR 1.51, 95% CI 1.32-1.83) and overall survival (Cox regression: HR 1.54, 95% CI 1.39-1.71; PSM: HR 1.49, 95% CI 1.31-1.69; IPTW: HR 1.54, 95% CI 1.39-1.71). However, median total costs over six months period were significantly higher with TMT than RC ($171,401 vs. $99,890, p<0.001).

Conclusion: TMT therapy was associated with decreased cancer-specific and overall survival at increased costs compared to RC. In the absence of data from randomized controlled trials, this observational study provides further evidence to suggest the superiority of RC over TMT in patients with muscle-invasive bladder cancer.

Table 1: Association of Bladder Cancer Treatment with Survival Outcomes and Costs of Care

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Unadjusted</th>
<th>Cox proportional hazards regression</th>
<th>Propensity score matching</th>
<th>Inverse probability of treatment weight</th>
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<tbody>
<tr>
<td>RC</td>
<td>Ref</td>
<td>Ref</td>
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<tr>
<td></td>
<td>Overall Survival, HR (95% CI)</td>
<td></td>
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</tr>
<tr>
<td>TMT</td>
<td>1.55 (1.24-1.89)</td>
<td>1.38 (1.25-1.53)</td>
<td>1.49 (1.31-1.69)</td>
<td>1.54 (1.39-1.71)</td>
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<tr>
<td></td>
<td>Cancer-Specific Survival, HR (95% CI)</td>
<td></td>
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<tr>
<td>TMT</td>
<td>1.24 (1.10-1.39)</td>
<td>1.50 (1.32-1.70)</td>
<td>1.55 (1.32-1.83)</td>
<td>1.51 (1.40-1.63)</td>
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<tr>
<td></td>
<td>Total Median Cost – 6 months, Difference (95% CI)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>TMT</td>
<td>$63,901 (54,093-73,764)</td>
<td>$91,090 (77,327-104,853)</td>
<td>$91,468 (76,468-106,469)</td>
<td>$87,415 (76,820-98,009)</td>
</tr>
</tbody>
</table>

RC: Radical Cystectomy; TMT: Trimodal Therapy
Poster #152
A MULTI-INSTITUTIONAL INVESTIGATION OF THE INFLUENCE OF MICROPAPILLARY UROTHELIAL CARCINOMA VARIANT ON PROGNOSIS AFTER RADICAL CYSTECTOMY
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Presented By: Anirban P. Mitra, MD, PhD

Background: While evidence suggests that micropapillary urothelial carcinoma (MUC) is an aggressive variant with poor prognosis, these data are derived from single-institution or population-based series with limited events or curated clinicopathologic data. We sought to determine association of MUC with outcomes after radical cystectomy using a large cohort aggregated from centers of excellence in bladder cancer.

Methods: Information on MUC patients treated with radical cystectomy (1980-2011) was obtained from five academic centers across North America and Europe. Tumor histology was categorized as urothelial carcinoma without any histologic variants (UC; n=1,346) or MUC (n=151). Patients were assigned a diagnosis of MUC if histopathology revealed any micropapillary component. Univariable and multivariable models were used to analyze associations with recurrence-free (RFS) and overall (OS) survival.

Results: Median age was 67 years; 80% were males. Median follow-up was 10 and 8 years for UC and MUC groups, respectively. No differences were noted between UC and MUC groups with regard to age, gender, clinical stage, and administration of neoadjuvant and adjuvant chemotherapy (all, p≥0.10). When compared with UC, presence of MUC was associated with higher pathologic stage (organ-confined, 60% versus 27%; extravesical, 18% versus 23%; node-positive, 22% versus 50%; p<0.01) and lymphovascular invasion (LVI; 29% versus 58%; p<0.01) at cystectomy. Compared with UC, MUC patients had poorer 5-year RFS (70% versus 44%; p<0.01) and OS (61% versus 38%; p<0.01). Presence of MUC was associated with worse RFS and OS compared with those with pure UC, irrespective of whether micropapillary features comprised part or entirety of the tumor (both, p<0.01). However, on multivariable analysis, presence of MUC was not independently associated with risks of recurrence (p=0.27) or mortality (p=0.12).

Conclusion: This is the first non-registry international multi-institutional effort to suggest that presence of MUC is associated with advanced stage and higher LVI rates at cystectomy. These features portend poor prognosis in MUC patients by unadjusted survival analysis. However, after controlling for clinicopathologic predictors, presence of MUC was not independently associated with outcomes. This suggests that MUC patients have more aggressive disease at presentation, but do not experience worse outcomes when controlled for standard predictors. Our data support continued use of radical cystectomy for treating MUC patients.
DEVELOPMENT AND VALIDATION OF AN IMPROVED PATHOLOGICAL NODAL STAGING SYSTEM FOR UROTHELIAL CARCINOMA OF THE BLADDE

*Devin Patel, MD1; Michael Luu, MPH1; Zachary Zumsteg, MD1 and Timothy Daskivich, MD1

1Cedars-Sinai

Presented By: Devin Patel, MD

Introduction: Current pathological nodal staging for bladder cancer is based on lymph node (LN) location but not number of positive LN. We sought to improve prognostic classification by creating a novel staging system incorporating positive LN burden.

Methods: We sampled 12,515 patients from the National Cancer Database (NCDB) and 5,928 patients from the Surveillance, Epidemiology, and End Results (SEER) database with muscle-invasive bladder cancer (MIBC) for our development and validation cohorts, respectively. Multivariable Cox proportional hazards analysis with restricted cubic splines was used to assess the association between number of metastatic LNs and overall mortality (OM). A novel staging system was derived by recursive partitioning analysis (RPA) in NCDB and validated in SEER by assessing discrimination (Harrel’s c-index) and calibration (mean absolute prediction error).

Results: Mortality risk increased continuously with more metastatic LNs, the effect most pronounced up to four LNs (HR 1.29, 95% CI 1.26–1.33) and attenuated beyond four nodes (HR 1.03, 95%CI 1.02–1.05). Location of LN involvement was not a significant predictor of OM. RPA generated a novel staging system predicting mortality by metastatic nodal number with cutpoints at 0 (Ref), 1 (HR 1.57, 95%CI 1.46–1.69), 2-3 (HR 2.03, 95%CI 1.88–2.19), 4–7 (HR 2.46, 95%CI 2.25–2.70), and >7 (HR 3.83, 95%CI 3.38–4.33) positive LNs. The optimism-corrected c-index for the proposed system on a bootstrapped internal validation sample showed improvement in predictive ability over the AJCC (8th edition) nodal-classification system (Figure). In external validation, the novel staging system showed good risk discrimination (optimism corrected c-index 0.677, 95%CI 0.672-0.682) and calibration (mean absolute prediction error 0.011 for 5-year OM). Results remains similar regardless of neoadjuvant chemotherapy status.

Conclusion: Number of metastatic LNs predicts mortality better than LN location. Our proposed nodal staging system stratifies risk over a greater spectrum, specifically for those at highest risk of poor prognosis and may improve pathological nodal staging in MIBC.
Poster #154
MOLECULAR CHARACTERIZATION OF NEUROENDOCRINE-LIKE BLADDER CANCER
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1Johns Hopkins Medical Institution, Baltimore, USA; 2 Department of Urologic Sciences, University of British Columbia; 3CHU Henri Mondor, Créteil, Assistance publique – Hôpitaux de Paris; 4GenomeDx Biosciences, Inc., Vancouver, British Columbia, Canada; 5Massachusetts General Hospital, Boston, USA; 6Department of Urology, University of Washington School of Medicine, Seattle, Washington, USA; 7UC Davis Comprehensive Cancer Center, Sacramento, CA, USA; 8Department of Urology, University Hospital of Southampton, Hampshire, UK; 9Erasmus University Medical Center, Rotterdam, Netherlands; 10Netherlands Cancer Institute, Amsterdam, Netherlands; 11Department of Urology, University of Minnesota, USA; 12Department of Urology, University of Bern, Bern, Switzerland; 13Dana-Farber Cancer Institute, Boston, USA; 14San Diego Pathologist Medical group, San Diego, USA; 15Urology Department, University of Southern California, Los Angeles, California, USA; 16Cleveland Clinic, Cleveland, Ohio, USA; 17UT Southwestern Medical Center, Dallas, USA
Presented By: Trinity J. Bivalacqua, MD, PhD

Introduction: Neuroendocrine bladder carcinoma (NEBC) is a rare and aggressive variant. Molecular subtyping studies have found that 5-15% of muscle invasive bladder cancer (MIBC) have transcriptomic patterns consistent with NEBC in the absence of neuroendocrine (NE) histology.

Methods: Transcriptome-wide expression profiles were generated for MIBC patients collected from 7 institutions and through the commercial use of Decipher Bladder. Using an unsupervised clustering approach, we generated a robust clustering solution on a prospective training cohort (n = 175), developed single sample classifiers to predict NE tumors, and evaluated the resultant models on a testing cohort (R1; n=225). A random forest model was finalized and applied to 4 validation cohorts, including a radical cystectomy only cohort (RC2; n=256), a neoadjuvant chemotherapy (plus radical cystectomy) cohort (NAC; n=233), a trimodal therapy cohort (TMT; n=139) and the TCGA radical cystectomy cohort (n=408). Uni- and multi-variable survival analyses were used to characterize the clinical outcomes of the NE-like tumors. 7 pathological confirmed NE tumors were collected to test the performance of the model. We analyzed the true NE tumors and NE-like by H&E and validated the expression of neuronal markers by immunohistochemistry staining.

Results: In the training set, hierarchical clustering using a panel of 84 genes showed a cluster of 8 patients (4.6%) with highly heterogeneous expression of NE markers in the absence of basal or luminal marker expression. This biological profile was consistently seen across 4 validation cohorts, where NE-like tumors were identified in 1.3% to 7.1% of cases. These patients had significantly worse 1-year progression free survival (65% NE-like vs 82% overall; p=0.046). After adjusting for various clinical and pathological factors, patients with NE-like tumors had a 6.40 increased risk of all-cause mortality (p=0.001). Staining with neuronal markers on 12 NE-like cases confirmed the neuronal character of these tumors. The NE-like tumors showed distinct therapeutic drug sensitivities to conventional chemotherapy drugs, including cisplatin and etoposide.

Conclusion: We have developed single patient classifier that identifies patients with histological urothelial cancer that harbors a NE transcriptomic profile. This represents a high-risk group of MIBC which may require different treatment. Further validation will be required to assess the potential clinical utility of this NE-like classifier.
THE COST TO MEDICARE OF BLADDER CANCER SURVIVORSHIP

*Wei Phin Tan, MD1; Gregory Barton1; Frank Sloan1; Arseniy Yashkin1; Igor Akushevich1 and Brant Inman1

1Duke University

Presented By: Wei Phin Tan, MD

Introduction: Surveillance and treatment of bladder cancer is known to be costly to insurers such as Medicare, but the medical cost of bladder cancer patients relative to identical control patients without bladder cancer is unknown.

Methods: A case-control study using 1998-2013 SEER-Medicare registry data for bladder cancer cases and a 5% random sample of Medicare beneficiaries for controls was conducted. Controls without bladder cancer were propensity-matched for diagnosis year, age, gender, race, and 31 component comorbidities from the Elixhauser index. Three successive 5-year bladder cancer incidence cohorts from 1998 (n=3,136), 2003 (n=7,000), and 2008 (n=7,002) were compared for trends in survival and Medicare payments. Medicare Parts A and B payments inflated to 2018 dollars using monthly values of the Experimental Consumer Price Index—Medical were tabulated, and monthly costs compared between cases and controls. To calculate differences in survival outcomes between incidence year cohorts, we used a difference-in-differences approach.

Results: From 1998-2008, bladder cancer patients became older and had more comorbidities at initial diagnosis, though no stage migration or change in survival was detected. Incremental costs (above controls) were highest during the first year post-diagnosis, and were higher with distant cancer ($47,533), than regional cancer ($42,403), or localized cancer ($14,304). However, survival of bladder cancer was highly stage dependent with 55% of localized cancers and <2% of patients with distant cancers surviving to 5-years compared to 62% for controls. After an initial dramatic spike in costs lasting 1-2 years, monthly costs dropped in survivors but remained higher than controls. Long-term survivors, most of which had localized cancers, accrued the highest cumulative health care costs, approximately $172,426 over 16 years, and amount 46% higher than controls surviving a similar duration of time. The high cost of survivorship was due to the cost of surveillance, treatment, and treatment-morbidity management.

Conclusion: While a diagnosis of bladder cancer incurs initial high Medicare costs particularly in patients with advanced cancers, the cumulative costs of bladder cancer in long-term survivors are even higher. Early detection, better therapies, and life extension of elderly persons with bladder cancer are worthwhile goals, but they come at the cost of higher Medicare outlays for bladder cancer care.
Poster #156
TUMOR-PRODUCED HYALURONAN SUPPORTS EXPANSION OF MYELOID DERIVED SUPPRESSOR CELLS AND PROMOTES DEVELOPMENT OF PD-L1+ MACROPHAGES IN BLADDER CANCER MICROENVIRONMENT

*Paul L. Crispen, MD1; Paul Dominguez Gutierrez1 and Sergei Kusmartsev1
1University of Florida
Presented By: Paul L. Crispen, MD

Introduction: PD-L1 is considered a major player in the regulation of anti-tumor immune response and its expression is highly upregulated in human and experimental bladder cancer. Additionally, bladder cancer is characterized by aberrant hyaluronan (HA) metabolism resulting in increased HA production in tumor tissue. HA is a prominent component of the tumor stroma/microenvironment. Membrane-bound or free extracellular HA favors tumor progression by inducing tumor cell motility, invasive properties, proliferation, production of growth factors and epithelial-mesenchymal transition. Here, we provide evidence that tumor-produced HA contributes to the formation of immunosuppressive tumor microenvironment and stimulates PD-L1 expression.

Methods: Myeloid-derived Suppressor Cells (MDSCs) were isolated from peripheral blood of bladder cancer patients or from spleen of MBT-2 bladder tumor-bearing mice using microbeads (Miltenyi Biotec). Expression of PD-L1 and cell surface markers were measured using immunofluorescence microscopy. Cytokine production was evaluated with Multiplex cytokine assay, and PGE2 production via ELISA. Tumor-produced HA was visualized using HA binding protein (biotin-HABP). Expression of HA synthases (HAS1-3) was determined by qRT-PCR.

Results: Tumor-derived HA specifically binds to CD44 receptor expressed by myeloid precursors, such as MDSCs and promotes its expansion with differentiation toward PD-L1-expressing F4/80+ macrophages. Inhibition of HA synthesis in tumor cells with pharmacologic inhibitor 4-MU, or blockade of CD44 signaling in myeloid cells with anti-CD44 antibody, prevented macrophage differentiation and tumor-induced up-regulation of PD-L1 expression. We also found that tumor-derived HA stimulated production of immunosuppressive and inflammatory factors IL-6, IL-10, TNF-alpha, IL-1beta and PGE2 by myeloid cells in CD44-dependent manner. Moreover, tumor-produced HA stimulated development of PD-L1-expressing macrophages in both murine and human myeloid cells.

Conclusion: Our study suggests that bladder cancer may evade the immune system by creating a protective “shield” in the form of tumor-produced HA, which binds to the CD44-expressing tumor-recruited MDSCs, stimulating production of immunosuppressive factors and promoting development of the PD-L1+ macrophages. Inhibition of hyaluronan synthesis by tumors or targeting HA-CD44 signaling may provide an attractive approach to break tumor-induced immune tolerance and improve the immune response.
**Poster Session II — Full Abstracts**

**Poster #157**

**PAN CARCINOMA ARTIFICIAL NEURAL NETWORK ALGORITHM FOR PREDICTION OF HIGH DOCETAXEL SENSITIVITY IN UROTHELIAL CARCINOMA**

*Thomas Sanford, MD¹; Reema Railkar¹; Stephanie Harmon¹ and Piyush Agarwal¹

¹NCI

Presented By: Thomas Sanford, MD

**Introduction:** Despite recent advances in second line therapy for patients with advanced bladder cancer, most patients eventually progress. Selection of the choice of additional therapy who have progressed despite cisplatin-based therapy and immunotherapy is difficult. Docetaxel has been tested in the 2nd line setting and is associated with a 13% response rate. In this study, we use deep learning to develop a gene expression model to identify those most likely to respond to docetaxel.

**Methods:** Cell line and drug sensitivity data were obtained from the genomics of drug sensitivity website (www.cancerrxgene.org). A total of 292 carcinoma cell lines were used for training and a total of 74 carcinoma cell lines were used for validation. A separate test set of 14 bladder carcinoma cell lines were used as a validation set. Gene expression microarray data were downloaded in pre-processed form and scaled with mean of zero and standard deviation of 1. Drug sensitivity defined as the top 10% of IC50 values were considered to be sensitive and the bottom 90% were considered not sensitive. All of the 10240 genes were used as inputs to the neural network. The neural network consistent of 4 total densely connected layers with 4-12 nodes in each layer. The ReLU activation function was used in all nodes other than the output node, which used a sigmoid activation function. Dropout of 0.5 was used in each layer. Sensitivity was confirmed with a cell viability assay.

**Results:** The final model was tuned using parameter sweeps. Accuracy on the training set was 90-100%, accuracy on the validation set was 94.0%. Of the bladder cancer cell lines, the algorithm predicted the correct classification in 13/14 bladder cancer cell lines. 5637 and BFTC-905 were among the top 10% most sensitive cell lines, and their sensitivity was correctly predicted by the algorithm. 5637 was confirmed to have an IC50 of 1nM to docetaxel.

**Conclusion:** A deep learning model was able to learn to use gene expression data to correctly predict which cell lines had a high degree of sensitivity to docetaxel. Further studies are needed to see if this approach can generalize to patient samples.
Poster #158

USING METAGENOMICS TO IDENTIFY PROGNOSTIC BIOMARKERS THAT INFLUENCE CELLULAR NETWORKS IN BLADDER CANCER

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Presented By: Anirban P. Mitra, MD, PhD

Introduction: Profiling studies have identified several biomarker panels that are associated with bladder cancer outcomes. However, there is marginal overlap between such panels, thereby limiting their clinical applicability. We employed metagenomics to identify biomarkers that would represent the confluence of various cellular networks affected during bladder carcinogenesis and progression, and investigate their prognostic value.

Methods: Prior expression profiling studies were reviewed to identify protein-coding gene panels associated with oncologic outcomes in bladder cancer. After excluding non-mappable genes, curated pathway analyses were used to enumerate direct and indirect interactions between mRNAs within the context of merged biological networks. Top ranking molecules, defined by the highest percentile of interactions, were evaluated for their prognostic potential in independent datasets.

Results: 825 genes were shortlisted and used to construct two large merged interactome networks. A total of 8,776 direct and indirect molecular interactions were identified. The identified genes were then percentile-ranked based on the number of their direct and indirect interactions with neighboring genes within curated pathways. 78 molecules contributed to the top 90 percentile of all interactions; merged analysis identified IFNG, TNF, TGFB1, IL2, TP53, ERBB2, and IL13 among the top 99-percentile of biomarkers, which were used for further analyses. The top-ranked canonical pathways included intranuclear receptor signaling, activation and modulation of T lymphocytes, death receptor and interleukin signaling, and other pathways associated with molecular progression of cancer. The cellular functions associated with these networks included cell death, cell-cycle regulation, cell growth and proliferation, and cellular movement. The top biomarkers were then individually analyzed on three independent bladder cancer datasets (total, n=489 patients). ERBB2 overexpression was associated with higher rates of overall mortality in two datasets (p=0.002 and p=0.005), while IL13 overexpression was noted to be favorable for overall survival in another dataset (p=0.01). Merged canonical analysis also indicated that these may be druggable targets in bladder cancer.

Conclusion: We describe a metagenomic approach for identifying biomarkers that play putative crucial roles in modulating the molecular circuitry in bladder cancer. In addition to being consensus biomarkers that are generated from previously described prognostic panels, these may also represent druggable targets in this disease.
Poster #159
PRESENCE OF PIK3CA MUTATIONS IN ARID1A WILD TYPE, HIGH-GRADE BLADDER CANCER IS ASSOCIATED WITH REDUCED INCIDENCE OF RECURRENCE AFTER INTRAVESICAL BACILLUS CALMETTE-GUERIN THERAPY

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Presented By: Nima Almassi, MD

Introduction: Identifying genomic alterations in high-grade bladder cancer associated with clinical response to intravesical Bacillus Calmette-Guerin (BCG) therapy would be of great clinical utility, both for prognostic purposes and the development of novel targeted therapy. Our group previously demonstrated an association between ARID1A mutations and an increased risk of recurrence after BCG therapy (Pietzak et al, Eur Urol, 2017). With the goal of identifying additional predictive genomic biomarkers of BCG response, we examined a cohort of BCG-naïve patients with ARID1A wild type high-grade bladder cancer treated with intravesical BCG therapy.

Methods: We identified treatment naïve NMIBC patients enrolled on a prospective IRB-approved protocol for which targeted exon capture sequencing (MSK-IMPACT) was performed on pretreatment tumor DNA and matched germline DNA in a CLIA-certified laboratory and who were subsequently treated with intravesical BCG. Analysis was restricted to patients with ARID1A wild type tumors. The primary endpoint of analysis was high-grade recurrence following intravesical BCG therapy. Genomic alterations and tumor mutational burden (TMB) were correlated with recurrence of high-grade disease after BCG.

Results: Seventy-four patients were identified who met inclusion criteria. Forty-one patients (55%) were cTa, 10 (14%) cTis, and 23 (31%) cT1 at diagnosis. At a median 49-month (IQR 33-75) follow-up, 25 patients (34%) experienced high-grade recurrence. PIK3CA mutations were associated with a reduced risk of high-grade recurrence after BCG (8% v. 37%, p=0.01). High TMB was also associated with a lower incidence of high-grade recurrence at 12 months compared to low TMB (11% v. 31%, p=0.06).

Conclusion: Among BCG-naïve patients with ARID1A wild type tumors, the presence of PIK3CA mutations was associated with a reduced risk of high-grade recurrence following intravesical BCG therapy. High TMB also appears to be associated with a reduced risk of high-grade recurrence after BCG, although this relationship will require a larger prospective cohort to confirm this hypothesis. These findings may potentially serve as predictive biomarkers for BCG response and improve current risk stratification methods.
Poster #160
FAMILIAL BLADDER CANCER: INCIDENCE AND GERMLINE MUTATION PREVALENCE

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Presented By: Guru Sonpavde, MD

Introduction: Recent data indicate an increased bladder cancer risk in first-degree relatives of patients with bladder cancer. The familial aggregation of bladder cancers suggests a role for inherited germline mutations. Bladder cancer is a well-established component tumor of Lynch syndrome and occurs with a higher frequency among MSH2 mutation carriers. Polymorphisms in other DNA damage repair (DDR) genes including NBN, XPC and OGG1 have been reported in bladder cancer patients. However, the incidence and association of familial bladder cancer with germline genetic mutations is unknown.

Methods: Retrospective medical record review was conducted of bladder cancer patients treated at Dana-Farber Cancer Institute (DFCI) to identify those a first-degree relative with bladder cancer. A second cohort of patients referred to the Cancer Genetics and Prevention Disease Center at DFCI for suspicion of a hereditary cancer syndrome was analyzed for an association between germline mutations and bladder cancer. Descriptive reports were generated for proportions of patients with the variable.

Results: Among 976 patients with bladder cancer, 43 patients (4.4%) had a family history of bladder cancer in a first-degree relative. In the second cohort, 27 of 80 (34%) patients with bladder cancer evaluated for hereditary cancer syndromes had a germline mutation. Pathogenic mutations were identified in the following genes: APC, ATM, BARD1, BRCA1, BRCA2, CHEK2, FANCA, FANCQ, MLH1, MSH2, MUTYH, PALB2, PMS2 and SDHC.

Conclusion: This is the first study to our knowledge to quantify the incidence of familial bladder cancer – defined here as a family history of bladder cancer in a first degree relative – to be 4.4%. Additionally, among patients suspected to have a familial cancer syndrome, 34% of patients with bladder cancer had a known pathogenic germline mutation. Further study of germline mutations in patients with familial bladder cancer including loss of heterozygosity somatic testing may provide insights regarding disease pathogenesis and inform therapy.
Poster #161
COMPREHENSIVE RADIOGENOMIC ANALYSIS OF QUALITATIVE AND QUANTITATIVE FEATURES OF CROSS-SECTIONAL IMAGING IN THE TCGA PROJECT IN MIBC
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Presented By: Seth P. Lerner, MD

Introduction: Quantitative imaging descriptors derived from CT and MRI images can be integrated with genomic data in order to test associations with mutations, disease biology, molecular phenotypes and may be used as noninvasive prognostic or predictive biomarkers. We report the results of this integrated radiogenomics project designed to develop subjective and objective parameters that can be extracted from cross-sectional imaging of MIBC based on studies archived in the TCIA and linked to the TCGA project in MIBC.

Methods: TCGA project in MIBC reported comprehensive integrated genomic analysis of 412 tumors (Cell 2017). Seven of the 33 tissue source sites also submitted cross-sectional imaging scans to the TCIA for 106 patients. We developed a comprehensive list of 17 features describing lesion size, tumor locations, sites of metastases, and tumor morphology; 9 GU radiologists reviewed the scans blinded to the readings of the other radiologists. The data was compiled and analyzed by one of us (EH) independently of the radiologists. To assess inter-reader agreement, kappa statistics were computed for categorical features while coverage probabilities (i.e. probabilities of radiologists’ reads on the same case differing by no more than 25%) were computed for quantitative features(Lin et al 2002). Associations between individual features and molecular subtypes were assessed using Fisher’s Exact Test for categorical features and the Kruskal-Wallis Test for quantitative features.

Results: Substantial agreement (κ≥ 0.6) was observed in four features: tumor laterality, tumor within bladder diverticulum, right and left ureterovesical junction involvement, and right and left hydroureter. Weak agreement (95% CI for kappa <0.4) was observed in bladder neck, posterior bladder, dome, and trigone involvement, tumor margin, internal architecture, radiographic stage, left upper tract involvement, and metastases. The coverage probability for lesion size was 0.59 (0.544-0.638) (Figure). Tumor morphology was found to be associated with microRNA cluster, with diffuse wall thickening morphologies having a higher tendency toward Clusters 3 and 4 than other morphologies (p = 0.00009).

Conclusion: This blinded comprehensive assessment of qualitative and quantitative features extracted from cross-sectional imaging highlights many of the ongoing challenges in staging patients with MIBC. We will continue to refine and investigate relationships between features and correlate these findings with the TCGA genomic data.
Poster #162
TRENDS AND MORBIDITY FOR MINIMALLY INVASIVE VERSUS OPEN CYTOREDUCTIVE NEPHRECTOMY IN THE MANAGEMENT OF METASTATIC RENAL CELL CARCINOMA
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Presented By: Dimitar V. Zlatev, MD, MS

**Introduction:** Cytoreductive nephrectomy (CN) prior to systemic therapy for metastatic renal cell carcinoma (RCC) is recommended in patients with a surgically resectable primary tumor. Traditionally performed as open surgery, the advent of laparoscopic and robotic surgery provides a minimally invasive alternative to CN with a potential for accelerated recovery and earlier initiation of systemic therapy. We sought to compare the trends and morbidity of laparoscopic, robotic, and open CN for patients with metastatic RCC.

**Methods:** Using the Premier Hospital Database (Premier, Inc., Charlotte, NC), we identified 24,145 patients who underwent elective radical nephrectomy for metastatic RCC in the United States between 2003 and 2015. Comparative analysis between laparoscopic, robotic, and open CN was performed with propensity weighting on rates of 90-day complications, prolonged operating time, blood transfusion, prolonged length of stay (LOS), discharge destination, 90-day readmission, 90-day mortality, and direct hospital costs.

**Results:** Over the course of the study period, the rates of open CN decreased from 76.7% to 66.4%, laparoscopic CN decreased from 22.3% to 11.4%, and robotic CN increased from 0.6% to 22.1%. Compared to open CN, the laparoscopic approach was associated with a 29% decreased odds of 90-day major complications (OR 0.71, 95% CI 0.54 - 0.94, p<0.05). Compared to open CN, both laparoscopic and robotic approaches were associated with significantly increased odds of prolonged operating time (OR 1.27 and 1.74, respectively), significantly decreased odds of blood transfusion (OR 0.42 and 0.37, respectively), and significantly decreased odds of prolonged LOS (OR 0.47 and 0.29, respectively). Direct costs were lowest for laparoscopic CN.

**Conclusion:** Compared to open CN, minimally invasive CN is associated with decreased rates of blood transfusion and LOS. Laparoscopic CN is additionally associated with decreased major complications and direct costs compared to open CN. When technically feasible, the utilization of minimally invasive CN, especially laparoscopic, may serve to reduce the burden of metastatic RCC on the health care system by accelerating recovery, facilitating earlier initiation of systemic therapy, and decreasing overall costs of care.
THE ARROWHEAD SIGN (AS): A NOVEL, REPRODUCIBLE RADIOGRAPHIC INDICATOR OF INTRAMUSCULAR VENOUS BRANCH INVASION (PT3A) IN PATIENTS WITH RENAL CELL CARCINOMA (RCC)

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Presented By: Brian Kadow, MD

**Introduction:** Accurate preoperative prediction of pT3a disease in patients with renal cell carcinoma (RCC) is currently a clinical challenge. Yet, preoperative knowledge of renal sinus/perirenal fat invasion can influence clinical decision-making regarding the suitability of nephron sparing surgery or enrollment into clinical trials. We report and validate the observation that tumors that exhibit invasion into the muscular branches of the venous vasculature tend to form a “beak-shaped” irregularity as they extend towards the renal sinus fat that resembles an “arrowhead”. Here, we sought to determine if the “Arrowhead Sign (AS)” CT finding could be used as a preoperative predictor of proximal venous invasion on final histopathologic evaluation.

**Methods:** We queried our prospectively maintained, IRB-approved, kidney cancer database and identified 174 patients with localized renal tumors who underwent surgical resection between 2009 and 2018 and had a pre-operative contrasted CT within 90 days prior to surgery. Two junior radiologists with fellowship training in abdominal imaging and a senior radiologist with 25 years of experience blindly and independently reviewed the imaging. To evaluate for the likelihood of tumor venous invasion on final histopathology, the images were assessed for the following radiographic predictors of cT3a disease: AS, perinephric invasion, and sinus fat infiltration. Indicators were scored on a 1-4 scale according to the reader’s degree of confidence in the finding, with a score of 1 - definitely present, 2 - probably present, 3 - probably absent, 4 - definitely absent. Statistical analyses using Fisher’s exact test and Cohen’s kappa coefficient were performed.

**Results:** Final histopathologic staging revealed pT1=116 (66.6%), pT2=9 (5.1%), pT3=48 (27.5%) and pT4=1 (0.006%). The sensitivity and specificity of AS for predicting muscular venous invasion were 92% and 73%, respectively. Perinephric invasion had 62% sensitivity and 85% specificity, while sinus fat infiltration was 89% sensitive and 73% specific. Inter-reader agreement for AS was moderate (κ = 0.64).

**Conclusion:** The arrowhead sign is a novel and potentially clinically actionable predictor of muscular venous invasion in patients with renal cell carcinoma, with high sensitivity and moderate inter-reader agreement. These initial findings justify further investigation.

**Image 1:** Example of "Arrowhead Sign"
CHARACTERISTICS OF LONG-TERM SURVIVORS WITH SARCOMATOID RENAL CELL CARCINOMA

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Presented By: Kyle A. Blum, MD, MSc

Introduction: Long-term survival in sarcomatoid renal cell carcinoma (sRCC) is unusual with median survival reported between 6-10 months. However, some patients live well past median estimates. While it is known that sRCC portends a poor prognosis, it is unknown why some patients survive longer than others with the same histology. We aim to evaluate characteristics associated with long-term survival for sRCC patients using a prospectively managed kidney cancer database.

Methods: After IRB approval, we conducted a review of patients treated at Memorial Sloan Kettering Cancer Center for sRCC between 1982-2018. Pathology was reviewed by dedicated genitourinary pathologists. Patients were divided into 2 groups: average and long-term survivors, based on a 3-year survival cutoff. Those who survived < 3 years were defined as average survivors and those who survived ≥3 years were defined as long-term survivors. Patients lost to follow-up before 3 years were excluded. Non-time dependent characteristics, identified at initial diagnosis, were compared between the 2 groups and included sex, BMI, ASA-score, margin-status, TNM-stage, tumor size, histology, and preoperative neutrophil-to-lymphocyte ratio (NLR) taken within 1 month prior to nephrectomy. Characteristics were analyzed using Mann-Whitney U-test and Fisher’s exact test.

Results: A total of 362 sRCC patients were identified with a median age of 59.6 years (IQR 51.1-67.7) and comprised of 256 (70.7%) males. Patients had a median BMI of 26.4 (IQR 23.8-30.38), a median tumor size of 9cm (IQR 7.25-12.15) and 154 (42.5%) had metastasis at presentation. There were 256 (70.7%) average survivors, and 106 (29.3%) long-term survivors. In the M0 setting, long-term survivors had lower stage, negative margins, negative N status, and lower NLR, p<0.03. In the M1 setting, long-term survivors had clear-cell histology and lower NLR, p<0.001. Notably, long-term survivors had lower NLR in both the M0 and M1 setting, p<0.001, after correcting for stage and tumor size (Figure 1).

Conclusion: sRCC long-term survivors have lower NLR after correcting for sex, BMI, stage, tumor size, and margin-status in the metastatic and non-metastatic setting. Besides NLR, it does not appear that baseline characteristics play a role in delineating long-term survivorship in this disease. Our next steps will be to investigate the genomic, metabolomic, and immunologic components of these survivors.
Poster #165

PRE-OPERATIVE SITES OF METASTASES IMPACT SURVIVAL AFTER CYTOREDUCTIVE NEPHRECTOMY IN PATIENTS WITH SARCOMATOID RCC

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Presented By: Andrew W. Silagy

Introduction: Renal cell carcinoma with sarcomatoid dedifferentiation (sRCC) is often associated with metastatic disease at presentation and a uniformly poor prognosis; thus, the role of cytoreductive nephrectomy in this tumor subtype is contentious. We sought to evaluate the outcomes of patients with sRCC who have undergone cytoreductive nephrectomy to determine which pre-operative factors predict survival outcomes.

Methods: After obtaining IRB approval, the medical records of 514 patients with sRCC, between 1993 and 2018 years, were systematically reviewed for treatment, metastatic patterns and survival outcomes. Patients who had distant metastases at nephrectomy or developed metastatic disease within 30 days after the procedure were considered to have undergone a cytoreductive nephrectomy. Univariate and multivariate cox regression analyses were used to identify significant predictors of overall and cancer specific survival.

Results: 225 patients underwent a cytoreductive nephrectomy, with a median age of 59 years (IQR 52-66). 51 patients had a biopsy prior to nephrectomy, with a sensitivity for sRCC of 64.7%. Lung/pleura and abdominal cavity were the most common locations for metastases. Median follow up time for survivors was 13 months. Estimated 2- and 5-year overall survival were 33.2% (95% CI: 27.1%-40.8%) and 16.3% (95% CI: 11.2%-23.7%), respectively. On multivariate cox regression analysis metastases to multiple organs (HR=4.39; 95% CI 1.22-15.85; p=0.024), appendicular bone involvement (HR=2.33; 95% CI 1.13-4.80; p=0.022), lung/pleural metastases (HR=1.83; 95% CI 1.11-3.01; p=0.018) and tumor size >10cm (HR=1.59; 95% CI 1.07-2.36; p=0.021) were significant predictors for worse overall survival, with non-clear cell histology trending towards significance (p=0.084). N0/NX status (HR=0.38; 95% CI 0.23-0.60; p<0.001) was a protective factor for OS and CSS (Figure 1).

Conclusion: Patients undergoing cytoreductive nephrectomy for sRCC have an overall poor outcome. Patients with a single metastatic site that does not involve the appendicular bones and lung/pleura, a tumor size <10cm and no evidence of nodal disease have a better outcome following cytoreductive nephrectomy and may benefit from the procedure.

Funding: This research was funded in part through the NIH/NCI Cancer Center Support Grant P30 CA008748
INTRODUCTION: Cytoreductive nephrectomy (CN) is selectively utilized for the management of metastatic RCC (mRCC). Recently, the CARMENA trial failed to show benefit in the use of upfront CN for intermediate- and poor-risk clear cell RCC emphasizing the importance of patient selection. Few reports evaluated the clinical benefit for CN in non-clear cell RCC (nccRCC). We analyzed CN in nccRCC to report treatment outcome and identify pre-operative characteristics of patients that respond best to CN.

METHODS: We queried our prospectively collated nephrectomy database for mRCC patients with a nccRCC histology who underwent CN at MSKCC from 1990-2018 (total n=122). All available pathology specimens were re-reviewed by genitourinary pathologists. Sixteen patients reclassified as clear cell histology and 5 patients with inadequate follow-up were excluded from the study cohort. Pre-operative clinicopathological factors and subsequent treatment and survival outcomes were recorded. The pre-operative Neutrophil to Lymphocyte Ratio (NLR) was calculated and analyzed as a continuous variable, grouped into quartiles (Q1, Q2-3 and Q4) and grouped according to previously published cutoffs (<3 and <4.5). The Kaplan-Meier method was used to estimate survival. A multivariate cox-regression analysis was performed to identify statistically significant pre-operative predictors of survival.

RESULTS: The study cohort included 101 nccRCC patients treated with CN; 65.7% of the cohort were male, the median age was 61 (IQR: 48-69). Median follow-up was 13.5 months (IQR: 3-30.5). 80 patients died at a median time of 11.5 months. Estimated 2- and 5-year overall survival were 31.7% and 7.9%, respectively.

Patients with lower NLR had longer overall survival on Kaplan-Meier; \( p<0.001 \) (Figure 1). On multivariate cox-regression analysis, an elevated NLR was a significant predictor of cancer-specific survival when evaluated as a continuous variable, categorized in quartiles (Q1: Reference, NLR Q2-Q3: (HR 4.23 95%CI [1.43,12.47]; \( p=0.009 \), NLR Q4: (HR 6.21 95% CI [1.94,19.86.30]; \( p=0.002 \)) and based on the cutoff values >3 and >4.5. Tumor T-stage (T3, T4 vs. T1, T2) was also found to be a significant predictor of cancer specific survival.

CONCLUSION: The outcome of CN for nccRCC is poor. Patients with the highest quartile of pre-operative NLR may have worse survival when adjusting for established clinicopathologic prognostic features.

Poster #166
CYTOREDUC TIVE NEPHRECTOMY FOR NON-CLEAR CELL RCC: NLR PREDICTS SURVIVAL OUTCOMES
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Presented By: Andrew W. Silagy
A MULTICENTER INTERNATIONAL EXPERIENCE WITH NEPHRON-SPARING SURGERY FOR PATIENTS WITH RENAL MASSES AND PREOPERATIVELY KNOWN VENOUS TUMOR THROMBUS

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Presented By: Firas G. Petros, MD

Introduction: To better define the role of Nephron-sparing surgery (NSS) in locally advanced renal cell carcinoma (RCC) cases, we describe our experience with patients undergoing NSS in the setting of known venous tumor thrombus (VTT).

Methods: A retrospective chart review was performed for patients who underwent NSS with preoperatively identified VTT at four academic centers between October 2003 and September 2017. Patient characteristics, indication for NSS, perioperative parameters, functional and oncologic outcomes were recorded.

Results: A total of 20 patients underwent NSS with venous tumor thrombectomy (robotic=8, open=12). Imperative indications for NSS were noted in 12/20 (60%) patients, of these solitary kidney (functional or anatomic) constituted 8/12 (67%) cases. Median age was 63 years (range 40-85). Median preoperative eGFR was 69 mL/min/1.73 m2 (range 41-130). Median RENAL nephrometry score was 10.0 (range 6-11), and 11/20 (55%) patients had hilar tumors. All patients except 2 had level-0 thrombus (within renal vein). One patient had level-I thrombus (extending into inferior vena cava (IVC)<2 cm above the renal vein) and the other patient had level-II thrombus (extending into IVC>2 cm above the renal vein but not to the hepatic vein). Median estimated blood loss was 300mL (range 50-4400). Median warm ischemia (WI) time was 27 minutes (range 11-45) for 12/20 (60%) patients who underwent WI resection. Median pathologic tumor size was 4.9 cm (range 2-13). All except one patient had pT3a clear cell-RCC with a median Fuhrman grade of III. One patient had angiomyolipoma on final pathology. Median 3-month postoperative eGFR was 49 mL/min/1.73 m2 (range 18-112). There was no evidence of disease in 14/20 (70%) patients during a median follow-up of 29 months. Metastasis developed in 6/20 (30%) patients at a median of 4.6 months post-surgery, of whom 2 had concomitant local recurrence at the resection bed. There were 4/20 (20%) disease-related deaths at a median of 19.1 months.

Conclusion: NSS for selected patients with clinical T3 renal masses due to VTT can play a role in preserving renal function and complete resection of disease. However, patients remain at higher risk of recurrence due to the higher stage of disease. This must be balanced with the risks/benefits of radical nephrectomy.
Poster #168
TIMING AND DISTRIBUTION OF EARLY RENAL CELL CARCINOMA METASTASES STRATIFIED BY PATHOLOGIC NODAL STATUS IN M0 PATIENTS AT TIME OF NEPHRECTOMY

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Presented By: Tanner Miest, MD, PhD

Introduction: At the time of nephrectomy, patients with node-positive renal cell carcinoma (RCC) fare worse than patients with node-negative disease even in the absence of distant metastasis. The location of RCC metastases is known to affect prognosis, with liver and bone metastases being least favorable, but differences in the timing and anatomic distribution of first metastatic spread in node-positive versus node-negative disease are poorly understood. We aim here to evaluate the timing and anatomic distribution of first RCC metastatic spread stratified by nodal status at the time of nephrectomy.

Methods: We evaluated 1,049 adult patients (median age 62, 725M/324F, 135 N1, 914 N0/x) treated with radical or partial nephrectomy for sporadic, unilateral RCC between 1970 and 2011 who subsequently developed distant metastasis to 3 or fewer sites. Association of nodal status with time to metastasis was evaluated using Cox proportional hazards regression models. Site-specific metastases-free 2-year survival rates were estimated using the Kaplan-Meier method.

Results: The median duration from nephrectomy to identification of first distant metastasis for N1 patients was 0.4 years [IQR 0.2-1.1] compared to 2.2 years [IQR 0.6-6.0] in N0/x patients. The most common site of distant metastasis for both groups was lung (62/46% N1, 477/52% N0/x) but this occurred earlier in N1 patients (median 0.3y vs 2.0y). N1 nodal status was associated with significantly lower site-specific 2-year metastases-free survival when compared to N0/x for lung (37% vs 70%, p<0.001), bone (63% vs 87%, p<0.001), non-regional lymph nodes (60% vs 96%, p<0.001), and liver metastases (79% vs 91%, p<0.001). After controlling for clinicopathologic factors, N1 status remained significantly associated with lung (p<0.001), bone (p<0.001), and non-regional lymph node (p<0.001) metastases, but was no longer associated with liver metastases (p=0.25).

Conclusion: At the time of nephrectomy for RCC, N1 nodal status in M0 patients is associated with more frequent early metastases compared to N0/x disease, with sites like bone conferring poorer prognosis. Patients with N1 disease justify close oncologic surveillance and should be counseled regarding their increased risk of early metastatic disease.
UNDERSTANDING THE EFFECTIVENESS OF RPLND IN NODE ONLY RECURRENCES AFTER NEPHRECTOMY FOR RCC
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Presented By: Marcelo Panizzutti Barboza, MD

Introduction: The role of retroperitoneal lymph node dissection (RPLND) in node only recurrences after nephrectomy for renal cell carcinoma (RCC) is ill-defined. We set out to examine the relapse pattern after RPLND in an attempt to define appropriate borders of dissection based on primary tumor location and nodal recurrence site.

Methods: We reviewed the records of patients undergoing RPLND for RCC recurrences between 2011 and 2018. All patients included initially had primary non-metastatic RCC, and subsequent recurrence restricted to the retroperitoneal lymph nodes (LN). The initial LN recurrence site was defined relative to the side of nephrectomy (ipsilateral (ILN), contralateral (CLN), or bilateral (BLN)). The RPLND templates were either full bilateral, right modified, left modified, or a full left (Interaortocaval (IAC) +Para-aortic LNs). LN relapses after RPLND were assessed.

Results: Our cohort comprised 19 patients with a median age of 60 years at RPLND. Median follow up after RPLND was 29 months (IQR 22-38). The median time to recurrence after the initial nephrectomy was 10 months. Right nephrectomy (RNx) or left nephrectomy (LNx) was performed in 14 (73.7%) and 5 (26.3%), respectively. The extent of lymphadenectomy during nephrectomy varied considerably based on surgical approach. After RNx there were 2 BLN, 1 CLN, and 11 ILN recurrences, while after LNx, 3 BLN, 1 CLN, and 1 ILN recurrences. These recurrences were treated according to surgeon’s preference (Fig. 1). After RPLND, 8 patients relapsed in the retroperitoneum, 5(62.5%) infield only (2 para-aortic, 1 para-aortic+IAC, 2 IAC), 2(25%) out-of-field only (2 para-aortic). Only 3 patients relapsed outside the RPLND template, 2 of 8 (25%) after a right template for RNx ILN recurrence, and one patient after a right template for LNx CLN recurrence. Eight (42%) patients remained disease free during the median follow-up of 29 months.

Conclusion: Overall the chance of infield relapse in IAC and para-aortic LNs is high due possibly to the local aggressiveness of LN metastasis and/or a lack of standardized LN dissection at initial nephrectomy. Regardless, if RP recurrence occurs, a full bilateral standardized RPLND is indicated. Furthermore, RPLND can achieve complete remission in a significant proportion of RCC patients with node only recurrences.
Poster #170
A HIGH-THROUGHPUT BLOOD BASED PLATFORM FOR ASSESSMENT OF PD-L1/PD-1 POSITIVITY IN PATIENTS WITH METASTATIC CLEAR CELL RENAL CELL CARCINOMA
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Presented By: Paras Shah, MD

Introduction: PD-L1/PD-1 positivity in metastatic clear cell renal cell carcinoma (mRCC) remains loosely defined and poorly correlates with immunotherapy response. Histopathologic evaluation as is currently done is severely limited in its ability to assess the immunophenotype of the entire tumor. While studies have demonstrated inter- and intra-tumoral heterogeneity in immunophenotype exhibited by mRCC, non-invasive methods to assess this in the clinical setting have not been developed. The growing role of immune checkpoint blockade for mRCC reveals a need for development of such methodologies.

Methods: We present a novel, high-throughput blood-based platform to rapidly assess PD-L1/PD-1 positivity in patients with mRCC. Using nanoscale flow cytometry (nFC), PD-L1/PD-1 antibodies were used to detect PD-L1/PD-1 on the surface of tumor-cell specific extracellular vesicles (EV). Because the size of EVs can fall under the lower limit of detection of traditional flow cytometers, these platforms are ill-equipped for this analysis. The nFC platform requires <0.1mL of plasma, fewer than five minutes of unsupervised runtime, and limited secondary analysis to quantify PD-L1/PD-1 positivity with high sensitivity. Co-expression of CA9 on the surface of exosomes was used to confirm RCC tumor-specificity.

Results: Using a sample cohort of N=10 mRCC patients either undergoing cytoreductive nephrectomy, experiencing metastatic recurrence after nephrectomy, or undergoing metastasectomy, we assessed PD-L1/PD-1 EV-positivity using plasma samples collected as part of routine blood collection pre-surgery and 3-months post-surgery. We show marked heterogeneity in PD-L1/PD-1 positivity between patients, with up to 50-fold differences in expression. Interestingly, decreases in tumor burden were associated with decreases in PD-L1/PD-1 expression and similarly, increases in PD-L1/PD-1 expression were observed in patients that exhibited clinical progression 3 months post-surgery.

Conclusion: We present a nanoscale flow cytometry-based blood-test that can rapidly capture the immunophenotypic profile of the tumor by measuring PD-L1/PD-1 released by cancer cells on the surface of EVs, overcoming tissue sampling bias seen in traditional histopathologic tests. This high-throughput technique can be used to determine the degree of heterogeneity in PD-L1/PD-1 expression between patients, as well as help stratify patients based on potential for greatest benefit from immune checkpoint blockade as per their immune profile.
Poster #171
SARCOPENIA IS INDEPENDENTLY ASSOCIATED WITH DECREASED OVERALL SURVIVAL AFTER SURGERY FOR INFERIOR VENA CAVA TUMOR THROMBUS PATIENTS
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Presented By: Milton A’Keem Williams

**Introduction:** The presence of sarcopenia, a lean muscle mass deficiency is independently associated with inferior survival following the surgical treatment of localized renal cell carcinoma (RCC). This association has not yet been studied in more advanced disease such as patients with RCC and concomitant inferior vena cava (IVC) thrombus tumors. In this study we retrospectively analyzed the association between preoperative sarcopenia and overall survival following definitive surgery for patients with IVC tumor thrombus.

**Methods:** Baseline lumbar skeletal muscle index (SMI) for patients who underwent surgical treatment for known IVC thrombus tumors between 2006-2018 by a single surgeon were quantified at the 3rd lumbar vertebra from preoperative computerized tomography (CT) or magnetic resonance imaging (MRI). The SMI thresholds we used to define sarcopenia were developed using receiver operating characteristic (ROC) analysis of our cohort. For those with a BMI <25kg/m2, sarcopenia was defined as having a SMI <43cm2/m2 and <40cm2/m2 for males and females, respectively. For those with a BMI ≥25kg/m2, sarcopenia was defined as a SMI <53cm2/m2 for males and <48cm2/m2 for females. Overall survival was compared between patients with and without sarcopenia using the Kaplan-Meier method as well as univariate and multivariate cox proportional hazards regression models.

**Results:** The cohort consisted of 194 patients of whom 128 (65%) were male and 146 (75%) were non-Hispanic white. There were 143 (74%) clear cell renal cell carcinoma cases. 110 patients (57%) were sarcopenic. Patients with sarcopenia had significantly decreased overall survival, log-rank p=0.009 (Figure). The presence of sarcopenia was also associated with decreased overall survival in univariate analysis, (hazard ratio (HR)=1.80, 95% CI 1.15-2.83; p=0.010). In multivariable analysis controlled for age, number of comorbidities, and AJCC Stage, sarcopenia maintained significance as a predictor of decreased overall survival (HR=1.66, 95% CI 1.05-2.61; p=0.030).

**Conclusion:** Preoperative sarcopenia is independently associated with mortality in patients with IVC thrombus tumors after controlling for common variables. External validation of our results is warranted.

*Kaplan-Meier Survivorship Function According to Sarcopenia Status in Patients with IVC Thrombus Tumors*
THREE DIMENSIONAL VOLUMETRICS OF INFERIOR VENA CAVA TUMOR THROMBUS PREDICTS SURGICAL OUTCOMES

Matthew Winter, BMBS (Hons), FRACS; Alessandro Tafuru; Marielena Rivas; Giovanni Cacciamani; Shane Pearce; Alasger Shakir; Luis Medina; Akbar Ashrafi; Michele Gallucci; Walter Artabani; Rene Solelo; Monish Aron; Mihir Desai; Vinay Duddalwar and Inderbir Gill

University of Southern California, Institute of Urology

Presented By: Matthew Winter, BMBS (Hons), FRACS

Introduction:
To evaluate the use of three-dimensional (3D) reconstruction to measure tumor, renal vein and IVC volumetric parameters, which could then be used to predict surgical outcomes during IVC (inferior vena cava) thrombectomy.

Methods:
We identified 83 consecutive patients who underwent open or robotic level II-III IVC tumor thrombectomy, between November 2007 and December 2017 in 2 high volume centers. Using 3D reconstructions, via the Synapse system, an experienced uro-radiologist evaluated (CT and/or MRI) and quantitated the preoperative imaging in each patient to provide comprehensive volumetric measurements (Figure 1). We compared these measurements with surgical outcomes (operative time, estimated blood loss (EBL), units of transfusion required and length of stay (LOS) and complications graded by Clavien-Dindo. Univariate analysis and multivariable regression analysis were performed to determine independent associations between outcomes and dependent variables.

Results:
Measured volumetric components are outlined in Table 1. On univariate analysis operative time was associated with maximum thrombus diameter (MTD) (Rho 0.31, p=0.006) and IVC thrombus volume (ITV) (Rho 0.32, p=0.003). EBL was correlated with renal tumor volume (Rho 0.24, p=0.01), MTD (Rho 0.33, p=0.03), ITV (Rho 0.46, p<0.001) and total tumor volume (TTV) (Rho 0.29, p=0.007). Need for transfusion was associated with percent of IVC occlusion (Rho 0.36, p=0.001), MTD (Rho 0.35, p=0.002), ITV (Rho 0.45, p<0.001), MCD (Rho 0.33, p=0.002), TTV (Rho 0.23, p=0.041) and superior IVC diameter (Rho 0.29, p=0.008). Length of stay was correlated with ITV (Rho 0.25, p=0.02). On multivariable linear regression ITV remained an independent predictor of operative time (p=0.002), EBL (p<0.001), need of transfusion (<0.001) and LOS (p=0.009). On multivariable logistic regression, ITV remained an independent predictor for complications (OR=1.02, p=0.009). Median ITV of level III cohort (n=54) was 34mls and was found to be the most accurate predictor of level III surgical outcomes; operative time (p=0.003), EBL (p=0.001), need of transfusion (p=0.008) and LOS (p=0.02).

Conclusion:
Our study demonstrates the utility of tumor volumetrics using 3D reconstruction to predict surgical outcomes in level II and III caval thrombectomy. IVC thrombus volume is a valuable prognostic indicator to predict surgical outcomes.

<table>
<thead>
<tr>
<th>Volumetric Component</th>
<th>Median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal Tumor Parameters</td>
<td>94 (72-121)</td>
</tr>
<tr>
<td>Renal tumor volume (ml)</td>
<td>422 (163-759)</td>
</tr>
<tr>
<td>Renal Vein Parameters</td>
<td>13 (7-29)</td>
</tr>
<tr>
<td>Renal vein thrombus volume (ml)</td>
<td>19 (15-23)</td>
</tr>
<tr>
<td>Superior IVC diameter (mm)</td>
<td>24 (20-30)</td>
</tr>
<tr>
<td>IVC parameters</td>
<td>90 (70-98)</td>
</tr>
<tr>
<td>IVC thrombus volume (ml)</td>
<td>23 (12-47)</td>
</tr>
<tr>
<td>IVC thrombus length (mm)</td>
<td>57 (38-75)</td>
</tr>
<tr>
<td>Total tumor volume (renal tumor + RV thrombus + IVC thrombus) (ml)</td>
<td>460 (235-798)</td>
</tr>
</tbody>
</table>

Table 1 – Volumetric components of renal tumor, renal vein, IVC and tumor thrombus
USE OF AUTOMATION AND COMPUTER VISION IN DIFFERENTIATING BENIGN RENAL ONCOCYTOMA FROM CHROMOPHOBEO RENAL CELL CARCINOMA: PROOF OF CONCEPT

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Presented By: Amir Baghdadi, PhD

Introduction: Recently, our group developed and validated a CT-based methodology to differentiate benign renal CD117 (+) oncocytoma (Onco) from chromophobe renal cell carcinoma (ChRCC). In this study, we aimed to utilize an automated method for differentiating Onco from ChRCC.

Methods: Images of the tumor and kidney were manually segmented from the CT scans for six patients who had their tumors surgically removed. Peak early-phase enhancement ratio (PEER) was evaluated through a series of image processing operations. PEER was defined as the ratio of signal intensity differences between an early and a delayed/excretory contrast phases for the peak enhancing portion of the tumor to the renal cortex. For measuring the intensities, a fixed size circular or elliptic region-of-interest (ROI) for the kidney along with an arbitrary elliptical ROI for the tumor was identified. Oncocytoma was associated with PEER > 0.5. The performance was evaluated by the comparison of automated diagnosis model and final tumor pathology using tumor type classification accuracy and root mean square error (RMSE) between calculated PEERs.

Results: Our automated algorithm was able to identify a 1-cm circular ROI in the tumor and an elliptical ROI with unspecified dimensions in the renal cortex (Figure 1). The automated Onco versus from ChRCC diagnosis method correctly classified five of the six tumors (83%) compared to the differentiation based on the final pathology (RMSE of 7% in PEER ratio calculation).

Conclusion: To our knowledge, this is the first study to automate differentiation of renal tumors. Our method was able to extract radiographic measures and accurately identify the CD117(+) Onco and ChRCC.

Figure 1. Flowchart of automated PEER for Onco/ChRCC identification using computer vision. In Phase 2, the green and red boundary areas in the top image are the segmented kidney and tumor, respectively. In the right zoomed image, showing a sample of the automatic annotations, the blue boundary areas show the elliptic and circular ROIs for kidney and tumor, respectively. In the left zoomed image, showing the manual annotations for the same patient, the ROIs for kidney and tumor are presented in dashed back lines.
Poster #174
CLONALITY ESTIMATES OF ONCOGENIC EVENTS TO IDENTIFY CLEAR-CELL RENAL CELL CARCINOMA SUBTYPES WITH DIFFERING CLINICAL OUTCOMES

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Presented By: Renzo Giuseppe Di Natale, MD

Introduction: The genomic events underlying ccRCC have been extensively studied in next-generation sequencing studies. However, ccRCC tumors are very heterogeneous which complicates the identification of potential biomarkers. Recent multiregional sampling studies have proposed that the evolution of ccRCC follows constrained trajectories that determine the overall disease course. It has been suggested that identification of clonal driver events may help categorize tumors into specific evolutionary subtypes. However, many of these studies either lack robust statistical methods or don’t consider clonality estimates. We aimed to use clonality estimates of driver events to analyze a cohort of 176 single-site biopsies with proven ccRCC.

Methods: We identified 267 patients with proven ccRCC who had undergone targeted-panel next-generation sequencing at our center. Patients with incomplete clinical data were excluded, the final cohort consisted of 176 single-biopsy samples. Mutation calling was performed using our previously-validated institutional pipeline. Annotation of oncogenic variants was done using OncoKB. Allele-specific copy-number (CN) and purity estimates were computed using FACETS (Shen, Nucleic Acids Research 2016). Clonality of a specific event was calculated based on the allele frequency, purity and CN estimates. Consensus clustering analysis was performed using a binary matrix of clonal driver events and the segmentation data using the iCluster package. Clinical outcomes were compared between clusters. Overall (OS) and recurrence-free survival estimates were computed using the Kaplan-Meier method. Cox models were used to calculate inter-cluster survival differences. All analyses were performed in R v3.5.0

Results: After selecting the best combination of clusters and penalty parameters, five clusters were identified. The main difference between clusters was the fraction of copy-number altered genome (ANOVA,p<0.001). We then proceeded to evaluate overall survival differences between clusters. Particularly, there was a significant difference in OS between clusters 1 and 2 (Cox, p=0.02, HR 0.3 [0.1 - 0.9]).

Conclusion: Clonality estimates from single-site biopsy samples allows characterization of ccRCC subgroups that correlate with clinical outcomes. Future inclusion of additional clinical parameters and other data types may improve outcome prediction.
Poster #175
ONE IN THE SAME? THE HISTOPATHOLOGICAL DIFFERENCES IN RADICAL VS DONOR NEPHRECTOMY SPECIMENS
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1University of Texas Health San Antonio; 2University of Manitoba; 3Queen's University
Presented By: Deepak Kumar Pruthi, MD, MSCI-TS, FRCSC

Introduction: Patients undergoing radical nephrectomy are often counseled that it is safe to live with a solitary kidney as the renal transplant literature is often cited. We sought to determine if there were underlying histopathological differences in the non-neoplastic kidney (NNK) for patients undergoing radical nephrectomy (RN) for kidney cancer against matched patients undergoing donor nephrectomy (DN) for renal transplant.

Methods: Consecutive subjects who underwent either radical nephrectomy for kidney cancer or donor nephrectomy were included. Subjects underwent 1:1 matching with propensity score matching based on age, sex, pre-operative serum creatinine, hypertension, age-adjusted Charlson score, and BMI. Patients with diabetes, other pre-existing renal diseases, or prior kidney surgery were excluded. All slides were independently reviewed for histopathologic changes using the Banff 1997 criteria by two blinded nephropathologists. Differences in the NNK findings were assessed by Chi-square testing, Fischer’s exact test, and the Mann-Whitney U test. Logistic regression was used to identify the covariates associated with NNK findings in the matched cohort.

Results: Of the 351 patients that met the inclusion criteria, 112 patients (56 per group) were matched. Patients who underwent RN were more likely to harbor glomerulopathy (p<0.001) and arterial (odds ratio [OR] = 7.14; 95% confidence interval [CI] 2.7-20; p<0.001) changes. Conversely, patients who underwent DN were more likely to have tubular atrophy (p<0.001) and arteriolar changes (OR=6.76; 95% CI 2.52-20.54; p=0.002). There was no difference in the detection of interstitial fibrosis between the groups (p=0.90). The matched cohort logistic regression identified that increasing age was mildly significantly associated with increased risk of tubular atrophy (OR 1.11; 95% CI 1.05-1.18; p=0.001), interstitial fibrosis (OR=1.09; 95% CI 1.03-1.17; p=0.004), arterial (OR=1.11; 95% CI 1.05-1.18), and arteriolar changes (OR 1.07; 95% CI 1.02,1.14; p=0.007).

Conclusion: In a propensity-matched group patients undergoing radical nephrectomy for kidney cancer were more likely to harbor changes in the glomerular and arterial compartments while patients undergoing donor nephrectomy were more likely to have tubular atrophy and arteriolar changes. Investigation into these differences is warranted including the examination of downstream effects on renal function.
Poster #176
PROGNOSTIC VALUE OF LOSS OF CHROMOSOME 10Q IN LOCALIZED RENAL CELL CARCINOMA
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1Institute of Urologic Oncology, Department of Urology, David Geffen School of Medicine at UCLA, Los Angeles, CA; 2Department of Urology, University Hospital Bicetre, APHP, University Paris-Saclay, Le Kremlin Bicetre, France; 3Department of Urology, University Medicine Greifswald, Germany; 4Department of Hematology and Oncology, David Geffen School of Medicine at University of California, Los Angeles, CA
Presented By: Aydin Pooli, MD
Introduction: While loss of 10q is a frequently seen cytogenetic abnormality noted to occur in patients with renal cell carcinoma (RCC), little is known about its prognostic significance. Several tumor-suppressor genes have been mapped to 10q, including PTEN. We investigated the association of loss of 10q with pathological features and disease-free survival (DFS) in patients with localized RCC.
Methods: All patients with primary localized RCC who underwent surgery at UCLA and had tumor cytogenetic analysis were included in the study. Alterations in chromosome 10q was specifically reviewed for this study. Logistic regression analyses were used to assess association of loss of 10q with final histopathology, ISUP grading, and T-stage. Cox proportional hazard modeling and Kaplan-Meier analyses were used to assess the impact of loss of 10q on DFS. Recurrence was defined as any local recurrence or development of new metastasis.
Results: A total of 886 patients were included in this study. Loss of 10q occurred in 64 patients. Loss of 10q was more commonly seen in chromophobe subtype (24% vs. 6% in non-chromophobe RCC, OR=4.62, 95%CI [2.50-8.54], p<0.0001); greater tumor size (mean size 6.3 vs. 5.1 cm, OR=1.08, 95%CI [1.02-1.15], p=.006); T3-stage (37% vs. 23%, OR=1.99, 95%CI [1.17-3.39], p=.011); and ISUP grade 3-4 (61% vs. 37%, OR=2.64, 95%CI [1.58-4.40], p<0.001). These patients had significantly worse DFS than those without a loss of 10q (HR=2.15, 95%CI [1.32-3.50], p=.002). On Kaplan-Meier analysis, Loss of 10q was associated with a shorter time to recurrence (Figure 1, Log-rank p=.002). This prognostic value was even more important for T1-2 stages (estimated median DFS 116 months, HR=3.19, 95%CI [1.67-6.09], p<.001).
Conclusion: Loss of chromosome 10q is a prognostic factor associated with larger tumor size, higher grade and T-stage and a shorter time to recurrence in patients with localized RCC. Identifying patients with loss of 10q can provide additional prognostic information to standard clinicopathologic variables.
Poster #177
A MACHINE LEARNING ALGORITHM IDENTIFIES TRANSCRIPTOMIC FEATURES OF SARCOMATOID RENAL TUMORS
*Heinric Williams, MD; Manoharan Manoharan1; Mridul Chaudhary1; Ravi Gupta1; Rohit Gupta1; Amit Chaudhuri1 and Raghu Metpally2
1MedGenome; 2Weis Center for Research; 3Geisinger Medical Center
Presented By: Heinric Williams, MD

Introduction: Sarcomatoid renal cell carcinoma (sRCC) is characterized by a mesenchymal phenotype, resistance to therapies and poor prognosis. No biomarkers are available for identifying these tumors a priori. Therefore, developing early predictive sRCC biomarkers is an unmet need to improve outcomes from this disease.

Methods: A machine learning approach was developed to interrogate gene expression dataset of 46 sarcomatoid (E/S), 43 epithelioid (E/R) and 56 non-sarcomatoid (E*) clear cell renal cell carcinoma samples (GEO: GSE59266). We built a classification model based on Random Forest algorithm using a subset of data for training and others for testing. The classification model was further refined by feature selection to arrive at a 199-gene signature that predicted sRCC with 96% accuracy in the training dataset and at 100% accuracy for the unseen test data.

Results: This signature was tested on the transcriptome data of 534 renal cancer samples from TCGA data and identified 43 sRCC. Molecular characterization revealed high expression of epithelial to mesenchymal transformation (EMT) genes. Survival analysis of the 43 sRCC showed significantly reduced survival compared to the non-sarcomatoid tumors. Analysis of mutated genes in the sarcomatoid vs the non-sarcomatoid groups identified mutations occurring more frequently in AHNAK2, TP53, and FBN2 genes. Pathway analysis of significantly upregulated genes in sRCC revealed cell motility, inflammation and angiogenesis pathways driven by hepatocyte growth factor (HGF), interleukin-8 (IL-8) and VEGF-C respectively.

Conclusion: This 199 gene signature appears promising for early detection of sRCC and the development of novel intervention strategies.
Poster #178
PRIMARY RENAL CELL CARCINOMA XENOGRAFTS GROWN ON AVIAN CHORIOALLANTOIC MEMBRANES FOR PRECLINICAL CHARACTERIZATION OF ONCOLYTIC VIROTHERAPY: PROOF-OF-PRINCIPLE FOR HIGH-THROUGHPUT THERAPEUTIC SCREENING
*Tanner Miest, MD, PhD1; Yaroslav Fedysyn1; Pierce Reynolds2; Eva Galanis, MD2 and Bradley Leibovich, MD1
1Mayo Clinic Department of Urology; 2Mayo Clinic Department of Molecular Medicine
Presented By: Tanner Miest, MD, PhD

Introduction: Renal cell carcinoma (RCC) is an immunotherapeutic-responsive malignancy recently approved as a target for checkpoint inhibitors. This makes it an attractive target for oncolytic virotherapy, which harnesses replicating viruses for lytic destruction of tumor cells and stimulation of immune responses against tumor neoantigens. We have developed an oncolytic measles virus (MV) showing efficacy in clinical trials against multiple tumor types. Here we tested MV infectivity in patient-derived RCC xenografts grown on chicken embryo chorioallantoic membranes (CAM-PDX) to create a high-throughput disease model for real-time preclinical screening.

Methods: RCC cell lines were obtained from ATCC. Patient RCC tumor cores were obtained at the time of radical nephrectomy. Tumor fragments were implanted directly on chicken embryo chorioallantoic membranes. Clinical grade oncolytic MV was grown at Mayo Clinic facilities. In vivo infectivity studies were performed with MV expressing green fluorescent protein (MV-GFP). Direct virus inoculation prior to tumor implantation or by micropipette injection after tumor implantation were performed. Tumors were harvested posttreatment and analyzed by confocal microscopy for infectivity.

Results: MV-GFP achieved robust infection of RCC cell line 786-O both in vitro and in vivo. RCC tumors with pathology ranging from oncocytoma to clear cell with sarcomatoid features supported infection after direct virus inoculation using the CAM model. Virus infection was observed within 24 hours with spread throughout tumor tissue for up to four days. The kinetics and distribution of infection varied with direct inoculation achieving rapid infection and spread throughout tumors, while intratumoral injection achieved expanding infection localized to the administration site. GFP signal was observed within infected xenografts by confocal microscopy.

Conclusion: Oncolytic MV achieved infection and spread throughout patient RCC xenografts grown on CAMs. These data highlight the potential of oncolytic virotherapy as a therapeutic strategy against RCC. Due to its immunostimulatory potential, MV virotherapy represents an attractive option for combination therapy with checkpoint inhibition. The CAM-PDX model allows for rapid analysis of individual disease responses to therapy, making in vivo-directed individualized treatment approaches a viable option for future clinical trials.
CD-70 BLOCKADE AS A NOVEL IMMUNOTHERAPY FOR THE TREATMENT OF CLEAR-CELL RENAL CELL CARCINOMA
*Paras Shah, MD¹; Mario Cepeda, PhD¹; Vidhu Joshi, BS¹; Stephen Boorjian, MD¹; Brian Costello, MD¹; John Cheville, MD¹; R. Houston Thompson, MD¹ and Bradley Leibovich, MD¹
¹Mayo Clinic

Presented By: Paras Shah, MD

Introduction: Immune checkpoint blockade, particularly in the form of combinational therapy, has demonstrated significant objective response rates and clinical activity in the treatment of advanced RCC, suggesting that targeting multiple immunosuppressive pathways can enhance the anti-tumor immune response. Although normally restricted to activated B and T-cells, CD70 has been shown to be overexpressed in several types of solid tumor types including RCC, specifically the clear cell phenotype (ccRCC). Here, we show that inhibiting CD-70 signaling by ccRCC cells using antibody blockade enhances the anti-tumor immune response and is thus an attractive novel immunotherapy target for the management of ccRCC as a monotherapy or in combination with PD-1/PD-L1 blockade.

Methods: Surgically resected ccRCC tumor tissue was processed to generate matched sets of primary patient-derived cancer cell lines and tumor infiltrating lymphocytes (TILs). Patient derived ccRCC cells were co-cultured with autologous TILs to test the effect on TIL reactivity of CD70-blockade with and without combination therapy with Nivolumab as measured via IFN-γ release and CD107a mobilization to the membrane.

Results: Co-culture of patient-derived ccRCC cancer cell lines with autologous TILs in the presence of CD70-blockade resulted in significantly greater killer T-cell reactivity that correlated with CD-70 expression by the patient derived ccRCC cells. Notably, this elevated T-cell reactivity was observed in ccRCC patients suggesting efficacy of CD70-blockade is greatest in patients with ccRCC, in which CD70 is most highly expressed. Interestingly, combination therapy with Nivolumab showed a trend towards increased T-cell reactivity indicating that CD-70/PD-1 blockade may be an effective combination immunotherapy for ccRCC management.

Conclusion: Immune checkpoint blockade targeting the PD-1 immune checkpoint axis only benefits a fraction of patients with mRCC. Combination immunotherapy has been shown to improve RCC disease burden thereby demonstrating the need to identify other targets to enhance the immune response against RCC. Here, we demonstrate that blocking RCC associated CD-70 increases T-cell reactivity against autologous patient derived ccRCC cells and may be an effective immunotherapy as a monotherapy or in combination with PD-1/PD-L1 immune checkpoint blockade.
Background: Our previous prospective, randomized, placebo-controlled, double-blind trial originally demonstrated that patients with normal kidney function who received mannitol during nephron sparing surgery had no better kidney function that those who received placebo at 6 weeks and 6 months following surgery. Herein, we examined these patients at 3-year follow-up to assess long-term renal function outcomes.

Methods: Between 2012 and 2015, 204 participants with normal renal function (defined as preoperative estimated glomerular filtration rate (eGFR) >45 ml/min/1.73m²) undergoing partial nephrectomy at Memorial Sloan Kettering Cancer Center were randomized to receive mannitol (12.5g) or placebo intravenously within 30 minutes prior to renal vascular clamping. The original follow-up was a 6 month assessment of renal function by differences in eGFR. In this analysis, follow-up for renal function was completed to 3 years.

Results: In our study population, median age at time of surgery was 57.8 months, 63% were male and 81% were white. 101 patients were randomized to receive mannitol and 98 received placebo. Median follow-up was 3.8 years. At baseline, median pre-operative eGFR was 86 ml/min/1.73m² (IQR: 71-99) in the mannitol arm and 89 ml/min/1.73m² (IQR: 78-100) in the placebo arm. At 3 years, median eGFR was 79 ml/min/1.73m² (IQR: 63-92) in the mannitol arm and 78 ml/min/1.73m² (IQR: 66-90) in the placebo arm. At 3 years, 19% of patients in the mannitol arm and 14% in the placebo arm had eGFR < 60 ml/min/1.73m². No patients in either arm had eGFR < 30 ml/min/1.73m². Across all time points (baseline, 6 month, 1 year, 2 year and 3 year follow-up), the difference in eGFR between the mannitol and placebo arms were not significantly different (p > 0.05) (Figure 1).

Conclusion: In this 3 year follow-up study, patients with normal kidney function who received 12.5g mannitol during partial nephrectomy had no better kidney function compared to placebo across all time points.

Figure 1: Mean estimated glomerular filtration rate (eGFR) as a function of time by assigned treatment (mannitol vs. placebo). Vertical bars indicate point-wise 95% confidence intervals.
**ELEVATED C-REACTIVE PROTEIN IS INDEPENDENTLY ASSOCIATED WITH PROGRESSIVE RENAL FUNCTIONAL DECLINE AFTER SURGERY FOR RENAL CELL CARCINOMA: RESULTS OF AN INTERNATIONAL COHORT STUDY**

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1UC San Diego School of Medicine; 2Tokyo Medical and Dental University; 3Emory University School of Medicine

**Presented By:** Brittney Cotta, MD

**Introduction:** C-reactive protein (CRP) is an inflammatory marker associated with cardiovascular outcomes in chronic kidney disease. We investigated association of pre-treatment CRP and renal functional outcomes in a cohort of patients undergoing surgery for renal cell carcinoma (RCC).

**Methods:** Retrospective international multicenter-center (UC San Diego, Tokyo Medical and Dental University, Emory University) analysis of patients surgically treated for RCC with pretreatment CRP from 2006-17. Descriptive analyses were obtained between normal (CRP ≤0.5mg/L) and elevated (CRP >0.5mg/L) groups. Primary outcome was development of de novo estimated glomerular filtration rate (eGFR) <45 ml/min/1.73m², by CKD-EPI equation. Multivariable analyses (MVA) and Kaplan Meier Analyses (KMA) were utilized to delineate freedom from and predictors for eGFR<60, <45, and <30.

**Results:** A total of 2,445 patients who underwent radical (RN) or partial nephrectomy (PN) for RCC were included in the study (normal-CRP n=1,092; elevated-CRP n=1,353, median follow-up 22 months). Groups were similar in age (normal-CRP 59 vs. elevated-CRP 60 years, p=0.138), BMI (p=0.358) and type of surgery (p=0.652). African-American race (37.5% vs. 2.8%, p<0.001), coronary artery disease (13.6% vs. 9.3%, p=0.001), and median tumor size (6.1 cm vs. 4.0 cm, p<0.001) were more frequent in elevated-CRP patients. Postoperatively, de novo eGFR<45 (19.4% vs. 9.2%, p<.001), and de novo eGFR<30 (7.7% vs. 3.4%, p=0.001) developed more frequently in the elevated-CRP patients. On MVA elevated-CRP was independently associated with development of de novo eGFR<60 (OR=2.56, p<0.001), eGFR<45 (OR=2.75, p<0.001) and eGFR<30 (OR=1.98, p<0.001). KMA revealed significantly higher 5 year freedom from de novo eGFR<45 for normal-CRP as opposed to elevated-CRP (92% vs. 56%, log-rank p=0.001, Figure).

**Conclusion:** Pre-treatment elevated CRP was independently associated with progressive renal functional decline in patients undergoing surgery for RCC in an international cohort. Our findings suggest consideration for close functional follow up and renoprotective strategies for patients with elevated CRP as well as employment of nephron-sparing management when feasible and appropriate. Further investigation is requisite.

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**Figure: Kaplan Meier Analysis for Freedom from de novo eGFR<45**

**Multivariable Analysis For Risk Factors for Development of de novo eGFR<45**

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing Age (continuous)</td>
<td>1.06</td>
<td>1.05-1.07</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Race (African-American vs. Other)</td>
<td>3.56</td>
<td>2.67-4.74</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Increasing Tumor Size (continuous)</td>
<td>0.98</td>
<td>0.95-1.02</td>
<td>0.324</td>
</tr>
<tr>
<td>Surgery (RN vs. PN)</td>
<td>1.41</td>
<td>1.13-1.76</td>
<td>0.003</td>
</tr>
<tr>
<td>CRP (&gt;0.5 mg/L vs. ≤0.5 mg/L)</td>
<td>2.75</td>
<td>2.13-3.56</td>
<td>&lt;0.001</td>
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</tbody>
</table>
**Poster Session II – Full Abstracts**

Poster #182  
**COMPARISON OF LONG-TERM SYMPTOMS BETWEEN OPEN AND MINIMALLY INVASIVE NEPHRECTOMIES**  
*Jaime O. Herrera-Caceres, MD; Hanan Goldberg; Dixon T.S. Woon; Thenappan Chandrasekar; Omar Alhunaidi; Zachary Klaassenv; Michael Jewett; Neil Fleshner; Robert Hamilton and Antonio Finelli*  
¹Princess Margaret Cancer Centre, University of Toronto, University Health Network  
Presented By: Jaime O. Herrera-Caceres, MD  

**Introduction:** There are many benefits to minimally invasive surgery (MIS), including less blood loss and faster recovery. On the other hand, long-term performance and symptoms have not been evaluated sufficiently. We present long-term symptom scores of patients who underwent MIS compared to open nephrectomy (Nx).

**Methods:** On every visit at the clinic, all kidney patients in our center fill out the Edmonton Symptom Assessment Scale (ESAS) questionnaire evaluating pain, tiredness, nausea depression, anxiety, drowsiness, appetite, well-being, and shortness of breath using a scale 0-10, 0 being the absence of a symptom and 10 being the worst level of it. We used our Institutional Databases to compare this information between patients who underwent open and MIS Nx, considering each of the ESAS domains.

**Results:** We included 483 patients (406 open, 77 MIS) who underwent Nx in our center between 2007 and 2017. Mean age at Nx was 55.6 (SD 12.4) and 54.8 (SD 13) for open and MIS, respectively. Mean age at last questionnaire was 59.8 (SD 12.6) and 58.5 (SD 13.7), with no statistically significant difference (NS). Most patients were male 63.1% vs. 61% (NS), and 53.7% vs. 89.6% were right sided respectively (p< 0.001). A total of, 47% vs. 54.5% of the surgeries were radical Nx (p= 0.263), for open and MIS respectively. After surgery, 61.1% vs. 74% were T1 (p= 0.04), 6.5% had N+ vs . 1.4% p= 0.096, M+ 3.1% vs. 2.7% (p= 0.840). During follow up, 18.2% vs. 13% (p= 0.266) received systemic therapy for metastatic disease in each group, and 30.5% vs. 26% (p= 0.441) had evidence of disease (open vs. MIS). Table 1 shows the ESAS scores at the last evaluation. On multivariable analysis (including gender, TNM, histology, age at Nx, side of Nx, surgical modality and type of surgery [radical or partial]), the only factor associated with higher pain scores was surgical modality (p= 0.014), favouring MIS.

**Conclusion:** With a mean fw time of almost 4 years following surgery, MIS was associated with significantly lower pain scores when compared to open surgery. This should be taken into consideration when deciding what surgical modality is appropriate for the patient.

**Table 1: ESAS in the last evaluation**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Open Nephrectomy</th>
<th>MIS Nephrectomy</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (mean SD)</td>
<td>1.52 (2.275)</td>
<td>1.00 (1.886)</td>
<td>0.265</td>
</tr>
<tr>
<td>Tiredness (mean SD)</td>
<td>2.58 (2.63)</td>
<td>1.79 (2.149)</td>
<td>0.144</td>
</tr>
<tr>
<td>Nausea (mean SD)</td>
<td>0.43 (1.343)</td>
<td>0.32 (1.090)</td>
<td>0.690</td>
</tr>
<tr>
<td>Depression (mean SD)</td>
<td>1.46 (2.259)</td>
<td>1.43 (2.149)</td>
<td>0.952</td>
</tr>
<tr>
<td>Anxiety (mean SD)</td>
<td>1.81 (2.413)</td>
<td>1.96 (2.808)</td>
<td>0.767</td>
</tr>
<tr>
<td>Drowsiness (mean SD)</td>
<td>1.42 (2.127)</td>
<td>1.39 (1.833)</td>
<td>0.947</td>
</tr>
<tr>
<td>Appetite (mean SD)</td>
<td>1.10 (2.487)</td>
<td>0.71 (1.487)</td>
<td>0.433</td>
</tr>
<tr>
<td>Well Being (mean SD)</td>
<td>2.17 (2.411)</td>
<td>2.11 (2.753)</td>
<td>0.899</td>
</tr>
<tr>
<td>Shortness of Breath (mean SD)</td>
<td>1.06 (1.895)</td>
<td>0.68 (1.362)</td>
<td>0.326</td>
</tr>
</tbody>
</table>
THE IMPACT OF INSTITUTIONAL AND INDIVIDUAL EXPERIENCE ON COMPLICATIONS AND NON-DIAGNOSTIC RATES FOLLOWING CORE RENAL MASS BIOPSY

*Natasza Posielski, MD*; Anthony Bui; Shane Wells, MD; Sara Best, MD; Lori Mankowski Gettle, MD, MBA; Timothy Ziemlewicz, MD; Meghan Lubner, MD; J. Louis Hinshaw, MD; Fred Lee Jr., MD; Glenn Allen, MPH; Stephen Nakada, MD FACS FRCS and E. Jason Abel, MD FACS

1University of Wisconsin

Presented By: Natasza Posielski, MD

**Introduction:** Utilization of percutaneous renal mass biopsy has expanded in recent years. The purpose of this study is to evaluate the impact of individual and institutional experience on procedural complications and non-diagnostic findings after biopsy.

**Methods:** Complications ≤30 days following core biopsy from 2000-2017 were graded using the Clavien-Dindo system; fine needle aspirations were excluded. Non-diagnostic findings were defined as: only fibrosis, necrosis or normal renal parenchyma. Three groups were assigned according to total number of biopsies per year: <10, 10-100, >100 (figure). Univariate and multivariate analyses were used to evaluate associations between risk of complications or non-diagnostic findings and experience or other variables.

**Results:** Of 1155 core biopsies performed, 24 (2.2%) overall complications and 5 (0.4%) major complications (≥Clavien 3a) were identified. Average biopsy/year increased from 5 to 46 to 134 when comparing periods 2000-2006 to 2007-2010 to 2011-2017. No difference in complication rates were identified among 3 periods, 2.8% vs. 0.5% vs 2.4%, p=0.21. Twelve radiologists performed at least 50 biopsies (range 62-138), with complication rates ranging from 0-3.6%. Risk was not increased during a radiologist’s first 25 or 50 cases (p=0.07, 0.35). Trainee presence did not increase complication rate, p=0.1. Number of cores obtained, nephrometry score, type of imaging guidance, mass diameter and repeat biopsy were not associated with complications (p=0.17-0.83). Biopsy findings were non-diagnostic in 145 (14.6%) of cases; individual radiologist rates 10.3-23.9%. Non-diagnostic rates for biopsies from 2000-2006 was not different when compared to 2007-2010 or 2011-2017, 14.3 vs. 16.9 vs. 14.2%, p=0.62. After multivariate analysis, predictors of non-diagnostic findings were cystic features, radiologic contrast enhancement, mass diameter, and skin-to-mass distance (p<0.001, p=0.002, p=0.02, p=0.049). Radiologist experience was not associated with non-diagnostic rate (p=0.33).

**Conclusion:** Despite increased utilization, institutional renal mass biopsy complication and non-diagnostic rates have remained stable. Individual radiologist experience was not associated with complications or non-diagnostic findings suggesting a short learning curve for this procedure.
**Poster #184**

**PERCUTANEOUS BIOPSY FOR UPPER TRACT UROTHELIAL CARCINOMA – SAFETY AND DIAGNOSTIC ACCURACY**

*Tanner Miest, MD, PhD 1; Jason Joseph, MD 1; Amir Toussi, MD 1; Theodora Potretzke, MD 2; Thomas Atwell, MD 2; Bradley Leibovich, MD 2; Matthew Tollefson, MD 1 and Aaron Potretzke, MD 1

1Mayo Clinic Department of Urology; 2Mayo Clinic Department of Radiology

Presented By: Tanner Miest, MD, PhD

**Introduction:** Short of surgical extirpation, ureteropyeloscopy with endoscopic biopsy remains the standard for establishing a histologic diagnosis of upper tract urothelial carcinoma (UTUC). Endoscopic biopsy is safe and affords visualization; however, it is not always feasible, and its diagnostic accuracy is debated. We report our experience with percutaneous image-guided core-needle biopsy (CNB) for UTUC to better understand safety and diagnostic accuracy.

**Methods:** We retrospectively reviewed 444 patients undergoing radical nephroureterectomy (RNU) for UTUC at Mayo Clinic between 2009 and 2017. Forty-two patients undergoing CNB prior to RNU were identified. Clinical notes, imaging, and pathology reports were reviewed. Major complications were those grade 3 or higher according to the Common Terminology Criteria for Adverse Events.

**Results:** Median age at biopsy was 72.8 years (37.8-91.5). All lesions were intrarenal. Median tumor size was 3.2 cm (1.2-8.3). CT-guidance was utilized in 52.4% (n=22), ultrasound-guidance in 47.5% (n=20). Relative to RNU pathology, rate of histologic diagnosis by CNB was 95.2% (n=40). When CNB provided histologic grade (n=29, 69%), rate of concordance with surgical pathology was 86.2% (n=25). Minor and major complication rates were 14.3% (n=6) and 2.4% (n=1) respectively. At a median biopsy-to-interval imaging time of 26.2 months (1.2-76.5), no cases of CNB tract seeding were identified.

**Conclusion:** In our cohort undergoing RNU for UTUC, CNB was a safe and effective diagnostic tool. To our knowledge, this represents the largest reported experience with CNB for diagnosis of UTUC. Additional studies are underway to compare the diagnostic accuracy of CNB to that of endoscopic biopsy.
Association of Elevated C-Reactive Protein with Oncologic Outcomes in Renal Cell Carcinoma: A Multicenter Analysis

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1 University of California San Diego; 2 Tokyo Medical and Dental University; 3 Emory University; 4 University of California, San Diego

Presented By: Sunil H. Patel, MD, MA

Introduction: C-reactive protein (CRP) is a systemic inflammatory marker which has been associated with overall survival (OS) in Renal Cell Carcinoma (RCC) patients in Asia. Data supporting utility of CRP as a predictive marker in non-Asian populations are sparse and controversial. We analyzed utility of pre-treatment CRP as a predictor of survival and oncological outcomes in a multicenter cohort of RCC patients.

Methods: Retrospective international 3 center (UCSD/TMDU/Emory) analysis of patients of patients with RCC with pretreatment CRP values from 2006-2017. CRP >0.5mg/dl was used as threshold for elevation and the cohort was subdivided into two groups for descriptive analysis (normal-CRP ≤0.5 normal and elevated-CRP>0.5). Primary outcome was recurrence-free survival (RFS). Secondary outcome was overall survival (OS). Kaplan-Meier (KMA) and multivariable analyses (MVA) were utilized to delineate survival outcomes and their predictors.

Results: Overall 2445 patients were analyzed (1641 Male/804 female, normal-CRP 1056/elevated-CRP 1389; mean follow-up 36 months). Patients with elevated CRP were older (59.2 years vs. 59.9 years, p=0.144) had higher incidence of hypertension (p=0.001) and BMI (p<0.001) and tumor size (3.9 cm vs. 6.0 cm, p<0.001). MVA for RFS demonstrated elevated-CRP (OR=1.9, p=0.005), increasing tumor size (OR=1.1, p=0.001), and high tumor grade (OR=3.1, p<0.001) to be independent risk factors. MVA for all-cause mortality demonstrated elevated CRP (OR=12.4, p=0.005), increasing tumor size (OR=1.1, p=0.001), high tumor grade (OR=2.5, p<0.001), and radical nephrectomy (OR=1.8, p=0.001) to be independent risk factors. For normal vs. elevated CRP, KMA revealed 5-year RFS of 94% vs. 86% (p=0.001), 95% vs. 83% (p=0.163), 84% vs 62% (p=0.001), and 52% vs. 60% (p=0.513) for Stages 1, 2, 3, and 4, respectively. KMA revealed 5-year OS of 98% vs 80% (p=0.001), 94% vs. 80% (p=0.103), 94% vs 65% (p=0.001), 99% vs 40% (p<0.001) for Stages 1, 2, 3, and 4, respectively.

Conclusion: Pre-treatment CRP was an independent predictor of recurrence free survival and overall survival in an international multicenter cohort of RCC patients. While further confirmation is requisite, our findings suggest incorporation of CRP into nomographic and risk stratification protocols.
ENHANCED RECOVERY AFTER RENAL SURGERY: INITIAL RESULTS

*Daniel Swerdloff, MD1; Rachel Smith1; Kanwaldeep Williams1; Paul Feustel1; Michael Swerdloff1; Donald Lee1; Demetri Podolski1; Igor Galay1 and Ronald Kaufman1

1Albany Medical Center

Presented By: Daniel Swerdloff, MD

Introduction: Enhanced Recovery After Surgery (ERAS) protocols are the new topic of interest among various surgical subspecialties. ERAS gives surgeons a dedicated pathway, no matter the surgeon or institution. Though treatment algorithms vary across specialties, the aim is identical: accelerate recovery time, thereby reducing the hospital length of stay. Within Urology, ERAS protocols are used with radical cystectomy patients. There is little evidence that looks at the application of ERAS protocol in renal surgery patients. We sought to implement an ERAS protocol in this patient population. The aim of this study is to report initial results.

Methods: A retrospective analysis was performed comparing patients who underwent renal surgery prior to and after implementation of ERAS. The ERAS team is a multidisciplinary team composed of perioperative nurses, anesthesiologists and urologists. In the pre-operative period, patients were given detailed instructions and expectations. On the morning of their surgery, they were provided with a standardized set of multimodal antiemetic and analgesic prophylactics, taking weight, GFR and type of surgery into consideration, and they remained on this pathway until discharge.

Results: There were 76 patients in the pre-ERAS group and 42 in the ERAS group. Median length of stay (LOS) in the pre-ERAS vs ERAS group was 3 days vs 2 days (p<0.005). For open procedures, median LOS was 5 days vs 2 days (p<0.001). For robotic procedures, median LOS decreased from 3 days to 2 days (p<0.001). Median LOS was lower in the ERAS group independent of Age, Sex, BMI, ASA score and Anesthesia time. For the purposes of pain control analysis, all oral pain medications were converted to their oxycodone equivalent and all IV pain medications were converted to their morphine equivalent. Median total oxycodone went from 52.5mg to 8.75mg (p<0.005) and median total morphine went from 4mg to 0 (p<0.005). Thirty day readmission rate in the pre-ERAS group was 13.2% and 16.7% in the ERAS group (p = 0.558). The average total cost per patient decreased from $23,379 pre-ERAS to $16,908 in the ERAS group.

Conclusion: ERAS works well for renal surgery patients. It significantly decreased overall length of stay and hospital cost, without having a significant effect on readmission rate.
Poster #187
HISTOLOGIC VARIANTS OF UPPER TRACT UROTHELIAL CARCINOMA INFLUENCE SURVIVAL AFTER RADICAL NEPHROURETERECTOMY

*Shane M. Pearce, MD1; Daniel Oberlin2; Monish Aron1; Inderbir Gill1; Mihir Desai1; Anne Schuckman1; Siamak Daneshmand1 and Hooman Djaladat1

1USC Institute of Urology, Los Angeles, CA; 2Golden Gate Urology, San Francisco, CA

Presented By: Shane M. Pearce, MD

Introduction: Variant histology (VH) in urothelial carcinoma (UC) is an unfavorable prognostic factor associated with high grade and advanced pathologic T stage at presentation. Several small series support this observation for VH of upper tract urothelial carcinoma (UTUC), however, to date there are no nationwide studies. We evaluated patient survival after nephroureterectomy (NU) and the effect of chemotherapy on survival of patients with UTUC and VH.

Methods: A Retrospective cohort study of patients with UTUC was established using the National Cancer Data Base (NCDB) from 2004-2013. Patients were categorized as pure UC or variant histology based on ICD-O-3 histology code. Demographic and cancer-related factors were analyzed and logistic regression was used to determine associations with VH. Oncologic outcomes following NU were described and related to overall survival (OS) using Cox proportional hazard regression.

Results: Variant histology, including micropapillary (n=59) or spindle cell variant (n=232), was identified in 291 of 56,881 total patients with UTUC (0.5%). NU was performed in 256 patients (88%) with VH compared to 35,011 (62%, p<0.001) patients with UC. Subgroup analysis in patients treated with NU showed that patients with VH had a higher frequency of locally advanced (pT 2 or higher, p<0.01) and nodal disease (p<0.01) compared to pure UC. Variant histology was associated with significantly higher administration of chemotherapy compared to pure UC (35% vs. 16%, p<0.001), but there was no difference in neoadjuvant chemotherapy (1.4% vs. 2.0%, p=0.4). Despite this, prognosis was especially poor among patient with VH; Kaplan-Meier curves showed significantly decreased estimated 5-year OS (26% for VH vs. 51% for UC, p<0.001). After adjustment for age, comorbid conditions, chemotherapy, clinical and pathologic stage, VH was independently associated with worse OS (HR 1.61, 95% CI 1.27-2.04, p<0.001).

Conclusion: We report on the largest national series of patients with VH in UTUC. We found that VH is an uncommon but biologically aggressive entity associated with higher stage at diagnosis, higher utilization of chemotherapy, more advanced disease after definitive surgery, and is an independent predictor of worse OS compared to pure UC. Future clinical and molecular studies are needed to identify subsets of patients whom may benefit of neoadjuvant chemotherapy in this population.

<table>
<thead>
<tr>
<th>Patient characteristic</th>
<th>Pure</th>
<th>Variant Histology</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y), mean ± SD</td>
<td>71.1 ± 11.25</td>
<td>70.1 ± 11.6</td>
<td>0.01</td>
</tr>
<tr>
<td>Sex (% male)</td>
<td>59.7</td>
<td>64.2</td>
<td>0.10</td>
</tr>
<tr>
<td>Race (% White)</td>
<td>91</td>
<td>92</td>
<td>0.8</td>
</tr>
<tr>
<td>Charlson Comorbidity, n (%)</td>
<td></td>
<td></td>
<td>&lt;0.03</td>
</tr>
<tr>
<td>CCI 0</td>
<td>38.809 (68.8)</td>
<td>211 (72.5)</td>
<td></td>
</tr>
<tr>
<td>CCI 1</td>
<td>13.017 (23.0)</td>
<td>57 (19.6)</td>
<td></td>
</tr>
<tr>
<td>CCI 2 or more</td>
<td>4.764 (8.4)</td>
<td>23 (7.9)</td>
<td></td>
</tr>
<tr>
<td>Clinical stage, n (%)</td>
<td></td>
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<tr>
<td>&lt;T2</td>
<td>64.3</td>
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<tr>
<td>T3</td>
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<td>T4</td>
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<td>Pathologic T stage, n (%)</td>
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<td>T4</td>
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<td>Pathologic N Stage, n (%)</td>
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Poster #188
PREDICTING SIGNIFICANT ESTIMATED GLOMERULAR FILTRATION RATE (eGFR) DECLINE FOLLOWING RENAL UNIT REMOVAL TO AID IN THE CHOICE BETWEEN RADICAL (RN) AND PARTIAL NEPHRECTOMY (PN)

*Andrew McIntosh, MD; Robert Uzzo, MD, FACS; Brian Egleston, PhD; David Chen, MD, FACS; Richard Greenberg, MD, FACS; Rosalia Viterbo, MD, FACS; Shreyas Joshi, MD; Daniel Parker, MD; Mohammed Haseebuddin, MD; Marc Smaldone, MD, MSHP, FACS and Alexander Kutikov, MD, FACS

1Fox Chase Cancer Center; *Temple Health

Presented By: Andrew McIntosh, MD

Introduction: The American Urological Association (AUA) Guideline for Management of the Localized Renal Masses suggests that an anticipated eGFR below 45 ml/min/1.73m² upon renal unit removal should help guide decision-making between RN or PN in patients for whom risk trade-offs between RN and PN are uncertain. Yet, there is no point-of-care clinical tool that can help renal surgeons predict post-RN eGFR in patients who face the choice of PN vs. RN. As such, we sought to develop a clinically-actionable predictive model to quantify the risk of eGFR dropping below 45 ml/min/1.73m² in patients with a localized renal mass and normal pre-operative renal function.

Methods: Our prospectively maintained kidney cancer registry was reviewed for patients undergoing RN from Jan 1990 – July 2015 (n=1078). Demographic and co-morbidity data were indexed. Serum creatinine values were queried and eGFR was calculated using the Modification of Diet in Renal Disease (MDRD) formula. New baseline eGFR was defined as the last reported eGFR within one year of surgery. We used a multivariable logistic regression to develop the nomogram and evaluated it utilizing receiver operating characteristic (ROC) analysis.

Results: 667 patients undergoing RN with pre-operative eGFR ≥ 60 ml/min/1.73m² were included in the analysis (median age 61 yrs [IQR 52-69 yrs], 64% male, 89% white). Median maximum tumor diameter was 6 cm (IQR 4-9.5 cm). 184 patients (28%) experienced a GFR decline to ≤ 45 ml/min/1.73m². On multivariable analysis, increasing age (p<0.0001), female gender (p<0.0001), and increasing pre-operative Cr (p<0.0001) were associated with eGFR decline to ≤ 45 ml/min/1.73m². Based on these variables, we constructed a predictive nomogram for eGFR decline to ≤ 45 ml/min/1.73m² to be used in the clinical setting (Figure 1a). The area under ROC curve was 0.78 with good calibration (Figure 1b).

Conclusion: The decision to perform RN vs. PN, especially in comorbid patients with anatomically complex lesions, is multifaceted. Pursuant to the AUA Guidelines, PN may be favored when significant post-operative renal functional decline is anticipated. We provide a simple quantitative tool to help identify patients who are at an increased risk of an eGFR decline to ≤ 45 ml/min/1.73m².
Poster #189
PREDICTORS OF RENAL TRANSPLANTATION AMONG PATIENTS RENDERED SURGICALLY ANEPHRIC FOR RENAL CANCER
*Vidit Sharma, MD 1; Timothy C Boswell, MD 1; Mary E Westerman, MD 1; R. Houston Thompson, MD 1; Bradley C Leibovich, MD 1 and Stephen A Boorjian, MD 1

1Mayo Clinic Urology
Presented By: Vidit Sharma, MD

Introduction: Patients rendered surgically anephric during treatment of non-hereditary renal cancers in solitary kidneys (or bilateral masses) are often counseled regarding the possibility of renal transplantation. However, predictors of renal transplantation after completion nephrectomy are understudied in this setting.

Methods: A retrospective review was conducted to identify patients rendered surgically anephric during 2001-2016 due to non-hereditary renal cancers (renal cell carcinoma, urothelial carcinoma, and other malignancies) in an anatomically or functionally solitary kidney. The need for long term dialysis must have been identified preoperatively. Patient demographics, comorbidities and cancer features were compared between patients achieving renal transplantation and those not. Kaplan-Meier curves were used to compare time to transplantation across the identified parameters.

Results: Among 27 patients rendered anephric, 4 (15%) received a renal transplantation over a median follow up of 59 months for patients alive at last follow up. All transplanted patients were less than 70 years of age and had cT1a renal parenchymal masses at the time of nephrectomy. No patient undergoing completion nephrectomy for upper tract urothelial carcinoma received transplantation. Patients receiving transplant evaluation prior to nephrectomy were more likely to eventually receive a transplantation (60% vs 5%, p<0.01). 5-year overall survival for transplanted patients was 100% compared to 14% for patients that did not receive a transplant (p=0.01). However, 60% of the non-transplanted patients (compared to 100% of the transplanted patients) were free of cancer recurrence at 5 years.

Conclusion: The majority of non-sporadic renal cancer patients rendered surgically anephric for cancer do not receive renal transplantation, and patients with non-sporadic renal cancers contemplating completion nephrectomy should weigh the risks and benefits of dialysis versus the natural history of the malignancy. Patients undergoing nephrectomy for renal cancer in a solitary kidney are more likely to receive renal transplantation if they are less than 70 years of age at the time of nephrectomy, have a cT1a renal parenchymal mass, and receive transplant consultation before nephrectomy. This information may inform patient counseling.

Figure 1: Overall survival in transplanted vs nontransplanted patients after completion nephrectomy renal malignancy
ASSOCIATION OF PARTIAL VERSUS RADICAL NEPHRECTOMY WITH SUBSEQUENT HYPERTENSION RISK FOLLOWING RENAL TUMOR RESECTION

Paras Shah, MD; Bradley Leibovich, MD; Holly Van Houten, MD; Tim Lyon, MD; Meghan Knoedler; Lindsey Sangaralingham; Xiaoxi Yao, PhD; Andrea Kattah, MD; R. Houston Thompson, MD; Nilay Shah, PhD and Stephen Boorjian, MD

Mayo Clinic

Presented By: Paras Shah, MD

Introduction: Although partial nephrectomy (PN) represents the recommended management strategy for small renal masses, recent series have suggested a possible increased risk of postprocedural hypertension relative to radical nephrectomy (RN). Herein, therefore, we investigate the risks of new-onset and worsened hypertension after RN versus PN.

Methods: We performed a retrospective, population-based cohort study using the OptumLabs Data Warehouse, a large administrative claims database of privately insured and Medicare Advantage enrollees. Adult patients who underwent RN or PN between January 1, 2007 and December 31, 2016 were included. One-to-one propensity score matching was used to balance surgical groups based on age, gender, race, census region, baseline comorbidities, current medications, year of surgery, and length of follow-up. The primary outcome was to evaluate incidence rates and propensity score-matched Cox proportional hazards models to compare new-onset and worsened hypertension following RN versus PN.

Results: Among 13,893 patients who underwent nephrectomy, 9,207 were managed with RN and 4,686 with PN. Mean follow-up after surgery was 2.4 (SD=2.1) years. In the 3,106 propensity-matched patients without preexisting hypertension, RN was associated with a higher risk for new-onset hypertension compared to PN (18.07 vs. 12.35 events/100 person-years, absolute difference=5.72 events/100 person-years, 95%CI=3.67-7.77; HR=1.40, 95%CI=1.22-1.60, P<0.001). Similarly, among the 6,242 propensity-matched patients with hypertension prior to surgery, RN was associated with a higher risk for worsening of hypertension compared to PN (51.43 vs. 41.83 events/100 person-years, absolute difference=9.60 events/100 person-years, 95%CI=6.42-12.78; HR=1.18, 95%CI=1.10-1.26, P<0.001). Subgroup analysis of patients ≥75 years also revealed greater likelihood for worsened hypertension after RN versus PN (65.08 vs. 53.61 events/100 person-years, absolute difference=11.47 events/100 person-years, 95%CI=8.00-12.94; HR=1.19, 95%CI=1.10-1.27, P<0.001).

Conclusion: Radical nephrectomy was associated with a higher risk for new-onset and worsened hypertension compared to PN, including among elderly patients, a subgroup for whom there is continued debate regarding optimal treatment strategy. Given prior noted associations between hypertension and non-cancer related morbidity, our results further encourage the preferential use of PN in the management of localized renal masses when technically feasible.
Poster #191
DO POSITIVE MARGINS FOR PARTIAL NEPHRECTOMY MATTER IN CLINICAL T1A RENAL CELL CARCINOMA? A MULTICENTER ANALYSIS
Ahmed Eldefrawy, DM1; Umberto Capitanio2; Shreyas Joshi3; Alessandro Larcher2; Stephen Ryan1; Margaret Meagher1; Aaron Bradshaw1; Brittney Cotta1; Addison Yee1; Fang Wan1; Francesco Montorsi2; Robert Uzzo3 and Ithaar Derweesh1
1University of California San Diego; 2Ospadele San Raffaele; 3Foc Chase Cancer Center

Presented By: Ahmed Eldefrawy, DM

Introduction: Impact of positive margins in partial nephrectomy for small renal masses in small is controversial. Conflicting data suggest varying conclusions with respect to effect on outcomes and survival. We sought to characterize outcomes of partial nephrectomy in a large multi-institutional cohort with respect to margin status and risk of recurrence.

Methods: Retrospective multicenter (UCSD, Fox Chase Cancer Center, Ospadele San Raffaele) analysis of patients with clinical T1a Renal Cell Carcinoma who underwent partial nephrectomy from 1998 to 2017 was performed. Chi square test compared categorical variables and independent sample t test compared continuous variables. Primary outcome was recurrence free survival (RFS). Kaplan-Meier survival analysis described recurrence free survival (RFS) and log-rank test compared survival between positive and negative margin groups. Cox regression analysis was used to identify independent predictors of disease recurrence.

Results: 1777 patients met inclusion criteria for analysis (median age was 60 years, median follow-up 50.5 months); 85 patients (4.8%) had positive surgical margin. 44 patients (2.5%) developed disease. Comparing positive and negative margin groups, no differences were noted in demographics between the two groups. Tumor size was larger in the positive margin group (2.9 cm vs. negative margin 2.6 cm, p=0.033). Tumor grade (p=0.365), lymphovascular invasion (p=0.426), and tumor histology (p=0.228) were not different between the groups. Three patients (3.5%) with positive margins developed disease recurrence, while 41 (2.4%) of patients with negative margins developed disease recurrence (p=0.352). Of the 5 patients who developed local recurrence, only one had positive margin. Kaplan-Meier analysis demonstrated 5-year RFS of 97.3% for negative margins and 91.5% for positive margins (p=0.341). On Multivariable analysis, increasing tumor size was the only significant predictor of disease recurrence with (HR 1.5, p=0.040)

Conclusion: In clinical T1a RCC, positive surgical margin was not associated with higher risk of disease recurrence. Our findings suggest that T1a patients with positive margins do not represent a higher risk cohort. More intensive postoperative surveillance protocols may not be of added benefit, and reflexive salvage surgery is not recommended.
Poster #192
A STATEWIDE QUALITY IMPROVEMENT COLLABORATIVE'S ADHERENCE TO 2017 AUA GUIDELINES REGARDING INITIAL EVALUATION OF SMALL RENAL MASSES

*Alon Z. Weizer, MD, MS1; Craig Rogers2; Tae Kim1; Ji Qi1; Sanjeev Kaul3; Michael Traver4; Tony Pinson5 and Brian Lane6

1Department of Urology, University of Michigan, Ann Arbor, MI; 2Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI; 3Comprehensive Urology, Royal Oak, MI; 4Western Michigan Urological Associates, Holland, MI; 5Pinson Urology, Jackson, MI; 6Department of Urology, Spectrum Health Medical Group, Grand Rapids, MI for the Michigan Urological Surgery Improvement Collaborative, Ann Arbor, MI

Presented By: Alon Z. Weizer, MD, MS

Introduction: The American Urological Association (AUA) published guidelines for renal mass and localized renal cancer in 2017. The Michigan Urological Surgery Improvement Collaborative: Kidney mass: Identifying and Defining Necessary Evaluation and therapy (MUSIC-KIDNEY) program analyzes the patterns of care across the state of Michigan for patients diagnosed with localized renal masses ≤7 (RM≤7cm). We report initial adherence to these guidelines within this regional quality improvement collaborative for kidney cancer.

Methods: Proposed and approved in 2015, MUSIC KIDNEY commenced after beta testing with data collection in September 2017 at 8 diverse MUSIC practices. Data abstractors recorded clinical, radiographic, pathologic, and short-term follow-up data into the registry for patients with a newly-diagnosed RM≤7cm.

Results: During the initial 12 months of data entry, 8 pilot practices (34 physicians) evaluated 474 patients with newly diagnosed RM≤7cm. AUA guidelines recommend newly diagnosed RM≤7cm patients receive a complete metabolic profile (CMP), complete blood count (CBC), urinalysis (UA), chest x-ray or CT thorax (chest imaging), and cross-sectional abdominal imaging (CT or MRI). Of 474 MUSIC KIDNEY patients, CBC was documented in 70% (n=334), CMP in 66% (n=315), UA in 70% (n=331), chest imaging in 36% (n=172), and CT or MRI in 92% (n=434). Only 16% (n=76) patients received all recommended testing: CMP, CBC, UA, CXR or CT thorax, and CT or MRI. AUA guideline adherence varied at a practice level from 0-71% (Figure 1).

Conclusion: In MUSIC KIDNEY's initial assessment of clinical evaluation patterns for patients with localized RM ≤7cm, less than a fifth of patients received all elements of preliminary testing recommended by the AUA guidelines. The primary reason for failure to complete all recommended testing was absence of chest imaging. There was significant practice-level variation for overall guideline adherence and for individual tests, particularly chest imaging.
Introduction: Regional quality improvement collaboratives are an effective way to analyze the patterns of care that are in place across multiple practices. The Michigan Urological Surgery Improvement Collaborative (MUSIC) has established the infrastructure to examine prostate cancer outcomes in Michigan. We describe the initial pattern of usage of active surveillance (AS) in a regional quality improvement collaborative for kidney cancer.

Methods: MUSICKidney mass: Identifying and Defining Necessary Evaluation and therapy (KIDNEY) was proposed in September 2015, approved in December 2015, and underwent beta testing in 2016–2017. Case entry for 8 Michigan practices began in September 2017. Expansion to other sites within MUSIC is planned for early 2019. Clinical, radiographic, pathologic, and short-term follow-up data were entered into the registry by data abstractors.

Results: During the initial 12 months of data entry, 474 patients with newly diagnosed renal masses ≤7 cm in size were evaluated. Eight diverse pilot practices contributed data from visits to 34 physicians. Of these patients, 199 (42%) initially chose definitive treatment (Rx) and 210 (44%) pursued AS. Sixty-one patients (13%) underwent renal biopsy to help decision-making, after which 32 chose Rx and 29 elected AS. With confirmation 4 months later, final management was Rx for 249 (53%) and AS for 225 (47%) patients. Patients choosing AS vs. Rx demonstrated a significant difference in age (median 70 vs. 63, p < .001), insurance type (56% vs. 43% with public insurance, p = 0.012), tumor size (median 2.3 vs. 3.4 cm, p < .001), clinical T stage (84% vs. 61% with T1a, p < .001) and GFR (68% vs. 77% with GFR > 60, p = 0.045). Gender, race, BMI, and comorbidity were not significantly associated with treatment decision (p > 0.05 for each). The decision to pursue AS vs. Rx demonstrated significant variation across the practices (p < .001), with AS use among pilot practices ranging from 0-67% (Figure).

Conclusion: In our initial assessment of treatment patterns for patients with localized RM ≤7 cm, a surprisingly high proportion of patients (39%) were managed with surveillance. Further analysis of the factors leading to surveillance and inclusion of additional practices is being performed. Confirmation of these provocative findings via evaluation of claims data is planned.

Figure: MUSIC KIDNEY Pilot practice level variation in SRM

![Graph showing pilot practice level variation in surveillance]

*Alon Z. Weizer, MD, MS; Craig Rogers; Tae Kim; Ji Qi; Sanjeev Kaul; Edward Schervish; Benjamin Stockton and Brian Lane*

1 Department of Urology, University of Michigan, Ann Arbor, MI; 2 Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI; 3 Department of Urology, University of Michigan; 4 Comprehensive Urology, Royal Oak, MI; 5 Michigan Institute of Urology, Detroit, MI; 6 Lakeside Urology, St. Joseph, MI; 7 Department of Urology, Spectrum Health Medical Group, Grand Rapids, MI for the Michigan Urological Surgery Improvement Collaborative, Ann Arbor, MI
COMPARATIVE ANALYSIS OF MINIMALLY INVASIVE RADICAL AND PARTIAL NEPHRECTOMY FOR CLINICAL T2 RENAL MASS: ANALYSIS OF THE ROBOTIC SURGERY FOR LARGE RENAL MASS (ROSULA) GROUP

Introduction: Utilization of partial nephrectomy (PN) for clinical T2 renal mass (cT2RM) is controversial. Minimally invasive surgery (MIS) is increasingly used in larger masses, though impact of MIS in cT2RM is unclear. We compared outcomes of MIS PN and radical nephrectomy (RN) in cT2RM.

Methods: Retrospective international multicenter analysis of MIS PN and RN for cT2RM (T2N0M0) [RObotic SUrgery for LArge renal mass (ROSULA) Group]. Primary outcome was change in estimated glomerular filtration rate (ΔeGFR). Secondary outcomes included complication rates, de novo Chronic Kidney Disease (CKD, eGFR<60 mL/min/1.73m²) and eGFR<45, overall survival (OS) and progression free survival (PFS). Multivariable analysis (MVA) and Kaplan-Meier analysis (KMA) were carried out for survival and de novo eGFR<45.

Results: 760 patients (227 PN/533 RN, median follow up 20 months) were analyzed. RN had larger tumor size (9.3 vs. 8.5 cm, p<0.001) and RENAL score (9.4 vs. 9.2, p=0.001). Median ischemia time for PN was 22 minutes. No significant differences were noted for 30-day complications (PN 24% vs. RN 17.9%, p=0.1) or readmissions (p=0.1). PN had higher estimated blood loss (290 mL vs. 175 mL, p<0.001) and positive margin rate (6.4% vs. RN 3.1%, p=0.062). PN had lower ∆eGFR (6.6 vs. 25.2, p<0.001), de novo eGFR <60 (13% vs. 5 6.1%, p<0.001) and de novo eGFR <45 (6.1% vs. 34.2%, p<0.001). MVA revealed that increasing ASA (American Society of Anesthesiologists) score (HR 4.49, p<0.001) was predictive for all cause mortality, but not type of surgery (p=0.137). Increasing age (HR 1.09, p <0.001) and RN (HR 5.46, p <0.001) were independent predictors for de novo eGFR<45. KMA showed 79.3% and 86% 5-year OS for patients who underwent PN and RN, respectively (p =0.951) No significant differences were noted for 5 year PFS (PN 67.7% vs. RN 68.4%, p=0.112).

Conclusion: MIS PN for select cT2RM provides renal functional benefit while not compromising oncologic and outcomes and not having greater morbidity. Consideration may be given to PN in cT2RM when technically feasible and indicated.

Figure. Kaplan Meier Analysis for OS for RN vs. PN in cT2 RCC.
Introduction: Anemia is an established adverse prognostic factor for metastatic renal cell carcinoma (RCC), but its significance in localized RCC is unclear. Anemic patients are often on iron supplementation, which is supported as a kidney-specific carcinogen in epidemiologic and animal studies. We investigated the effect of iron supplementation and anemia on cancer outcomes of localized RCC patients.

Methods: 770 patients who underwent a partial or radical nephrectomy for localized RCC between 2006-2016 at a National Comprehensive Cancer Network institute were retrospectively reviewed. Preoperative anemia was defined as hemoglobin (Hgb) within the lowest 5th percentile using validated age-, gender- and race-adjusted cut-offs. Microcytic anemia was defined as red blood cell mean corpuscular volume <80 fL. Kaplan-Meier method and Cox regression models were utilized to investigate the association of iron supplementation, Hgb level, anemia, and microcytic anemia with metastasis-free survival (MFS) and cancer-specific survival (CSS).

Results: Preoperative anemia was strongly associated with adverse tumor pathology, including size, grade, stage and sarcomatoid dedifferentiation (all p<0.001); whereas iron supplementation was associated with grade (p=0.036) and sarcomatoid dedifferentiation (p<0.01). Lower Hgb and microcytic anemia were each strongly associated with worse MFS and CSS (all p<0.001), and remained so after multivariable adjustment for iron supplementation, tumor size, stage and grade. Iron supplementation was strongly associated with worse MFS (P<0.001) but not CSS (P=0.44), and remained so after adjustment for anemia, tumor size, stage and grade, but not microcytic anemia.

Conclusion: Preoperative iron supplementation and anemia are novel independent poor prognostic factors for localized RCC patients, and may improve risk stratification for surgical versus active surveillance consideration and for identification of nephrectomy patients who may benefit most from adjuvant therapy. Whether perioperative modification of iron supplementation or anemia can improve RCC patient outcomes warrants further investigation, as does the prognostic significance of anemia correction versus persistence after nephrectomy.
**Poster #196**

**GROWTH RATES OF BIRT-HOGG-DUBÉ-ASSOCIATED RENAL TUMORS**

*Mark W. Ball, MD; Rabindra Gautam; Laura Schmidt and W. Marston Linehan*

1National Cancer Institute, Bethesda, MD

Presented By: Mark W. Ball, MD

**Introduction:** Birt-Hogg-Dubé (BHD) is an autosomal dominant inherited syndrome in which affected individuals are at risk for developing benign hair follicle hamartomas (fibrofolliculomas), pulmonary cysts, spontaneous pneumothoraces and renal tumors caused by germline alterations in *folliculin* (*FLCN*). Approximately 30% of patients with BHD develop renal tumors of various histologies including hybrid oncocytic tumors (50%) that contain features of chromophobe renal cell carcinoma (RCC) and oncocytoma, chromophobe RCC (34%), clear cell RCC (9%), and oncocytoma (5%). The paradigm for treating renal tumors in BHD includes active surveillance for lesions less than 3 cm, and surgical resection for lesions greater than 3 cm. Knowledge of growth rates for renal lesions in BHD guide surveillance schedules. We sought to characterize growth rates for BHD-associated renal tumors and to determine if growth rates varied by histologic type.

**Methods:** The National Cancer Institute hereditary kidney cancer registry was queried for patients with BHD and solid, enhancing renal tumors with multiple cross-sectional imaging studies and known germline mutation status. In patients with multiple index lesions, only the largest was analyzed. Renal tumor size was measured as the largest one-dimension diameter. Growth rates were calculated using linear regression.

**Results:** From an initial cohort of 161 patients with BHD, 71 patients met inclusion criteria. A total of 266 time-point measurements were included for analysis. Median follow-up was 4.3 years. Median tumor growth rate was 0.09 cm/year (interquartile range 0.02-0.2 cm/year). There was no difference in growth rates among hybrid tumors, chromophobe RCC and other histologies (0.05, 0.09 and 0.09 cm/year, respectively, p=0.5)

**Conclusion:** The majority of BHD-associated renal tumors have a growth rate of less than 0.2 cm/year. While lifelong surveillance is recommended, surveillance schedules may be safely extended up to several years for patients with small renal tumors.
Poster #197

DOES INCREASING TIME TO SURGERY AFFECT SURVIVAL IN STAGE 1 RENAL CELL CARCINOMA? AN ANALYSIS OF THE NATIONAL CANCER DATABASE

Brittney Cotta, MD; Stephen Ryan, MD; Ahmed Eldefrawy, MD; Reith Sarkar, BS; Aaron Bradshaw, BS; Margaret Meagher, BS; Zachary Hamilton, MD; James Murphy, MD and Ithaar Derweesh, MD

UC San Diego School of Medicine

Presented By: Brittney Cotta, MD

Introduction: Optimal timing for surgical treatment of localized renal cell carcinoma (RCC) remains undefined. We sought to determine the survival impact of time to definitive surgical treatment for Stage 1 RCC and elucidate factors associated with a delay in surgical care utilizing the National Cancer Database (NCDB).

Methods: The NCDB was queried for Stage 1 RCC cases (cT1N0M0) from 2004-2013 treated with partial or radical nephrectomy. All patients had known renal cell histology, pathologic tumor size, follow-up, and discrete time from diagnosis to definitive surgical treatment. Quartiles were formed from the range of time to definitive surgery of the entire cohort in days: early defined as the first two quartiles and delayed as the fourth. Descriptive analyses were conducted between early and delayed treatment groups. Overall survival (OS) between early and delayed groups was calculated with Kaplan-Meier analysis. Multivariable analysis was performed to determine demographic and clinical factors associated with delay in surgical care.

Results: 38,859 patients were analyzed. Median time to treatment was 40 days (IQR 22-68). Early (≤40 days, n=23,712) and delayed (>68 days, n=15,147) groups had a median follow-up of 44.8 and 41 months, respectively (p<0.001). Delayed surgery was more frequent with African-Americans (14.8% vs. 9.1%, p<0.001), patients with government or no insurance (53.7% vs. 45.1%, p<0.001), males (60.7% vs. 58.3%, p=0.001), and Charlson Comorbidity Index (CCI)≥2 (9.7% vs. 6.7%, p<0.001). Kaplan-Meier analysis demonstrated survival benefit to earlier as opposed to delayed treatment group, with 5 year OS of 85.5% and 80.9% (p<0.001; Figure). On multivariable analysis, increasing age (OR=1.001, p=0.015), African-American race (OR=1.5, p<0.001), increasing distance from treatment center (OR=1.005, p=0.001), residence in areas with low high school graduation rates (OR=1.42, p<0.001), residence in metropolitan area of >1 million population (OR=1.6, p<0.001), and CCI >2 (OR=1.4, p<0.001) were independently associated with increasing time to surgery.

Conclusion: Surgery of T1 RCC carried out beyond 9 weeks after diagnosis is associated with reduced overall survival compared to patients treated within 6 weeks. Time to definitive surgical treatment should be a quality of care metric, with special attention given to populations most at risk for delays in care. Further study is requisite.
Poster #198
SPONTANEOUS REGRESSION OF RENAL CELL CARCINOMA TUMORS ON ACTIVE SURVEILLANCE.
*Shervin Badkhshan, MD1; Ahmed Aly1; Arun Menon1; Tashionna White1; Gaybriella James1; Paul May1; Qiang Li1; Tom Schwaab
and Eric Kauffman1
1Roswell Park Cancer Institute
Presented By: Shervin Badkhshan, MD

Introduction: Occasional spontaneous shrinkage of renal tumors under active surveillance (AS) is a well-documented but poorly
studied phenomenon. The histology of these shrinking tumors is unknown due to lack of widespread use of biopsy during AS. Here
we describe the incidence and features of spontaneous tumor shrinkage among histologically confirmed RCC patients on AS,
including novel discovery of common spontaneous regression among non-clear cell subtypes.

Methods: A prospectively maintained kidney tumor AS database at a single National Comprehensive Cancer Network institute
was queried to identify all patients with ccRCC, chRCC, or pRCC diagnosed by percutaneous needle core biopsy and >/=6 months
follow-up. Clinical features were retrospectively studied and all shrinking tumors (>20% volume reduction) were confirmed by
radiologist re-review. Needle core biopsies of all shrinking and select growing tumors were re-reviewed by a genitourinary
pathologist and scored for various histologic features including macrophage and lymphocytic infiltration, eosinophilia and necrosis.

Results: 74 AS patients with RCC on biopsy were identified: 42 ccRCC, 24 pRCC and 8 chRCC. Intriguingly, 9/24 (38%) pRCC
tumors and 4/8 (50%) chRCC tumors shrunk during AS without any treatment, compared to only 5/42 (12%, p=0.03 and 0.03,
respectively) ccRCC tumors. The median tumor volume shrinkage (range) was 57% (31-84%) for pRCC and 83% (68-97%) for
chRCC, compared to only 28% (20-31%) for ccRCC. Shrinkage was temporally associated with the biopsy in 8/9 pRCC tumors,
4/4 chRCC, and 6/7 ccRCC tumors. On pathologist re-review, most shrinking pRCC tumors demonstrated extensive macrophage
infiltration compared to only moderate, low or absent levels in all growing pRCC tumors. Shrinking chRCC tumors exhibited intense
eosinophilia in 3/4 (75%) cases, whereas shrinking ccRCC tumors lacked significant eosinophilia or macrophage infiltration.

Conclusion: In among the largest series of biopsied RCC tumors on AS to our knowledge, we discovered a novel phenomenon of
common spontaneous tumor regression among non-clear cell subtypes. Macrophage infiltration and association of tumor
regression with the biopsy suggest a possible immune etiology despite current understanding of non-clear subtypes as relatively
immuno-resistant. Spontaneous RCC shrinkage carries clear implications for AS patient selection, and warrants additional studies
to identify clinical, histologic and molecular predictors.
A PHASE 3, RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY OF ENZALUTAMIDE IN MEN WITH NONMETASTATIC CASTRATION-RESISTANT PROSTATE CANCER: POST HOC ANALYSIS OF PROSPER BY PRIOR DEFINITIVE SURGERY

Paul R. Sieber, MD; David F. Penson1; Neal Shore3; Maha Hussain4; Fred Saad5; Joyce Steinberg6; Jennifer Sugg6; Katharina Modelska7; Suha Sari8 and Cora N. Sternberg9

1Vanderbilt University Medical Center, Nashville, TN, USA; 2Lancaster Urology, Lancaster, PA, USA; 3Carolina Urologic Research Center, Myrtle Beach, SC, USA; 4Robert H. Lurie Comprehensive Cancer Center, Northwestern University, Chicago, IL, USA; 5University of Montreal Hospital Center, Montreal, QC, Canada; 6Astellas Pharma, Inc., Northbrook, IL, USA; 7Pfizer Inc., San Francisco, CA, USA; 8Pfizer Inc., Cambridge, MA, USA; 9San Camillo Forlanini Hospital, Rome, Italy

Presented By: Paul R. Sieber, MD

Introduction: Men with nonmetastatic castration-resistant prostate cancer (nmCRPC) are at high risk of developing metastatic CRPC. The goal of nmCRPC treatment is to delay metastatic disease progression, delay initiation of additional antineoplastic therapies, and ultimately prolong survival and maximize quality of life. In the primary analysis of PROSPER, enzalutamide provided a statistically significant and clinically meaningful improvement in metastasis-free survival (MFS) in men with nmCRPC. Here we report results in patients with or without prior definitive surgery.

Methods: Eligible men with nmCRPC, prostate-specific antigen (PSA) doubling time ≤ 10 months, and PSA ≥ 2 ng/mL at screening continued androgen deprivation therapy and were randomized 2:1 to enzalutamide 160 mg or placebo. The primary endpoint was MFS.

Results: 1401 men were enrolled, with a median age of 74 years (standard deviation, 7.8 years). In all men, enzalutamide reduced the risk of metastasis or death by 71% (hazard ratio [HR], 0.29; 95% confidence interval [CI], 0.24-0.35; P < .0001). Overall, 391 patients (28%) had prior definitive surgery, including prostatectomy and cryoablation (n = 246 [26%] in the enzalutamide group, n = 145 [31%] in the placebo group). Enzalutamide significantly reduced the risk of metastasis or death regardless of whether patients received prior definitive surgery (HR with prior surgery, 0.18; 95% CI, 0.13-0.26; HR without prior surgery, 0.37; 95% CI, 0.30-0.47) (Table).

Conclusion: In men with nmCRPC and rapidly rising PSA, enzalutamide treatment resulted in a clinically meaningful and statistically significant reduction in the risk of developing metastases or death regardless of whether patients had received prior definitive surgery. The treatment effect was greater in patients who had received prior definitive surgery.

Clinical trial identification: NCT02003924

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<tr>
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<th>Enzalutamide (n = 933)</th>
<th>Placebo (n = 468)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prior definitive surgery: Yes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>246</td>
<td>145</td>
</tr>
<tr>
<td>Events, no. (%)</td>
<td>51 (20.7)</td>
<td>88 (60.7)</td>
</tr>
<tr>
<td>Median, mo (95% CI)</td>
<td>NR (33.1-NR)</td>
<td>11.1 (7.5-14.7)</td>
</tr>
<tr>
<td>Hazard ratio (95% CI)</td>
<td>0.18 (0.13-0.26)</td>
<td></td>
</tr>
<tr>
<td><strong>Prior definitive surgery: No</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>667</td>
<td>323</td>
</tr>
<tr>
<td>Events, no. (%)</td>
<td>169 (24.5)</td>
<td>140 (43.3)</td>
</tr>
<tr>
<td>Median, mo (95% CI)</td>
<td>36.6 (32.6-NR)</td>
<td>16.7 (14.7-22.0)</td>
</tr>
<tr>
<td>Hazard ratio (95% CI)</td>
<td>0.37 (0.30-0.47)</td>
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</tbody>
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Poster #202

PSMA-PET RESULTS IN A NONMETASTATIC CASTRATION-RESISTANT PROSTATE CANCER SPARTAN-LIKE POPULATION THAT IS NEGATIVE BY CONVENTIONAL IMAGING

Wolfgang P. Fendler, MD; Manuel Weber; Amir Iravani; Michael S. Hofman; Jérémie Calais; Johannes Czernin; Harun Ilhan; Eric J. Small; Matthew R. Smith; Tobias Maurer; Ken Hermann; Paola M. Perez; Thomas A. Hope; Isabel Rauscher; Anil Londhe; Angela Lopez-Gitlitz; Shinta Cheng; Matthias Eiber and Boris Hadaschik

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Presented By: Wolfgang P. Fendler, MD

Introduction: In SPARTAN, patients with nonmetastatic castration-resistant prostate cancer (nmCRPC), assessed by conventional imaging, benefited from apalutamide treatment (Smith et al., N Engl J Med. 2018;378:1408-18). PSMA-PET detects localized and metastatic prostate cancer with very high sensitivity. We characterized disease extent by PSMA-PET in patients with characteristics similar to those in SPARTAN.

Methods: We retrospectively screened PSMA-PET databases (N = 8825 patients) from 6 high-volume PET centers. SPARTAN-like patients (n = 200) with nmCRPC were included in this study based on: 1) histologically confirmed prostate cancer; 2) documented CRPC during continuous androgen-deprivation therapy (ADT) and prostate-specific antigen (PSA) > 2 ng/mL; 3) high risk for development of metastatic disease defined by PSA doubling time (PSADT) ≤ 10 mos or Gleason score (GS) ≥ 8; 4) no pelvic nodes ≥ 2 cm in the short axis and no known extra-pelvic metastases on prior assessment (including CT/MRI and bone scans). Entry criteria were generally similar to those of SPARTAN, except GS ≥ 8. The primary end point was detection rate on PSMA-PET, including local/pelvic disease and distant metastatic (M1) disease. PSMA-PET was interpreted locally by 1 unblinded reader and centrally by 2 blinded readers following PROMISE criteria.

Results: Patient characteristics of the PSMA-PET population (overall, PSADT ≤ 10 mos, GS ≥ 8) were generally similar to the SPARTAN population (Table). PSMA-PET was positive in 196 of 200 (98%) study patients overall, 111 of 115 (97%) with PSADT ≤ 10 mos, and 85 of 85 (100%) with GS ≥ 8. Overall, 55% of patients had pelvic nodal (N1), and 55% had any extra-pelvic distant metastatic disease despite negative conventional imaging (39% M1a, 24% M1b, 6% M1c). Agreement among the 3 readers for PET interpretation was near-perfect (Fleiss’ κ 0.81 to 0.91).

Conclusion: Detection rate and patient characteristics in the PSMA-PET study were similar for the PSADT ≤ 10 mos and GS ≥ 8 groups. The overlap in baseline characteristics, particularly PSADT, supports that the PSMA-PET positive patients resemble the SPARTAN study population.

Table. Baseline characteristics of patients in the PSMA-PET and SPARTAN studies.

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>PSMA-PET</th>
<th>SPARTAN</th>
<th>N = 1297</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (range)</td>
<td>71 (46-94)</td>
<td>71 (46-94)</td>
<td>73 (48-86)</td>
<td>74 (48-97)</td>
</tr>
<tr>
<td>PSA (ng/mL)</td>
<td>5.3 (1.3-263.8)</td>
<td>5.2 (1.3-263.8)</td>
<td>5.4 (2.099.1)</td>
<td>7.8 (0.1-294.8)</td>
</tr>
<tr>
<td>PSADT (mos)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (range)</td>
<td>4.0 (0.0000)</td>
<td>1.0 (0.0000)</td>
<td>1.7 (0.0000)</td>
<td>1.4 (0.02)</td>
</tr>
</tbody>
</table>
Poster #203
PREDICTING PATHOLOGIC TUMOR SIZE IN PROSTATE CANCER BASED ON PREOPERATIVE FINDINGS.

*Aydin Pooli, MD; David C. Johnson, MD, MPH; Taylor Y. Sadun, MD; Anthony E. JR. Sisk, DO; Ely R. Felker, MD; Steven S. Raman, MD; and Robert E. Reiter, MD

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2Genitourinary Pathology, Department of Pathology, David Geffen School of Medicine at UCLA, Los Angeles, California;
3Diagnostic and Interventional Radiology, Department of Radiology, David Geffen School of Medicine at UCLA, Los Angeles, California

Presented By: Aydin Pooli, MD

Introduction: Image-guided focal therapies are gaining interest in prostate cancer (PCa) management and their oncologic efficacy depends heavily on accurate tumor localization and size estimation. The aim of this study is to correlate the size of multiparametric MRI (mpMRI) detected index lesions with histopathologic size and to predict the pathologic tumor size based on preoperative findings.

Methods: The study cohort includes consecutive patients with biopsy proven PCa and a corresponding PIRADS ≥ 3 index tumor on 3-Tesla mpMRI who subsequently underwent radical prostatectomy. Patients with prior prostate resection, radiation therapy, contraindication to mpMRI, or images with technical limitations were excluded. A genitourinary pathologist and radiologist used sector mapping to match all radiographic index lesions to whole mount histopathology tumor correlates and compared maximum tumor diameter for both modalities. A Bland-Altman plot was used to assess the agreement between radiologic and pathologic size. Linear regression analysis was used to examine the predictive value of clinical, biopsy, and radiographic parameters on pathologic tumor size.

Result: After excluding patients with missing data, 499 out of 602 eligible patients were included for statistical analysis. The mean maximum radiologic and pathologic diameters were 1.56 cm (SD = 0.78 cm) and 2.36 cm (SD = 0.88 cm), respectively (mean difference: 0.8 cm, SD = 0.91 cm, p<0.001). The Spearman correlation between radiologic size and pathologic size was 0.4 (p<0.001). The radiologic size consistently underestimated the pathologic size regardless of the covariates. In linear regression model, pathologic size was significantly larger for biopsy Gleason Grade Group (GGG) 5 (mean change=0.596, P=0.0001), PIRADS 5 lesions (mean change=0.4220, p<.0001), and tumors locating at the base (0.0043) and transitional zone (p=0.0023). The degree of underestimation was significantly more for tumors larger than 2 centimeters compared to smaller tumors (Mean change 0.91 cm, p<0.0001). The covariates for GGG, PIRADS score, and PSA density remained significantly predictive of pathologic size in multivariable analysis.

Conclusion: The predicted tumor size based on radiologic features tends to underestimate the pathologic tumor size regardless of radiologic covariates. However, the degree of underestimation increases with higher PIRADS score and larger tumor size. Therefore, when pursuing focal therapies for an index lesion, a larger margin of ablation should be considered for such tumors.
Poster #204
INCREASED DETECTION RATES OF INTERMEDIATE AND HIGH-GRADE PROSTATE CANCER IN AFRICAN-AMERICAN MEN AFTER 2012 USPSTF RECOMMENDATION AGAINST PSA SCREENING
*Jeffrey Arace1; Viktor Flores1,2; Dennis Robins1,2; Andrew Winer1,2 and Jeffrey Weiss1,2
1SUNY Downstate Medical Center; 2Department of Veterans Affairs, New York Harbor Healthcare System
Presented By: Jeffrey Arace

Introduction: In 2012, the USPSTF recommended to exclude PSA screening from routine primary care for all patients. The Brooklyn Veterans Hospital patient population consists of ~50% African-American patients, who are at higher risk for development of prostate cancer, as well as the development of more aggressive disease than the general population. We evaluated the impact of the 2012 USPSTF guideline recommendation on prostate cancer detection rates and biopsy patterns in African-American patients and Caucasian patients.

Methods: Demographics, prostate specific antigen (PSA), TRUS volume, and pathologic data were collected on patients who underwent their first prostate biopsy at the Brooklyn Veterans Hospital between January 2007 and June 2018. The period from January 2007 to May 2012 was considered pre-guideline, and the period from June 2012 to June 2018 was considered post-guideline. PCa detection rates and biopsy patterns were compared using Chi-square test.

Results: 609 biopsies were analyzed pre-guideline (113 biopsies/year), and 487 were analyzed post-guideline (81 biopsies/year), indicating a 28% decline in biopsy rate overall. In Caucasian patients there was no significant difference in the detection rates of low, intermediate, or high grade PCa. In contrast, African-American patients were significantly more likely to be diagnosed with PCa in the post-guideline group (56% vs. 65%, p=0.016), and significantly more likely to be diagnosed with intermediate-high grade PCa (38% vs. 47%, p=0.038). Before the 2012 USPSTF guideline recommendation, African-American and Caucasian patients undergoing their first biopsy were equally likely to be diagnosed with high-grade PCa (11% AA vs. 11% CA). After the 2012 decision, we found that African-Americans were 50% more likely than Caucasians to be diagnosed with high-grade PCa on their first biopsy (10% AA vs. 15% CA, p=0.008).

Conclusion: Our study demonstrates that African-American patients have been disproportionately impacted by the 2012 USPSTF recommendation against prostate cancer screening. In the 6 years following the recommendation, detection rates of intermediate-high risk disease remained unchanged for Caucasian patients but have increased significantly for African-Americans. Whether these observations reflect improved selection of patients to biopsy or an increased number of undiagnosed patients remains unclear. The results of our study strongly support the role of routine PSA screening, particularly in higher risk patients.
Poster #205
SURGICAL PERFORMANCE EVALUATION AND PATIENT OUTCOMES COMPARISON UTILIZING AUTOMATIC PERFORMANCE METRICS DURING ROBOTIC-ASSISTED RADICAL PROSTATECTOMY
*Andrew Hung, MD1; Jian Chen1; Paul Oh1; Jessica Nguyen1; Devin Stewart1; Daphne Remulla1; Tiffany Chu1; Ryan Lee1; Yan Liu1 and Inderbir Gill1
1USC Institute of Urology
Presented By: Andrew Hung, MD
Introduction: Surgical performance directly impact post-operative outcomes of patients. We utilized automated performance metrics (APMs) obtained by a novel recorder “dVLogger” during robotic-assisted prostatectomies (RRP) to assess the surgical performance of contemporary cases and stratify the surgeons, and to see if such determination could distinguish clinical outcomes in historical cases.
Methods: APMs (instrument motion tracking and robotic system events data) from 22 single-surgeon cases were recorded from eight faculty surgeons. We utilized machine learning algorithm to select six APMs most predictive of patient outcomes, and used these APMs for surgeon classification. We assigned 1 point to surgeons whose APMs were ranked in the top half of the cohort. The four top surgeons with the most points were categorized in “Group1/APMs” (more efficient APMs) versus “Group2/APMs” (less efficient APMs). Separately, the surgeons were also classified by prior RARP experience. The four surgeons with more than 2000 prior RRP experience were grouped as “Group 1/Experience”, versus the remaining four surgeons who grouped as “Group 2/Experience”. Historical RRP clinical data of these eight surgeons from January 2015 to August 2016 was obtained from our institute’s IRB-approved database. Kruskal-Wallis and Chi-square test were used to determine differences in clinical data between groups.
Results: 526 total historical cases were divided into “Group1/APMs” (n=316) and “Group2/APMs” (n=210) based on the APMs, and “Group 1/Experience” (n=425) and “Group 2/Experience” (n=101) based on surgeons’ prior RRP experience. There were no significant differences in patient demographics between groups (age, BMI, PSA, Gleason score, comorbidities). “Group1/APMs” had shorter surgery time (230 vs 246 minutes, p<0.001), less vesicourethral anastomosis leakage (2.3 vs 8.4%, p=0.002), shorter pelvic drainage tube duration (1 vs 3 days, p<0.001). “Group1/APMs” also had higher urinary continence recovery rate at 3 months (47.8 vs 38%, p=0.029) and 6 months (70.5 vs 61.9%, p=0.048) post-surgery. When classified by prior RRP experience, only low grade (Clavien-Dindo I-II) post-operative complication rate was significantly different between the two groups (6.2 vs 2.6%, p=0.026).
Conclusion: Our analysis showed that for the RRP, skilled surgeons with more efficient APMs have superior intra- and post-operative outcomes, further highlighting the importance of robotic skill on patient outcomes in urologic surgery.
Poster #206

APPLYING DEEP LEARNING TO MULTIPARAMETRIC MRI TO PREDICT CORE-LEVEL BIOPSY PATHOLOGY

*Leo C. Chen, MD1; Nicholas Bien2; Richard Fan, PhD1; Robin Cheong3; Pranav Rajpurkar2; Alan Thong, MD1; Nancy Wang, MD1; Sarir Ahmadi1; Mirabela Rusu, PhD3; James Brooks, MD1; Andrew Ng, PhD2 and Geoffrey Sonn, MD1

1Department of Urology, Stanford School of Medicine, Stanford, CA; 2Department of Computer Science, Stanford University, Stanford, CA; 3Department of Radiology, Stanford School of Medicine, Stanford, CA

Presented By: Leo C. Chen, MD

Introduction: Multiparametric MRI improves the detection of clinically significant prostate cancer and is becoming an integral component of diagnosis and management. However, MRI interpretation suffers from high interobserver variability even among experts, thereby limiting its clinical utility. Recent advances in machine learning methods have great potential to standardize interpretation of medical imaging. We sought to apply deep learning to aid in interpretation of prostate MRI.

Methods: Over 9,000 MRI-US fusion biopsy cores were collected over 3 years from 600+ patients using a robotic fusion biopsy device (ArtemisTM, Eigen). The spatial coordinates of both targeted and standard template cores were recorded and mapped on their corresponding MRI location. Core level biopsy pathology was prospectively recorded. A supervised deep neural network model was trained using 3D MR coordinates and corresponding pathology of the biopsy core tracts. Training, validation, and testing sets were randomly selected in an 80/10/10 ratio.

Results: A preliminary binary classification model correctly predicted benign versus cancerous cores with an AUROC of 0.78.

Conclusion: Our deep binary neural network-based algorithm shows promise in predicting core level biopsy pathology based on automated analysis of MRI. The model was trained and validated on a large dataset including pathology from systematic and targeted biopsy cores whose locations were carefully tracked. The eventual goal of this work is automated generation of probabilistic maps of clinically significant prostate cancer based on MRI. This information could improve a urologist’s ability to maximize detection of Gleason 7+ cancer while minimizing the total number of biopsy cores required and overdetection of insignificant cancer.
Introduction: Patient-centered delivery of healthcare and shared decision-making have become increasingly important concepts over the past several decades, yet current tools lack critical information for risk counseling. We sought to develop a risk calculator that provides clinicians and patients with contextualized risk estimates for upgrading on biopsy while enrolled in AS. We sought to develop and evaluate the usability of a risk calculator interface that would convey personalized information regarding risk of upgrading on AS.

Methods: A risk calculator was developed that included increased contextual information regarding an individual patient’s risk, including how specific variables compared with the model cohort and the patient’s relative risk compared to other similar men. The usability of this calculator was then assessed among urologists using case-based scenarios. A survey was sent to urology residents, fellows, and attendings. We assessed accuracy in interpreting the calculator and participant-rated clinical usefulness of the calculator.

Results: The individual risk calculator has 3 columns: 1) patient variables; 2) how the patient’s values compare with the cohort; and 3) the patient’s relative risk compared with the cohort (Figure 1). There were 17 respondents to the usability survey (5 residents, 3 fellows, 9 attendings). Among attending urologists, 78% had completed oncology-focused fellowships. Accuracy for interpreting individual patient outcomes was 92%. Clinicians were confident in their ability to use the calculator 70% of the time. Overall, 70% of respondents stated that such a risk calculator would be useful in clinical practice.

Conclusion: The PASS Risk Calculator interface improves upon previously-published risk calculators for prediction of upgrading on AS by providing more personalized tailored information to both clinicians and patients. The interface derives from a new model for risk prediction. More work is required to determine if clinical implementation of the risk calculator is associated with improved patient-centered outcomes related to decision-making on AS.

Figure 1: Sample individual patient interface showing clinical information, patient context, and individual risk prediction
PROSPECTIVE CLINICAL VALIDATION OF A MOLECULAR URINE TEST FOR DETECTION OF HIGH-GRADE PROSTATE CANCER

*Paul M. Yonover, MD, FACS¹; Sandra Steyaert, PhD²; Celeste Ruiz, RN¹; Karolina Grafcezynska, RN¹; Jessica DeHart²; Michael Brawer, MD³; Jack Schalken, MD, PhD³; Jack Groskopf, PhD² and Wim Wim Van Criekinge, PhD⁴

¹UroPartners, Chicago, IL; ²MDxHealth, Irvine, CA; ³Radboud University Medical Center, Nijmegen, The Netherlands; ⁴Ghent University, Ghent, Belgium

Presented By: Paul M. Yonover, MD, FACS

Introduction: There is an unmet need for non-invasive methods that can accurately identify patients at increased risk for clinically significant prostate cancer (PCa). SelectMDx is a urine-based molecular test that has been clinically validated for the detection of high-grade PCa in European men. In this prospective study, we evaluated SelectMDx clinical performance in a cohort of U.S. men undergoing initial prostate biopsy in a community urology practice.

Methods: The study population consisted of 330 prospectively enrolled men who were undergoing initial prostate biopsy at a large community urology practice due to suspected PCa (UroPartners, Chicago, IL). Post-DRE urine was collected from all subjects prior to biopsy, and samples shipped under ambient conditions to the testing laboratory (MDxHealth, Irvine, CA). Urinary HOXC6 and DLX-1 mRNAs were quantified, and the RNA results combined in a clinical model with other risk factors to determine the likelihood that subsequent biopsy would identify ISUP grade group (GG) >= 2 (Gleason Score >= 7) cancer. We assessed SelectMDx performance characteristics for detection of GG2 or higher PCa in this cohort.

Results: For the 330 subjects enrolled, average age was 57 years (median 63, interquartile range 54 to 68), and average serum PSA level 8.3 ng/mL (5.7, 4.5 to 8.1). Cancer was identified in 148/330 (44.8%) men biopsied: 64/148 (43.2%) GG1, 47/148 (31.8%) GG2, 7/148 (4.7%) GG3 and 30/148 (20.3%) GG4-5. For detection of GG2 or higher PCa vs. GG1 or no PCa at biopsy, SelectMDx sensitivity was 81% (95% C.I. 71-89%), specificity 46% (40-52%), negative predictive value (NPV) 88% (82-92%) and positive predictive value (PPV) 34% (31-37%). In this cohort, 84/330 (25.5%) subjects were found to have GG2 or higher cancer. At an adjusted disease prevalence of 12% GG2-5 PCa, SelectMDx NPV and PPV were 95% and 18%, respectively.

Conclusion: This is the first prospective clinical study to evaluate SelectMDx in U.S. men. Test performance in this community-based cohort was comparable to the published EU validation study, showing a high NPV for detection of GG2 or higher PCa. These results support the clinical validity of SelectMDx for use in U.S. clinical practice.
Introduction: Multiparametric magnetic resonance imaging (MP-MRI) and MRI/Ultrasound (US) fusion-guided biopsy are becoming more widely used techniques for prostate cancer (PCa) diagnosis and management. However, their widespread adoption and use, where available, are limited by cost and added time. These limitations could be minimized if the dynamic contrast enhanced (DCE) phase of the full MP-MRI is eliminated and a Bi-parametric MRI (BP-MRI) focusing on T2-weighted and diffusion-weighted imaging is performed. Herein, we report the cancer detection rate of BP-MRI compared with full MP-MRI and consider the clinical significance of cases identified on MRI-targeted biopsy.

Methods: Biopsy-naïve and prior negative biopsy patients with clinical suspicion for PCa underwent MP-MRI with an imaging protocol incorporating narrow field-of-view T2-weighted, diffusion-weighted, and DCE pelvic MRI. Then patients underwent MRI/US fusion-guided biopsy of target lesions between November 2013 and October 2017. The pathology results were compared to the positivity of each imaging sequence to define the differential value of the DCE sequence compared to the BP-MRI findings alone.

Results: There were 648 targeted lesions biopsied in 344 patients. We defined biparametric screen filter positivity as both T2W and DWI positivity for the same lesion. The majority of target lesions (552/648, 85%) were screen filter positive. For those that were screen filter negative, a minority (14/96, 15%) had DCE positive findings. Of these, all but one cancer positive case was seen on T2W imaging. For those 82 that were screen filter negative and DCE negative, the DCE phase would not have added imaging suspicion. Only 3/82 (3.7%) were cancer positive; two with low-risk, GG1 cancer and one with intraductal carcinoma variant histology, all identified and targeted based on T2-weighted MRI positivity.

Conclusion: BP-MRI for the evaluation of PCa and for guiding MRI/US fusion-targeted biopsy has the advantages of reducing cost, time, and contrast exposure of MP-MRI by eliminating the DCE phase. These benefits are realized without forfeiting valuable diagnostic information, as shown by the similar cancer detection rates of BP-MRI and MP-MRI in this study, particularly for clinically-significant cases of PCa.
EVALUATING THE IMPACT OF LENGTH OF TIME FROM DIAGNOSIS TO SURGERY IN INTERMEDIATE TO VERY HIGH RISK PROSTATE CANCER PATIENTS

Natasha Gupta, MD; Trinity Bivalacqua, MD PhD; Misop Han, MD; Alan Partin, MD PhD and Mufaddal Mamawala, MBBS MPH

The James Buchanan Brady Urological Institute and Department of Urology; Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

Presented By: Natasha Gupta, MD

Introduction: Prior studies have shown that men with intermediate to very high risk clinically localized prostate cancer (PCa) (Grade Group [GG] ≥ 3) have an increased risk of biochemical recurrence (BCR) following radical prostatectomy (RP). Therefore, we sought to assess if length of time from biopsy to RP was associated with adverse outcomes in these patients.

Methods: We performed a retrospective review of men with a diagnosis of GG≥ 3 PCa on a biopsy who underwent RP at our institution between 2005 and 2017. We assessed patient age, preoperative serum prostate specific antigen (PSA), biopsy GG, days from biopsy to RP, and clinical stage. We categorized time between biopsy and RP into two intervals (< 3 months and 3-6 months). For each GG, we compared pathological outcomes at RP [organ-confined (OC) disease, seminal vesicle invasion (SVI), and lymph node involvement (LVI)] and risk of 5-year BCR between patients who had RP < 3 months vs. 3-6 months after diagnosis.

Results: Among 2,388 men, 1,295 (54%) were GG3, 629 (26%) were GG4, and 464 (20%) were GG5. The median age and PSA were 62 years (IQR 57-66) and 6.0 ng/ml (IQR 4.5 – 9.1), respectively. 13% were African American, and 62% had cT1c disease. 69% underwent RP <3 months after diagnosis. There was no significant difference in rates of OC disease (GG3: 50% vs. 52%, p=0.6; GG4: 47% vs. 54%, p=0.2; GG5: 28% vs. 26%, p=0.8), SVI (GG3: 13% vs. 11%, p =0.3; GG4: 13% vs. 13%, p=1.0; GG5: 32% vs. 33%, p=0.8), or LNI (GG3: 6% vs. 4%, p=0.3; GG4: 7% vs. 5%, p=0.4; GG5: 19% vs. 16%, p=0.5) in men who had RP <3 months vs. men who had RP 3-6 months after diagnosis. In 1,601 men who had follow-up post-RP for >1 year, there was no significant difference in rates of 5-year BCR between patients who had RP < 3 months vs. 3-6 months after diagnosis (GG3: 69% vs. 66%, p=0.3; GG4: 51% vs. 57%, p=0.6; GG5: 48% vs. 54%, p=0.3).

Conclusion: Waiting for RP up to 6 months after diagnosis is not associated with adverse outcomes among patients with intermediate to very high risk PCas.
INTERPRETATION OF DOMAIN SCORES ON THE EXPANDED PROSTATE CANCER INDEX COMPOSITE: HOW DOES THE
DOMAIN SCORE TRANSLATE INTO FUNCTIONAL OUTCOME?
*Aaron A. Laviana, MD; Agustin Hernandez; Li-ching Huang; Zhiguo Zhao; Tatsuki Koyama; Karen Hoffman; Irene Feurer; Ralph Conwill; David Penson and Daniel Barocas
1Department of Urology, Vanderbilt University Medical Center, 2Center for Quantitative Sciences and Department of Biostatistics Vanderbilt University School of Medicine; 3Department of Radiation Oncology, Division of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX; 4Prostate Cancer Patient Advocate, Vanderbilt University School of Medicine, Nashville, TN, USA
Presented By: Aaron Alan Laviana, MD

Introduction: The Expanded Prostate Cancer Index short form (EPIC-26) is a validated questionnaire for measuring health-related quality-of-life in men with prostate cancer. Responses to the 26 individual questions are aggregated into 5 domains, with domain scores reported as a measure of patient function. However, the relationship between domain score and specific functional outcomes remains unclear, leading to potential confusion about treatment expectations. For instance, what does a sexual function domain score of 80 actually mean with regard to a patient being able to obtain an erection sufficient for intercourse? Resultantly, we sought to clarify the relationship between domain scores and individual questions reflecting clinically relevant functional outcomes on the EPIC-26.

Methods: Utilizing data obtained from the Comparative Effectiveness Analysis of Surgery and Radiation Study, a multicenter, prospective, population-based, observational study of men diagnosed with localized prostate cancer in 2011 to 2012, we analyzed the EPIC-26 from 2,138 men at 3 years of follow-up who were treated with either radical prostatectomy, radiotherapy, or active surveillance. We dichotomized every EPIC-26 questionnaire item into its best possible outcome (best versus any other response) and assessed the percentage of men at each domain score who obtained the best result.

Results: Figures were created to show the relationship between domain scores and individual items. These demonstrate the domain score below which optimal functional outcomes are less likely for each question. For example, a score of 80 on sexual function corresponded to 96% of men reporting an erection sufficient for intercourse whereas at 40, only 12% of men reported adequate erections. Meanwhile, at a score of 95 on the urinary incontinence domain, 100% of patients reported no leakage, but at a score of 50, 0% of patients were dry. Similarly, at a score of 95, 100% of patients reported no pads versus only 30% at a score of 50.

Conclusion: Our findings show a novel way to interpret EPIC-26 domain scores and understand clinically meaningful differences
CREATION OF A PERSONALIZED PREDICTION TOOL AND ONLINE NOMOGRAM TO PREDICT SEXUAL, URINARY, AND BOWEL FUNCTION LONGITUDINALLY AFTER RADIATION THERAPY, SURGERY, OR OBSERVATION

* Aaron A. Laviana, MD; Li-ching Huang; Zhao Zhiguo; Tatsuki Koyama; Karen Hoffman; Irene Feurer; Ralph Conwill; David Penson and Daniel Barocas

1 Department of Urology, Vanderbilt University Medical Center; 2 Center for Quantitative Sciences and Department of Biostatistics, Vanderbilt University School of Medicine; 3 Department of Radiation Oncology, Division of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX; 4 Prostate Cancer Patient Advocate, Vanderbilt University School of Medicine, Nashville, TN, USA

Presented By: Aaron A. Laviana, MD

Introduction: Shared decision-making to guide treatment of localized prostate cancer requires the delivery of anticipated quality of life (QOL) outcomes after robotic radical prostatectomy, intensity-modulated radiation therapy, and active surveillance. We sought to create a personalized tool to predict sexual, urinary, bowel, and hormonal function outcomes after treatment to guide both patients and providers alike when deciding which treatment to pursue.

Methods: The Comparative Effectiveness Analysis of Surgery and Radiation (CEASAR) Study is a multicenter, prospective, population-based, observational study of men diagnosed with localized prostate cancer from 2011 to 2012. Men were followed from enrollment to 5 years with the Expanded Prostate Cancer Index short form (EPIC-26), a validated questionnaire for measuring QOL in men with prostate cancer. Responses to the 26 individual questions were aggregated into 5 domain scores (sexual, urinary irritative, urinary incontinence, bowel, hormonal). Comprehensive models to predict domain scores were fit from 2,138 patients, including all available covariates (age, race, pre-treatment PSA, biopsy grade, body mass index, baseline function on EPIC-26, treatment, and scores on standardized instruments measuring comorbidity, general QOL and psychosocial health.) To create a usable tool, we fit parsimonious models for each domain with selected factors based on clinical considerations and statistical performance (age, race, pre-treatment PSA, biopsy grade, baseline function on EPIC-26, and treatment). The parsimonious models were compared to the comprehensive models using a 300-iteration bootstrap approach. Adjusted R-squared values were compared and calibration plots developed to evaluate the performance of the parsimonious versus comprehensive models. A web-based tool was developed from the parsimonious models.

Results: The prediction models achieved adjusted R-squared values of 0.388, 0.245, 0.217, 0.234, and 0.348 for sexual function, urinary incontinence, urinary irritative, bowel, and hormonal domains, respectively. Differences in R-squared values between the comprehensive and parsimonious models were small and not statistically significant. Calibration was excellent (Figure 1). The web-based tool may be found at https://statez.shinyapps.io/PCDSPred/.

Conclusion: Functional outcomes after treatment for localized prostate cancer can be predicted at the time of diagnosis based on age, race, PSA, biopsy grade, baseline function, and a general question regarding overall health. Providers and patients can use this prediction tool to inform shared decision-making.

Figure 1: Full (Left) and reduced (Right) calibration models for sexual function and urinary incontinence domains
A FRAMEWORK FOR AUTOMATED CO-REGISTRATION OF PROSTATE MRI AND DIGITAL WHOLE MOUNT PATHOLOGY IMAGES

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1Stanford University Department of Urology; 2Stanford University Department of Pathology; 3Stanford University Department of Radiology

Introduction: Multiparametric MRI is a powerful tool for prostate cancer diagnosis, yet false positive and false negative findings remain common. Accurate registration between MRI and pathology is essential to better understand the histologic basis of these errors. However, highly accurate co-registration is complex, expensive and time-consuming, and therefore not performed at most institutions. We developed a framework for 3D spatial integration of radiology and pathology images and integrated it into our clinical workflow. We present our workflow and quantification of alignment accuracy.

Methods: Since 2015, we have used patient-specific 3D-printed molds to guide sectioning of prostatectomy specimens in plane and with the same slice thickness as T2wMRI. Whole mount pathology slides are digitally scanned and cancer foci are annotated. Our registration approach (FIGURE) begins with groupwise-registration methods to reconstruct the pre-sectioned histology specimen. Next, the 3D histology reconstruction is registered to the 3D T2wMRI using a deformable alignment process. Groupwise-registration enables simultaneous consideration of multiple consecutive slices. Quantitative evaluation of registration accuracy was performed using the urethra as an anatomic landmark and the Dice similarity coefficient to assess prostate overlap on MRI and histology.

Results: Analysis of registration accuracy was performed in 15 men who underwent MRI prior to prostatectomy. All 101 histology slices were spatially registered to the axial T2wMRI. We found a Dice similarity coefficient of 0.94 ± 0.02 and a urethra deviation of 1.11 ± 0.34 mm (~2 pixels) between reconstructed histology and MRI. The Dice coefficient improved significantly for each step in the registration process. The time required for registering each case is approximately 10 minutes. This process is now integrated into our clinical workflow leading to ~300 co-registered cases available for prostate MRI research.

Conclusion: Our radiology-pathology fusion framework enables rapid and highly accurate alignment of pre-surgical MRI with histology slices, thereby enabling cancers annotated on histology to be mapped on the MRI. Automating this process generates a large amount of data for ongoing projects teaching MRI interpretation, performing radiogenomic analysis, and developing Machine Learning algorithms.
Poster #214
DIAGNOSTIC PROPERTIES OF PROSTATE-SPECIFIC ANTIGEN TO PREDICT PROSTATE CANCER AMONG MEN WITH ANDROGEN DEFICIENCY

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1UIC; 2Washington University in St. Louis; 3Cedars-Sinai Health System
Presented By: Daniel M. Moreira, MD, MHS

Introduction: Androgen deficiency (AD) is common among aging males. Prior to starting androgen replacement, men with AD are recommended to undergo prostate-specific antigen (PSA) screening. However, given the lower prevalence of prostate cancer (PCa) in AD, it remains unclear whether PSA is a sensitive and specific test for PCa among AD men. Thus, we sought to evaluate the diagnostic properties of PSA to predict PCa among men with AD compared to men with normal serum androgens.

Methods: We conducted a retrospective analysis of 3,197 men undergoing a 2-year prostate biopsy in the placebo arm of the Reduction by Dutasteride of PCa Events (REDUCE) study. Men were divided in two groups based on the presence or absence of AD (total testosterone <10.4nmol/L). Diagnostic properties of PSA to predict PCa were determined for several PSA thresholds in the two groups and plotted as receiver operator characteristic curves.

Results: A total of 588 (18.4%) had AD. Men with and without AD were comparable in age, race, geographic origin, digital rectal exam, PSA levels, and family history of PCa. AD men had higher mean body mass index and prostate volume (both P<0.05). The prevalence of PCa in AD men was 92 (15.7%) compared to 441 (16.9%) in the non-AD men (P=0.46). Figure 1 shows sensitivity, specificity, correct classification and prevalence of PCa for several PSA thresholds, comparing AD to non-AD men. In summary, PSA was slightly more specific, sensitive and accurate to predict PCa among AD men (Figure).

Conclusion: In a cohort of men undergoing prostate biopsy, PSA had a higher sensitivity and specificity to predict PCa among AD men compared to their non-AD counterparts. PSA seems to be a safe means of PCa screening in men with AD.

Figure: Diagnostic properties of PSA to predict prostate cancer by androgen deficiency status

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PATIENT REPORTED FUNCTIONAL OUTCOMES AFTER 5 YEARS IN MEN WITH LOW-RISK AND FAVORABLE INTERMEDIATE-RISK PROSTATE CANCER

*Daniel D. Joyce, MD1; Zighuo Zhao, PhD2; Karen E. Hoffman, MD, MHS, MPH3; Li-Ching Huang, PhD2; Tatsuki Koyama, PhD2; Ralph Conwill, BS; David F. Penson, MD, MPH1 and Daniel A. Barocas, MD, MPH1
1Department of Urologic Surgery, Vanderbilt University Medical Center; 2Department of Biostatistics, Vanderbilt University Medical Center; 3Department of Radiation Oncology, The University of Texas, MD Anderson Cancer Center

Presented By: Daniel D. Joyce, MD

**Introduction:** Comparing the urinary, sexual, and bowel function outcomes associated with management of localized prostate cancer is critical for shared decision-making. Comparative harms are especially salient for lower risk disease where the benefits of treatment are less certain. The aim of this study was to compare 5-year functional outcomes of contemporary management options for low-risk and favorable intermediate-risk prostate cancer – active surveillance (AS), nerve-sparing radical prostatectomy (RP), external beam radiation therapy (EBRT) without androgen deprivation therapy (ADT) and brachytherapy (BT) without ADT.

**Methods:** We prospectively enrolled a population-based cohort of men, <80 years old, with newly diagnosed localized low- or favorable intermediate-risk (defined as biopsy Grade Group 1 or 2, PSA < 20, clinical stage < T2b) prostate cancer between 2011 and 2012 as part of the Comparative Effectiveness Analysis of Surgery and Radiation study (CEASAR). The 26-item validated Expanded Prostate Cancer Index Composite (EPIC-26) questionnaire was administered at baseline and longitudinally out to 5 years. Domain scores ranged from 0-100, with higher scores representing better function. Results were interpreted in light of previously published minimal clinically important differences (MCIDs).

**Results:** Management of the 1426 patients consisted of RP (n=679, 47.6%), EBRT (n=286, 20.1%), BT (n=87, 6.1%), and AS (n=374, 26.2%). At 5 years, RP was associated with worse sexual function (mean difference: -10.2 points, p<0.01; MCID: 10-12 points) and incontinence (-11.3 points, p<0.01; MCID: 6-9), and better irritative urinary (5.6 points, p<0.01; MCID 5) scores compared to AS after controlling for covariates. While EBRT was associated with worse bowel (-2.6 points, p=0.02; MCID: 4) and sexual function (-5.1 points, p=0.04), these findings did not meet the threshold of MCID. Figure 1 shows unadjusted domain score trajectories by treatment. Despite overall score differences between treatments, the only domains to meet the threshold of MCID after adjustment were seen in the RP cohort.

**Conclusion:** Men with low- and favorable intermediate-risk prostate cancer who underwent surgery had clinically important worse sexual function and incontinence, and better irritative urinary symptoms compared to those on AS after 5 years. Other functional outcomes between treatments were comparable. These findings may help better inform patients of the risks associated with management of low/favorable intermediate-risk prostate cancer.
COMPARISON OF TRUS-TARGETED VS. MRI-TARGETED VS. SYSTEMATIC PROSTATE BIOPSY IN DETECTING PROSTATE CANCER

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Presented By: Annika Herlemann, MD

Introduction: To compare prostate cancer detection rates of transrectal ultrasound (TRUS)-targeted (TBx) vs. magnetic resonance tomography (MRI)-targeted (MBx) vs. systematic (SBx) prostate biopsy.

Methods: A prospective, single-center study was conducted on all consecutive patients with prostate cancer suspicion or with low-risk prostate cancer on active surveillance. All patients underwent pre-biopsy multiparametric MRI of the prostate. TBx, MBx and SBx were performed during the same session, respectively. Three experienced surgeons performed the biopsies and were blinded to the MRI results before both SBx and TBx, and MBx was performed at the end.

Results: 112 patients were included in our study. Median age and PSA were 67 years (IQR 63-72) and 7.3 ng/mL (IQR 5.0-10.5), respectively. Suspicious lesions were visible on both TRUS (hypoechoic lesion (HEL)) and MRI (≥PIRADS 3) in 77% of patients. More lesions per patient were found on MRI compared to TRUS. PIRADS 3, 4, and 5 MRI lesions were seen as HEL on TRUS in 74%, 89%, and 77% of patients, respectively. There were no significant differences in overall prostate cancer detection when comparing all three techniques. Prostate cancer was detected in 80% of PIRADS 3 lesions, 97% of PIRADS 4 lesions, and 85% of PIRADS 5 lesions. The highest overall Gleason score was detected in 5% by TBx only, and in 8% by MBx only. In 15% of patients no prostate cancer was found by either biopsy method.

Conclusion: In the setting of high expertise and experience with TRUS and TBx, MRI and MBx do identify some additional high-grade cases, but this is not common, and the incremental value of MBx over SBx and TBx is relatively modest. SBx should not be omitted routinely from biopsy protocols, and urologists should not abandon TRUS as an important diagnostic imaging modality.
Poster #217
UROLOGY PRACTICE CHARACTERISTICS INFLUENCE THE USE OF ACTIVE SURVEILLANCE FOR PROSTATE CANCER
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1University of Michigan
Presented By: Parth K. Modi, MD, MS

Introduction: Active surveillance is the preferred management strategy for many men with prostate cancer, yet its use in the US lags behind that in other countries. This may be due to incentives in the fee-for-service healthcare system. An understudied aspect of this system is the influence of urology practice characteristics, such as group organization and ownership of treatment modalities (e.g. intensity modulated radiation therapy [IMRT] vaults). Understanding practice-level factors influencing active surveillance use can inform the development of interventions and policies to increase its use.

Methods: We identified patients with incident prostate cancer using a 20% national sample of Medicare data from 2010 through 2014. We assigned each patient to a urology practice, using the Medicare Data on Provider Practice and Specialty file. We categorized each group into one of 5 types: solo (1-2 urologists); small single specialty (<10 physicians with at least half urologists); large single specialty (10 or more physicians with at least half urologists); multispecialty (less than half urologists with at least 1 primary care physician); or specialist (less than half urologists with no primary care physicians). We determined IMRT ownership status in 2010 for each group using a validated algorithm. Using a mixed effects logistic regression model, we estimated the impact of group organization and IMRT ownership on the use of observation (no curative therapy within 1 year of diagnosis).

Results: We included 45,194 men with incident prostate cancer from 2010 to 2014. Overall, the use of observation increased from 17.5% in 2010 to 20.7% in 2014. The use of observation varied among practice types and based on IMRT ownership (Table). After excluding low volume practices (≤10 cases per year), our study sample included 22,225 men managed within 219 practices. Multispecialty groups were most likely to use observation (21.2%, 95%CI 19.4%-23.0%) while specialist only groups were the least likely (12.6%, 95%CI 8.9%-16.2%). After controlling for group organization and year of diagnosis, IMRT ownership was associated with lower use of observation (OR 0.78 95%CI 0.67-0.90, P=0.001).

Conclusion: Urology groups differ in their use and adoption of surveillance for prostate cancer. This adoption is influenced by both the group organization and ownership of IMRT facilities.
Diet Quality and Disease Progression Among Localized Prostate Cancer Patients on Active Surveillance

*Justin R. Gregg, MD; Jiali Zheng, PhD; David Lopez, PhD; Chad Reichard, MD; Brian Chapin, MD; Jeri Kim, MD; John Davis, MD and Carrie Daniel, PhD

University of Texas MD Anderson Cancer Center; University of Texas Houston Medical School; Merck Co., Inc.

Presented By: Justin R. Gregg, MD

Introduction: Active surveillance (AS) is increasingly used as a management strategy for localized prostate cancer. There is a paucity of data addressing the role of pre- and post-diagnostic diet quality in AS patient outcomes. We prospectively investigated diet quality, as assessed by the Healthy Eating Index-2015 (HEI2015), in relation to Gleason score progression among men diagnosed with localized prostate cancer and closely followed on an AS clinical protocol.

Methods: A total of 411 men with newly diagnosed Gleason score (GS) 6 or 7 prostate cancer who enrolled on a prospective AS protocol completed a baseline food frequency questionnaire (FFQ) asking them to recall their usual intake prior to diagnosis; a subset of these patients (n=263) completed a subsequent FFQ 6-months post-diagnosis. Diet quality, reflecting adherence to U.S. dietary recommendations across 13 dietary components, was defined using the HEI2015. Cox proportional hazards models were fit to evaluate multivariable-adjusted associations of pre- and post-diagnosis diet quality with progression-free survival (PFS) defined as an increase in Gleason score over a biennial monitoring regimen.

Results: After a median follow-up of 36 months, 76 men progressed. Following adjustment for key clinical factors, patients with the highest (as compared to the lowest) tertile of baseline diet quality were less likely to experience Gleason score progression (HR=0.59, 95%CI=0.32-1.08, P-trend=0.06). Although not statistically significant, this inverse association was consistent across a range of factors, including statin use, BMI, and smoking status. We observed no associations with diet quality assessed at 6 months post-diagnosis, nor with change in diet quality from diagnosis.

Conclusion: Usual diet quality prior to diagnosis, though not 6 months following diagnosis, was modestly associated with lower risk of Gleason score progression in localized prostate cancer patients on active surveillance. These findings are consistent with a recently reported randomized trial investigating the affect of increased vegetable intake1 and warrants further investigation. Parsons J, Zarieh D, Pierce J, et al: Late-Breaking Abstract: The Men’s Eating and Living (MEAL) Study (CALGB 70807 [Alliance]): A Randomized Clinical Trial of a Diet Intervention in Men on Active Surveillance for Prostate Cancer. In: San Francisco, CA 2018.

Poster #218

Poster Session II – Full Abstracts
Poster #219
PHASE I STUDY EVALUATING LITHIUM IN LOCALIZED PROSTATE CANCER
*Derek Jensen, MD*1; Na Yu, PhD1; Haixia Xu, MD, PhD1; Gregory Reed, PhD2; Eugene Lee, MD1; J Brantley Thrasher, MD1; Benyi Li, MD, PhD1 and Moben Mirza, MD1

1University of Kansas, Department of Urology; 2University of Kansas, Department of Clinical Pharmacology

Presented By: Derek Jensen

Introduction: Our laboratory has demonstrated Lithium to inhibit cell proliferation of prostate cancer cell lines and reduced S-phase gene expression. Additionally, Lithium suppressed tumor growth of LNCaP xenograft mice. We sought to evaluate the safety and feasibility of Lithium administration in patients with prostate cancer in a phase I clinical trial. We also compared markers of cell proliferation and transcriptional activation in prostatic tissue after prostatectomy between Lithium and control patients.

Methods: Lithium Carbonate was administered to nine patients for four weeks prior to radical prostatectomy using a 3+3 model for dose escalation. Doses of 600mg, 900mg, and 1200mg were used. Safety, tolerability, and lithium concentrations in serum and prostate tissue were measured. Immunohistochemical (IHC) analysis of prostatic tissue was conducted to compare expression of molecular markers (Ki-67, H3K4me3, H3K27me3, HeK9Ac and H3K18Ac) between lithium treated and previously collected control prostate samples.

Results: Five out of nine patients reported adverse effects for a total of twenty events reported over the study period. Eighteen were grade 1 toxicities and two were grade 2 toxicities. There were no dose limiting toxicities. Serum lithium levels ranged from 0.1 – 1.2MEQ/L. Tissue concentrations in the prostate gland were 1.44ng/mg for the 600mg, 6.09ng/mg for the 900mg, and 4.14ng/mg for the 1200mg group. IHC studies showed that Ki-67 index was significantly reduced in lithium-treated prostate cancer specimens (21.1 vs 1.67, p = 0.01). The active transcription histone markers for H3K4 tri-methylation (H3K4me3), and acetylation (H3K9Ac & H3K18Ac) were reduced in lithium-treated prostate cancer. In contrast, the repressive histone modification marker H3K27 tri-methylation (H3K27me3) was increased in prostate cancer specimens.

Conclusion: In this phase I study, we demonstrated that Lithium Carbonate is well tolerated and safely administered to patients with prostate cancer undergoing radical prostatectomy. Lithium serum levels were maintained in a safe range across dose levels. Lithium concentrated well in the prostate gland with the highest concentration demonstrated in the 900mg dose group. Exploratory IHC analysis also suggested an objective response in cell proliferation and transcriptional modulation. We plan to use these data to design a phase 2/3 clinical trial to study the potential therapeutic benefits of lithium in prostate cancer.
A GENOMIC CLASSIFIER SHOWS IMPROVED PREDICTION OF ONCOLOGIC OUTCOMES IN AFRICAN-AMERICAN MEN TREATED WITH RADICAL PROSTATECTOMY

*Stephen J. Freedland, MD1,2; Marguerite du Plessis3; Ivy Zhang3; Lauren Howard4; Amanda De Hoedt2 and Elai Davicioni3

1Division of Urology, Cedars-Sinai Department of Surgery, Los Angeles; 2Urology Research, Veteran Affairs Medical Center, Durham; 3GenomeDx Biosciences; 4Duke Cancer Institute, Duke University School of Medicine, Durham

Introduction: Accurate risk stratification after radical prostatectomy (RP) is important to help select men at risk of recurrence who will benefit most postoperative radiation or multi-modal therapy. Increasingly genomic testing is being used in the clinic for this purpose. However, little is known about how these tests predict outcomes in African-American men (AAM), an underserved at risk population. Here we evaluate Decipher within a large Veteran Affairs cohort and compare its performance to the CAPRA-S clinical model for predicting outcomes in AAM and non-AAM RP patients.

Methods: Decipher genomic classifier (GC) scores were generated for 557 PCa patients, who underwent RP at the Veteran Affairs Medical Center Durham between 1989 and 2016. This was a clinically high-risk cohort which all underwent RP and were selected to have either T3a, positive margins, seminal vesicle invasion, or received post-op radiation. Cox univariable and multivariable proportional hazards models and survival c-index were used to compare the performance of Decipher and CAPRA-S for predicting risk of metastasis and PCa specific mortality (PCSM).

Results: Overall, 55% (n=306) of patients in the cohort were AAM. CAPRA-S classified 10.4% as low risk for recurrence while for GC it was 50.4%. With a median follow-up of 9 years, only 40 patients developed metastases and 18 patients died of PCa. In multivariable analyses, both GC (p=0.044 HR:1.30 95% CI:1.01-1.69) and CAPRA-S (p=0.037 HR:1.27 95% CI:1.01-1.58) were significant predictors for metastasis within non-AAM; however, only GC (p<0.001 HR:1.70 95% CI:1.31-2.20), was significant within AAM. GC but not CAPRA-S was a significant predictor of PCSM for both EAM (p=0.044 HR:1.54 95% CI:1.01-2.53) and AAM (p=0.002 HR:1.65 95% CI:1.19-2.42). The survival c-index of GC for predicting metastasis 8 years post RP was 0.84 (95% CI: 0.76-0.90) in AAM and 0.70 (95% CI:0.63-0.80) in non-AAM. For PCSM endpoint, it was 0.82 (0.61-0.93) in AAM and 0.73 (95% CI:0.63-0.84) in non-AAM.

Conclusion: Our results among non-AAM confirm many prior studies showing that GC is a powerful predictor of metastasis and PCSM. Among AAM, not only was GC a very strong predictor of poor outcome, there was actually a suggestion that GC may perform better among AAM than
Poster #221
DO ELDERLY MEN (>75) HARBOR MORE AGGRESSIVE PROSTATE CANCER? COMPARISON OF DECIPHER AND PAM50 TESTS AMONG DIFFERENT AGE GROUPS

*Hanan Goldberg, MD1; Jaime Omar Herrera Cáceres1; Maria Santiago-Jiminez2; Nick Fishbane2; Elai Davicioni2; Zachary Klaassen1; Thenappan Chandrasekar1; Christopher Wallis1; Dixon Woon1; Robert Hamilton1; Girish Kulkarni1; Alejandro Berlin1 and Neil Fleshner1

1Princess Margaret Cancer Center, University Health Network, University of Toronto, Toronto, Ontario, Canada; 2GenomeDx Biosciences, San Diego, CA, USA
Presented By: Hanan Goldberg, MD

**Introduction:** Age is an important prognostic factor, in decision making in oncology. Over 20% of men diagnosed with prostate cancer (PC) are >=75 years old. In the growing elderly population, objective methods for predicting outcomes beyond chronologic age are necessary in order minimize the likelihood of withholding curative treatment when warranted. Herein, we describe and analyze age-related differences in clinico-genomic prognostic indices of aggressiveness in localized PC.

**Methods:** Clinical and genomic data for 8355 patients from the Decipher Genomic Resource Information Database (GRID; NCT02609269) was obtained. Conventional and genomic prognostic indices including Decipher GC scores, PAM50 molecular subtypes (e.g. luminal A/B or basal) NCCN risk groups and Gleason groups (GG) were stratified by age using multivariable logistic regression analyses (MLRA).

**Results:** Table 1 demonstrates the clinical characteristics and biopsy results of the cohort. With increasing decile of age, we observed a higher proportion of high GG and higher Decipher scores. There was a statistically significant increase in the proportion of patients with high Decipher scores with increasing age among GG1 and GG2 (<55 - 10.2%, 30.7%, 55-60 – 15.4%, 25.6%, 60-65 – 15.9%, 29.7%, 65-70 – 16.9%, 28.2%, 70-75 – 17.9%, 30%, and >75 – 20.3%, 37.3%, respectively). Furthermore, the prevalence of the PAM50 luminal B subtype (associated with worse prognosis) increased with age among GG1 and GG2 (<60 – 22.2%, 40%, 60-65 – 29.1%, 41.7%, 65-70 – 28.2%, 39.2%, 70-75 – 30%, 43.4%, 75-80 – 33.5%, 44.3%, >80 – 34.2%, 52%, respectively). Among higher grade tumors (GG 3-5), no statistically significant differences between the different age groups were observed. MLRA demonstrated that in addition to higher T stage, PSA and GG, each age decile entailed a 20% increased risk for a high Decipher score (OR 1.2, 95% C.I 1.11-1.3, p<0.001).

**Conclusion:** Older men with lower grade tumors, as opposed to higher grade tumors, harbored worse disease based on genomic risk models. The accepted paradigm of elderly PC patients being treated conservatively based solely on chronologic age, needs to be changed. We provide evidence suggesting the utility of clinical-genomic characterization for better treatment individualization decisions.
POSTER SESSION II — FULL ABSTRACTS

Poster #222
DEVELOPMENT OF A CLINICAL TOOL TO PREDICT TREATMENT SPECIFIC OUTCOMES OF SURGERY AND RADIATION IN CLINICALLY LOCALIZED PROSTATE CANCER

*Udit Singhal, MD1; Lauren J. Beesley, PhD2; Ganesh S. Palapattu, MD1; Jeffrey S. Montgomery, MD1; Alon Z. Weizer, MD1; Brent K. Hollenbeck, MD1; David C. Miller, MD1; Rohit Mehta, MD3; Scott A. Tomlins, MD3; Daniel E. Spratt, MD1; Allison Furgal2; Stephanie Daignault-Newton, MS2; Jeremy M.G. Taylor, PhD2 and Todd M. Morgan, MD1
1University of Michigan, Department of Urology, Ann Arbor, MI, USA; 2University of Michigan, Department of Biostatistics, Ann Arbor, MI, USA; 3University of Michigan, Department of Pathology, Ann Arbor, MI, USA; 4University of Michigan, Department of Radiation Oncology, Ann Arbor, MI, USA

Presented By: Udit Singhal, MD

Introduction: In the absence of prospective, randomized data comparing radiotherapy versus surgery for treatment of localized prostate cancer, new statistical approaches are needed for comparative studies. We developed a tool for personalized, treatment-specific outcome prediction and compared the effect of radiation therapy and surgery on metastasis and survival in a matched cohort.

Methods: We analyzed a cohort of 4,544 (3,769 surgery, 775 radiation) consecutive patients with clinically localized prostate cancer treated at the University of Michigan between 1996-2013. Primary outcomes were clinical failure (CF) and overall survival (OS). Covariates included age, comorbidities, treatment year, race, PSA, cT-stage, Gleason grade, gland volume, and presence of perineural invasion (PNI). A multistate model was used to facilitate consideration of multiple simultaneous outcomes while adjusting for patient and tumor characteristics. A custom built program was developed to perform individualized outcome prediction. Propensity scoring was then used to match patients to create a balanced subset of data for comparative analysis, yielding a cohort of 1,276 (638 surgery, 638 radiation) patients.

Results: Baseline characteristics showed men undergoing primary radiotherapy were older, had more comorbidities, and harbored more aggressive tumor characteristics. During the follow up period, 157 patients experienced metastasis (2.7% surgery, 7.1% radiation), with 468 deaths (7.2% surgery, 25.6% radiation). 90 patients died after experiencing metastasis (1.4% surgery, 4.8% radiation). Multistate modeling showed covariates with increased risk of CF included PSA, PNI, Gleason grade, and cT2-3 stage (p<0.05). Covariates with increased risk of progression from CF to death included Gleason grade 9-10 and age (p<0.05). Individualized outcome prediction was performed using the RShiny application and is shown: https://lbeesleybiostat.shinyapps.io/ProstatePredictions/. In the matched cohort, Cox regression showed decreased OS with radiation (HR 1.26, 95% CI 0.97, 1.65), with decreased risk of CF (HR 0.67, 95% CI 0.42, 1.05).

Conclusion: A multistate model was used to analyze a large cohort of men undergoing radiotherapy or surgery for treatment of localized prostate cancer, and a tool was created to enable individualized treatment-related outcome prediction. A matched cohort comparing outcomes demonstrated decreased survival and metastasis in men undergoing radiation. With validation, the RShiny tool may serve as a platform to assist in treatment selection for men with localized prostate cancer.

Outcome Prediction for Prostate Cancer Patients

![Outcome Prediction for Prostate Cancer Patients](image)

*Disclaimer: This model has not been validated and is intended to be used by clinicians and researchers. Contact: Lauren J. Beesley, beesley@umich.edu*
Poster #223
LONG-TERM RISK OF METASTATIC PROSTATE CANCER IN MEN WITH GRADE GROUP 2 MANAGED WITH ACTIVE SURVEILLANCE
*Sigrid Carlsson, MD, PhD, MPH1,2,3; Nicole Benfante1; Ricardo Alvim1; Daniel Sjoberg2; Behfar Eghaei1; Peter Scardino1; James Eastham1 and Karim Touijer1
1Urology Service at the Department of Surgery, Memorial Sloan Kettering Cancer Center, New York; 2Department of Epidemiology and Biostatistics, Memorial Sloan Kettering Cancer Center, New York; 3Institute of Clinical Sciences, Department of Urology, Sahlgrenska Academy at the University of Gothenburg, Sweden
Presented By: Sigrid Carlsson, MD, PhD, MPH

Introduction: There is now a growing trend toward expanding active surveillance (AS) inclusion criteria beyond low risk prostate cancer. We sought to study the long-term risk of metastatic development in men with Grade Group 2 disease being managed with initial AS at Memorial Sloan Kettering Cancer Center.

Methods: After IRB approval, our institutional database captured 228 men with Gleason Score 3+4 (Grade Group [GrdGrp] 2) managed with AS during 2000-2017. Confirmatory biopsy was recommended to confirm eligibility and Magnetic Resonance Imaging (MRI) was added in more recent years. Patients were followed semi-annually with PSA, DRE and a review of their health. Biopsy was performed every 2 to 3 years or triggered by changes in MRI, DRE or a sustained PSA-increase. Patient preference or disease progression triggered treatment. Descriptive statistics is reported. Survival was estimated using the Kaplan-Meier method.

Results: Among the 228 men with GrdGrp 2, the median age at diagnosis was 67 years (IQR 61, 73), the median PSA was 5 ng/mL (IQR 4, 7) and the majority of patients had clinical stage T1c (66%). During follow-up, 68 men received treatment: 36 (53%) radical prostatectomy; 13 radiotherapy (19%); 14 hormones (21%); and 5 focal therapy (7%). The treatment-free survival was 61% (95% CI 52%, 69%) at 5 years and 46% (95% CI 33%, 58%) at 10 years, respectively. Of the 36 patients who underwent RP, 31 (89%) had GrdGrp 2 on pathology and 4 (11%) GrdGrp 3 (1 missing). Three men experienced biochemical recurrence after RP. The overall survival for the entire cohort of 228 men was 97% (95% CI 93%, 99%) at 5 years and 79% (54%, 91%) at 10 years after diagnosis, respectively. The median follow-up for those who did not die was 3.1 years (IQR 1.9, 5.2). No man died of prostate cancer during the follow-up. Two men developed metastasis. The metastasis-free survival was excellent at 98% (95% CI 95%, 99%) both at 5 and 10 years.

Conclusion: AS appears to be a safe initial management strategy for carefully selected men with Grade Group 2 prostate cancer managed at a tertiary cancer center.
INTRODUCTION: Prostate cancer (PC) is the most common non-cutaneous cancer in Canadian men and the third most common cause of cancer death in males accounting for 10% of all male cancer deaths in Canada. Several observational and randomized studies have shown that use of commonly prescribed medications, including those used for the treatment of diabetes and hypercholesterolemia, is associated with improved survival in various malignancies, including PC. There has not been any large population-based study, examining the effects of these and other commonly prescribed medications, such as proton pump inhibitors (PPI), on the rate of PC diagnosis, over more than 20 years of follow-up.

METHODS: A retrospective population-based study using data from the Institute of clinical evaluative sciences (ICES), including all male patients aged 65 and above in Ontario who has had a negative first prostate biopsy between 1994 and 2016. We assessed the impact of commonly prescribed medications on PC diagnosis. The analyzed medications included Statins (hydrophilic and hydrophobic), most commonly used diabetes drugs (metformin, insulins, sulfonylureas, and thiazolidinediones), PPIs, 5 alpha reductase inhibitors, and alpha blockers. Time-dependent Cox regression proportional hazards models were performed to determine predictors of PC diagnosis. Medication exposure was time-varying and modeled as “ever” vs. “never” use or as cumulative exposure.

RESULTS: A total of 51,415 men were analyzed over a mean (SD) follow-up time of 8.06 (5.44) years. Overall, 10,466 patients (20.4%) were diagnosed with PC, 16,726 (32.5%) had died, and 1,460 (2.8%) patients died of PC. On multivariable analysis for PC diagnosis increasing age and rurality index were associated with higher PC diagnosis rate, while a more recent index year and usage of hydrophilic statins was associated with a lower diagnosis rate in both “ever” vs. “never” and cumulative models (table 1).

CONCLUSION: Hydrophilic statins are associated with a clinically and statistically significant lower PC diagnosis. To our knowledge, this is the first study demonstrating a clear advantage of hydrophilic over hydrophobic statins in PC prevention.

Table 1 - Multivariable analysis for “Ever” vs. “Never” (A) and cumulative drug use (B) to assess predictors of prostate cancer diagnosis:
ASSOCIATIONS OF 5Α-REDUCTASE INHIBITORS WITH DELAYED PROSTATE CANCER DIAGNOSIS AND INCREASED PROSTATE CANCER MORTALITY

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Presented By: J. Kellogg Parsons, MD, MHS

Introduction: 5α-Reductase inhibitors (5-ARIs), commonly used to treat benign prostatic hyperplasia, reduce serum prostate-specific antigen (PSA) concentrations by 50%. The effect of 5-ARIs on prostate cancer detection in a PSA-screened population remains unclear. We sought to test the hypothesis that pre-diagnostic 5-ARI use is associated with a delayed diagnosis, more advanced disease, and higher risk of prostate cancer-specific mortality and all-cause mortality.

Methods: We used the Veterans Affairs Informatics and Computing Infrastructure to obtain patient records. Our cohort included 80,875 men with stage I-IV prostate cancer diagnosed from 2001-2015, of whom 8,587 were pre-diagnostic 5-ARI users. The main outcomes were time from initial PSA elevation (defined as PSA ≥ 4 ng/mL) to diagnostic prostate biopsy, cancer grade and stage at diagnosis, and prostate cancer-specific and all-cause mortality. PSA was adjusted by doubling the value for 5-ARI users, consistent with prior clinical trials. We compared differences in time from initial PSA elevation to diagnostic prostate biopsy using Wilcoxon Rank Sum Tests, and differences in cancer grade and stage with Chi-Squared tests. We compared prostate-cancer specific mortality using Fine-Gray competing risk regression and all-cause mortality using Cox regression, controlling for potential confounders.

Results: Median follow-up was 5.9 years. Median time from first adjusted elevated PSA to diagnosis was significantly greater for 5-ARI patients than 5-ARI non-users (3.60 years vs. 1.40 years; p<0.001). Median adjusted PSA at time of biopsy was significantly higher for 5-ARI users than 5-ARI non-users (13.5 ng/mL vs. 6.5 ng/mL; p<0.001). 5-ARI patients were more likely to have Gleason ≥ 8 (25% vs. 17%; p<0.001), clinical stage ≥ T3 (5% vs. 3%; p<0.001), node positive (3% vs. 2%; p<0.001), and metastatic (7% vs. 3% p<0.001) disease than 5-ARI non-users. In a multivariable regression, 5-ARI patients had higher prostate cancer-specific (SHR 1.39; 95% CI 1.27-1.52; p<0.001) and all-cause (HR 1.10; 95% CI 1.05-1.15; p<0.001) mortality.

Conclusion: Pre-diagnostic use of 5-ARIs was associated with delayed diagnosis and worse cancer-specific outcomes in men with prostate cancer. These data highlight an urgent need to raise awareness of 5-ARI-induced PSA suppression, establish clear guidelines for early prostate cancer detection, and motivate systems-based practices to facilitate optimal care for men who use 5-ARIs.
Poster #226

18-YEAR PROSTATE CANCER-SPECIFIC MORTALITY AFTER PROSTATECTOMY, EXTERNAL BEAM RADIATION THERAPY, BRACHYTHERAPY, HORMONAL THERAPY, OR MONITORING FOR LOCALIZED PROSTATE CANCER

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1University of California, San Francisco, Helen Diller Family Comprehensive Cancer Center, Dept. of Urology, San Francisco, CA

Presented By: Annika Herlemann, MD

Introduction: We provide updated comparative effectiveness based on long-term, 18-year prostate cancer-specific mortality (PCSM) among men who underwent radical prostatectomy (RP), men who received external-beam radiation therapy (EBRT), brachytherapy (BT), primary androgen deprivation therapy (PADT) or monitoring (AS/WW) for localized prostate cancer.

Methods: Within the Cancer of the Prostate Strategic Urologic Research Endeavor (CaPSURE) registry, we analyzed 9,774 men with localized prostate cancer. Prostate cancer risk was assessed using the Kattan preoperative nomogram and the Cancer of the Prostate Risk Assessment (CAPRA) score. A multivariable analysis was performed to compare PCSM by primary treatment adjusting for age and case-mix.

Results: 5,235 (54%) underwent RP, 1,138 (12%) BT, 1,307 (13%) EBRT, 1,262 (13%) PADT, and 832 (9%) AS/WW. During the 18-year follow-up period, 319 men (3%) died from prostate cancer. Median months to PCSM within 18 years were 70 (IQR 42-108). Adjusting for clinical CAPRA score the hazard ratios for PCSM relative to RP for BT, EBRT, PADT and AS/WW were 1.58 (95% CI, 1.04-2.40, p=0.03), 2.08 (95% CI, 1.54-2.82, p<0.01), 3.01 (95% CI, 2.22-4.10, p<0.01), and 2.07 (95% CI, 1.33-3.21, p<0.01), respectively. Two additional analyses using 100-Kattan score and a de novo model demonstrated similar results. In low-risk patients, no treatment modality showed a significant prostate-cancer specific survival benefit.

Conclusion: In a large, prospective, multi-center cohort of men with PCa, after rigorous case-mix adjustment, risk of PCa mortality was lowest with RP. Mortality was substantially higher with EBRT and AS/WW, and highest with PADT. The greatest difference was observed for high-risk patients. Therefore, we advise an increased role for RP in high-risk disease, and for AS/WW in low-risk disease.
EVALUATING MRI FUSION BIOPSY VS SYSTEMATIC ULTRASOUND GUIDED BIOPSY IN PREDICTING HIGH GRADE CANCER AT TIME OF RADICAL PROSTATECTOMY

*Hao Gia Nguyen, MD, PhD*; Katsuto Shinohara, MD; Janet Cowan, MS; Niloufar Ameli, MS; Antonio Westphalen, MD; Jeff Simko, MD; Matthew Cooperberg, MD, MPH and Peter Carroll, MD, MPH

UCSF

Presented By: Hao Gia Nguyen, MD PhD

**Introduction:** The uncertainties of both over staging and under staging using MRI fusion targeted biopsy have not been well addressed. We aimed to evaluate the accuracy of cancer risk estimation with MRI fusion biopsy; traditional sextant and anterior (14 cores) ultrasound guided biopsy or the combination, using whole-mount histopathology at time of prostatectomy.

**Methods:** We retrospectively analyzed 510 men with MRI fusion biopsy. 185 patients had radical prostatectomy in 2014-2016. All patients had undergone systematic ultrasound guided biopsy and mpMRI fusion biopsy. We compared Gleason Score (GS) upgrading or downgrading between MRI fusion and systematic ultrasound guided biopsy to that of the final Gleason score evaluated by whole-mount histopathological analysis. Logistic regression was used to evaluate association to adverse pathological outcome for each biopsy approach.

**Results:** Of 185 patients who had RP, significant cancer grade (GS ≥3+4) found on MRI fusion biopsy matched final pathology in 41% of the cases while it was overestimated in 14% of patients and underestimated in 45%. Cancer grade found on traditional systematic biopsy matched final pathology in 51% of patients while it overestimated grade in 18% and underestimated grade in 31% of patients with GS≥7. The combined systematic and MRI fusion matched final pathology 55% of the case while underestimated 18% of patients and overestimated grade in 27% of patients who had GS≥7 on their final pathology. In the logistic regression model, having a GS ≥ 4+3 detected on combination biopsy (MRI +systematic) was associated with higher odds (OR: 14.1 95% CI 5-34, p <0.01) of higher stage cancer (≥pT3a) at RP. The association persisted when the model was adjusted for clinical CAPRA score. The ROC curve (area) of systematic and MRI target is 0.82 while systematic biopsy has 0.78 and MRI target biopsy has 0.76. This study was limited by its retrospective nature.

**Conclusion:** Risk of over - staging using MRI fusion biopsy is low compared to systematic biopsy. However, MRI targeted biopsy alone could significantly underestimate those with clinically significant disease. Using MRI fusion biopsy alone to detect high grade cancer may not be adequate in this contemporary cohort. This data may have important implications for guiding treatment decisions.
**Introduction:** CLIN1001 PCM301 is a prospective phase 3 trial which randomized 413 men with low (but not very low) risk PCa (≤ 3 positive cores, 3-5 mm max cancer core length) to partial gland ablation with vascular-targeted photodynamic therapy (VTP; n=207) or active surveillance (AS; n=206). As previously reported, VTP men had lower rates of disease progression at the primary endpoint of the trial (28% vs. 58%) and decreased conversion to radical therapy (RT) at 2 years (7% vs 33%), 3 years (14% vs 44%) and 4 years (24% vs 53%). Herein we report a sensitivity analysis of the triggers for conversion to RT.

**Methods:** Sensitivity analyses were conducted by first censoring at time of RT subjects in both arms who converted by choice, without evidence of progression, and second, by censoring in addition those who converted after progression by PSA or volume criteria without progression in grade.

**Results:** Drivers for conversion to RT were similar in the VTP and AS arms: increase in grade to GG 2 or higher (61% of 36 conversions in the VTP cohort vs 49% of 87 in the AS cohort), increase in cancer volume without change in grade (11% of VTP vs 26% of AS), PSA failure (3 consecutive PSA >10ng/mL) (0% vs 2%), and patient choice (28% vs 24%). Sensitivity analyses confirmed the substantially lower rate of conversion to RT in the VTP cohort when comparing only patients with objective evidence of progression (HR=0.29, 95% CI=0.18-0.45; p<0.001) and those with progression in grade (HR=0.38, 95% CI=0.23-0.64; p<0.001). The proportion of study participants in each arm who converted to RT by choice, without objective evidence of progression, was somewhat higher in the AS arm: 10 (5%) of 206 in the VTP cohort versus 19 (14%) of 207 in the AS cohort (RR=0.53, 95% CI=0.25-1.11; p=0.09).

**Conclusion:** VTP in comparison to AS substantially reduces the likelihood of progression to higher Gleason grade and/or larger volume cancer on subsequent biopsy, markedly reducing the rate of conversion to RT, with its attendant morbidity. As such, PGA with VTP provides a clinically meaningful benefit to selected men with low-risk but not very low-risk prostate cancer.
PROSPECTIVE RANDOMIZED TRIAL OF GENE EXPRESSION CLASSIFIER UTILITY IN MEN AT HIGH RISK OF RECURRENCE FOLLOWING RADICAL PROSTATECTOMY (G-MINOR)

Todd M. Morgan, MD1; Linda Okoth, MPH1; Felix Feng, MD2; Anna Johnson, MS1; Brian Lane, MD, PhD3; Susan Linsell, MHSA1; Khurshid Ghani, MD1; James Montie, MD1; Nick Fishbane, MSc1; Tara Marti, BS1; Marguerite du Plessis, BSc2; Elai Davicioni, PhD3; Thomas Maatman, DO2; Kirk Wojno, MD3; Frank Burks, MD6; Paul Rodriguez, MD7; Nick Liu, MD8; Richard Sarle, MD9; David Miller, MD, MPH1 and Michael Cher, MD10

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Presented By: Todd M. Morgan, MD

Introduction: The Decipher assay is a tissue-based genomic classifier (GC) developed and validated in the post-radical prostatectomy (RP) setting as a predictor of metastasis. Retrospective evidence suggests that patients with a high GC score may benefit from adjuvant radiotherapy, while observation may be safe for those with a lower GC score. We sought to conduct the first prospective randomized trial assessing the impact of GC testing on adjuvant therapy use in this setting and report patient characteristics and risk distribution of the cohort.

Methods: The Genomics in Michigan Impacting Observation or Radiation (G-MINOR) study is enrolling 350 participants across 13 sites. Eligible patients had undergone RP within 9 months of enrollment, had pT3-4 and/or positive surgical margins, and a post-RP PSA <0.1ng/mL. Patients were assigned to either the GC or Usual-Care-Based (UC) group using cluster-crossover block randomization assignments. Patients in both arms received a CAPRA-S derived predicted risk of recurrence. If enrolled during the GC period, the subject and physician were also provided with the Decipher score. Decipher results were assessed centrally in UC patients but were not available to clinicians or patients. Clinical data, including CAPRA-S and Decipher scores, were compared between arms.

Results: We reported on 335 patients that met the inclusion criteria and whose RP tissue passed the required QC thresholds. Of these patients, 175 (52.2%) and 160 (47.8%) were randomized to the GC and UC groups, respectively. Between study arms, we found no statistically significant difference in the frequency of extraprostatic extensions, seminal vesicle invasion, or surgical margins; nor did we find a difference in distribution of Gleason grade group, pre-operative PSA, or CAPRA-S score. Based on the
**Poster Session II – Full Abstracts**

**Poster #230**

**PROTUX CLINICAL TRIAL: OPEN LABEL, SINGLE INSTITUTION PILOT STUDY OF RITUXIMAB NEOADJUVANT THERAPY IN HIGH RISK PROSTATE CANCER PATIENTS SCHEDULED TO UNDERGO RADICAL PROSTATECTOMY**

*Stephen T. Ryan1; Michael Liss2; Ahmed Shabaik3; Emily Pittman4; Jing Zhang4; Michelle Muldong1,5; Danielle Burner1,5; Johnathan Cunha, MS2; Nicole Basler, MS2; Shabnam Shalapour6; Michael Karin6,5; Karen Messer4,5; Stephen Howell7,5; Christopher Kane1,5 and Christina Jamieson1,5

1Dept. Of Urology UCSD, La Jolla, CA; 2Dept of Urology, University of Texas Health Science Center San Antonio, San Antonio, TX; 3Dept. of Pathology UCSD, La Jolla, CA; 4Family and Preventive Medicine UCSD, La Jolla, CA; 5Moores Cancer Center UCSD, La Jolla, CA; 6Dept. of Pharmacology UCSD, La Jolla, CA; 7Dept. of Medicine UCSD, La Jolla, CA

**Presented By:** Stephen T. Ryan

**Introduction:** A novel, immunosuppressive B cell subpopulation which accelerated the emergence of castrate resistant prostate cancer (PCa) was discovered in mouse models and PCa patients. Ablation of B lymphocytes with anti-CD20 antibody in the mouse models delayed regrowth of PCa. We determined that neoadjuvant treatment of high risk PCa patients with the anti-CD20 immunotherapy, Rituximab, significantly reduced B cell infiltration of prostate tumors for 8 patients with high risk PCa who received neoadjuvant rituximab when compared to 11 historical controls. We report analyses of T cell and immune checkpoint markers to determine how the reduction of B cell density in tumor tissue may have altered the immune environment.

**Methods:** An open label, non-randomized, single arm clinical trial for high risk PCa prior to prostatectomy ("PROTUX" NCT01804712) was performed. Subjects were candidates for prostatectomy with curative intent. Enrolled men received one cycle of rituximab (375 mg/m² IV once weekly for 28 days), followed in 2 weeks by prostatectomy. Controls were selected from a pathologic biobank with similar patient characteristics and stained concurrently for CD20. Tumor regions were marked by a blinded pathologist and a deconvolution algorithm quantified the immunostaining in tumor and adjacent tissue regions. Mean immunohistochemical (IHC) staining area of CD3+, CD8+, PD-L1 and PD1 cells within the tumor was compared against historical controls.

**Results:** Mean CD20 IHC stained area in the tumor region of the treated group was 0.027 (95% CI 0.021 – 0.033) and control was 0.044 (95% CI 0.028 – 0.062, p=0.02) utilizing unequal variances t test. The same approach was used to analyze CD3, CD8, PD1 and PD-L1 immunostaining and showed modification of different immune cell populations.

**Conclusion:** Neoadjuvant rituximab treatment significantly decreased B cell density within tumors compared to historical controls (p=0.02, relative to controls) and appeared to alter the immune environment within the tumor region. These results provide evidence that rituximab can modify the immune environment of the tumor.
Poster #231
HIGH PERCENT-FREE PSA IN THE SETTING OF BIOCHEMICAL RECURRENCE AFTER RADICAL PROSTATECTOMY IS ASSOCIATED WITH POORER OUTCOMES: A VALIDATION STUDY USING PROSPECTIVELY COLLECTED BIOBANK SPECIMENS.

*Dixon T.S. Woon, MBBS1; Hanan Goldberg1; Jaime O. Herrera-Cáceres1; Hina Shiahk1; Emily A. Whelan1; Khaled Ajib1; Gregory J. Nason1; Robert J. Hamilton1; Alexandre Zlotta1; Girish Kurkami1; Antonio Finelli1 and Neil Fleshner1

1Princess Margaret Cancer Centre, University of Toronto, Toronto, ON, Canada

Presented By: Dixon T.S. Woon, MBBS

Introduction: The role of percent-free PSA (%fPSA) in the management of patients who have undergone radical prostatectomy (RP) and subsequently relapsed is unclear. Our team previously conducted a retrospective study of 308 patients and found that %fPSA of ≥15 in the setting of biochemical recurrence (BCR) confers a more aggressive disease, manifesting in faster development of CRPC, metastasis, and death. However, this retrospective study has its intrinsic limitations, in particular, the %fPSA tests were performed at random and at various time points after BCR. To validate our previous findings, we propose to use biobank specimens collected prospectively when patients were first diagnosed with BCR.

Methods: Biobank specimens of all patients with undetectable PSA after RP and then develop BCR (PSA ≥0.2) were included. Biobank samples were analyzed for %fPSA. Patients were stratified according to the %fPSA cut-off of 15% (Group 1:<15% and Group 2:≥15%). Multivariable logistic regression analysis was performed to predict covariates associated with a higher %fPSA. Cox proportional hazard models were performed to evaluate androgen deprivation therapy (ADT) free, metastasis-free, CRPC free, cancer-specific (CSS) and overall survival (OS).

Results: A total of 154 men were included (Table 1). Patients in group 2 were more likely to receive ADT, 42.9% vs 24.8%, HR 2.3 (95% CI 1.09-4.9, p=0.03), develop metastatic disease, 21.4% vs 7.9%, HR 8.16 (95% CI 1.59-41.77, p=0.04), become castrate resistant (CRPC), 14.3% vs 4% HR 495 (95% CI 1.18-206521, p=0.04). Time from surgery to the start of ADT was shorter in group 2 (38.2 months) vs group 1 (45.1 months), p=0.03. Time from surgery to metastasis was shorter in group 2 (28.4 months) vs group 1 (63.4 months), p=0.018. There was difference in CSS.

Conclusion: Patients with %fPSA of ≥15 were started on ADT earlier, and they progressed to CRPC and metastatic stage earlier. %fPSA of ≥15 in the setting of BCR after RP is an indicator of more aggressive disease, and it can potentially be used as a simple and cheap biomarker. Unlike in the diagnostic setting, a higher %fPSA ratio portends a worse clinical outcome. This validates our previous findings.

<table>
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<tr>
<th>Table 1: Clinical Information of Patients</th>
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<tr>
<td>%fPSA &lt;15% (Group 1)</td>
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319
**Poster #232**

**THE IMPACT OF CLINICAL FACTORS AND INTER-SITE VARIATION ON 18F-FLUCICLOVINE PET/CT IN BIOCHEMICAL RECURRENCE OF PROSTATE CANCER: DATA FROM THE LOCATE TRIAL**

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Presented By: Ashutosh K. Tewari, MBBS

**Introduction:** 18F-Fluciclovine has an established diagnostic performance for PET imaging of recurrent prostate cancer, which supported its regulatory approval. Here, we explore the impact of clinical factors and variations between enrolling sites on the detection rate (DR) and subsequent management decisions in the LOCATE trial (NCT02680041), which assessed the impact of 18F-fluciclovine PET/CT on management of patients with recurrent prostate cancer.

**Methods:** Data were collected at 15 US sites from men who received curative-intent primary treatment for histologically confirmed prostate cancer, but were experiencing rising PSA. Patients had negative/equivocal standard-of-care imaging results in the preceding 60 days. PSA and Gleason scores were recorded during the first visit. The patient’s management plan was documented both before and after 18F-fluciclovine PET/CT, with changes to treatment modality recorded as ‘major’, and changes within a modality as ‘other’.

**Results:** Across all sites, 213 patients received a 18F-fluciclovine PET/CT; 57% were positive, with patient-level DRs ranging from 31% at PSA<0.5ng/mL to 95% at PSA>10ng/mL.

Gleason scores ≥ 9 correlated with the highest extraprostatic detection (51% vs 31% for scores ≤6) and lymph node positivity was most frequent among those with high Gleason scores. However, Gleason scores had little impact on overall patient-level DRs. The proportion of patients with a post-scan management change was similar in those who had undergone prostatectomy as those who had not (58% vs 63%, respectively). Whilst PET/CT was performed according to standardized procedures, inter-site variation was noted (see table) for baseline PSA, prior therapy, type of PET/CT scanner, and the 18F-fluciclovine dose (mean: 374.8MBq [10.1MCi], median: 364.6MBq, range: 341.1-440.3MBq). Across the top 5 recruiting sites (>20 patients), the overall DRs were broadly consistent; mean: 64.8%, median: 62.5%, range: 54.5-77.4%, with more variance observed when restricted to patients with PSA≤1.0ng/mL (mean: 41.7%, median: 43.8%, range: 20.0-71.7%, n=10-16). Site 14 had the highest DR and the greatest proportion of patients with a post-scan management change (90%, 68% of which were major).

**Conclusion:** 18F-Fluciclovine detected recurrent prostate cancer in a wide range of patients, with acceptable performance at low PSA. Distal spread of disease was more common among patients with higher Gleason scores. Post-scan management changes did not appear to be influenced by prior therapy.

<table>
<thead>
<tr>
<th>Patients and prostate cancer characteristics by site</th>
<th>Post-prostatectomy, n (%)</th>
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<tbody>
<tr>
<td>Site</td>
<td>Number of eligible subjects</td>
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<tr>
<td>All</td>
<td>213</td>
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(Shaded rows indicate a top 5 recruiter site (>20 patients)
Poster #233
IS 68Ga-PSMA-11 PET-CT ACCURATE IN EXCLUDING PELVIC LYMPH NODE METASTASIS IN PATIENTS WITH INTERMEDIATE AND HIGH-RISK PROSTATE CANCER?
*Taylor Y. Sadun, MD; Aydin Pooli, MD; David C. Johnson, MD, MPH; Wolfgang P. Fendler, MD; Matthias Eiber, MD; Johannes Czernin, MD; Robert E. Reiter, MD and Jeremie Calais, MD

1Institute of Urologic Oncology, Department of Urology, David Geffen School of Medicine at UCLA, Los Angeles, CA; 2Ahmanson Translational Imaging Division, Department of Molecular and Medical Pharmacology at UCLA, Los Angeles, CA

Presented By: Taylor Y. Sadun, MD

Introduction: Standard staging imaging techniques perform poorly in prostate cancer staging and 68Ga-PSMA-11 (PSMA) PET/CT is a promising alternative currently under investigation. We report the performance of PSMA PET/CT in ruling out pelvic lymph node metastasis (PLNM) in patients with intermediate-risk (IR) or high-risk (HR) prostate cancer (PCa). We investigate pelvic lymph node histopathology after radical assisted laparoscopic prostatectomy (RALP) in treatment naïve patients who had negative findings for PLNM per PSMA PET/CT prior to surgery.

Methods: This is a post-hoc retrospective analysis of all patients with IR PCa (n=40) and HR (n=112) who underwent PSMA PET/CT for initial staging at UCLA (prospective study NCT03368547) from 12/2016 to 6/2018 (n=152). We excluded patients who received treatment at outside institutions (n=72/152, 47%; 22 IR, 50 HR). Patients with metastatic M1 disease (n=7/80 (9%) extra-pelvic node M1a; n=2/80 (2.5%) bone M1b; n=2/80 (2.5%) lung M1c), PLNM by PSMA PET/CT (n=12/80 (15%) pelvic node N1), and prior therapy before PSMA PET/CT (n=2/80 (2.5%) HR PCa treated with androgen deprivation therapy (ADT)) were also excluded. Among the 33/51 patients (64%) that elected to undergo RALP, 7/33 patients (21%) with neoadjuvant ADT (n=4) or radiation therapy (n=3) were further excluded. All patients who underwent RALP underwent a standard template pelvic lymph node dissection. We reviewed patients’ demographic, clinical, radiographic, and histopathologic findings.

Results: Final analysis included 26 patients with treatment-naïve IR (n=5) or HR PCa (n=21) with negative staging PSMA PET/CT who underwent RALP at our institution. The average age at presentation was 64 years (51 years – 75 years) and the median PSA was 18.5 ng/ml (4.5ng/mL – 75.4 ng/mL range). 8/26 patients (31%) had histopathology positive PLNM disease; the negative predictive value of PSMA PET/CT for pelvic nodal pathology was 69%.

Conclusion: Although PSMA PET/CT scan may improve the accuracy of pre-operative staging for PCa, our series demonstrates that PSMA PET/CT may miss a considerable number of pelvic lymph node metastases, even in patients with intermediate-risk disease. While the therapeutic benefit of pelvic lymph dissection in patients with limited lymph node disease is unclear, staging pelvic lymph node dissection at the time of radical prostatectomy remains necessary even after a negative staging PSMA.

Patient Selection
Introduction: The risk of a detectable PSA following radical prostatectomy (RP) varies based on clinical and pathologic features, while risk of non-cancer death evolves as a function of age and comorbidities. Despite differences in how these competing risks mature over time, current guidelines recommend surveillance based on stage alone with no clear guidance on when to stop. We sought to develop risk adapted recommendations regarding postoperative surveillance duration.

Methods: Men with localized prostate cancer (PCa) who underwent RP between 2001 and 2014 (n=7,250) were identified from our institutional RP registry. Risk of three endpoints - PSA ≥ 0.4, PSA ≥1, and systemic progression/local recurrence/treatment were estimated over 10 years using accelerated failure-time (AFT) models by risk group (low, intermediate, and high). Men with a detectable PSA at their first recheck were excluded. Low risk was defined as pT2a, PSA <10, and pGleason score ≤6, while ≥pT3, PSA > 20, pGleason score 8-10, or positive surgical margins were defined as high risk, with the remainder being intermediate risk. Risk of non-cancer death was estimated by age (<55, 55-59, 60-64, 65-69, ≥70) and comorbidity index (CCI: 0 versus ≥1). Cumulative hazard ratios for each endpoint were plotted along with risk of non-cancer specific mortality as determined by age and CCI. For example, a 60 year-old man with CCI=0, low risk disease, and a surveillance goal of detecting a PSA ≥0.4 would be followed for 6.5 years. After this time, his risk of death from any cause exceeds the likelihood of a PSA recurrence. Conversely, a man aged ≤55, with a CCI ≥ 1 and intermediate risk disease has a higher recurrence risk than all-cause mortality risk during the 10 year period and should continue surveillance.

Conclusion: Using AFT models for estimating risk of recurrence and risk of death we generated risk-adapted recommendations for duration of post-operative screening for surgically managed patients with localized PCa.
ASSOCIATION BETWEEN RADICAL PROSTATECTOMY AND SURVIVAL IN MEN WITH CLINICALLY NODE-POSITIVE PROSTATE CANCER

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Presented By: J Kellogg Parsons, MD, MHS

Introduction: Evidence supporting radical prostatectomy (RP) to treat men with clinically node-positive (cN+) prostate cancer (PCa) is limited. In a U.S. national database, we identified 741 men with cN+, non-metastatic PCa diagnosed from 2000-2015 who underwent definitive local therapy with RP (n=78), radiotherapy (RT) with neoadjuvant androgen deprivation therapy (ADT) (n=193), or non-definitive therapy with ADT alone (n=445) or observation (n=25).

Methods: We compared prostate cancer-specific mortality (PCSM) and all-cause mortality (ACM) using multivariable Fine-Gray competing risk regression and Cox regression, respectively.

Results: Compared to non-definitive therapy, RP was associated with significantly improved PCSM (Subdistribution Hazard Ratio [SHR] 0.32; 95% CI 0.16-0.66; p=0.002) and ACM (Hazard Ratio [HR] 0.36; 95% CI: 0.21-0.61; p <0.001). Compared to RT, RP was not associated with a significant difference in PCSM (SHR 0.47, 95% CI: 0.19-1.17, p=0.1) and ACM (HR 0.88, 95% CI 0.46-1.70, p=0.71).

Conclusion: These data suggest that RP is associated with favorable survival outcomes which appear to be superior to patients who did not receive definitive therapy and comparable to the outcomes of patients receiving definitive ADT/RT. Randomized trials of surgery with multi-modal therapy are needed.
**Poster #236**

**PSMA-11 PET STAGING ACCURACY IN INTERMEDIATE AND HIGH-RISK PROSTATE CANCER**

*Adam J. Gadzinski, MD, MS†; Samuel Washington†; Thomas Hope‡; Kirsten Greene†; Hao Nguyen†; Dora Tao‡; Raven Smith‡; Robert Hicks‡; Robert Flavell‡; Antonio Westphalen‡ and Peter Carroll†

†University of California San Francisco, Department of Urology; ‡University of California San Francisco, Department of Radiology

Presented By: Adam J. Gadzinski, MD, MS

**Introduction:** Conventional imaging studies have lower sensitivity for detecting sites of disease in men with prostate cancer. We aim to assess the distribution of Gallium-68 Prostate-Specific Membrane Antigen (PSMA)-11 PET avid disease sites and reader accuracy in men diagnosed with intermediate and high-risk prostate cancer.

**Methods:** Men diagnosed with intermediate and high-risk prostate cancer underwent staging PSMA-PET CT or MRI. We assessed the locations of PSMA avid disease. For men who subsequently underwent radical prostatectomy (RP), we retrospectively had three radiologists perform blinded reads of the PSMA scans in order to compare accuracy and inter-rater reliability measures of PSMA positive pelvic lymph nodes (LNs) compared to the gold standard of surgical pathology.

**Results:** Seventy men underwent PSMA-PET imaging for this study. Median PSA was 12.5 (IQR 7.3-24.8) and median CAPRA score was 6 (IQR 4-7). Twenty-six men (37%) had PSMA avid pelvic LNs and 12 men (17%) had PSMA avid disease outside of the pelvis. Forty-one men underwent RP, and 40 had a LN dissection of at least one pelvic region (Right or Left). Sixteen men (40%) had pN1 disease. All blinded readers had high specificity for PSMA positive pelvic LNs both on a per patient level and when assessing LNs by lateral region (Table 1). Fleiss’ κ for Pelvic LN on a per patient basis was 0.66 (p <0.001) and 0.76 (p<0.001) by LN region.

**Conclusion:** PSMA PET reveals regional and distant disease in over one-third of men with intermediate and high-risk prostate cancer. This imaging modality has high specificity and substantial inter-rater reliability for pelvic lymph node disease. This may lead to significant changes in treatment decisions.

**Table 1:**

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Poster session II – Full Abstracts
Poster #237
LOCATION OF PROSTATE CANCER RECURRENCE DETECTED BY GALLIUM-68 PSMA-11 PET IN MEN ELIGIBLE FOR SALVAGE RADIATION THERAPY
*Adam J. Gadzinski, MD, MS; Lauren Boreta1; Susan Wu1; Melody Xu1; Hao Nguyen2; Mack Roach1; Felix Feng1; Peter Carroll2 and Thomas Hope3
1University of California San Francisco, Department of Radiation Oncology; 2University of California San Francisco, Department of Urology; 3University of California San Francisco, Department of Radiology
Presented By: Adam J. Gadzinski, MD, MS

Introduction: Conventional imaging techniques infrequently detect the site of prostate cancer in men with biochemical recurrence following radical prostatectomy (RP). We used Gallium-68 Prostate Specific Membrane Antigen (PSMA)-11 PET imaging to determine whether standard salvage radiation fields would cover the location of prostate cancer recurrence following RP.

Methods: We retrospectively reviewed patients who underwent PSMA-PET imaging for recurrence of prostate cancer following RP with PSA ≤ 2.0 ng/ml. We examined the anatomical locations of recurrence and assessed if these areas were within standard salvage radiation nodal target volumes. We compared patient and clinical variables between men with recurrences covered by standard salvage radiation fields and those with recurrences outside of standard fields.

Results: We identified 125 patients for study inclusion. The median PSA at imaging was 0.40 ng/mL (interquartile range 0.28-0.63). PSMA avid disease was found in 66 (53%) of patients. Twenty-five of these patients (38%) had PSMA avid lesions found outside of the pelvis, 33 (50%) had lesions confined to the pelvic lymph nodes and prostate bed, 8 (12%) men had PSMA recurrence only in the prostate bed. Salvage radiation including standard intensity-modulated radiotherapy pelvic nodal fields would not cover all PSMA avid lesions in 38 men (30% of study population). Only PSA at time of PSMA imaging was statistically associated with having PSMA avid disease outside of standard nodal fields (p<0.01). With increasing PSA, more men had PSMA avid extra-pelvic disease and lesions not covered by radiation fields (Figure).

Conclusion: PSMA-PET detected disease in majority of patients with PSA ≤ 2.0 following RP. One-third of men had PSMA avid disease that would not be covered by standard salvage radiation fields. This imaging modality may dramatically impact the design and use of post-RP salvage radiotherapy.

Figure 1:
THE ROLE OF 68Ga-PSMA PET/CT IN INITIAL STAGING OF TREATMENT-NAÏVE HIGH RISK PROSTATE CANCER.

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1Institute of Urologic Oncology at UCLA, Department of Urology, David Geffen School of Medicine, University of California, Los Angeles; 2Ahmanson Translational Imaging Division, Department of Molecular and Medical Pharmacology, UCLA, Los Angeles, California

Presented By: Aydin Pooli, MD

Introduction: The 68Ga-PSMA PET/CT scan is a valuable tool for localizing biochemical recurrences (BCR) of prostate cancer (PCa) after definitive treatment. We investigate the concordance/discordance of PSMA PET/CT findings with conventional imaging (CI) in the initial staging of treatment-naïve high-risk PCa.

Methods: The prospectively established PSMA PET/CT database at UCLA from December 2016 to June 2018 was used for data extraction (total n= 152, NCT03368547). We included in this post-hoc retrospective analysis all patients with high-risk PCa (n=112) and available prior CI findings data (n=83). Patients with any treatment prior to PSMA PET/CT were excluded (n=11). The patients’ age, initial PSA, Gleason score at biopsy, and image findings were recorded. The performance of PSMA PET/CT in identifying pelvic lymph node (PLN), extrapelvic lymph node (EPLN), bone metastasis (BM) and visceral metastasis (VM) were compared to CI.

Results: A total of 72 patients with treatment-naïve high-risk PCa were identified who had CI studies including bone scan, CT abdomen/pelvis, and/or prostate MRI as well as PSMA PET/CT. The average age at presentation was 65 years (44-82) and the median PSA was 42 ng/ml (2.4ng/mL – 155 ng/mL range). Eighteen events in 15 patients, demonstrated non-concordance between PSMA scan and CI. Of those, PSMA scan detected BM in two patients, uptake in EPLN in two, and positive PLN in eight patients while conventional imaging was negative for those findings. Interestingly, PSMA ruled out BM in six patients while conventional imaging tools were suspicious for metastasis. Overall, PSMA scan was non-concordant with conventional imaging in 15/72 patients (20.8%), detected new findings missed in conventional imaging in 12/72 patients (16.7%), and ruled out bone metastasis in 6/72 patient (8.3%)

Conclusion: The 68Ga-PSMA PET/CT scan may serve as a valuable tool in the initial staging of treatment-naïve high-risk PCa. Judicious use of PSMA PET/CT can detect diseased lymph nodes or bone metastasis missed by conventional imaging. Alternatively, the PSMA/PET CT scan may confirm or rule out metastasis of equivocal lesions detected by conventional imaging. The PSMA PET/CT has an impact in the initial staging of treatment-naïve high-risk PCA by altering treatment plans to provide more precise and appropriate intervention so as to avoid initial treatment failure.

<table>
<thead>
<tr>
<th>Treatment Naïve High Risk PCa with CI/PSMA</th>
<th>Non concordance events of potential impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLN</td>
<td>Ci+/ PSMA+ (N)</td>
</tr>
<tr>
<td>PLN</td>
<td>0</td>
</tr>
<tr>
<td>EPLN</td>
<td>0</td>
</tr>
<tr>
<td>BM</td>
<td>6</td>
</tr>
<tr>
<td>VM</td>
<td>0</td>
</tr>
</tbody>
</table>

* 15 unique patients with non concordance events / 72 patients = 20.8% patient non concordance
* 12 patients with new findings on PSMA / 72 patients = 16.7% of new findings on PSMA not found on CI
* 6 patients with CI findings not supported by PSMA / 72 patients = 8.3% of findings on CI not supported by PSMA

Abbreviations:
CI: conventional imaging
PLN: pelvic lymph node
EPLN: extrapelvic lymph node
BM: bone metastasis
VM: visceral metastasis
Poster #239
ESTIMATES OF UNDERSTAGING FOR LYMPH NODE POSITIVE PROSTATE CANCER: ANALYSIS FROM THE NATIONAL CANCER DATABASE
*Nicholas Chakiryan, MD1; Ann Martinez Acevedo, MPH1; Michael Conlin, MD1,2; Mark Garzotto, MD1,2; Yiyi Chen, PhD1; Jen Jane Liu, MD1; Christopher Amling, MD1 and Ryan Kopp, MD1,2
1Oregon Health and Science University, Portland, OR; 2Portland VA Medical Center, Portland, OR
Presented By: Nicholas Chakiryan, MD
Introduction: We hypothesized that stage pN1 prostate cancer (CaP) is under-detected due to low extent of lymph node dissection (LND) at radical prostatectomy. We describe a novel method for estimating the impact of LND extent on understaging of pN1 CaP and overall survival (OS) using the National Cancer Database (NCDB).
Methods: RP cases from 2004-2013 were included. LND extent was defined by the number of lymph nodes examined. Logistic regression was used to identify predictors for the top quartile of LND extent and pN1 disease. A predictive model was created to estimate the expected prevalence of pN1 disease, and observed over expected (O/E) ratios for detection were determined. We repeated estimates using the Memorial Sloan Kettering nomogram. A Cox regression model was used to evaluate the effect of LND extent on OS.
Results: LND was performed in 209,789 (60%) of 358,522 surgeries, with pN1 CaP in 6,428 (3.08%). Increasing quartiles for LND extent were significantly associated with pN1, (3-5 nodes OR 2.11; 6-8 nodes OR 3.12; ≥9 nodes OR 5.91, all p<0.001). The predictive model suggested that 59% of all pN1 cases are missed due to inadequate LND. Increased LND extent was associated with increasing detection rate (O/E: 1-2 nodes = 0.18; 3-5 nodes = 0.37; 6-8 nodes = 0.56; ≥9 nodes = 1.01). Cox proportional hazards modeling demonstrated that the top quartile for extent of LND had improved OS (HR 0.93, CI 0.87-0.99, p = 0.03).
Conclusion: Increasing extent of LND was associated with pN1 disease on multivariate analysis, and O/E models suggested a substantial proportion of pN1 were missed due to inadequate LND across all risk groups.
DEFINITIVE AND SUSTAINED INCREASE IN PROSTATE CANCER METASTASES IN THE UNITED STATES

*Jonathan E. Shoag, MD1; Neal Patel1; Art Sedrakyan1; Fernando Bianco2; Ruth Etzioni3; Michael Gorin4; We-Chun Hsu1; Jilain Mao5; Paul Nguyen5; Edward Schaeffer6; Andrew Vickers7 and Jim Hu1

1Weill Cornell Medicine; 2Nova Southeastern University; 3Fred Hutchinson Cancer Research Center; 4Johns Hopkins University School of Medicine; 5Dana Farber Cancer Institute; 6Feinberg School of Medicine, Northwestern University; 7Memorial Sloan-Kettering Cancer Center

Presented By: Jonathan E. Shoag, MD

Introduction: We examined the most recent Surveillance, Epidemiology, and End Results (SEER) release to corroborate temporal trends in non-metastatic and distant prostate cancer metastases in the United States.

Methods: SEER was analyzed for the incidence of non-metastatic (T1-T4N0M0) and distant metastasis (M1) for men with prostate cancer aged 50-74 and ≥75 years during 2004-2015. Incidence ratios (IR) were calculated relative to the year prior.

Results: The incidence of distant metastasis significantly increased from 451.0 to 504.0 per million (IR: 1.12, 95% CI: 1.01-1.24) from 2011 to 2012 and 532.3 to 586.1 per million (IR: 1.10, 95% CI: 1.00-1.21) from 2014 to 2015 in men aged ≥75 years. The incidence of distant metastasis did not significantly increase in men aged 55-74 over the study period.

Conclusion: We demonstrate a sustained and definitive increase in prostate cancer distant metastases in men aged ≥75 years in the United States. Although our observational study design cannot pinpoint the exact cause of this increase, which likely multifactorial, this shift reverses declines in metastases at diagnoses that followed the advent of PSA screening in the 1990s.

Figure 1: Standardized incidence of non-metastatic and distant metastases by quarter during 2004 to 2015.
CREATING PATIENT-CENTRED RADIOLOGY REPORTS (PACERR) TO EMPOWER PATIENTS UNDERGOING PROSTATE MRI

Guan Hee Tan, MBBS, MS, FRCS(Urol); Nathan Perlis; Antonio Finelli; Amelia Di Meo; Michael Nesbitt; Odélia Lee; Adam Badzynski; Mike Lovas; Kristin Foster; Joseph Cafazzo; Janet Papadakos; Vasiliki Bakas; Alejandro Berlin; David Wiljer; Sangeet Ghai and Masoom Haider

University Health Network; 2Health Human Factors, UHN; 3Patient Engagement Innovations, UHN; 4Centre for Global eHealth Innovation and Healthcare Human Factors; 5Patient Education, Cancer Care Ontario; 6myUHN Patient Portal; 7Education Technology and Innovation; 8Mount Sinai Hospital

Presented By: Guan Hee Tan, MBBS, MS, FRCS(Urol)

Introduction: As we progress to an era when patient-autonomy and shared decision making are highly valued, we feel that there is a need to also have effective patient-centred communication tools. Radiology reports can be very technical and difficult for our patients to understand; and yet patients are often expected to make potentially life-changing decisions based on these reports. Therefore, we aimed to create a patient-centred prostate MRI report in order to give our patients a better understanding of their clinical condition.

Methods: A prototype PACERR was created by identifying items to include based on opinions sought from a group of patients undertaking prostate MRI and medical experts using Modified Delphi approach in semi-structured interviews. After informed consent, patients were interviewed based on a salient belief question in person prior to their MRI. A prototype PACERR was created in collaboration with human factors engineering and design, medical imaging, biomedical informatics, and cancer patient education groups. Any ambiguous sections were rectified.

Result: Fifteen patients and 8 experts from urology, radiation oncology, radiology and nursing participated in this study. Patients were particularly interested to have a report with laymen terms, concise language, contextualization of values, defining medical terms, and next course of action. The experts placed importance on getting across how severe the condition is, Prostate Imaging Reporting and Data System (PI-RADS) score and the context for it in laymen terms, and the course of action. The majority of patients and expert preferred the report to be limited to 1 page or less. Everyone felt the report should include the risk of MRI findings actually being cancer in the subsequent biopsy and whether the images showed extra-prostatic disease. After 5 iterations, a prototype PACERR was created as shown in Figure 1.

Conclusion: Patient-oriented radiology reports can be designed with input from experts and patients. A prostate MRI PACERR has been developed to communicate the most important findings relevant to decision making in prostate cancer. After further instrument refinement, the ability of this tool to improve patient knowledge, self-efficacy and patient-provider communication will be explored.
Poster #242

UTILIZATION OF AN INTERNET OF THINGS (IoT) INDOOR GPS SYSTEM TO CHARACTERIZE INEFFECTIVENESS IN A UROLOGIC ONCOLOGY CLINIC

Aaron A. Laviana, MD; Jackson Cabo; Valeria Tringali; David Penson and Matthew Resnick

Department of Urology, Vanderbilt University Medical Center, Nashville, TN; IRCCS European Institute of Oncology, Department of Urology, Milan, Italy

Presented By: Aaron A. Laviana, MD

Introduction: While lean intelligence has garnered interest recently to boost clinic productivity, decrease operational costs, and improve patient satisfaction, these models are innately limited by staff bandwidth and existing flow processes already in place to identify waste. An Internet of Things (IoT) real-time tracking system has been proposed to offer detailed insights into operational flow management and cost reduction by utilizing clinic model simulations to drive immediate change. We report the first surgical report of this system.

Methods: We used an IoT Bluetooth Low Energy (BLE)-based real time tracking system to track 2235 consecutive urologic oncology clinic patients as well as all staff that interacted with these patients at room-level accuracy (Analytics and Calibration, ClearView MD, Inc.). For each visit, patients and staff wore badges (beacons) that allowed their approximate location to be tracked by the calibrated system of BLE gateways. Patient and provider location accuracy was externally validated by an independent observer. We calculated average wait times across the arc of the clinic visit including every interaction the patient had with each staff member.

Results: Granular process flow maps were created for each patient. Despite patients checking in 24 minutes prior to their scheduled times, patients had their first interaction with any clinic staff member 18 minutes after their scheduled time. The average time from scheduled appointment to first attending physician interaction was 39 minutes, and total idle wait time from when a patient checked in to checked out without seeing a staff member was 55 minutes. Idle time before entering the exam room was longer for bladder cancer (22 minutes) versus prostate cancer patients (19 minutes) [Figure 1]. Finally, mean nurse interaction time was 12 minutes, resident/fellow time 17 minutes, and attending time 12 minutes, although this ranged on the provider (9 to 16.9 minutes).

Conclusion: BLE tracking systems are frequently advertised to be less than 1/5 the cost of legacy tracking solutions. With the proper configuration and analytics, we believe this approach has the potential to nearly fully automate operations flow mapping. We demonstrate this system can be successfully implemented in urology, and we next seek to develop simulation models that mitigate inefficiency, ultimately reducing wait/idle times.
Poster #243
AN SMS-BASED PERI-PROCEDURAL INTERVENTION FOR PATIENTS UNDERGOING PROSTATE BIOPSY: IMPACT ON CLINIC UTILIZATION, PATIENT/PROVIDER COMMUNICATION, AND PATIENT SATISFACTION
*Anobel Y. Odisho, MD, MPH1,2; Ashwin Balakrishnan1,2; Hao Nguyen1,2; Katsuto Shinohara1,2 and Peter Carroll1,2;
1University of California San Francisco, Dept. of Urology; 2Helen Diller Family Comprehensive Cancer Center, San Francisco, CA
Presented By: Anobel Y. Odisho, MD, MPH

Introduction: Inadequate patient education and preparation for prostate biopsy leads to care delays, cancelled appointments, decreased patient satisfaction, and costs to the healthcare system. Mobile health (mHealth) approaches can improve outreach and the patient experience. We developed and deployed a text message-based (SMS) reminder and education program for patients scheduled for transrectal prostate biopsy and evaluated the impact on cancellation rates, communication frequency, and patient satisfaction.

Methods: We developed an SMS-based program with seven reminders containing links to web-based content and surveys sent over an 18-day period (14 days before through 3 days after prostate biopsy). Messages contained educational content and reminders regarding MRI for fusion biopsy, antibiotic adherence, anticoagulation management, and enema use. Demographic information, appointment cancellations/changes statistics, and patient/provider communications were collected between a 12-week pre-launch period (2/1-4/30/18) and a 12-week pilot period (6/1-8/24/18). Patients satisfaction was evaluated in the pilot cohort.

Results: There were 333 scheduled and 224 completed appointments in the pre-launch period, compared to 326 scheduled and 190 completed appointments in the post-launch period. There were no differences in patient age, race/ethnicity, distance traveled to clinic or rural/urban status. There was a higher rate of appointment cancellations or changes in the pilot period compared to pre-launch (41.1% vs 32.1%, p = 0.04). However, there were fewer cancellations within 7 days (9.2% vs. 14.7%, p = 0.04) and fewer same-day cancellations (0.9% vs. 5.1%, p<0.01). The median time between cancellation and appointment date improved from 8.8 days (IQR, 1.9-21.9) to 25.4 days (IQR, 8.0-46.9) post-launch (p<0.001). After launch, there were also fewer secure messages (6.8 vs 3.9, p <0.01) and telephone interactions (1.1 vs 0.8, p <0.01) per patient. Mean patient satisfaction was 4.8 out of 5 (SD 0.5) for the SMS program and 4.9 (SD 0.4) for overall care. 80% of patients felt the number of reminders was just right, and 20% felt it was too high.

Conclusion: An SMS-based peri-procedural outreach program significantly lowered last-minute appointment cancellations, and was associated with decreased secure messages and phone calls and with high patient satisfaction scores. This leads to fewer under-utilized procedure appointments, more efficient scheduling, decreased inbox and phone call burden, and high patient satisfaction.

Table 1. Appointment cancellation and rescheduling statistics comparing the pre-launch and post-launch periods.

<table>
<thead>
<tr>
<th></th>
<th>Pre-launch</th>
<th>Post-launch</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Completed Appts</td>
<td>224</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>Canceled or Resched.</td>
<td>107 (32.1%)</td>
<td>134 (41.1%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Same Day Cancellations</td>
<td>17 (5.1%)</td>
<td>3 (0.9%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Appts Canceled within 7</td>
<td>49 (14.7%)</td>
<td>30 (9.2%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Appts Canceled within 14</td>
<td>65 (19.5%)</td>
<td>49 (14.7%)</td>
<td>0.16</td>
</tr>
<tr>
<td>Cancellation Lead Days</td>
<td>8.8 (1.9-21.9)</td>
<td>25.4 (8.0-45.9)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
THE COST OF OBESITY IN RADICAL CYSTECTOMY

Melissa J. Huynh, MD1; Ye Wang, PhD2; Daniel Pucheril, MD1; Dimitar Zlatev, MD MS1; Alice Yu, MD1; Steven Chang, MD, MS1 and Matthew Mossanen, MD1,2

1Division of Urologic Surgery, Brigham and Women’s Hospital; 2Center for Surgery and Public Health, Brigham and Women’s Hospital

Presented By: Melissa J. Huynh, MD

Introduction: The Centers for Disease Control and Prevention estimates that nearly 40% of the U.S. population meets the criteria for obesity classification. Several studies have shown that obesity is associated with increased medical morbidity and costs. In this study, we investigated the impact of obesity on the financial burden of radical cystectomy. We hypothesize that the cost of radical cystectomy is greater in obese and morbidly obese patients compared to overweight patients.

Methods: We performed a retrospective observational study within the Premier Healthcare Database (Premier Inc., Charlotte, NC), a large, U.S. hospital-based, all-payer database representing approximately 20% of annual inpatient discharges. ICD-9 procedure codes were used to identify all patients who had undergone elective radical cystectomy (57.71, 57.79) from 2003 to 2015, and administrative data was used to extract the costs associated with the index hospitalization. Patients were stratified into three body mass index (BMI) categories: overweight (25 ≤ BMI < 30), obese (30 ≤ BMI < 40) and morbidly obese (BMI ≥ 40). Quantile regression analysis was performed to examine the effect of BMI category on cost.

Results: We identified 12,056 patients who underwent radical cystectomy, 1,406 of whom had data available regarding BMI category. The crude cost of the index hospitalization for radical cystectomy was $24,596 for overweight patients. The costs associated with patients in the obese and morbidly obese categories were $2,158 (p=0.059) and $5,308 (p<0.001) higher compared to overweight patients, respectively. Median operative time for overweight, obese, and morbidly obese patients was 346, 391, and 420 minutes, respectively (p=0.0001). Multivariable models were constructed controlling for clinicodemographic, and surgical factors. After adjustment for operative time, there were no longer statistically significant differences in cost between the BMI categories.

Conclusion: The cost of radical cystectomy is significantly greater for obese and morbidly obese patients compared to overweight patients. This increased financial cost associated with obesity difference is driven by increased operative times encountered in obese patients.
Poster #245
READMISSION COSTS TO INDEX VS. NON-INDEX HOSPITALS FOLLOWING MAJOR UROLOGIC ONCOLOGY SURGERIES: IDENTIFYING SOURCES OF COST VARIABILITY
*Meera R. Chappidi, MD, MPH1 and Anobel Odisho, MD, MPH1
1University of California, San Francisco, San Francisco, CA
Presented By: Meera R. Chappidi, MD, MPH

Introduction: Previous studies in non-urologic populations have demonstrated readmission to non-index hospitals can result in increased costs of care, and are a source of variation that can be targeted to decrease costs. However, this has not been well studied in urologic surgery populations. Therefore, our objective was to compare the cost of index vs. non-index readmissions following major urologic oncology surgeries.

Methods: Patients undergoing radical cystectomy (RC), prostatectomy (RP), nephrectomy (RN), partial nephrectomy (PN), and nephroureterectomy (NU) for cancer were identified between 2010-2014 in the Nationwide Readmissions Database. Among patients who experienced readmission within the 90-day post-operative period, the cost of first readmission was compared between readmissions to index vs. non-index hospitals. Multivariable models controlling for patient, surgery, and hospital-level characteristics were used to determine if non-index readmission was associated with increased readmission costs.

Results: Following major urologic oncology surgeries, 90-day readmission rates were 40.3% (RC, n=9,964), 5.8% (RP, n=12,341), 14.9% (RN, n=11,543), 14.0% (PN, n=6,419), and 17.6% (NU, n=2,431). The percentages of readmitted patients with readmission to non-index hospitals were 26.6% (RC), 30.7% (RP), 28.7% (RN), 25.6% (PN), and 30.3% (NU). On multivariable modeling, non-index hospital readmissions were more expensive following RP ($10,826 vs. $9,585, p<0.001), but less expensive following radical cystectomy ($12,275 vs. $14,543, p=0.001). The cost of index vs. non-index hospital readmissions was comparable following RN, PN, and NU (Figure).

Conclusion: Hospital readmission to non-index hospitals is a source of significant cost variability following RC and RP. Non-index readmissions were more expensive than index readmissions following RP, but the opposite was true for RC. This suggests a unique approach must be used for each individual surgery in order to understand how to improve readmission costs. As there is increased focus on cost containment with the implementation of bundled payment models, there is a need to better understand the factors associated with cost variability based on hospital readmission location following RC and RP.
Introduction: Bladder cancer (BCa) is a common and potentially lethal malignancy; the lethality being impacted by tumor grade and stage. Insurance coverage may impact timeliness and availability of standard of care treatments in BCa. We aimed to evaluate the impact of insurance status on clinical presentation, treatment and overall survival in patients with BCa using national cancer registry data.

Methods: Patients with urothelial BCa diagnosed from 2004 to 2013 were identified from the National Cancer Database (NCDB) and stratified based on insurance status into 4 groups: privately insured or managed care, uninsured, Medicaid, and Medicare, excluding patients with unknown insurance status. Multivariable logistic regression analysis was used to identify predictors of presentation with muscle-invasive bladder cancer (MIBC) and receipt of standard of care treatment in IBC. Kaplan-Meier survival estimates and multivariable Cox regression analysis were performed to determine the association between insurance status and survival.

Results: Among 374,054 patients diagnosed with urothelial BCa during the study period, uninsured and Medicaid patients to present with late stage disease, have more co-morbidities, and be treated at non-metropolitan and low volume facilities (p<0.001). The odds of receiving definitive radical cystectomy (RC) was approximately 35% lower for uninsured and Medicaid-insured with non-metastatic invasive BCa (OR 0.66, 95% CI 0.57-0.76, and OR 0.65, 95% CI 0.57-0.73, respectively), while Medicaid patients were also more likely to have delay to cystectomy and more likely to have higher pathologic stage disease at RC (p<0.001). After adjusting for age, race, education, income, clinical and treatment parameters, the risk of death was significantly higher in uninsured patients (HR 1.75, 95% CI 1.65-1.87) and Medicaid-insured patients (HR 1.94, 95% CI 1.84-2.05).

Conclusion: In a contemporary population-based cohort, uninsured and Medicaid patients with BCa, tend to have increased comorbidity, more advanced stage at diagnosis and reduced survival compared to privately insured patients. After adjusting for numerous demographic, clinical and facility factors, uninsured and Medicaid-insured were less likely to receive definitive surgical treatment in MIBC and remained at substantially increased risk of all-cause mortality compared to those with private insurance. Private insurance appears to be an important factor in timely access to bladder cancer care.
Poster #247
“FAKE NEWS” IN UROLOGIC ONCOLOGY: ANALYZING THE ACCURACY OF SOCIAL MEDIA CONTENT
*Muhannad Alsyouf, MD1; Phillip Stokes1; Akin Amasyali1; Herbert Ruckle1 and Brian Hu1
1Loma Linda University Health
Presented By: Muhannad Alsyouf, MD

Introduction: Social media offers a powerful platform for connectivity. However, uncensored and non-peer reviewed medical content may lack scientific merit. This potential misinformation can have a detrimental impact on the public or a patient's understanding of a disease. We evaluated the accuracy of the most popular articles on social media platforms pertaining to genitourinary malignancies.

Methods: The 10 most-shared articles on the most popular social media platforms (Facebook, Twitter, Pinterest, and Reddit) were identified for prostate cancer, bladder cancer, kidney cancer, testis cancer, and PSA testing using a social media analysis tool (August 2017-August 2018). Articles were reviewed for accuracy by comparing the article information against available scientific research and consensus data. Articles were classified as accurate, inaccurate, or misleading (some inaccuracies). Mann Whitney U was used for statistical comparison.

Results: Articles pertaining to prostate cancer were the most shared across all social media platforms (399K) followed by kidney cancer (115K). The percentage of inaccurate or misleading articles were high: prostate cancer (80%), kidney (30%), bladder (20%), testis (20%), and PSA testing (10%) (Figure 1). The most shared articles were more likely to be inaccurate or misleading (Figure 2). Inaccurate articles were 28 times more likely to be shared than factual articles (average of 54.0K vs 1.9K shares, respectively; p<0.01). When comparing the average number of shares for individual genitourinary malignancies, prostate cancer and kidney cancer had a significantly higher number of inaccurate articles (p=0.02).

Conclusion: Misleading or inaccurate information on genitourinary malignancies is commonly shared on social media platforms. The study highlights the importance of directing patients to appropriate cancer resources and potentially argues for oversight by the medical and technology communities.
Poster #248
THE OUTCOMES OF UROTHELIAL CARCINOMA MANAGED BY NON-OPERATIVE MANAGEMENT: A NATIONAL CANCER DATABASE STUDY

*Jamil Syed; Kevin Nguyen; Alfredo Suarez-Sarmiento; Cynthia Leung; Marianne Casilla-Lennon; Jay Raman and Brian Shuch
Yale School of Medicine; Pennyslvania State University
Presented By: Jamil Syed

Introduction: Approximately 7% of patients with localized upper tract urothelial cancer UTUC are treated without definitive therapy. Understanding outcomes and alternative therapy would aid in counseling older patients with comorbidities.

Methods: We utilized the National Cancer Database to identify patients with localized UTUC managed non-surgically between 2004 and 2013. Patient demographics, comorbidity, tumor grade, and chemotherapy and radiation utilization were recorded. Survival analyses were performed with the Kaplan-Meier method and a cox proportional hazard regression model.

Results: We identified 3157 (10.9%) patients with localized UTUC who did not receive definitive surgery. Median age was 79 years, 55% were males, 79% had government health insurance, and 68% had a CDS of 0. Tumor grade was low (grade 1 or 2) in 632 (36.4%) and high (grade 3 or 4) in 1104 (63.6%). Median overall survival (OS) for the cohort was 2.2 years, significantly shorter for patients with greater comorbidities. Chemotherapy or radiation was performed in 294 (9.3%) and 197 (6.3%) patients respectively. There were no OS differences for individuals receiving chemotherapy. Of patients who received radiation therapy, the median OS was 1.4 vs 2.0 years, (p<0.001) favoring no radiation. Those with high grade tumors had worse survival (1.9 vs 3.8 years (p<0.001). Significant predictors of shorter OS included older age, male gender, higher CDS, and government insurance.

Conclusion: In this population-based cohort, 10.9% of patients with localized UTUC were managed non-surgically. Radiation and chemotherapy were not routinely utilized, and did not demonstrate improved survival. Median OS was significantly shorter for those with higher grade disease, increasing comorbidity profile, male gender, and those with government insurance status.
Reduction of Opioid Utilization After Urologic Oncology Surgery

Kris Prado, MD; Jessica Kee, PA; Kerri Stevenson, PA; Eliza Van Zyl; Anisia Dugala; Daniel Greenberg; Rustin Massoudi, MD; Benjamin Chung, MD; Geoffrey Sonn, MD; Alan Thong, MD; Harcharan Gill, MD; Eila Skinner, MD and Jay Shah, MD

1Stanford University, Department of Urology, Stanford, CA; 2Stanford Health Care, Stanford, CA; 3Stanford University School of Medicine, Stanford, CA

Presented By: Kris Prado, MD

Introduction: Exposure to opioids after surgery increases the risk of persistent opioid use. Reducing opioid use during hospitalization after surgery may decrease the incidence of persistent opioid use as well as the side effects from these medications. We implemented a quality improvement initiative to decrease opioid use among patients admitted for all types of Urologic Oncology surgery. We hypothesized that implementation of standardized perioperative pain management regimens could reduce opioid use without compromising pain control.

Methods: We identified causes contributing to excess opioid use and designed an opioid-sparing regimen consisting of acetaminophen, ketorolac, gabapentin, and liposomal bupivacaine. We incorporated education for patients, nurses and providers prior to implementation of this regimen, and we prospectively measured opioid use calculated as morphine equivalent daily dose (MEDD), pain scores, and anxiety scores after implementation of standardized perioperative pain management regimens for patients who were admitted post-operatively for any type of Urologic Oncology surgery. We compared these data to retrospective data from our review of opioid use, pain scores, and anxiety scores for patients who underwent all types of Urologic Oncology surgery during the 4-month period prior to implementation of our initiative.

Results: After implementation of this quality improvement initiative, the mean inpatient opioid use per patient in 436 patients (pre-implementation n=255, post-implementation n=181) decreased by 46% (96.2 to 51.6 MEDD, p<0.05). This decrease was seen among patients undergoing robotic prostatectomy as well as open cystectomy (Figure 1). There was no significant difference in pain scores before and after implementation of the standardized perioperative pain management regimens when measured at 24 and 48 hours post-operatively (3.03 vs 3.04, p>0.05 and 2.92 vs 2.96, p>0.05, respectively). Similarly, there was no significant difference in anxiety scores 24 or 48 hours after surgery (0.15 vs 0.12, p>0.05 and 0.48 vs 0.30, p>0.05, respectively).
Poster #250

UROLOGIC MALIGNANCIES: A COMPARISON OF OUTCOMES AFTER INDEX SURGERY BETWEEN ACADEMIC AND COMMUNITY HOSPITALS.

*Jamil Syed1; Alejandro Abello1; Michael Leapman1 and Patrick Kenney1

1Yale School of Medicine

Presented By: Jamil Syed

Introduction: To compare the rate of 30-day readmission, direct costs of index admissions and other outcomes in patients with urologic malignancies who underwent surgery as part of treatment in academic and community hospitals.

Methods: We retrospectively reviewed the Vizient Clinical Database (Irving, Texas) from September 2014 to December 2017. Vizient is a member-driven health services organization that includes ~99% of academic hospitals and more than 40 community hospitals. This is a comparative database comprised of administrative billing with discharge and line-item data comparing clinical outcome performance within and between institutions. Data include patient demographics, readmission rates, costs, length of stay (LOS), case mix index (CMI) and mortality. Patients aged ≥ 18 were included and ICD-9 codes were used to identify patients with urologic malignancies who underwent surgical treatment. Chi square and student t-tests were used to compare categorical and continuous variables, respectively.

Results: We identified a total of 37,628 cases. There were 33,290 (88%) procedures performed in Academic Hospitals and 4,330 (12%) in Community Hospitals. These included prostatectomy (18,540), radical nephrectomy (rNx) 8,059, partial nephrectomy (pNx) (5,287), Radical Cystectomy (4,421), radical nephroureterectomy (rNu) (1,006), and Partial Cystectomy (321). There were no significant differences in 30-day readmission rates for any procedure between academic and community hospitals (Table 1). LOS was significantly lower for radical cystectomy and prostatectomy in Academic Hospitals and lower for rNx in Community hospitals. The mean direct cost for index admission was significantly higher in Academic Institutions for rNx, pNx, rNu, and prostatectomy. Case complexity measured using the CMI was similar between institution categories.

Conclusion: The Vizient clinical database provides a novel resource for observational data at US hospitals. Despite academic and community hospitals having similar case complexity, direct costs were lower in community hospitals without an associated increase in readmission rates or deaths. The only clinically significant difference in length of stay was shorter stays for cystectomy in academic centers.

Table 1: Outcomes comparison between academic and community hospitals for each index surgery.
Introduction: The widespread availability of NGS and an expanding repertoire of targeted therapies has garnered significant enthusiasm among clinical oncologists who use this technology. FoundationOne (Foundation Medicine, Cambridge, MA) is a validated comprehensive genomic profiling (CGP) assay intended to help guide therapy decisions based upon tumor specific genetic variations. We reviewed our multi-disciplinary group’s experience with FoundationOne testing in advanced genitourinary (GU) cancer and examined whether NGS directed therapy in a meaningful way.

Methods: We performed a retrospective review of patients with advanced GU cancer between 2/1/2013 – 8/13/2018 who also had FoundationOne CGP testing. We then compared the duration patients were maintained on NGS directed therapy to the duration of each non-NGS therapy.

Results: A total of 73 patients were identified with NGS testing for prostate (25, 34%), urothelial (30, 41%), and kidney (18, 25%) cancer. 11 (15%) of these patients had therapy directed against a genetic alteration indicated by NGS. Of the treated patients, 46% (5) had urothelial, 36% (4) had kidney, and 18% (2) had prostate cancer. The average duration that each non-NGS therapy was effective in patients with urothelial, kidney, and prostate cancer was 165, 417, and 382 days respectively. Duration of NGS directed therapy averaged 226, 367, and 278 days for urothelial, kidney, and prostate cancer. The range of the duration of response to NGS directed therapy for urothelial, kidney, and prostate cancer was 66-616 days, 106-467 days, and 28-528 days. Four (36%) patients treated with NGS directed therapy achieved a duration of response greater than the average duration of all other non-NGS directed therapy they had received (Table 1).

Conclusion: A minority of patients received NGS directed therapy following FoundationOne testing. Treated patients demonstrated varying responses with 4 patients experiencing a longer duration of response compared to non-NGS directed therapy. Our experience illustrates that NGS has a limited but evolving role in the management of advanced GU malignancies at this time while also demonstrating a benefit to a subset of patients. Future studies should focus on identifying which patients are most likely to benefit from this technology.

Table 1: Patients treated with NGS directed therapy.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Type of cancer</th>
<th>Mutation</th>
<th>NGS Directed Therapy</th>
<th>Line of therapy</th>
<th>Duration of effect (days)</th>
<th>Average Duration of Effect from non-NGS</th>
<th>Duration of NGS therapy/avg Non-NGS</th>
<th>Was NGS med SOC at the time?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Urothelial</td>
<td>PIK3CA</td>
<td>Temsirolimus</td>
<td>5</td>
<td>137</td>
<td>122.5</td>
<td>1.12</td>
<td>no</td>
</tr>
<tr>
<td>2</td>
<td>Urothelial</td>
<td>FGFR3</td>
<td>Pazopanib</td>
<td>4</td>
<td>88</td>
<td>241.3</td>
<td>0.36</td>
<td>no</td>
</tr>
<tr>
<td>3</td>
<td>Urothelial</td>
<td>TMB high</td>
<td>Atezolizumab</td>
<td>2</td>
<td>222</td>
<td>151</td>
<td>1.47</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>Urothelial</td>
<td>TMB high</td>
<td>Atezolizumab</td>
<td>1</td>
<td>616</td>
<td>na</td>
<td>na</td>
<td>yes</td>
</tr>
<tr>
<td>5</td>
<td>Urothelial</td>
<td>ERBB2</td>
<td>Trastuzumab/pertuzumab</td>
<td>3</td>
<td>66</td>
<td>156</td>
<td>0.42</td>
<td>no</td>
</tr>
<tr>
<td>6</td>
<td>Kidney</td>
<td>MTOR</td>
<td>Temsirolimus</td>
<td>4</td>
<td>432</td>
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<tr>
<td>8</td>
<td>Kidney</td>
<td>PTEN</td>
<td>Everolimus</td>
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<td>461</td>
<td>733</td>
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</tbody>
</table>
ASSOCIATIONS OF RURALITY AND DISEASE OUTCOME IN UROLOGIC MALIGNANCY

*Alejandro Abello, MD1; Marianne Casilla-Lennon1; Patrick Kenney1 and Michael Leapman1
1Yale School of Medicine
Presented By: Alejandro Abello, MD

Introduction: Patients residing in rural regions have comparatively worse outcomes for many cancers. However there is less known about treatment and outcome for patients with urologic cancers. The objective of this study is to evaluate differences in treatments and outcomes among patients with urologic malignancies when coming from rural compared to metropolitan communities using national, population-level data.

Methods: We queried the Surveillance, Epidemiology and End-Results database to identify patients with urological cancers from 1973 to 2015. We compiled patient clinical, demographic, and outcome data, including rurality at the county level. Rural counties is defined as those with >50% population living in rural areas. We evaluated the association of rurality with treatment received, presence of advanced disease, and cancer-specific death using descriptive statistics and Cox proportional hazard models.

Results: We identified 992,536 patients including those with Kidney (112,477), Bladder (208,230), Prostate (637,005), penile (6,297) and testis cancer (28,527). Among all patients, 898,050 (90.4%) were male and 64,992 (6.55%) lived in rural counties. Overall, patients living in rural communities were older (mean 67.41 ± 12.7 vs 70 ± 12.1) at cancer diagnosis and more frequently of white race (97.1% vs 82.46%). Patients residing in rural counties were less likely to undergo definitive treatment with surgery for stage 1 or stage 2 disease (p <0.001). In multivariable Cox regression, rural status was associated with greater risk of cancer-specific death in kidney cancer (HR: 1.1, 95% CI: 1.02-1.24; P value: 0.03) but was not seen in other cancers (Figure 1). After categorizing the population based on % of rurality, adjusted kidney cancer-specific death increased among most rural populations: 15% rurality or more (HR: 1.16, 95% CI: 1.05-1.27; P: 0.03), 40% rurality or more (HR: 1.31, 95% CI: 1.15-1.49; P < 0.001) and 70% or more (HR: 1.32, 95% CI: 1.05-1.67; P value: 0.01)

Conclusion: There are notable differences in cancer incidence, treatment and outcome for patients residing in rural areas. Rural status was associated with poorer cancer-specific survival for kidney cancer but was not seen in other genitourinary malignancies, independent of stage at diagnosis and treatment received. Further research is warranted to understand the factors underlying these differences in outcome.

Figure 1:
Poster #253
ONCOLOGIC OUTCOMES FOLLOWING SURGICAL MANAGEMENT OF CLINICAL STAGE II SEX CORD STROMAL TUMORS
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1Indiana University School of Medicine, Department of Urology
Presented By: Adam C. Calaway, MD

Introduction: Sex cord stromal tumors (Sertoli or Leydig Cell Tumors) are rare and relatively indolent testicular neoplasms of low malignant potential. Orchiectomy alone is curative in upwards of 90% of men. Little is known regarding the best treatment approach for the rare patient presenting with or developing metastatic disease during surveillance. We sought to investigate the clinical history of patients with clinical stage II sex-cord stromal tumors who underwent RPLND at our institution.

Methods: Our prospectively maintained testicular cancer database was queried to identify patients who presented with or developed Clinical Stage II Sex-Cord Stromal Tumors who underwent RPLND at our institution between 1980 and 2018. Demographic, clinical and pathological characteristics were reviewed. Updated records were obtained through consultation with previous referring provider. Kaplan-Meier curves were graphed to assess recurrence-free and overall survival.

Results: Fourteen patients were included in the study. The median age at diagnosis was 44.2 (range: 16-67). Four patients presented with Clinical Stage II disease and 10 developed metastatic disease during follow-up with a median time to metastasis of 2.7 years (range 0.4-19.5 years). Of the 10 patients with orchiectomy pathology data available, all patients had at least 1 risk factor on testis pathology (mean 2.9). Prior to RPLND, 13 of the 14 patients had received the following treatment prior to referral to our institution: four patients had undergone a RPLND, 5 had been treated with chemotherapy and four received radiation therapy. All patients recurred post-operatively with a median recurrence-free survival of 9.8 months and four had subsequent surgeries for the recurrence. The sites of recurrence were usually multifocal with spread within the retroperitoneum, peritoneal viscera, distant lymph nodes and the lungs. 12 of 14 patients died of disease with a median overall survival of 14.4 months. The two surviving patients are living with disease and on investigational therapies 24 and 46 months since the time of RPLND.

Conclusion: Stage II sex cord stromal tumors are rare; yet, if metastatic disease occurs, these tumors are refractory to chemotherapy, radiation and aggressive retroperitoneal surgery. Patients presenting with sex cord stromal tumors should consider prophylactic primary RPLND especially in the setting of any pathological predictor of malignancy.
**Poster #254**

**POST-ORCHIECTOMY HORMONE LEVELS IN TESTICULAR GERM CELL TUMORS**

*Madeleine L. Burg, BA; Zhoobin H. Bateni, MD; Shane M. Pearce, MD; Jamal Nabhani, MD; Hooman Djalahat, MD, MS; Anne K. Schuckman, MD and Siamak Daneshmand, MD*

1Institute of Urology, USC/Norris Comprehensive Cancer Center, University of Southern California, Los Angeles, CA

Presented By: Madeleine L. Burg, BA

**Introduction:** Men with testicular germ cell tumors (TGCT) are known to have gonadal dysfunction before orchiectomy. Few studies have examined gonadal function long-term after orchiectomy and completion of chemotherapy. We aimed to determine whether men have persistent hormone abnormalities after orchiectomy and/or chemotherapy.

**Methods:** Using an IRB approved TGCT database, patients with non-seminomatous and seminomatous TGCT were reviewed for post-orchiectomy hormone levels including total testosterone (Total T), free testosterone (Free T), follicle stimulating hormone (FSH), luteinizing hormone (LH), estradiol, and sex hormone binding globulin (SHBG). Patients who underwent bilateral orchiectomies or on testosterone replacement therapy at time of blood draw were excluded. Hormones were recorded as continuous variables and as normal, low, or elevated. Additional variables included patient age, prior treatment received, and most recent treatment date before blood draw. Patients who underwent post-chemotherapy retroperitoneal lymph node dissection had most recent prior chemotherapy treatment date used. Univariate analyses were performed.

**Results:** 100 patients had hormones available. Median values and frequencies in Table 1. Median age was 31 years and not associated with any difference in hormone levels. Median time since last treatment prior to blood draw was 219 days (IQR 70-611 days). 55 patients (55%) had undergone cisplatin chemotherapy prior to blood draw with median of 133 days since last treatment. Receipt of chemotherapy was associated with elevated FSH (mean values 20.9 vs. 9.8 mIU/mL, p=0.0003) and elevated LH (mean values 13.0 vs. 7.0 mIU/mL, p=0.0001). There was no difference in Total T (mean values 436 vs. 448 ng/dL), Free T (66.5 vs. 69.8 ng/dL), estradiol (25.6 vs. 26.2 pg/mL), or SHBG (36.6 vs. 35.6 nmol/L) between those who did or did not receive chemotherapy, respectively. Among those who received chemotherapy more than 2 years prior (n=10, median age 33 years), 4 patients had elevated LH (40%).

**Conclusion:** About 8% of men with testicular germ cell tumors are hypogonadal following orchiectomy, which is higher than reported overall population rates for this age group. Those who received chemotherapy have significantly higher FSH and LH levels. Further longitudinal studies are needed to determine whether patients with history of testis GCT and receipt of cisplatin-chemotherapy are at increased risk for eventual secondary hypogonadism.

<table>
<thead>
<tr>
<th>Table 1. Hormone levels of overall cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hormone</strong></td>
</tr>
<tr>
<td>Total T, ng/dL</td>
</tr>
<tr>
<td>Free T, pg/dL</td>
</tr>
<tr>
<td>FSH, mIU/mL</td>
</tr>
<tr>
<td>LH, mIU/mL</td>
</tr>
<tr>
<td>Estradiol, pg/mL</td>
</tr>
<tr>
<td>SHBG, nmol/L</td>
</tr>
</tbody>
</table>
Introduction: Primary tumor size (PTS) is the main prognostic factor for relapse in clinical stage (CS) IA testicular seminoma and the Tumor-Node-Metastasis (TNM) staging system now subcategorizes pT1 tumors into pT1a (<3 cm) and pT1b (≥3 cm). We attempted to assess PTS as a prognosticator for overall survival (OS) and to evaluate the comparative effectiveness of active surveillance (AS) versus adjuvant therapy (AT) in patients with large primary tumors (LPT).

Methods: In the National Cancer Database (2004-2014), 2455 (47.7%) and 2685 (52.3%) patients with CS IA seminoma were treated with AS and AT, respectively. A cut-point analysis was performed to determine the optimum PTS threshold predicting OS at 5 years after orchiectomy. Inverse-probability of treatment weighting (IPTW)-adjusted Kaplan-Meier curves and Cox regression analyses were used to compare OS of patients with LPT treated with AS versus AT.

Results: Pathologic T-stage did not predict OS and no OS benefit was noted in pT1b patients treated with AT. The optimum PTS cut-point was 5-cm. In multivariable analysis, patients with LPT had an increased risk of overall mortality (HR=1.87, \( P=0.003 \)). IPTW-adjusted Kaplan-Meier curves revealed that OS was superior in patients with LPT treated with AT (IPTW-adjusted log-rank \( P=0.029 \)). In IPTW-adjusted Cox regression analysis, AT was associated with an OS benefit in patients with LPT (HR=0.59, \( P=0.017 \)).

Conclusion: PTS was a predictor of OS in CS IA seminoma. An OS benefit was noted for individuals with LPT managed with AT. These findings may warrant refinement of the TNM staging system and clinical practices.
TRENDS AND QUALITY OF INITIAL TESTIS CANCER CARE IN NORTH CAROLINA

*Benjamin J. McCormick, MD1; Stephen McMahon, BS1; Josy Zhou, MS1; Chris Bagget, PhD1; Michael Woods, MD2; Mark Litwin, MD3; Ronald Chen, MD1; Matthew Milowsky, MD1; Eric Wallen, MD1 and Hung-Jui Tan, MD1

1UNC; 2Loyola; 3UCLA

Presented By: Benjamin J. McCormick, MD

**Introduction:** The management of testis cancer has become increasingly protocolized, providing support for the emergence of active surveillance for early-stage disease. However, the real-world quality of testis cancer care remains largely unknown. In this context, we evaluated the quality of initial evaluation and management for men diagnosed with testis cancer.

**Methods:** As testis cancer affects younger men, we utilized data from the North Carolina Central Cancer Registry linked to Medicare, Medicaid, and private insurance claims. This unique dataset is created and maintained by the Cancer Information and Population Health Resource at UNC and captures 85% of cancer cases in North Carolina. For this study, we identified adult males diagnosed with testis cancer by orchiectomy from 2003–2013 with continuous insurance from 1 month prior to 4 months post diagnosis. For each patient, we identified demographics, histology (i.e., seminoma vs. nonseminoma), and stage. We then measured receipt of recommended evaluation defined as pre-orchiectomy tumor markers (i.e., AFP, BHCG, LDH), baseline body CT/MRI and chest imaging, and visits with two or more specialists (i.e., urologist, medical oncologist, radiation oncologist). Additionally, we identify receipt of semen analysis/preservation and index management. Temporal trends were evaluated using chi-squared testing.

**Results:** From 2003–2013, we identified 487 adult males with seminoma (59.3%) or nonseminoma (40.7%) treated with radical orchiectomy. These patients were predominantly white (92.4%), had private insurance or Medicare (81.1%), resided in urban areas (69.6%), and diagnosed with stage I disease (87.9%). Overall, 33.7% of patients received recommended evaluation though this increased from 19.8% in 2003–2005 to 46.1% in 2010–2013 (p<0.001). Fertility assessments remained low through the study period (7.4%). Expectant management for stage I testis cancer increased significantly for both seminoma (29.3% in 2003–2005 to 38.0% in 2010–2013, p=0.020) and nonseminoma (48.7% in 2003–2005 to 59.2% in 2010–2013, p=0.027).

**Conclusion:** Expectant management has increased significantly for men diagnosed with testis cancer. However, only one-third of patients undergo a complete evaluation at baseline. This quality gap raises potential concern with adherence to clinical guidelines, especially given the high intensity requirements of active surveillance.

Figure: Trends in initial evaluation and management for testis cancer

![Graph showing trends in initial evaluation and management for testis cancer from 2003-2005, 2006-2009, and 2010-2013 with respective p-values.](Image)
Poster #257
A HISTOLOGIC COMPARISON OF PATIENTS PRESENTING WITH PURE CHORIOCARCINOMA VS MIXED NSGCT WITH SERUM HCG LEVELS >20,000 IN PATIENTS UNDERGOING PC-RPLND

*Ryan W. Speir, MD; Adam Calaway, MD; Marcelo Barboza, MD; Richard Foster, MD and Clint Cary, MD

IU School of Medicine, Department of Urology
Presented By: Ryan W. Speir, MD

Introduction: Choriocarcinoma tumors of the testis are rare and usually present with significantly elevated HCG levels and hematogenous metastasis. When curable, it is felt to be largely a result of chemotherapy with little role for RPLND. We sought to determine the histologic characteristics for those undergoing PC-RPLND and compare them with metastatic NSGCT patients with similarly elevated HCG levels.

Methods: We reviewed the medical records of men who underwent PC-RPLND between 1988-2017 with post-orchiectomy, pre-induction chemotherapy HCG levels greater than 20,000 mU/mL. They were stratified by primary tumor histology into two groups: pure choriocarcinoma and mixed NSGCT. Clinical, pathologic and serologic data were reported and logistic regression was used to assess for predictors of necrosis/fibrosis in the PC-RPLND specimen.

Results: Our cohort consisted of 152 men. The mixed group (N=129) had a median HCG of 108,001 mU/mL, a post chemotherapy node size of 4.45 cm, of whom 25.6% also received salvage chemotherapy prior to RPLND. The pure choriocarcinoma group (N=23) had a median HCG of 110,358 mU/mL, a post chemotherapy node size of 5.0 cm, of whom 30.4% received salvage chemotherapy prior to RPLND. In patients with pure choriocarcinoma, 87% had necrosis/fibrosis in the PC-RPLND specimen compared to only 29.5% of the mixed NSGCT group (p= <0.0001, Figure 1). While controlling for receipt of salvage chemotherapy, pre-chemotherapy HCG levels, node size and marker status, pure choriocarcinoma patients were 20 fold more likely to have necrosis on RPLND specimen compared to mixed NSGCT group (OR 20.68 (95% CI 5.279-81.114). Of importance, 4 additional major procedures were performed concomitantly with PC-RPLND in the pure choriocarcinoma group (2 pulmonary resections, 1 hepatic wedge resection and 1 nephrectomy), 100% of which had necrosis in the final RPLND pathology. This contrasts with the mixed NSGCT group in that of the 48 patients who required additional procedures, only 8.3% were done in the setting of necrosis in the final RPLND specimen.

Conclusion: While PC-RPLND is appropriate in patients with residual masses after chemotherapy, patients with pure choriocarcinoma presenting with significantly elevated HCG levels represent a unique patient population where necrosis is found more often than anticipated.
INTRODUCTION: Men with a history of testicular cancer are known to have an increased risk of developing prostate cancer in epidemiologic studies. The objective of this present study is to determine if long-term testicular cancer survivors are predisposed to higher incidences of aggressive prostate cancer later in life and are subjected to higher risks of prostate cancer-specific mortality.

METHODS: We retrospectively analyzed the records of 12,819 prostate cancer patients in the Surveillance, Epidemiology, and End Results (SEER) database with a previous diagnosis (≥5 years) of testicular cancer or another cancer characterized by high survival rate (5-year survival rate > 70%, breast cancer, bladder cancer, eye/orbital cancer, Hodgkin’s lymphoma, lymphocytic leukemia, cancer of the oral cavity [tongue and tonsil], skin cancer [excluding basal cell and squamous cell carcinoma], renal cancer, and thyroid cancer). We subsequently identified all patients with a cause of death attributed to prostate cancer and utilized univariate and multivariate Cox proportional hazard regression models to determine the risk of prostate cancer-specific mortality.

RESULTS: Of the 12,728 prostate cancer patients, 479 men had a history of testicular cancer and 12,249 men had a history of another cancer with a 5-year survival rate > 70% (control). The median age at which intermediate-to-high grade prostate cancer was diagnosed in the testicular cancer group and control group was 62 years (range, 42 – 86 years) and 73 years (range, 40 – 98 years) respectively (p < 0.0001) (Figure 1). Additionally, we identified 31 prostate cancer-specific mortalities within the testicular cancer group and 881 prostate cancer-specific mortalities within the control group. Testicular cancer was associated with increased risk of prostate cancer-specific mortality in both univariate (HR 3.11; CI 2.12-4.38; p < 0.0001) and multivariate (HR 2.01; CI 1.27-3.04; p = 0.0038) Cox proportional hazard models controlling for age of prostate cancer diagnosis, race, clinical T stage, PSA level, and Gleason score.

CONCLUSION: A history of testicular cancer is associated with a significantly increased risk of both developing intermediate/high-risk prostate cancer as well as risk of death from prostate cancer.
**Poster Session II — Full Abstracts**

**Poster #259**  
**RACIAL DISPARITIES BETWEEN BLACK AND WHITE MEN WITH TESTICULAR CANCER**  
*Jeffrey P. Johnson, MD; Alexandr Pinkhasov, MD, MPH; Garrett Smith, MD; Michael Daneshvar, MD; Alexandra Weston; Ruben Pinkhasov, MD, MPH; Elizabeth Ferry, MD; Oleg Shapiro, MD; Gennady Bratslavsky, MD and Joseph Jacob, MD, MCR*  
**SUNY Upstate Urology**  
Presented By: Jeffrey P. Johnson, MD

**Introduction:** Racial disparities among black and white men have been established in several urological malignancies including prostate and renal. The purpose of this study is to compare socio-demographic factors and survival outcomes among black and white men with testicular cancer.

**Methods:** The National Cancer Database was queried to identify black and white men with testicular cancer diagnosed between 2004 and 2015. Baseline demographic characteristics included age at diagnosis, Charlson Comorbidity Index (CCI), insurance status, median household income by residence, education level, distance to facility, facility type, and stage at diagnosis. Frequencies and relative frequencies were compared using Chi-squared test. Kaplan-Meier method and Cox proportional hazards modeling were used to analyze survival and comparisons, respectively.

**Results:** A total of 62,705 men were included in our analysis, of which 60,566 (96.6%) were white and 2,139 (3.4%) were black. When compared to whites, blacks had significantly higher CCI (8.4% vs 6.2%; p<0.001), were less likely to be insured (17.6% vs 10.8%; p<0.001), and more likely to have stage III disease (16.6% vs 12.6%; p<0.001). Blacks had a lower median household income and education level. Blacks were more likely to be treated at an Academic/Research/Integrated Network center (20.0% vs 13.9%; p<0.001), whereas whites were more likely to be treated at Community/Comprehensive Community centers (19.0% vs 14.6%; p<0.001). Blacks were more likely to live within a 10-mile radius of their treatment facility (62.3% vs 51.2%; p<0.001). Black men had a twofold increase in 30-day mortality (0.6% vs 0.3%; p<0.001) and 90-day mortality (1.3% vs 0.6%; p<0.001) when compared to white men. When compared to whites, blacks have a significantly lower 10-year overall survival (p<0.001). After controlling for insurance status, income, CCI, and stage, race continued to be a predictor of mortality (HR 1.122, p<0.001).

**Conclusion:** Our analysis reinforces previously identified conclusions on racial disparities in testicular cancer using a larger and more current data set. After surveying the largest cohort of cancer patients nationwide to date, race continues to be an independent predictor of mortality in testis cancer.
COMPARATIVE ANALYSIS OF BIOPSY PROVEN LYMPH NODE POSITIVE BLADDER CANCER TO THOSE WITH BIOPSY PROVEN NODE NEGATIVE DISEASE PRIOR TREATMENT

Amy Lim, MD, PhD; Vikram Narayan, MD; Mohamed Seif, MD; Colin Dinney, MD and Neema Navai, MD
MD Anderson Dept of Urology
Presented By: Amy Lim, MD, PhD

Introduction: Most studies assessing the efficacy of neoadjuvant chemotherapy (NAC) and cystectomy in bladder cancer patients include very few clinically node positive patients or completely exclude them, which make nodal response rates difficult to determine. Further, in studies that include clinically node positive patients, their true nodal status is often unknown. We report a descriptive analysis of patients with clinically node positive disease who underwent pelvic lymph node biopsy prior to treatment and their outcomes.

Methods: Data was collected retrospectively from patients with cTxN1-3M0 bladder cancer from 2006-2018 who underwent radical cystectomy at MD Anderson. SPSS was used for analysis.

Results: Among the 130 patients with cTxN1-3M0 (94M:36F, median age of 68 years, age range of 28-85, average follow up of 929 days), 42 underwent pelvic lymph node biopsy (PLNBx). 27 (64.3%) patients had positive PLNBx, 15 (35.7%) were negative. Of patients with positive PLNBx, 22 (81.4%) were cN1, 1 (3.7%) was cN2 and 4 (14.8%) were cN3. Of patients with negative PLNBx, 10 (66.7%) were cN1, 1 (6.7%) was cN2, 4 (26.7%) were cN3. Of patients with PLNBx positive disease, 27 (100%) underwent NAC. 18 (66.7%) of these patients had persistent positive nodal disease at time of cystectomy. Of the 15 patients that had a negative PLNBx, 12 (80%) received NAC and 4 (33.3%) had positive nodal disease at time of cystectomy. Patients with a positive PLNBx treated with NAC and were N+ at time of cystectomy, the average time to recurrence was 365 days (std dev 651) and the average time to death was 664 days (std dev 782). Patients with a negative PLNBx treated with NAC and were N+ time of cystectomy, the average time to recurrence was 123 days (std dev 257) and the average time to death was 540 days (std dev 95). Fischer’s exact test did not reveal a statistical significance of recurrence or death between these two groups (p=0.6).

Conclusion: Clinical node positive disease is likely over staged. However, the significance of this is unknown. 33.3% of patients with biopsy proven nodal disease achieved complete pathologic response after NAC. The role PLNBx in clinically node positive bladder cancer is yet to be determined.
Authors/Presenter, Date, Time, and Abstract Placement

Due to time limitations, authors who do not have a time and date listed will not be presenting their abstract at this meeting. See Abstract section for complete text.

ABBOSH, PHILLIP  
11/30/2018  1:48 p.m.

ABEL, E. JASON  
11/30/2018  8:54 a.m.

ABELLO, ALEJANDRO  
11/28/2018  1:00 p.m.  Poster #80
11/29/2018  1:00 p.m.  Poster #252

AGRAWAL, SUNDEEP  
11/29/2018  11:25 a.m.

ALAM, RIDWAN  
11/28/2018  1:00 p.m.  Poster #53

ALEMOZAFFAR, MEHRDAD  
11/28/2018  1:00 p.m.  Poster #7

ALMASSI, NIMA  
11/29/2018  1:00 p.m.  Poster #159

ALSYOUF, MUHANNAD  
11/29/2018  1:00 p.m.  Poster #247

AMINSHARIFI, ALIREZA  
11/28/2018  1:00 p.m.  Poster #114

ARACE, JEFFREY  
11/29/2018  1:00 p.m.  Poster #204

ARORA, VIVEK  
11/30/2018  10:30 a.m.

ASHRAFI, AKBAR  
11/28/2018  1:00 p.m.  Poster #19
11/29/2018  1:00 p.m.  Poster #246

AVIÑA MAGAÑA, JAIME ARTURO  
11/28/2018  1:00 p.m.  Poster #78

AZIZI, MOUNSIF  
11/29/2018  1:00 p.m.  Poster #255

BADKHSHAN, SHERVIN  
11/29/2018  1:00 p.m.  Poster #198

BAGHDADI, AMIR  
11/28/2018  1:00 p.m.  Poster #10
11/29/2018  1:00 p.m.  Poster #173

BALAKRISHNAN, ASHWIN  
11/28/2018  1:00 p.m.  Poster #100

BALAR, ARJUN  
11/30/2018  2:25 p.m.  AB #4

BALL, MARK  
11/29/2018  1:00 p.m.  Poster #196

BARBOZA, MARCELO  
11/29/2018  1:00 p.m.  Poster #169

BEANO, HAMZA  
11/28/2018  1:00 p.m.  Poster #2
11/28/2018  1:00 p.m.  Poster #8

BHAT, ABHISHEK  
11/28/2018  1:00 p.m.  Poster #77

BHATTU, AMIT  
11/28/2018  1:00 p.m.  Poster #99

BHINDI, BIMAL  
11/28/2018  1:00 p.m.  Poster #49
11/28/2018  1:00 p.m.  Poster #66

BINDAYI, AHMET  
11/29/2018  1:00 p.m.  Poster #194

BIVALACQUA, TRINITY  
11/29/2018  1:00 p.m.  Poster #154

BLUM, KYLE  
11/29/2018  1:00 p.m.  Poster #164

BLUTE, MICHAEL  
11/29/2018  10:45 a.m.
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Alphabetic Index of Authors

Ghabili Amirkhiz, Kamyar
11/28/2018  1:00 p.m.  Poster #110
11/29/2018  1:00 p.m.  Poster #94

Ghandour, Rashed
11/28/2018  1:00 p.m.  Poster #127

Ghodoussipour, Saum
11/29/2018  1:00 p.m.  Poster #146

Gill, Inderbir
11/30/2018  12:00 p.m.
11/29/2018  1:00 p.m.  Poster #228

Gleave, Martin
11/29/2018  3:25 p.m.
11/29/2018  3:45 p.m.
11/30/2018  10:30 a.m.

Goldberg, Hanan
11/28/2018  1:00 p.m.  Poster #61
11/28/2018  1:00 p.m.  Poster #62
11/29/2018  1:00 p.m.  Poster #221
11/29/2018  1:00 p.m.  Poster #224

Greenberg, Jacob
11/28/2018  1:00 p.m.  Poster #46
11/28/2018  1:00 p.m.  Poster #52

Gregg, Justin
11/29/2018  1:00 p.m.  Poster #218

Gupta, Gopal
11/30/2018  8:44 a.m.

Gupta, Natasha
11/29/2018  1:00 p.m.  Poster #210

Hacker, Kathryn
11/28/2018  1:00 p.m.  Poster #1
11/30/2018  8:08 a.m.  AB #2

Hakimi, Abraham
11/30/2018  8:54 a.m.

Hensley, Patrick
11/28/2018  1:00 p.m.  Poster #125
11/29/2018  1:00 p.m.  Poster #138

Herlemann, Annika
11/29/2018  1:00 p.m.  Poster #216
11/29/2018  1:00 p.m.  Poster #226

Herrera-Caceres, Jaime
11/28/2018  1:00 p.m.  Poster #83
11/29/2018  1:00 p.m.  Poster #182

Hoffman-Censits, Jean
11/29/2018  8:37 a.m.

Hung, Andrew
11/29/2018  1:00 p.m.  Poster #205

Hussein, Ahmed
11/28/2018  1:00 p.m.  Poster #29
11/29/2018  1:00 p.m.  Poster #149
11/29/2018  1:00 p.m.  Poster #195

Huyhn, Melissa
11/29/2018  1:00 p.m.  Poster #244

Jensen, Derek
11/29/2018  1:00 p.m.  Poster #219

Jericevic, Dora
11/28/2018  1:00 p.m.  Poster #112

Johnson, Jeffrey
11/29/2018  1:00 p.m.  Poster #259

Joyce, Daniel
11/29/2018  1:00 p.m.  Poster #215

Kadow, Brian
11/29/2018  1:00 p.m.  Poster #163

Kearns, James
11/29/2018  1:00 p.m.  Poster #207

Kemees, Tariq
11/28/2018  1:00 p.m.  Poster #111
11/28/2018  1:00 p.m.  Poster #58
11/28/2018  1:00 p.m.  Poster #90

Kibel, Adam
11/30/2018  2:39 p.m.  AB #6
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<tr>
<th>Author</th>
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**Alphabetical Index of Authors**

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<td>ORY, JESSE</td>
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The following urologic oncology fellowship programs have earned the credentials of the Society of Urologic Oncology:

**Combined Harvard Urologic Oncology Fellowship at Massachusetts General Hospital and Brigham & Women’s Hospital**
Program Director:
Adam S. Feldman, MD, MPH
Assistant in Urology, Massachusetts General Hospital
Assistant Professor of Surgery, Harvard Medical School
Email: afeldman@mgh.harvard.edu

Associate Program Director:
Steven L. Chang, MD, MS
Assistant Professor, Division of Urologic Surgery
Brigham & Women’s Hospital
Email: slchang@partners.org

Fellowship Coordinator:
Kimberly A. Williams
kwilliams40@mgh.harvard.edu
55 Fruit St., Yawkey Building 7E
Boston, MA 02114
Phone: (617) 726-8078
Fax: (617) 726-6131

www.massgeneral.org/urology
suonet.org/fellowships/Combined%20Harvard%20Urologic%20Oncology%20Fellowship%20Overview.pdf

**Glickman Urological and Kidney Institute, Cleveland Clinic**
Program Director:
Andrew J. Stephenson, MD
9500 Euclid Avenue – Desk Q10-1
Cleveland, OH 44195-0001
Phone: (216) 445-1062 | Fax: (216) 636-4492
Email: stephea2@ccf.org

my.clevelandclinic.org/services/urology-kidney/for-medical-professionals/educational-opportunities/urology-fellowships

**Indiana University, Urology Department**
Program Director:
Timothy A. Masterson, MD
Indiana University Health, Department of Urology
535 N. Barnhill, Suite 420
Indianapolis, IN 46202
Phone: (317) 948-7560 | Fax: (317) 944-0174
Email: tamaster@iuhealth.org or tamaster@iupui.edu

Fellowship Contact: Tina Hedges
Email: klhedges@iupui.edu

urology.iupui.edu/education/fellowships/uro_onc_program.php

**Johns Hopkins Brady Urological Institute**
Program Director:
Christian Pavlovich, MD
Associate Professor
Johns Hopkins Bayview Medical Center
4940 Eastern Avenue, 301 Building, Suite 3100
Baltimore, MD 21224
Phone: (410) 550-0013 | Fax: (410) 550-3341
Email: cpavlov2@jhmi.edu

urology.jhu.edu/professionals/oncology_fellowship.php

**Fox Chase Cancer Center, Division of Urologic Oncology**
Program Director:
David Y. T. Chen, MD
Department of Surgical Oncology
333 Cottman Avenue
Philadelphia, PA 19111
Phone: (215) 728-2548
Email: david.chen@fccc.edu

www.fccc.edu/healthProfessionals/fellowships/urologic.html
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<tr>
<td>Gopal N. Gupta, MD</td>
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</tr>
</tbody>
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*oyolamedicine.org/gme/urology-residency-program/fellowships*

*mdanderson.org/education-and-research/education-and-training/schools-and-programs/graduate-medical-education/residency-and-fellowship-programs/urologic-oncology-fellowship.html*

*ccc.cancer.gov/labs/lab.asp?labid=92*
<table>
<thead>
<tr>
<th>Institution</th>
<th>Program Director</th>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**SUO Fellowship Programs**
SUO Fellowship Programs

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Division of Urologic Oncology
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medicine.umich.edu/dept/urology/education/fellowships/
society-urologic-oncology-fellowship

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The Society of Urologic Oncology (SUO) was created in 1984 to include members interested in the care of patients with malignant genitourinary disease. The SUO develops educational and research initiatives, studies in urologic oncology, and provides physician statements representing state-of-the-art assessments of these issues to other organizations.

For more information, visit www.suonet.org.

The National Cancer Institute (NCI) is the government’s primary agency for conducting and supporting research in cancer causes, diagnosis, prevention, and treatment. In support of the entire community of cancer researchers, NCI employs its funding mechanisms, organizations, and networks to support basic, translational, and clinical research, and to invest in extraordinary opportunities to further progress made possible by previous discoveries.

For more information, visit www.cancer.gov.
## Match Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 19, 2019:</td>
<td>Registration deadline for both applicants and programs.</td>
</tr>
<tr>
<td>April 24, 2019:</td>
<td>Preference list phase begins.</td>
</tr>
<tr>
<td>May 24, 2019:</td>
<td>Deadline for receipt of all online preference lists.</td>
</tr>
<tr>
<td></td>
<td>(You will receive e-mail instructions on how to submit your list.)</td>
</tr>
<tr>
<td>May 28 - June 11, 2019</td>
<td>The Match is performed, using all possible safeguards to ensure accuracy and confidentiality.</td>
</tr>
<tr>
<td>June 13, 2019:</td>
<td>Match results sent out via e-mail link.</td>
</tr>
</tbody>
</table>
2019 SBUR/SUO Joint Meeting
   May 4, 2019
   Chicago, Illinois

2019 SUO Spring Meeting at the AUA
   May 4, 2019
   Chicago, Illinois

20th Annual Meeting of the SUO
   December 4 - 6, 2019
   Renaissance Washington DC
   Washington, DC

21st Annual Meeting of the SUO
   December 2 - 4, 2020
   Sheraton Dallas
   Dallas, Texas

22nd Annual Meeting of the SUO
   December 1 - 3, 2021
   Washington Marriott Wardman Park Hotel
   Washington, DC
34th Annual EAU Congress

www.eau19.org