15th Annual Meeting of the Society of Urologic Oncology

Extraordinary Opportunities for Discovery

December 3 – 5, 2014
Bethesda North Marriott Hotel & Conference Center
Bethesda, Maryland

PROGRAM BOOK & ABSTRACTS
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W. Kimryn Rathmell, MD, PhD
A list of 2014 SUO speaker bios can be found on the SUO website at: suonet.org/meetings/2014/bios/SUO-2014-Speaker-Bios.pdf

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Boston, MA

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American Urological Association Linthicum, MD

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Indianapolis, IN

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Cleveland, OH

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Boston, MA

Bradley C. Leibovich, MD
Mayo Clinic
Rochester, MN
<table>
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<tr>
<th>Name</th>
<th>Affiliation</th>
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<td>University of Washington Medical Center</td>
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<td>Jehonathan H. Pinthus, MD, PhD</td>
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<td>Elizabeth R. Plimack, MD, MS</td>
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<td>Alexandre Zlotta, MD, PhD</td>
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<td>Toronto, ON</td>
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<td>Chapel Hill, NC</td>
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<td>Carl A. Olsson, MD</td>
<td>Integrated Medical Professionals</td>
<td>North Hills, NY</td>
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<td>Allan J. Pantuck, MD</td>
<td>UCLA Medical Center</td>
<td>Los Angeles, CA</td>
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<td>David F. Penson, MD, MPH</td>
<td>Vanderbilt University</td>
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<td>Daniel P. Petrylak, MD</td>
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<td>New York, NY</td>
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<td>Andrew J. Stephenson, MD</td>
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<td>Samir S. Taneja, MD</td>
<td>New York University School of Medicine</td>
<td>New York, NY</td>
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<td>Harold E. Varmus, MD</td>
<td>National Cancer Institute</td>
<td>Bethesda, MD</td>
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<td>Christopher G. Wood, MD, FACS</td>
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### Industry Sponsored Breakfast

**6:45 a.m. – 7:45 a.m.**

**Industry Sponsored Breakfast**  
*Sponsored by Sanofi*  
*Location: Grand Ballroom B&C*  
*“Prostate Cancer Disease Heterogeneity”*

Christopher P. Evans, MD, FACS  
University of California Davis Cancer Center  
Sacramento, CA

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### Industry Sponsored Lunch

**12:15 p.m. – 1:15 p.m.**

**Industry Sponsored Lunch**  
*Sponsored by Genomic Health*  
*Location: Grand Ballroom B*  
*“Integration of the Oncotype DX® Assay in the Clinical Management of Low-Risk Prostate Cancer”*

Eric A. Klein, MD  
Cleveland Clinic Foundation  
Cleveland, OH

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### Industry Sponsored Lunch

**12:15 p.m. – 1:15 p.m.**

**Industry Sponsored Lunch**  
*Sponsored by Janssen*  
*Location: Grand Ballroom C*  
*“Clinical Decision Making in Treating Patients with mCRPC Who have Progressed on Androgen Deprivation Therapy”*

Christopher P. Evans, MD, FACS  
University of California Davis Cancer Center  
Sacramento, CA

Tony Luongo, MD, FRCSC, FACS  
Tufts Medical Center  
Boston, MA

Judd W. Moul, MD, FACS  
Duke University Medical Center  
Durham, NC
## Industry Sponsored Symposia

**Friday, December 5, 2014**

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<th>Time</th>
<th>Event Description</th>
<th>Details</th>
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| 6:45 a.m. – 7:45 a.m. | Industry Sponsored Breakfast | Sponsored by PCEC  
Location: Grand Ballroom B&C  
“Biomarkers in Prostate Cancer: Integration and Utility”  
E. David Crawford, MD  
University of Colorado Health Science Center  
Aurora, CO |
| 12:10 p.m. – 1:10 p.m. | Industry Sponsored Lunch | Sponsored by Medivation/Astellas  
Location: Grand Ballroom B&C  
“XTANDI (enzalutamide) Capsules in the Urology Practice: Continuing Care for Your Patients with Metastatic CRPC”  
Christopher P. Evans, MD, FACS  
University of California Davis Cancer Center  
Sacramento, CA |
The 15th Annual Meeting of the SUO will be held December 3–5, 2014, at the Bethesda North Marriott Hotel & Conference Center. The Society of Urologic Oncology will sponsor this highly interactive meeting where all attendees participate in the discussions led by internationally renowned urologic oncologists, medical oncologists and scientists. State-of-the-art translational topics on prostate, kidney and bladder cancer, as well as strategies in urologic oncology will be discussed. This year’s meeting will also feature two SPORE sessions, one on bladder and one on kidney, on Wednesday to start the meeting. More information on the course and registration can be found below.

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
Location: Grand Foyer
Wednesday, December 3, 2014 10:00 a.m. – 6:00 p.m.
Thursday, December 4, 2014 6:30 a.m. – 5:30 p.m.
Friday, December 5, 2014 6:30 a.m. – 3:00 p.m.

Exhibit Hall
Location: Grand A&D
Wednesday, December 3, 2014 2:00 p.m. – 6:00 p.m.
Thursday, December 4, 2014 7:30 a.m. – 7:00 p.m.
SUO Reception 5:30 p.m. – 7:00 p.m.
Friday, December 5, 2014 7:30 a.m. – 10:30 a.m.

Evening Functions
Young Urologic Oncologists (Y.U.O.) Dinner
Date: Wednesday, December 3, 2014
Time: 6:00 p.m. – 9:30 p.m.
Location: White Oak
Cost: One ticket is included in the registration fee. Please let us know if you will be attending on the registration form.
Attire: Business casual

Membership in the Y.U.O. Section of the Society of Urologic Oncology consists of fellows, scientists and board certified or eligible physicians who are members of the SUO and have some post-residency training in urologic oncology. Membership is limited to the first seven years after completion of fellowship.

SUO Reception
Date: Thursday, December 4, 2014
Time: 5:30 p.m. – 7:00 p.m.*
Location: Grand Ballroom D
Cost: One ticket is included in the registration fee.
Attire: Business casual

The Society of Urologic Oncology celebrates its 30th anniversary and welcomes its members to the 15th Annual Meeting. Members can visit with exhibitors and connect with fellow members, all while enjoying delicious drinks and hors d’oeuvres.
*Time subject to change.

Other Events

SUO Board of Directors Meeting
Date: Wednesday, December 3, 2014
Time: 6:00 p.m. – 9:00 p.m.
Location: Brookside

2014 SUO Fellowship Committee Meeting
Date: Thursday, December 4, 2014
Time: 6:30 a.m. – 7:30 a.m.
Location: Brookside A

SUO-CTC Board Meeting
Date: Thursday December 4, 2014
Time: 6:45 a.m. – 7:45 a.m.
Location: Forest Glen

2014 SUO Fellowship Annual Program Directors Meeting
Date: Thursday, December 4, 2014
Time: 12:25 p.m. – 1:25 p.m.
Location: Brookside AB

2014 Young Urologic Oncologists (Y.U.O.) Program
Moderator: Scott E. Eggener, MD
Date: Friday, December 5, 2014
Time: 8:00 a.m. – 8:30 a.m.
Location: Grand Ballroom E-H
**Educational Needs & Objectives**

**Educational Needs**

**Bladder Cancer SPORE Session**
This year’s Bladder Cancer SPORE session will focus on the recently reported full genomic analyses of bladder cancer and the relevance of these discoveries to tumor biology and the treatment of bladder cancer. The treating physician will become conversant with these translational opportunities that have the power to transform the management of this disease.

**Kidney Cancer SPORE Session**
Urologists and medical oncologists treating kidney cancer will need to have a clear understanding of emerging data regarding the biology of renal cell carcinoma in the context of its multiple forms of presentation and diverse biological behaviors. Novel therapies, such as checkpoint blockade and combinations thereof that are being developed require a broader perspective of the role of the immune system and targetable pathways. Having a better understanding of the new biological and genetic insights of kidney cancer will inform attendees of therapies and approaches, and possibly pave the way for personalized therapy.

**Bladder Cancer**
This year’s bladder cancer sessions will address major knowledge gaps in bladder cancer including an understanding of bladder cancer biology, a review of promising new therapies and a forum to review the integration of biology and novel treatments into clinical practice. The session will also foster collaboration among the many disciplines involved in the research and clinical management of bladder cancer that will accelerate further research and improve the care for patients living with this disease.

**Kidney Cancer**
The management of localized, locally advanced and metastatic kidney cancer has undergone dramatic change in recent years. Treatment of locally advanced renal cell carcinoma remains a very difficult surgical challenge that requires advanced surgical skills and attention to detail. Over the years, management of the adrenal gland, the role of lymph node dissection and management of venous tumor thrombi have been ongoing controversies such that the practicing urologist needs to have a firm understanding of the latest data on these topics. With the introduction of targeted therapy for kidney cancer, the concept of neoadjuvant therapy for locally advanced disease is on the near horizon, and the practicing urologist and medical oncologist needs to understand the indications, contraindications and the experimental nature of this approach. We have learned much about the molecular biology of kidney cancer, both through the research of brilliant and dedicated investigators, as well as through the efforts of the Cancer Genome Atlas Project (TCGA). These insights into the molecular biology of carcinogenesis and disease progression will undoubtedly lead to novel treatment approaches. Urologists and medical oncologists need to have a better understanding of the molecular biology of kidney cancer, the molecular changes that are associated with disease progression and novel molecular pathways that might prove fruitful for therapeutic development.

**Prostate Cancer**
Prostate cancer is the most commonly diagnosed cancer in men and the second leading cause of male cancer death. Controversy remains regarding if population-based screening for prostate cancer is beneficial, how screening might best be performed (which markers and how should they be utilized), how to best manage low-risk prostate cancer, how to incorporate MRI into screening, the role of PET CT scanning and surgical resection in the management of men with biochemical recurrence, and the role of surgery in men with bone mets.

The conference will also review new concepts in the pathophysiology of the metabolic syndrome, management of CRPCa and immunotherapy developments.

This year’s prostate cancer sessions will provide important information to physicians in order that they may provide patients with the best treatment options and outcomes.

**Testis Cancer**
Testicular cancer is a rare cancer, which is highly curable as patients who receive chemotherapy for testicular cancer usually live another 50-60 years. Urologists need to be aware of the long-term side effects of chemotherapy and alternative methods of management in order to mitigate the effects of chemotherapy in the long term.
Educational Objectives

At the conclusion of the 15th Annual Meeting of the Society of Urologic Oncology, attendees should be able to:

Bladder Cancer SPORE session
- Recognize the most commonly identified genetic alterations of bladder cancer and their relevance as prognostic or predictive biomarkers, as well as targets for therapy.
- Describe the unique basal and luminal subtypes of bladder cancer identified through whole genome analysis and their implications for tumor heterogeneity and therapy.
- Explain the normal physiologic functions of the noncoding miRNAs and lncRNAs.
- Describe the patterns and potential functional consequences of micro RNA expression in the intrinsic MIBC subtypes.
- Explain how lncRNAs interact with the transcription factors that control basal and luminal biology.
- Describe the epigenetic regulation of bladder cancer metastasis.
- Identify new targets for the therapy of metastatic bladder cancer.

Kidney Cancer SPORE session
- Describe the limitations of the Cancer Genome Atlas Project.
- Explain the mechanisms underlying development of resistance to VEGF inhibition.
- Recognize the new agents available for checkpoint blockade.
- Explain the mechanisms by how checkpoint blockade results in treatment response as well as toxicity.
- Identify strategies for optimizing doses in response to novel agents.

Bladder Cancer
- Integrate new approaches for the use of chemotherapy in the management of patients with muscle-invasive and metastatic disease.
- Describe the development of biomarkers that can be used to predict response to therapy and outcome.
- Identify a potential role for novel immunotherapy using immune checkpoint inhibitors including those targeting PD-1 and PD-L1.
- Recognize major advances in our understanding of bladder cancer genomics that has led to clinical trials of molecularly targeted agents.
- Describe the rapid advances in the development of novel therapies, which requires a cohesive plan for clinical trial and drug development.

Prostate Cancer
- Evaluate whether Gleason 6 is cancer.
- Evaluate if prostate MRI with selective targeted biopsies can replace systematic biopsy in men with elevated PSA.
- Describe the advances in immunotherapy for prostate cancer.
- Review the role of imaging in the management of patients with biochemical recurrence.
- Describe the indications for curative intervention with surgery or radiation in men with oligometastases.
- Explain how new therapies approved in the metastatic setting might be evaluated for use in early stage disease.
- Describe the mechanism of castration resistance and therapies useful in this clinical setting.
- Recognize the new agents available for checkpoint blockade.
- Explain the mechanisms by how checkpoint blockade results in treatment response as well as toxicity.
- Identify strategies for optimizing sequences of novel agents.
- Review the role of FSH in the metabolic syndrome associated with ADT.
- Review the non-genomic pathway of AR action.
- Review the impact of ECOG 3805 (CHAARTED) results on clinical practice.

Kidney Cancer
- Describe the appropriate surgical management of the ipsilateral adrenal gland in patients with locally advanced renal cell carcinoma.
- Describe the appropriate surgical management of venous tumor thrombi in patients with locally advanced renal cell carcinoma.
- Describe the role of lymph node dissection and the appropriate template in the surgical management of locally advanced renal cell carcinoma.
- Identify the potential risks and benefits of integrating neoadjuvant targeted therapy into the surgical management of patients with locally advanced renal cell carcinoma.
- Explain the importance of BAP1 in the biology of kidney cancer carcinogenesis and progression.
- Identify the significant advances in our understanding of the molecular biology of kidney cancer through the interrogation of data generated from the Cancer Genome Atlas Project in kidney cancer.
Testis Cancer

- Describe the short and long term effects of chemotherapy for testis cancer.
- Recognize various methods of mitigating the long-term chemotherapy effects in patients who are destined to be cured.
- Review retroperitoneal lymph node dissection and understand the correct template to be used in low stage disease.
- Identify issues related to nerve sparing regarding retroperitoneal lymph node dissection.
- Evaluate methods intra-operatively and post-operatively minimizing morbidity of retroperitoneal lymph node dissection.

Accreditation Statement

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 sponsorship 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.

AMA PRA Category 1 Credits™

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

American College of Surgeons
Division of Education

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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.
15th Annual Meeting of the Society of Urologic Oncology
Extraordinary Opportunities for Discovery
December 3 – 5, 2014
Bethesda North Marriott Hotel & Conference Center
Bethesda, Maryland

General Scientific Program

*Speakers and times are subject to change*
All sessions located in **Grand Ballroom E-H** unless otherwise noted
WEDNESDAY, DECEMBER 3, 2014

10:00 a.m. – 6:00 p.m. Registration/Information Desk Open
Location: Grand Foyer

10:00 a.m. – 6:00 p.m. Speaker Ready Room
Location: Timberlawn

2:00 p.m. – 6:00 p.m. Exhibit Hall
Location: Grand A&D

12:00 p.m. – 2:00 p.m. Bladder SPORE Program
Session Chair: Colin P.N. Dinney, MD
MD Anderson Cancer Center

Moderators:
Colin P.N. Dinney, MD
MD Anderson Cancer Center
David J. McConkey, PhD
MD Anderson Cancer Center

12:00 p.m. – 12:10 p.m. Introduction and Welcoming Remarks
Colin P.N. Dinney, MD
MD Anderson Cancer Center
Andrew Hruszkewycz, MD, PhD
National Cancer Institute

Update on Bladder Cancer Genomics
12:10 p.m. – 12:30 p.m. Genetic Findings in Invasive Bladder Cancer: Recent Data and Clinical Implications
David J. Kwiatkowski, MD, PhD
Harvard Medical Center, Dana-Farber Cancer Institute

12:30 p.m. – 12:50 p.m. New Insights into Bladder Cancer Subtyping
William Kim, MD
University of North Carolina Lineberger Comprehensive Cancer Center

12:50 p.m. – 1:10 p.m. Discussion

SPORE Presentations: Epigenetics and Bladder Cancer
1:10 p.m. – 1:30 p.m. Epigenetic Control of Bladder Cancer Heterogeneity by Non-Coding RNAs
David J. McConkey, PhD
MD Anderson Cancer Center

1:30 p.m. – 1:45 p.m. Biology of Bladder Cancer Metastasis
Colin P.N. Dinney, MD
MD Anderson Cancer Center

1:45 p.m. – 2:00 p.m. Discussion and Closing

2:00 p.m. – 2:30 p.m. Break – Visit Exhibits
Speakers and times are subject to change
All sessions located in **Grand Ballroom E-H** unless otherwise noted

2:30 p.m. – 4:30 p.m. **Kidney SPORE Program**
Session Chair: David F. McDermott, MD
Beth Israel Deaconess Medical Center

2:30 p.m. – 2:55 p.m. **Towards a Molecular Genetic and Functional Classification of Renal Cancer**
James Brugarolas, MD, PhD
**UT Southwestern Medical Center**

2:55 p.m. – 3:20 p.m. **Challenges and Opportunities Facing Tumor and Therapeutic Heterogeneity of Kidney Cancer**
James Hsieh, MD, PhD
**Memorial Sloan-Kettering Cancer Center**

3:20 p.m. – 3:45 p.m. **RCC Tumor Ontogeny – Lessons From the Small Renal Mass**
Eric Jonasch, MD
**MD Anderson Cancer Center**

3:45 p.m. – 4:10 p.m. **Optimal Targeting of the PD-1/PDL-1 Pathway in Metastatic Renal Cell Carcinoma**
David F. McDermott, MD
**Beth Israel Deaconess Medical Center**

4:10 p.m. – 4:30 p.m. **Discussion and Closing**

4:30 p.m. – 6:00 p.m. **Poster Session & Reception**
*Not CME Accredited*
(See page 51 for full abstracts)

6:00 p.m. – 9:00 p.m. **SUO Board of Directors Meeting**
*Location: Brookside*

6:00 p.m. – 9:30 p.m. **“Young Urologic Oncologist’s (Y.U.O.) Dinner”**
*Location: White Oak*
*Not CME Accredited*

6:00 p.m. – 7:00 p.m. **Cocktails**

7:00 p.m. – 9:00 p.m. **Dinner and Program**

7:00 p.m. **Welcome and Introduction**
Scott E. Eggener, MD
**University of Chicago Medical Center**

7:05 p.m. – 7:45 p.m. **“What Can (_____ ) Do for Young Urologic Oncologists?”**

7:05 p.m. – 7:15 p.m. Eric A. Klein, MD
**Editor-in-Chief, “Urology”**
**Cleveland Clinic Foundation**

7:15 p.m. – 7:25 p.m. Michael J. Droller, MD
**Editor-in-Chief, “Urologic Oncology”**
**Mt. Sinai Medical Center**
General Scientific Program

Speakers and times are subject to change
All sessions located in Grand Ballroom E-H unless otherwise noted

7:25 p.m. – 7:35 p.m.  William D. Steers, MD
Editor-in-Chief, “Journal of Urology”
University of Virginia

7:35 p.m. – 7:45 p.m.  Carolyn J. M. Best, PhD
AUA Director of Research

7:45 p.m. – 8:50 p.m.  Health Policy
Moderator: David F. Penson, MD, MPH
Vanderbilt University

7:45 p.m. – 7:50 p.m.  Introduction
David F. Penson, MD, MPH
Vanderbilt University

7:50 p.m. – 8:10 p.m.  Physician Ownership and Self-Referral: Clinical Care and Health Policy Implications
Carl A. Olsson, MD
Integrated Medical Professionals

8:10 p.m. – 8:30 p.m.  Urologist Ancillary Services Ownership: Financially Conflicted or Much Ado About Nothing?
Brent K. Hollenbeck, MD, MS
University of Michigan

8:30 p.m. – 8:50 p.m.  Questions/Discussion

THURSDAY, DECEMBER 4, 2014

6:30 a.m. – 5:30 p.m.  Registration/Information Desk Open
Location: Grand Foyer

6:00 a.m. – 6:00 p.m.  Speaker Ready Room
Location: Timberlawn

6:45 a.m. – 7:45 a.m.  SUO-CTC Board of Directors Meeting
Location: Forest Glen

6:45 a.m. – 7:45 a.m.  Industry Sponsored Breakfast Symposia
Location: Grand Ballroom B&C
See page 8 for more details

7:30 a.m. – 7:00 p.m.  Exhibit Hall
Location: Grand A&D
General Scientific Program

Speakers and times are subject to change
All sessions located in Grand Ballroom E-H unless otherwise noted

8:00 a.m. – 8:05 a.m. Welcome and Introduction
Daniel W. Lin, MD
University of Washington Medical Center
Surena F. Matin, MD
MD Anderson Cancer Center

8:05 a.m. – 9:10 a.m. Prostate Session I
Biology of Prostate Cancer
Moderator: Laurence H. Klotz, MD
Sunnybrook Health Sciences Centre

8:05 a.m. – 8:25 a.m. Histology vs. Genomics: Does Gleason 3 Have the Hallmarks of Cancer?
Yes: Jonathan I. Epstein, MD
Johns Hopkins Medical Institutions
No: Mark A. Rubin, MD
Weill Cornell Medical College

8:25 a.m. – 8:45 a.m. Should MR be the Standard of Care Before Biopsy?
Yes: Samir S. Taneja, MD
New York University School of Medicine
No: Andrew J. Stephenson, MD
Cleveland Clinic Foundation

8:45 a.m. – 8:55 a.m. Imaging for Biochemical Recurrence
Peter Choyke, MD
National Cancer Institute

8:55 a.m. – 9:10 a.m. Discussion

9:10 a.m. – 9:40 a.m. State-of-the-Art Lecture I
Targeting Hormone-DNA Repair Crosstalk in Prostate Cancer: Implications for Disease Progression and Therapeutic Intervention
Karen E. Knudsen, PhD
Thomas Jefferson University

9:40 a.m. – 10:00 a.m. Break – Visit Exhibits

10:00 a.m. – 10:30 a.m. Testis Session I
Session Chair: Richard S. Foster, MD
Indiana University Medical Center
Moderator: Richard S. Foster, MD
Indiana University Medical Center

10:00 a.m. – 10:15 a.m. Long Term Side Effects for Testis Cancer
Sophie Fossa, MD
Radiumhospitalet Medical Centre
10:15 a.m. – 10:30 a.m.  What a Urologist Should Do Based Upon Long Term Side Effects of Chemotherapy  
Panelists:  
Siamak Daneshmand, MD  
*University of Southern California-Keck School of Medicine*  
Darren R. Feldman, MD  
*Memorial Sloan-Kettering Cancer Center*  
Michael A.S. Jewett, MD  
*Princess Margaret Hospital*

10:30 a.m. – 11:30 a.m.  Bladder Cancer Session I  
Session Chair:  Matthew I. Milowsky, MD  
*University of North Carolina*  
Moderator:  David J. McConkey, PhD  
*MD Anderson Cancer Center*

**Update on Systemic Therapy for Bladder Cancer: Chemotherapy, Immunotherapy and Targeted Agents**

10:30 a.m. – 10:45 a.m. New Approaches to Chemotherapy in Bladder Cancer  
Elizabeth R. Plimack, MD, MS  
*Fox Chase Cancer Center*

10:45 a.m. – 11:00 a.m. Targeting PD-1 and PD-L1 in Bladder Cancer  
Daniel P. Petrylak, MD  
*Yale Cancer Center*

11:00 a.m. – 11:15 a.m. Clinical Trials of Novel Targeted Agents  
Jonathan Rosenberg, MD  
*Memorial Sloan-Kettering Cancer Center*

11:15 a.m. – 11:30 a.m. Discussion

11:30 a.m. – 12:15 p.m.  *SUO-CTC Scientific Session*  
*Not CME Accredited*  
Session Chair:  Robert G. Uzzo, MD  
*Fox Chase Cancer Center*

11:30 a.m. – 11:40 a.m. Introduction  
Robert G. Uzzo, MD  
*Fox Chase Cancer Center*

11:40 a.m. – 12:00 p.m. Perspectives from the Synergy of Academia and Industry  
Martin E. Gleave, MD  
*Vancouver Prostate Center*

12:00 p.m. – 12:15 p.m. Discussion  
Moderator:  E. David Crawford, MD  
*University of Colorado Health Science Center*
### General Scientific Program

*Speakers and times are subject to change*

*All sessions located in Grand Ballroom E-H unless otherwise noted*

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>12:15 p.m. – 1:15 p.m.</td>
<td><strong>Industry Sponsored Lunch Symposium</strong>&lt;br&gt;<strong>Location:</strong> Grand Ballroom B&lt;br&gt;See page 8 for more details</td>
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<tr>
<td>12:15 p.m. – 1:15 p.m.</td>
<td><strong>Industry Sponsored Lunch Symposium</strong>&lt;br&gt;<strong>Location:</strong> Grand Ballroom C&lt;br&gt;See page 8 for more details</td>
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<tr>
<td>1:15 p.m. – 1:20 p.m.</td>
<td><strong>Break</strong></td>
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</table>
| 1:20 p.m. – 2:20 p.m. | **Kidney Cancer Session I**<br>**Session Chair:** Christopher G. Wood, MD, FACS<br>*MD Anderson Cancer Center*<br>**Moderator:** Gennady Bratslavsky, MD<br>*SUNY Upstate Medical University*<br>**Panelists:**<br>- Jose A. Karam, MD<br>*MD Anderson Cancer Center*<br>- Bradley C. Leibovich, MD<br>*Mayo Clinic*<br>- Jodi K. Maranchie, MD<br>*University of Pittsburgh*<br>- Allan J. Pantuck, MD<br>*UCLA Medical Center*<br><br>**Management of Locally Advanced Renal Cell Carcinoma**<br>1:20 p.m. – 1:30 p.m. **Management of the Adrenal Gland**<br>Allan J. Pantuck, MD<br>*UCLA Medical Center*<br>1:30 p.m. – 1:40 p.m. **Role of Lymph Node Dissection**<br>Jodi K. Maranchie, MD<br>*University of Pittsburgh*<br>1:40 p.m. – 1:50 p.m. **Management of IVC Thrombi**<br>Bradley C. Leibovich, MD<br>*Mayo Clinic*<br>1:50 p.m. – 2:05 p.m. **The Role of Neoadjuvant Therapy**<br>Jose A. Karam, MD<br>*MD Anderson Cancer Center*<br>2:05 p.m. – 2:20 p.m. **Panel Discussion and Questions**<br>2:20 p.m. – 2:50 p.m. **State-of-the-Art Lecture II**<br>**What's New at the NCI**<br>Harold E. Varmus, MD<br>*National Cancer Institute*<br>2:50 p.m. – 3:15 p.m. **Break – Visit Exhibits**
3:15 p.m. – 4:00 p.m.  Prostate Session II

Session Chair:  Laurence H. Klotz, MD
Sunnybrook Health Sciences Centre

Locoregional/Recurrent Disease
Moderator:  Joel Nelson, MD
University of Pittsburgh

3:15 p.m. – 3:30 p.m.  Checkpoint Targeted Immunotherapy
David M. Lubaroff, PhD
University of Iowa

3:30 p.m. – 3:40 p.m.  Role of Surgery for Nodal Oligometastatic Disease in Men with Biochemical Failure
R. Jeffrey Karnes, MD
Mayo Clinic

3:40 p.m. – 3:50 p.m.  Role of Postop RT for pN+ After Prostatectomy
Ronald Chen, MD, MPH
University of North Carolina

3:50 p.m. – 4:00 p.m.  Radical Prostatectomy for Advanced Disease (Oligometastatic Disease)
Howard I. Scher, MD
Memorial Sloan-Kettering Cancer Center

4:00 p.m. – 5:30 p.m.  *Poster Session
*Not CME Accredited
(See page 168 for full abstracts)

5:30 p.m. – 7:00 p.m.  SUO Reception in Exhibit Hall

6:15 p.m. – 6:30 p.m.  Awards and Announcements

FRIDAY, DECEMBER 5, 2014

6:30 a.m. – 3:00 p.m.  Registration/Information Desk Open
Location: Grand Foyer

6:45 a.m. – 7:45 a.m.  Industry Sponsored Breakfast
Location: Grand Ballroom B&C
See page 9 for more details

7:00 a.m. – 3:00 p.m.  Speaker Ready Room
Location: Timberlawn

7:30 a.m. – 10:30 a.m.  Exhibit Hall
Location: Grand A&D
8:00 a.m. – 8:30 a.m. Young Urologic Oncologists (Y.U.O.) Program

Abstracts selected by the Y.U.O.
(See page 26 for full abstracts)
Moderator: Scott E. Eggener, MD
University of Chicago Medical Center

8:00 a.m. – 8:02 a.m. Introduction

8:02 a.m. Podium #1 ROLE OF RIP2 IN DEVELOPMENT OF TUMOR-INFILTRATING MDSCS AND BLADDER CANCER METASTASIS
(Presented by: Arnold Chin)

8:09 a.m. Podium #2 PREOPERATIVE MULTIVARIABLE PROGNOSTIC MODELS FOR PREDICTION OF SURVIVAL AND MAJOR COMPLICATIONS FOLLOWING SURGICAL RESECTION OF RENAL CELL CARCINOMA WITH SUPRAHEPATIC CAVAL TUMOR THROMBUS
(Presented by: Ahmed Haddad)

8:16 a.m. Podium #3 AN AGE-ADJUSTED COMORBIDITY INDEX FOR PREDICTION OF LONG-TERM, OTHER-CAUSE MORTALITY IN MEN WITH PROSTATE CANCER
(Presented by: Timothy Daskivich)

8:23 a.m. Podium #4 REFERRAL PATTERNS IN TESTICULAR CANCER: DO THEY IMPACT ONCOLOGIC OUTCOMES?
(Presented by: Nicholas Cost)

8:30 a.m. – 9:00 a.m. Testis Session II

Session Chair: Richard S. Foster, MD
Indiana University Medical Center

8:30 a.m. – 8:37 a.m. Nerve Sparing and Template Choice
Michael A.S. Jewett, MD
Princess Margaret Hospital

8:37 a.m. – 8:44 a.m. Choice of Templates for Low Stage Testis Cancer
Joel Sheinfeld, MD
Memorial Sloan-Kettering Cancer Center

8:44 a.m. – 8:51 a.m. Minimizing Morbidity of RPLND
Siamak Daneshmand, MD
University of Southern California-Keck School of Medicine

8:51 a.m. – 9:00 a.m. Q&A

9:00 a.m. – 10:00 a.m. Kidney Cancer Session II

Session Chair: Christopher G. Wood, MD, FACS
MD Anderson Cancer Center

Moderator: W. Kimryn Rathmell, MD, PhD
University of North Carolina Lineberger Comprehensive Cancer Center
9:00 a.m. – 9:10 a.m. The Role of SETD2 Mutations in the Biology of Renal Cell Carcinoma
W. Kimryn Rathmell, MD, PhD
University of North Carolina Lineberger Comprehensive Cancer Center

9:10 a.m. – 9:25 a.m. Therapy of Kidney Cancer: Where Are We Going Next?
W. Marston Linehan, MD
National Cancer Institute

9:25 a.m. – 9:35 a.m. Questions and Discussion

9:35 a.m. – 10:00 a.m. Best Poster Presentations
(See page 35 for full abstracts)
Moderator: Christopher G. Wood, MD, FACS
MD Anderson Cancer Center

9:35 a.m. – 9:42 a.m. IMPACT OF SYSTEMIC THERAPY ON CHARACTERIZATION OF PERIPHERAL CIRCULATING TUMOR CELLS IN METASTATIC RENAL CELL CARCINOMA
(Presented by: Thai Ho)

9:42 a.m. – 9:49 a.m. CLINICAL AND RADIOGRAPHIC PREDICTORS OF THE NEED FOR RESECTION OF THE INFERIOR VENA CAVA DURING NEPHRECTOMY FOR PATIENTS WITH RENAL CELL CARCINOMA AND CAVAL TUMOR THROMBUS
(Presented by: Sarah Psutka)

9:49 a.m. – 9:56 a.m. ACCELERATED GROWTH RATE OF MULTIFOCAL TUMORS AFTER INITIAL RADIOFREQUENCY ABLATION
(Presented by: Mario Taylor)

9:56 a.m. – 10:00 a.m. Discussion and Q&A

10:00 a.m. – 10:30 a.m. Break – Visit Exhibits

10:30 a.m. – 11:30 a.m. Prostate Cancer Session III

Advanced Disease
Moderator: Christopher P. Evans, MD, FACS
University of California Davis Cancer Center

The AR Pathway
10:30 a.m. – 10:42 a.m. FSH and the Metabolic Syndrome
Jehonathan H. Pinthus, MD, PhD
Juravinski Cancer Center

10:42 a.m. – 10:54 a.m. Non-genomic AR Pathway
Jeremy Jones, PhD
City of Hope

10:54 a.m. – 11:06 a.m. What is the Impact of ECOG 3805 (CHAARTED) Results on Clinical Practice?
Jeanny Aragon-Ching, MD, FACP
George Washington University Medical Center Medical Faculty Associates
11:06 a.m. – 11:18 a.m. Sequencing Prior to Chemotherapy
Evan Ya-Wen Yu, MD
University of Washington Medical Center

11:18 a.m. – 11:30 a.m. Discussion

11:30 a.m. – 11:40 a.m. *SUO Huggins Medal Presentation
*Not CME Accredited

11:40 a.m. – 12:10 p.m. Huggins Medal Lecture
Eric A. Klein, MD
Cleveland Clinic Foundation

12:10 p.m. – 1:10 p.m. Industry Sponsored Lunch Symposium
Location: Grand Ballroom B&C
See page 9 for more details

1:00 p.m. – 1:15 p.m. Break

1:15 p.m. – 2:15 p.m. Bladder Cancer Session II
Session Chair: Matthew I. Milowsky, MD
University of North Carolina
Moderator: Alexandre Zlotta, MD, PhD
Mount Sinai Hospital

Tumor Board 2014: Translating a New Understanding of Bladder Cancer Biology to the Bedside
1:15 p.m. – 1:25 p.m. Introduction
Alexandre Zlotta, MD, PhD
Mount Sinai Hospital

1:25 p.m. – 2:05 p.m. Panel Discussion
Panelists: Farhang Rabbani, MD
Albert Einstein College of Medicine
Joaquim Bellmunt, MD, PhD
Harvard Medical Center, Dana-Farber Cancer Institute
Noah Hahn, MD
Johns Hopkins University, Sidney Kimmel Comprehensive Cancer Center
Peter Black, MD
University of British Columbia

2:05 p.m. – 2:15 p.m. Q&A
2:15 p.m. – 3:00 p.m. Oral Abstract Session/Announcement of Poster Winners
(See page 29 for full abstracts)
Moderator: Neil Fleshner, MD

University Health Network

2:15 p.m. Podium #5 A FIVE−GENE DNA−METHYLATION BIOMARKER PANEL SENSITIVELY DETECTS BLADDER CANCER AND DISCRIMINATES BETWEEN HIGH−GRADE AND LOW−GRADE DISEASE IN VOIDED URINE
(Presented by: Bimal Bhindi)

2:22 p.m. Podium #6 LYMPH NODE STROMAL CELLS ENHANCE RENAL CELL CARCINOMA GROWTH, TRANSMIGRATION, AND METASTASIS IN AN ORTHOTOPIC XENOGRAFT MODEL
(Presented by: John Nelson)

2:29 p.m. Podium #7 NOMINATION AND VALIDATION OF SCHLAP1, A LONG NON-CODING RNA AS A PROGNOSTIC BIOMARKER IN PROSTATE CANCER
(Presented by: R. Jeffrey Karnes)

2:36 p.m. Podium #8 ADJUVANT RADIATION THERAPY, ANDROGEN DEPRIVATION AND DOCETAXEL FOR HIGH-RISK PROSTATE CANCER POST-PROSTATECTOMY: RESULTS OF RTOG 0621
(Presented by: Mark Hurwitz)

2:43 p.m. Podium #9 OUTCOMES OF PROGRESSION ON SURVEILLANCE FOR CLINICAL STAGE I NON-SEMINOMATOUS GERM CELL TUMOURS
(Presented by: Madhur Nayan)

2:50 p.m. Podium #10 GENETIC SIGNATURES PREDICT ADVERSE PATHOLOGIC AND CLINICAL OUTCOMES IN PATIENTS WITH UPPER TRACT UROTHELIAL CARCINOMA (UTUC)
(Presented by: Aditya Bagrodia)

3:00 p.m. Wrap up/End of Meeting

Statements, opinions and results of studies contained in the program are those of the presenters/authors and do not reflect the policy or position of the SUO nor does the SUO provide any warranty as to their accuracy or reliability.

Every effort has been made to faithfully reproduce the abstracts as submitted. However, no responsibility is assumed by the SUO for any injury and/or damage to persons or property from any cause including negligence or otherwise, or from any use or operation of any methods, products, instruments or ideas contained in the material herein.
Podium #1

ROLE OF RIP2 IN DEVELOPMENT OF TUMOR-INFILTRATING MDSCS AND BLADDER CANCER METASTASIS
Arnold Chin, MD, PhD\(^1\) and Hanwei Zhang, MD\(^2\)
\(^1\)UCLA, Los Angeles CA; \(^2\)UCLA, Los Angeles, CA
(Presented by: Arnold Chin)

Introduction: Tumor invasion and metastases represent a complex series of molecular events that portends a poor prognosis. The contribution of inflammatory pathways mediating this process is not well understood. Nod-like receptors (NLRs) of innate immunity function as intracellular sensors of pathogen motifs and danger molecules. We propose a role of NLRs in tumor surveillance and in programming tumor-infiltrating lymphocytes (TILs).

Methods: In this study, we examined the downstream serine/threonine kinase Rip2 in a murine model of bladder cancer. Mice deficient in Rip2 were implanted with intravesical syngenic MB49 bladder cell lines. Primary tumors and lungs were examined by immunohistochemistry and immunofluorescence. Bone marrow-derived myeloid cells were assessed.

Results: In Rip2-deficient C57Bl6 mice, larger MB49 tumors developed with more numerous and higher incidence of metastases compared to wild-type controls. As such, increased tumor infiltration of CD11b+Gr1hi myeloid-derived suppressor cells (MDSCs) with concomitant decrease in T cells and NK cells were observed in Rip2-deficient tumor bearing animals. Rip2-deficient tumors showed enhanced epithelial-to-mesenchymal transition, with elevated expression of zeb1, zeb2, twist, and snail in the tumor microenvironment.

Conclusion: We found that the absence of Rip2 plays an intrinsic role in fostering the development of granulocytic MDSCs by an autocrine and paracrine effect of granulocytic colony stimulating factor (G-CSF) expression. Our findings suggest that NLR pathways may be a novel modality to program TILs and influence tumor metastases.

Podium #2

PREOPERATIVE MULTIVARIABLE PROGNOSTIC MODELS FOR PREDICTION OF SURVIVAL AND MAJOR COMPLICATIONS FOLLOWING SURGICAL RESECTION OF RENAL CELL CARCINOMA WITH SUPRAHEPATIC CAVAL TUMOR THROMBUS
Ahmed Haddad, Bradley Leibovich, MD\(^1\), E. Jason Abel, MD\(^2\), Jun-Hang Luo, MD\(^3\), Laura-Maria Krabbe, MD\(^4\), R.Houston Thompson, MD\(^5\), Jennifer Heckman, MD\(^6\), Megan Merrill, MD\(^4\), Bishoy Gayed, MD\(^3\), Arthur Sagalowsky, MD\(^5\), Stephen Boorjian, MD\(^1\), Christopher Wood, MD\(^4\) and Vitaly Margulis, MD\(^3\)
\(^1\)Mayo Medical School and Mayo Clinic, Rochester, MN; \(^2\)University of Wisconsin School of Medicine and Public Health, Madison WI; \(^3\)The University of Texas Southwestern Medical Center, Dallas, TX; \(^4\)The University of Texas M.D. Anderson Cancer Center, Houston, TX
(Presented by: Ahmed Haddad)

Introduction: Surgical resection for RCC with associated suprahepatic IVC tumor thrombus is associated with significant morbidity, yet there are no prognostic tools for pre-operative assessment of morbidity and oncologic outcomes in these patients. Our goal was to develop an accurate multivariable predictive model for the prediction of survival outcomes and complications to aid decision making in the pre-operative setting.

Methods: We retrospectively identified patients who underwent surgery for RCC with suprahepatic tumor thrombus extension from 2000–2013 at 4 tertiary centers. A multivariable logistic regression model was used to evaluate the association of preoperative clinical variables with major complications within 90 days of surgery (≥ Clavien 3A). A Cox proportional hazard model was employed for analysis of overall survival. Nomograms were internally calibrated by bootstrap resampling method.

Results: 50 patients with level III and 89 with level IV thrombus were identified. Major complications were reported in 49 patients (35.5%). 83 patients (59.7%) died during a median follow-up of 24.4 months. Distant metastases, ECOG performance status, preoperative systemic symptoms, tumor size, and elevated pre-operative alkaline phosphatase were associated with overall survival on univariable analysis. Factors associated with increased risk of major complications on univariable analysis included preoperative systemic symptoms, level 4 thrombus, elevated alkaline phosphatase and aspartate transaminase. Preoperative nomograms achieved discrimination of 0.88 and 0.83 for overall survival and major complications, respectively.

Conclusion: We have developed and internally validated accurate pre-operative models for the prediction of survival and major complications in RCC patients treated surgically for suprahepatic IVC thrombus. If externally validated, these tools may have value in preoperative patient counseling and clinical trial design.
Podium #3
AN AGE-ADJUSTED COMORBIDITY INDEX FOR PREDICTION OF LONG-TERM, OTHER-CAUSE MORTALITY IN MEN WITH PROSTATE CANCER
Timothy Daskivich, MD, MSHPM1, Lorna Herbert, MPH2, Atreya Dash, MD3, Christopher Saigal, MD, MPH2 and Mark Litwin, MD, MPH2
1Los Angeles, CA; 2Department of Urology, David Geffen School of Medicine, University of California, Los Angeles, Los Angeles, CA; 3Department of Urology, University of Washington, Seattle, WA
(Presented by: Timothy Daskivich)

Introduction: Accurate estimation of life expectancy is critical for men with early-stage prostate cancer, since survival benefits associated with surgery and radiation therapy are delayed for many years. Yet there is a lack of tools available to assist clinicians in projecting longevity that incorporate its major predictors: age and health status. In this study, we sought to create an age-adjusted comorbidity index that predicts other-cause mortality to assist in treatment decision making for men with prostate cancer.

Methods: We sampled 1,598 consecutive men diagnosed with prostate cancer between 1998 and 2004 at two Veterans’ Affairs Hospitals. We used competing-risks regression in testing and validation cohorts to determine the risk of non-prostate-cancer-related (i.e., other-cause) mortality associated with age at diagnosis and prostate-cancer-specific comorbidity index (PCCI) scores. We then converted risks into a novel, 10-point scoring system and calculated 2−, 5−, and 10−year cumulative incidence of other-cause mortality by age-adjusted PCCI scores.

Results: PCCI score and age were associated with similar hazards of other-cause mortality in testing and validation cohorts. Each 6−year increase in age at diagnosis over 60 was equivalent to 1 additional PCCI point. After correcting PCCI scores for age, age-adjusted PCCI scores were strongly predictive of other-cause mortality; subhazard ratios for other-cause mortality among age-adjusted PCCI scores of 0, 1–2, 3–4, 5–6, 7–9, and 10+ (vs. 0) were 2.0 (95%CI 1.3–3.0); 4.0 (95%CI 2.6–6.1); 8.7 (95%CI 5.7–13.3); 14.7 (95%CI 9.4–22.8); and 43.2 (95%CI 26.6–70.4), respectively. Ten−year cumulative incidences of other-cause mortality were 10%, 19%, 35%, 60%, 79%, and 99%, respectively.

Conclusion: The age-adjusted PCCI strongly stratifies risk of long-term, other-cause mortality based on age and comorbidity at diagnosis. Incorporating this information into shared decision making may help to reduce unnecessary overtreatment of older and sicker men with low- and intermediate-risk tumors.
REFERRAL PATTERNS IN TESTICULAR CANCER: DO THEY IMPACT ONCOLOGIC OUTCOMES?
Nicholas Cost, MD1, Mehrad Adibi, MD2, Ganesh Raj, MD, PhD2, Arthur Sagalowsky, MD2 and Vitaly Margulis, MD2
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(Presented by: Nicholas Cost)

Introduction: Oncologic outcomes in advanced testicular cancer depend on appropriate and timely care. Often this advanced care is referred to tertiary academic medical centers (AMCs). The primary study objective was to compare oncologic outcomes of patients diagnosed and treated at a tertiary AMC to those whose care was initiated elsewhere with subsequent referral to an AMC.

Methods: We reviewed an institutional testicular cancer database and compared those initiating their cancer care either inside or outside our AMC. Patients were labeled as initiating care outside if they had any non-orchiectomy surgery or chemotherapy for testicular cancer outside our AMC. Baseline parameters and oncologic outcomes were compared between groups.

Results: 367 patients were reviewed, 133 initiated care outside, while 234 were managed initially at our AMC. Patients referred in after initiating care were more likely to have non-seminoma histology (70.7% vs 60.7%, p<0.001). Additionally, these patients had more advanced disease at presentation (Stage II(25.6%)/III(32.3%) vs Stage II(18.4%)/III(18.4%), p<0.001). There was no significant difference between groups in the proportion with Intermediate or Poor Risk disease, p=0.2.

We observed lower 3yr EFS in those initiating treatment outside an AMC (Figure − 69.0% vs 82.4%, log−rank p=0.007). On univariate analysis, the hazard ratio for an event (defined as: recurrence, incomplete response, progression or death) was 1.9 (95%CI 1.2−2.9, p=0.008). However, on multivariate analysis adjusting for stage and histology (seminoma vs non−seminoma), the location of initiating care was not significant (HR=1.2, 0.7−2.1, p=0.5). We did not observe a difference in 5yr overall survival between groups (90.3% vs 93.1%, p=0.75).

Conclusion: Patients initially treated in the community for testicular cancer and subsequently referred to an AMC were observed to experience worse EFS than those managed at an AMC from the outset. These findings are at least partially explained by a referral bias, where patients with advanced disease are more likely to be referred to regional AMCs. This bias should be considered when examining testicular cancer outcomes published by large tertiary AMCs.
A Five-Gene DNA-Methylation Biomarker Panel Sensitive to Bladder Cancer and Discriminates Between High-Grade and Low-Grade Disease in Voided Urine

Thomas Hermanns, MD1, Ekaterina Olkhov-Mitsel2, Andrea Savio3, Bethany Gill3, Jenna Sykes3, Bimal Bhindi, MD1, Tristan Juvet, MD1, Cynthia Kuk, MSc4, Aidan Noon, MD1, Ricardo Rendon, MD5, David Waltregny, MD6, Theodorus TH van der Kwast, MD7, Antonio Finelli, MD1, Neil E. Fleschner, MD1, Kirk Lo, MD4, Bharati Bapat, PhD2 and Alexandre R. Zlotta, MD, PhD4
1University Health Network, Surgical Oncology, Urology, Toronto, ON; 2Lunenfeld Tanenbaum Research Institute, Toronto, ON; 3University Health Network, Biostatistics, Toronto, ON; 4Mount Sinai Hospital, Urology, Toronto, ON; 5Capital Health, Halifax, NS; 6University Hospital of Liège, Liège, BE; 7University Health Network, Surgical Oncology, Pathology, Toronto, ON
(Presented by: Bimal Bhindi)

Introduction: Voided urine provides an excellent source of exfoliated cells from the bladder and an ideal medium for detection of bladder cancer (BC) biomarkers. Using two different genome-wide methylation-array profiling platforms in Toronto, CA and Liège, BE, several differentially methylated genes (TWIST1, NID2, RunX3, Gata4, FoxE1) from low grade (LG) vs. high grade (HG) BC were commonly identified. We investigated methylation of the five genes to non-invasively identify BC in voided urine and discriminate between LG and HG BC.

Methods: Voided urine from patients with histologically proven LG (n=59) and HG BC (n=64) as well as from BC-free controls (noBC, n=59) was collected. DNA extracted from the urinary cell pellets was analyzed using a highly sensitive, quantitative methylation specific assay (MethyLight) to examine the methylation status of selected candidate genes. Methylation levels (percent methylation reference, PMR) for each sample were obtained from averaging duplicate runs. Associations between PMR and diagnosis of HG vs. LG disease vs. noBC, BC overall vs. noBC and HG vs. LG were performed using the Kruskal-Wallis test or the Mann-Whitney U-test. Univariate and multivariable logistic regression models were used to create ROC curves to evaluate individual biomarker discrimination and combined discrimination, respectively. The Akaike information criterion was used to determine which biomarkers and clinical variables were necessary to include in the final model.

Results: The median PMRs for each gene were significantly different for HG, LG and noBC (RunX3: p=.0011, all others: p<0.001). The PMRs were significantly higher in BC cases compared to noBC cases for all genes (all p<0.001) and for HG compared to LG BC cases (RunX3: p=.0011, all others: p<0.001). The AUC to predict BC overall was .75 (95%CI: .69−.82) for TWIST1, .75 (.68−.82) for NID2, .70 (.63−.77) for RUNX3, .75 (.68−.81) for Gata4 and .63 (.58−.68) for FoxE1. For the prediction of HG BC the AUC was .72 (.65−.80) for TWIST1, .72 (.63−.81) for NID2, .57 (.49−.66) for RUNX3, .67 (.59−.74) for Gata4 and .68 (.61−.76) for FoxE1. The final model for BC included TWIST, RunX3 Gata 4 and age (AUC: .87 (.81−.92)). The final model for HG versus LG BC included TWIST, FoxE1, NID2 and age (AUC: .83 (.75−.90)).

Conclusion: A combination of five epigenetic markers (TWIST1, RunX3, FoxE1, Gata4, NID2) is a very promising non-invasive tool for sensitive and specific BC detection and prognostication.
Podium #6
LYMPH NODE STROMAL CELLS ENHANCE RENAL CELL CARCINOMA GROWTH, TRANSMIGRATION, AND METASTASIS IN AN ORTHOTOPIC XENOGRAFT MODEL
John Nelson, MD1, Jessie Gills, MD2, Ravan Moret, MS3, Xin Zhang, MD, PhD3, Grace Maresh, PhD3, Ashley Richman3, M’Liss Hudson, MD2, Mark Matrana, MD4, Ryan Hedgepeth, MD2, Shams Halat, MD5, Christudus Morais, PhD6, Glenda Gobe, PhD6, David Johnson, PhD6, Stephen Bardot, MD2 and Li Li Md, PhD3
1Ocshner Clinical Foundation − New Orleans, LA; 2Urology − Ochsner Clinical Foundation – New Orleans LA; 3Laboratory of Translational Cancer Research − Ochsner Clinical Foundation – New Orleans, LA; 4Department of Hematology and Oncology − Ochsner Clinical Foundation – New Orleans, LA; 5Department of Pathology − Ochsner Clinical Foundation – New Orleans, LA; 6Centre for Kidney Disease Research, School of Medicine, University of Queensland, Brisbane, Australia
(Presented by: John Nelson)

Introduction: The incidence of renal cell carcinomas (RCC) is on the rise with an estimated 63,920 new cases in 2014. Despite increased incidental detection of lower clinically staged tumors, metastatic RCC still affects up to 25% of patients at the time of diagnosis. Lymph node (LN) involvement is a strong negative prognostic indicator. LN stromal cells have been shown to enhance tumor cell growth, tumorigenicity and chemotherapy resistance in breast and colon cancer models. However, there are currently no described RCC xenograft models that explore the role of RCC/LN interactions in RCC metastasis.

Objective: Identification of molecular signals that play key roles in human RCC tumor formation and metastasis, and characterize their activity using a unique orthotopic patient-derived xenograft (PDX) intra-renal sub-capsular (IK) injection NOD/SCID mouse model that mimics metastatic RCC under the influence of LN stromal cells.

Methods: Freshly resected human RCC specimen (KiCa−Pt58) was obtained via radical nephrectomy. Six human RCC cell lines and KiCa−Pt58 cancer cells were tagged with luciferase (firefly) to enable bioluminescent imaging (BLI). RCC cells were cultured with or without human LN stromal cells (HK) for proliferation using transmigration assays. A unique PDX IK model was used to monitor tumor growth and metastasis weekly by BLI for up to 16 weeks. H&E, immunohistochemistry (IHC) staining and RT−PCR were performed on primary tumor and mouse lung specimens.

Results: The presence of HK cells significantly enhanced the proliferation and transmigration of RCC cells. In our PDX IK model, co-injection of HK cells enhanced RCC tumor formation (in 3 out of 6 cell lines) and spontaneous distant metastasis to lung (in 4 out of 6 cell lines). Figure 1

Conclusion: Our PDX model provides a platform to study the determinant factors of tumor formation and metastasis with regard to LN stromal/RCC interaction. It can lead to the development of realistic, durable, and individualized treatments for RCC patients and establish co-clinical trials. Funding: FORCE Grant
Introduction: Given the biological heterogeneity of prostate cancer (PC), there is a need to identify molecular biomarkers that can add value to the clinical variables currently used for risk stratification. The objective of this study was to identify such biomarkers by examining high-throughput microarrays of PC samples, and to validate our results in three independent cohorts.

Methods: High density Affymetrix Human Exon 1.0 ST microarrays were used to comprehensively profile gene expression from 1008 prostatectomy samples from four independent multi-institutional cohorts: Mayo Clinic I (MCI), Mayo Clinic II (MCII), Cleveland Clinic (CC), and Erasmus Medical Center (EMC). All genes including protein-coding and long noncoding RNA (lncRNA) genes were ranked by expression fold change between patients who developed metastases vs. those who did not in the MAYO I cohort, and the top nominated gene was then validated for prediction of metastases, biochemical recurrence (BCR), prostate cancer specific mortality (PCSM) and overall survival (OS) in the validation cohorts. The prognostic value of the top prostate-specific biomarker was then evaluated in 230 urine samples from the University of Michigan.

Results: SChLAP1 (Secondary Chromosome Locus Associated with Prostate 1), a recently identified IncRNA, was nominated as the gene with the highest fold change in metastatic vs. control cases (p < 0.0001) in the MCI cohort. In the MCII cohort, SChLAP1 expression was highly prognostic for metastasis (p=0.002, HR=2.8), BCR (p < 0.01, HR=2.0), and PCSM (p < 0.001, HR=3.0), and borderline prognostic for OS (p < 0.07, HR=1.9). In the CC, SChLAP1 was associated with 10-year metastasis (p < 0.02, OR=3.1) and 5-year BCR (p < 0.001, OR=6.5). In the EMC cohort, SChLAP1 expression was highly prognostic for metastasis (p<0.01, OR=∞) On pooled multivariate analyses, SChLAP1 expression was significantly associated with 10-year metastasis (p < 0.0001, OR=2.45) as well as for 5-year BCR (p < 0.001, OR=1.76) and 10-year OS (p < 0.001, OR=1.93). SChLAP1 expression also predicted higher grade disease in urine samples (p<0.01).

Conclusion: We nominate SChLAP1 as a highly prognostic PC- biomarker for metastatic progression and validate its performance for outcomes in multiple independent cohorts. SChLAP1 remains highly prognostic even after accounting for standard clinicopathologic variables. Therefore, SChLAP1 expression may be useful in further PC risk stratification.
Oral Abstract Session

Podium #8
ADJUVANT RADIATION THERAPY, ANDROGEN DEPRIVATION AND DOCETAXEL FOR HIGH-RISK PROSTATE CANCER POST-PROSTATECTOMY: RESULTS OF RTOG 0621

Mark Hurwitz, MD1, Jonathan Harris, MS2, Oliver Sartor, MD3, Ying Xiao, PhD1, Bobby Shayegan, MD4, Paul Sperduto, MD5, Kasray Badiozamani, MD6, Colleen Lawton, MD7, Eric Horwitz, MD8, Jeff Michalski, MD9, Kevin Roof, MD10, David Beyer, MD11, Ed Zhang, PhD12 and Howard Sandler, MD13

1Thomas Jefferson University, Philadelphia, PA; 2NRG Oncology Stat Center, Philadelphia, PA; 3Tulane University, New Orleans, LA; 4McMaster University, Hamilton, ON; 5Minneapolis Radiation Oncology, Minneapolis, MN; 6Virginia Mason Medical Center, Seattle, Washington; 7Medical COllege of Wisconsin, Milwaukee, WI; 8Fox Chase Cancer Center, Philadelphia, PA; 9Washington University College of Medicine, St. Louis, MO; 10Southeast Radiation Oncology, Charlotte, NC; 11Arizona Oncology Services, Phoenix, AZ; 12NRG Stat Center, Philadelphia, PA; 13Cedars Sinai Medical Center, Los Angeles, CA
(Presented by: Mark Hurwitz)

Introduction: Benefit of adjuvant radiation therapy (ART) for men with adverse pathologic factors at radical prostatectomy (RP) has been validated in phase III trials. Despite ART, high risk patients (pts) have been defined with 50% 3 yr risk of progression, a risk factor for prostate cancer specific mortality. RTOG 0621 is a single-arm phase II trial designed to assess whether addition of androgen deprivation (ADT) and docetaxel (DT) to ART would increase freedom from progression (FFP) at 3 years from 50% to ≥ 70% in this high-risk group.

Materials: Eligible patients had prostate cancer post-RP with PSA nadir > 0.2 and Gleason score (GS) ≥ 7 or PSA nadir ≤ 0.2 with GS ≥ 8 and ≥ pT3. Pts received 6 months of ADT + RT to the pelvis with prostatic fossa boost to 66.6 Gy followed by 6 cycles of DT 75mg/m2 q21 days. The primary objective was to assess whether addition of ADT and DT to ART results in FFP of ≥70% at 3 years. Progression was defined as PSA ≥0.4, non-protocol hormones, clinical progression, or death. Odds ratios were calculated from logistic regression.

Results: 80 pts were enrolled with 74 meeting eligibility criteria. Median follow-up (f/u) was 53 months. Median age: 62; T classification: pT2 4%, pT3 95% and pT4 1%; GS 7 18% and ≥8 82%; Post-RP PSA: ≤0.2 53% and >0.2 47%; Positive surgical margins: 58%. 3 yr FFP was 73% (95%CI:61%–83%). 3 yr cumulative incidence of biochemical, distant, and local failure were 26%, 7%, and 0% respectively. Three deaths occurred, 2 which were prostate cancer related with >4 yr f/u. On univariate [OR=10.9 (95%CI:2.7–65.8); p<0.001] and multivariate analysis (OR=16.3; 95%CI:3.5–108.2 p<0.001 after adjustment for GS) only post-RP PSA > 0.2 was associated with increased risk of progression within 3 years. Side effects of DT including grade 1–2 peripheral neuropathy and grade 3–4 neutropenia were common however only 3 cases of febrile neutropenia occurred. Late treatment related toxicities included 4 (5%) various grade 3 and 2 (3%) cases of grade 4 urinary incontinence.

Conclusion: This phase II trial of ADT, DT, and ART for men with high-risk prostate cancer post-prostatectomy met the pre-specified study endpoint of 70% 3–year FFS, as compared with historic levels of 50%. This promising result warrants phase III testing of such an integrated local and systemic therapeutic approach to such patients.

This work was supported by grants U10CA21661, U10CA180868, U10CA180822, U10 CA37422, U24CA180803 from the National Cancer Institute (NCI) and Sanofi-Aventis
OUTCOMES OF PROGRESSION ON SURVEILLANCE FOR CLINICAL STAGE I NON-SEMINOMATOUS GERM CELL TUMOURS

Madhur Nayan, Robert Hamilton, MD, MPH, Lynn Anson-Cartwright, Philippe Bedard, MD, MPH, Malcolm Moore, MD, Peter Chung, MD, Padraig Warde, MD, Joan Sweet, MD, Martin O’Malley, MD, Michael A. S. Jewett, MD
Princess Margaret Cancer Centre, Toronto, ON
(Presented by: Madhur Nayan)

Introduction: Active surveillance (AS), as the initial approach for non-seminomatous germ cell tumours (NSGCT) is universal for clinical stage (CS) 1A and adopted by most centers for CS1B. Patients progressing on AS have been typically treated with chemotherapy, but there is no consensus. We describe patterns and mode of detection of progression and treatment of progression in our NSGCT AS cohort.

Methods: From December 1980 to August 2011, 466 CSI NSGCT patients were managed with AS and 133 (28%) had disease progression while on AS. Choice of treatment after progression was based on site of progression (e.g. retroperitoneum vs. extra-retroperitoneal), bulk or multifocality of progression, and markers (S0 or stable, low level S1 vs. ≥ S1). We focused on progression treated with RPLND and logistic regression was used to explore factors associated with further treatment after RPLND.

Results: Median time to progression was 7.3 months and was first detected by routine imaging (48%), routine serum tumour markers (37%), or both (12%). Progression occurred in the retroperitoneum alone (65%) most commonly. Following progression, first-line treatment was chemotherapy for 71 (53%), retroperitoneal lymphadenectomy (RPLND) for 51 (38%), and 11 (8.3%) underwent other therapy. For the majority (59%), only one modality of treatment after progression was required: chemotherapy only in 40/71 (56%); RPLND only in 36/51 (71%). Elevated tumour markers pre-RPLND was the only factor associated with requiring further therapy (OR 7.67; p=0.009) after RPLND. When RPLND was performed without elevated tumour markers, 83% required no further treatment. Overall, a second relapse occurred in 25/133 (19%) patients. With a median follow-up of 8.1 years, there were 5 deaths (3.8% of AS progressors; only 1.1% of the overall AS cohort) from testes cancer.

Conclusion: The majority of patients who progress on AS do so in the retroperitoneum within the first year. Of those patients that progress, most will achieve complete response with single modality treatment. In particular, RPLND can be utilized as monotherapy in select cases.
GENETIC SIGNATURES PREDICT ADVERSE PATHOLOGIC AND CLINICAL OUTCOMES IN PATIENTS WITH UPPER TRACT UROTHELIAL CARCINOMA (UTUC)

Aditya Bagrodia, MD1, John Sfakianos, MD2, Eugene Cha, MD1, Gopa Iyer, MD1, Sasinya Scott1, Emily Zabor1, Ronak Shah1, Qinghu Ren1, Philip Kim, MD1, Ari Hakimi, MD1, Byron Lee, MD1, Irina Ostrovnaya1, Ricardo Ramirez2, Aphroithiti Hanrahan1, Neil Desai, MD1, Arony Sun1, Jonathan Rosenberg, MD1, Guido Dalbagni, MD1, Dean Bajorin, MD1, Victor Reuter, MD1, Michael Berger, MD1, Bernard Bochner, MD1, Hikmat Al-Ahmadie, MD1, David Solit, MD1 and Jonathan Coleman, MD1

1MSKCC, New York, NY; 2Mount Sinai, NY, NY

(Presented by: Aditya Bagrodia)

Introduction: Genomic characterization of presurgical biopsy specimens and final pathology of patients with UTUC may allow for thoughtful integration of systemic and targeted therapies. We report the association of genetic profiles with clinicopathologic outcomes in patients with UTUC.

Methods: Tumor and germline DNA from patients with UTUC (n=70) were analyzed using a next-generation exon capture sequencing assay to identify somatic mutations and copy number alterations in 300 cancer-associated genes. Fishers test was used to assess the association between altered genes and tumor grade, stage, and organ-confined (OC) status (T3/T4±N+). Kaplan Meier and regression analyses were used for clinical outcomes.

Results: Pathologic stage was Ta, T1, T2, T3, T4 in 19 (27.5%), 14 (20.3%), 8 (11.6%), 21 (30.4%), and 7 (10.1%) patients, respectively. 17 patients (24.6%) had positive lymph nodes. 29 patients had distant recurrences and 22 patients died from their disease. Of 24 commonly mutated genes within 9 genomic pathways, TP53/MDM2 and FGFR3 were the only genes uniformly associated with grade, stage, OC status, RFS, and CSS. A risk score was assigned: 0=WT TP53/MDM2 and Mut FGFR3 (n=30), 1=WT TP53/MDM2 and WT (n=19), and 2=Mut TP53/MDM2 and WT FGFR3 (n=17). 3 patients with both Mut TP53/MDM2 and Mut FGFR3 were excluded from risk score analyses. The frequencies of high grade (60 vs 100 vs 100%, p<0.001), advanced stage (16.7 vs 47.4 vs 76.5%, p<0.001), and non-OC disease (20 vs 47.4 vs 76.5%, p<0.001) were greater for risk scores of 0, 1, and 2, respectively. RFS (81%, 44%, and 21%, log-rank p<0.001) and CSS (93%, 71%, and 54% log-rank p=0.008) worsened at 3 years for risk scores 0, 1, and 2, respectively (Figure 1A/1B). Risk score remained significant in multivariable analysis adjusted for grade and location (only factors available preoperatively), for both RFS (HR 1.82, 95% CI 1.12–2.96, p=0.02) and CSM (HR 1.83, 95% CI 1.03–3.26, p=0.04).

Conclusions: TP53/MDM2 mutations are associated with adverse clinicopathologic outcomes whereas FGFR3 mutations are associated with favorable outcomes. This information may be combined for enhanced risk stratification, particularly in the biopsy setting.
IMPACT OF SYSTEMIC THERAPY ON CHARACTERIZATION OF PERIPHERAL CIRCULATING TUMOR CELLS IN METASTATIC RENAL CELL CARCINOMA
Richard Joseph, MD\(^1\), Peixuan Zhu, PhD\(^2\), Melissa Stanton, MD\(^1\), Erik Castle, MD\(^1\), Alan Bryce, MD\(^1\), Estrella Carballido, MD\(^1\), Cha-Mei Tang, PhD\(^2\) and Thai Ho, MD, PhD
\(^1\)Mayo Clinic; \(^2\)Creatv MicroTech, Inc
(Presented by: Thai Ho)

Introduction: Circulating tumor cells (CTCs) are emerging as a potential biomarker in metastatic cancers. However, the impact of systemic therapy on the detection of CTCs in metastatic clear cell renal cell carcinoma (ccRCC) is unknown. Furthermore, CTC capture methods dependent on cell surface expression of epithelial and/or cytokeratin markers may miss CTCs in RCC if they display a mesenchymal phenotype.

Methods: The CTC assay protocol was developed using three RCC cell lines, 786–O, Caki–1, and Caki–2. Persons with metastatic RCC (N=40) on systemic therapy or undergoing evaluation as a kidney donor (N=10) were consented. RCC tumor specimens from consented subjects were stained for CD10 and Vimentin. CellSieveTM microfilters, which have 7 µm diameter pores in a uniform array, with 160,000 pores in a 9 mm diameter area, were used for separation of CTCs in the matched blood specimen. The cells collected on the filter were post-fixed, permeabilized, and stained with DAPI and fluorescent antibodies specific to CD10, Vimentin, and CD45.

Results: The capture efficiencies for 786–O, Caki–1, and Caki–2 cell lines were determined to be 98%, 98% and 97%, respectively. On-filter antibody staining revealed heterogeneous expressions of vimentin and CD10 in RCC cell lines. The typical CTCs (3–50 cells) display abnormal morphology, including large nuclei (typically 15–30 µm in size), irregular cell size and shape, and high nucleus-to-cytoplasm ratio, and they were stained as vimentin+, CD10+ and CD45−. These cells were not detected in persons undergoing evaluation as kidney donors. The antibodies for CD10 and vimentin, showed some cross-reactivity with a portion of white blood cells, but the CTCs could be further distinguished from WBC based on morphology, cell size, and CD45 staining.

Conclusion: We demonstrated that CellSieveTM microfiltration can isolate CTCs from RCC patients while on systemic therapy. This technology might greatly facilitate detection of CTCs with a mesenchymal phenotype in blood specimens because they are often lack expression of the typical epithelial and/or cytokeratin markers. Molecular genetic classifications have been identified in ccRCC and future studies will be focused on examining the concordance of these molecular markers between primary specimens and CTCs.
CLINICAL AND RADIOGRAPHIC PREDICTORS OF THE NEED FOR RESECTION OF THE INFERIOR VENA CAVA DURING NEPHRECTOMY FOR PATIENTS WITH RENAL CELL CARCINOMA AND CAVAL TUMOR THROMBUS

Sarah Psutka, MD, Stephen Boorjian, MD, R. Houston Thompson, MD, Grant Schmit, MD, John Schmitz, MD, Thomas Bower, MD, Suzanne Stewart, MD, Christine Lohse, MS, John Cheville, MD and Bradley Leibovich, MD

1Department of Urology, Mayo Clinic, Rochester, MN; 2Department of Radiology, Mayo Clinic, Rochester, MN; 3Department of Surgery, Mayo Clinic, Rochester, MN; 4Department of Health Sciences Research, Mayo Clinic, Rochester, MN; 5Department of Pathology, Mayo Clinic, Rochester, MN

(Presented by: Sarah Psutka)

Introduction: To evaluate clinical and radiographic predictors of need for resection of the inferior vena cava (IVC–R) requiring complex vascular reconstruction during venous tumor thrombectomy at the time of nephrectomy for renal cell carcinoma (RCC).

Methods: We performed a retrospective review of 172 patients treated for RCC with IVC (level I–IV) venous tumor thrombus at the Mayo Clinic between 2000 and 2010. Preoperative imaging was re-reviewed by two radiologists blinded to the patient's surgical procedure. Univariable and multivariable associations of clinical and radiographic features with IVC–R were evaluated by logistic regression. Secondary analysis assessed the ability of the model to predict histologic invasion of the IVC by the tumor thrombus.

Results: Of the 172 patients, 38 (22%) underwent IVC–R procedures during nephrectomy. Optimal radiographic cut-points determined to predict need for IVC–R based on preoperative imaging included a renal vein (RV) diameter at the RV ostium (RVo) of 15.5 mm, maximal AP diameter of the IVC of 34.0 mm and AP and coronal diameters of the IVC at the RVo of 24 mm and 19 mm respectively. On multivariable analysis, the presence of a right-sided tumor (OR 3.3; p=0.017), a measured AP diameter of the IVC at the RVo ≥ 24.0 mm (OR 4.4; p=0.017), and radiographic identification of complete occlusion of the IVC at the RVo (OR 4.9; p<0.001) were associated with a significantly increased risk of IVC–R. The c-index for the model predicting IVC–R was 0.8. The AP diameter of the IVC at the RVo > 24 mm was also independently associated histologic invasion of the IVC wall by the tumor thrombus (OR 5.04, p<0.001; c-index 0.7).

Conclusion: We present a multivariable model detailing radiographic features associated with the need for IVC–R during tumor thrombectomy that may be used for preoperative planning, patient counseling, and planned involvement of vascular surgical colleagues in anticipation of need for complex vascular repair.

ACCELERATED GROWTH RATE OF MULTIFOCAL TUMORS AFTER INITIAL RADIOFREQUENCY ABLATION

Mario Taylor, Jason Rothwax1, W. Marston Linehan, MD, Brad Wood, MD and Adam Metwalli, MD

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(Presented by: Mario Taylor)

Introduction: Radiofrequency ablation (RFA) is a minimally-invasive treatment for patients with localized renal cell carcinoma (RCC). We report a subset of patients with multifocal RCC treated with RFA who subsequently demonstrated accelerated growth rates (AGR) in non-treated renal tumors after RFA.

Methods: A database of patients with multifocal RCC enrolled in a Phase II prospective clinical trial of RFA between 1999 and 2004 was reviewed. Patients who underwent ipsilateral secondary intervention following RFA were recorded and a subset of patients with AGR of subsequent renal tumors was identified. The ipsilateral tumors were measured and assessed for growth rate. AGR was defined as >0.5 cm/year in longest measurement on axial imaging. Clinical data was collected and included proximity to initial RFA site, timing of onset of accelerated growth, enhancement measured in Hounsfield units, tumor measurements in two dimensions, surgical history and presence of germline genetic mutations for known hereditary RCC conditions. Growth rates prior to initial RFA were recorded when available. Incompletely ablated tumors were excluded from the study.

Results: 63 patients were enrolled and 113 lesions were treated with RFA. Eighteen tumors in 15 patients (24%) demonstrated AGR following RFA. For all 18 tumors, average growth rate after RFA was 1.10 cm/year. The average follow-up was 9.06 years. 10 of 18 AGR tumors were visible on pre-RFA radiologic imaging. For these lesions, the average pre-RFA growth rate was 0.26 cm/year and the average post-RFA growth rate was 1.31 cm/year. The mean size of the tumors was 3.24 cm (Range: 1.38–6).

Conclusion: 24% of patients with multifocal RCC demonstrated AGR after RFA. The majority of tumors were not in proximity of initial RFA lesion. The mechanism for this is unclear and larger studies are necessary to validate these findings.
Poster Session I – Summary

Poster Session & Reception
Wednesday, December 3, 2014
4:30 p.m. – 6:00 p.m.
Poster Walks
See page 51 for full abstracts

Poster #1
PREDICTORS OF METASTATIC DISEASE AT DIAGNOSIS IN PATIENTS WITH UROTHELIAL CARCINOMA OF THE BLADDER
Zachary Klaassen, MD1, Rita P. Jen, MPH1, Lael Reinstatler, MPH1, John M. DiBianco2, Austin J. Evans1, Qiang Li, MD, PhD1, Rabii Madi, MD1 and Martha K. Terris, MD1
1Medical College of Georgia – Georgia Regents University, Augusta, GA; 2Ross University School of Medicine, Dominica, West Indies
(Presented by: Zachary Klaassen)

Poster #2
GENETIC VARIANTS RELATED TO PRESENCE OF BLADDER CANCER IN A HIGH RISK, ARSENIC-EXPOSED POPULATION IN NORTHERN CHILE (ANTOFAGASTA)
Mario Fernández, MD1,2, Cecilia Vial, PhD1, Karena Espinoza1, Eduardo Chaparro, MD3, Patricio Valdebenito, MD3 and Gabriela Repetto, MD1
1Center for Genetics and Genomics, Clínica Alemana – Universidad del Desarrollo, Santiago, Chile; 2Department of Urology, Clínica Alemana – Universidad del Desarrollo; 3Department of Urology, Hospital Regional de Antofagasta, Chile
(Presented by: Mario Fernández)

Poster #3
MITOCHONDRIAL DNA CONTENT: ASSOCIATION WITH RISK OF BLADDER CANCER AND DETERMINATION OF SIGNIFICANT MITOCHONDRIAL DNA POLYMORPHISMS
Stephen Williams, MD1, Yuanquing Ye, PhD2, Maosheng Huang, PhD2, Ashish Kamat, MD2, Xia Pu, PhD2, Colin Dinney, MD2 and Xifeng Wu, MD, PhD2
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(Presented by: Stephen Williams)

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DISTANCE TO TREATMENT FACILITY AND SURVIVAL OUTCOMES FOLLOWING RADICAL CYSTECTOMY FOR BLADDER CANCER
Ahmed Haddad, Nirmish Singla, MD, Neil Gupta, BSc, Ganesh Raj, MD, Arthur Sagalowsky, MD, Vitaly Margulis, MD, Yair Lotan, MD
University of Texas, Southwestern Medical Center, Dallas, TX
(Presented by: Ahmed Haddad)

Poster #5
NEXT GENERATION SEQUENCING OF DNA FROM URINE DETECTS MULTIPLE BLADDER TUMOR- DERIVED ALTERATIONS AND ADDITIONAL CHANGES THAT SUGGEST TUMOR HETEROGENEITY
Richard D. Abramson, PhD1, Gregory E. Alexander, PhD1, Ellen M. Beasley, PhD1, Francois Collin, PhD, Michael Crager, PhD1, Andrew Dei Rossi, BS1, Joseph Dorado, BS1, Adam Friedman, BS1, Bill Gibb, PhD1, Jennie Jeong, BS1, Col Jones, BS1, Chin-Jen Ku, PhD1, Yan Ma, PhD1, John Morlan, BS1, Kunbin Qu, PhD1, Aibing Rao, PhD1, Aaron Scott, BS1, Haluk Tezcan, MD1, Neal Shore, MD2 and Phillip G. Febbo, MD1
1Genomic Health, Inc., Redwood City, CA; 2Carolina Urologic Research Center, Myrtle Beach, SC
(Presented by: Richard D. Abramson)
**Poster #6**

**AN INDIVIDUALIZED APPROACH TO BLADDER CANCER TREATMENT USING PATIENT-DERIVED CELL LINES TO PREDICT RESPONSE TO CHEMOTHERAPEUTIC AGENTS**

LaMont Barlow, MD, Chee Wai Chua, PhD, Ming Lei, PhD, Guarionex DeCastro, MD, MPH, Ketan Badani, MD, Mitchell Benson, MD, James McKiernan, MD, Michael Shen, PhD

Columbia University Medical Center, New York, NY

(Presented by: LaMont Barlow)

**Poster #7**

**MULTI-INSTITUTIONAL VALIDATION OF THE PREDICTIVE VALUE OF KI-67 IN PATIENTS WITH HIGH-GRADE UROTHELIAL CARCINOMA OF THE UPPER URINARY TRACT**

Laura-Maria Krabbe, MD,1 Aditya Bagrodia, MD,2 Ahmed Haddad, MD, PhD,2 Bishoy Gayed, MD,2 Payal Kapur, MD2, Dina Khalil, MD2, Linda Hynan, PhD2, Christopher Wood, MD,3 Jose Karam, MD,4 Alon Weizer, MD4, Jay Raman, MD5, Mesut Remzi, MD6, Nathalie Rioux-Leclercq, MD7, Andrea Haitel, MD8, Marco Roscigno, MD8, Christian Bolenz, MD9, Karim Bensalah, MD1, Arthur Sagalowsky, MD2, Sharokh Shariat, MD2, Yair Lotan, MD2 and Vitaly Margulis, MD2

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(Presented by: Laura-Maria Krabbe)

**Poster #8**

**THE IMPACT OF DEFINITIVE PROSTATE CANCER TREATMENT ON POSITIVE MARGINS AT TIME OF RADICAL CYSTECTOMY**

Adam Luchey, MD, Gautum Agarwal, MD, Hui-Yi Lin, PhD, Binglin Yue, PhD, Julio Pow-Sang, MD, Philippe Spiess, MD, Michael Poch, MD, Scott Gilbert, MD, Jorge Lockhart, MD, Wade Sexton, MD

H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL

(Presented by: Adam Luchey)

**Poster #9**

**CHANGE IN CO2 PREDICTS HOSPITAL READMISSION FOR FAILURE TO THRIVE AFTER RADICAL CYSTECTOMY: A SERIES OF OVER 600 PATIENTS**

Mark Tyson, MD, Michael Patton, BS, Daniel Salevitz, BS, Catherine Chen, MD, Erik Castle, MD

Mayo Clinic Arizona

(Presented by: Mark Tyson)

**Poster #10**

**BLADDER UROTHELIAL CARCINOMA: PREDICTORS OF SUICIDE IN A POPULATION-BASED COHORT**

Zachary Klaassen, MD1, Rita P. Jen, MPH1, Lael Reinstatler, MPH1, John M. DiBianco2, Daniel Belew1, Qiang Li, MD, PhD1, Rabii Madi, MD1 and Martha K. Terris, MD1

1Medical College of Georgia – Georgia Regents University, Augusta, GA; 2Ross University School of Medicine, Dominica, West Indies

(Presented by: Zachary Klaassen)

**Poster #11**

**THE LONG NON-CODING RNA HOTAIR AFFECTS EXOSOME MEDIATED BLADDER CANCER PROGRESSION**

Jayme Olsen, BS1, Jonathan Flax, BS, MD1, Edward Messing, BS, MD1 and Carla Beckham, MD, PhD2

1University of Rochester, Rochester NY; 2University of Rochester, Rochester, NY

(Presented by: Carla Beckham)
Poster #12
DOES SQUAMOUS DIFFERENTIATION IN UROTHELIAL BLADDER CANCER HAVE A PROGNOSTIC SIGNIFICANCE?
David Y. Yang, BS¹, M. Francesca Monn, MD, MPH¹, Hristos Z. Kaimakliotis, MD¹, K. Clint Cary, MD, MPH¹, Jose A. Pedrosa, MD¹, Richard Bihrle, MD¹, Liang Cheng, MD, PhD² and Michael O. Koch, MD¹
¹Indiana University School of Medicine, Department of Urology, Indianapolis, IN; ²Indiana University School of Medicine, Department of Pathology, Indianapolis, IN
(Presented by: David Y. Yang)

Poster #13
CAN WE DO BETTER?: THE DISCREPANCY BETWEEN PERCEPTION AND PRACTICE OF ENHANCED RECOVERY AFTER CYSTECTOMY PRINCIPLES AMONG UROLOGIC ONCOLOGISTS
Janet Baack Kukreja, MD¹, Edward Messing, MD¹ and Jay Shah, MD²
¹University of Rochester, Rochester, NY; ²MD Anderson Cancer Center, Houston, TX
(Presented by: Janet Baack Kukreja)

Poster #14
THE IMPACT OF SUBSEQUENT BLADDER MALIGNANCY AFTER PRIMARY UPPER TRACT UROTHELIAL CARCINOMA: A POPULATION BASED STUDY
Qiang Li, MD, PhD, Klaassen Klaassen, MD, Rabii Madi, MD, Martha Terris, MD
Georgia Regents University, Augusta, GA
(Presented by: Qiang Li)

Poster #15
THE EFFECT OF CONCOMITANT CARCINOMA IN SITU ON NEOADJUVANT CHEMOTHERAPY: INFERIOR PATHOLOGIC OUTCOMES, BUT NO EFFECT ON SURVIVAL
William Parker, MD¹, Philip Ho, MD², Jonathan Melquist, MD², Katie Scott¹, Jeffrey Holzbeierlein, MD¹, Ernesto Lopez-Corona, MD³, Ashish Kamat, MD² and Eugene Lee, MD¹
¹The University of Kansas Medical Center; ²MD Anderson Cancer Center; ³Kansas City VA Medical Center
(Presented by: William Parker)

Poster #16
THE IMPACT OF METFORMIN ON CANCER-SPECIFIC SURVIVAL OUTCOMES IN DIABETIC PATIENTS UNDERGOING RADICAL CYSTECTOMY FOR UROTHELIAL CARCINOMA OF THE BLADDER
Madhur Nayan, Bimal Bhindi, Julie Yu, Thomas Hermanns, Robert J. Hamilton, Antonio Finelli, Michael A.S Jewett, Alexandre R. Ziotta, Neil E. Fleschner, Girish S. Kulkarni
Division of Urology, Department of Surgical Oncology, University Health Network, Toronto, Ontario, Canada
(Presented by: Madhur Nayan)

Poster #18
PERSISTENT CANCER WITHIN THE PROSTATE AT THE TIME OF RADICAL CYSTOPROSTATECTOMY FOLLOWING PELVIC RADIATION THERAPY
Pranav Sharma, MD, Adam Luchey, MD, Shohreh Dickinson, MD, Jasreman Dhillon, MD, Philippe Spiess, MD, Julio Pow-Sang, MD, Wade Sexton, MD, Michael Poch, MD
Moffitt Cancer Center, Tampa, FL
(Presented by: Pranav Sharma)

Poster #19
EMETINE DIHYDROCHLORIDE PREFERENTIALLY MODULATES HIFΑ EXPRESSION IN BLADDER CANCER CELLS
Kimberly Foreman, PhD, Deval Patel, BS, Valerie Davidson, BS, Gopal Gupta, MD
Loyola University Chicago, Maywood IL
(Presented by: Gopal Gupta)
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Poster #20
RADICAL CYSTECTOMY WITH CURATIVE INTENT FOR REFRACTORY CARCINOMA IN SITU OF THE BLADDER: INSIGHT INTO PATIENT OUTCOMES AND PATTERNS OF CARE
Gautum Agarwal, MD1, Oscar Valderrama, MD1, Patrick Espiritu, MD1, Adam Luchey, MD1, Jorge Lockhart, MD2, Julio Powsang, MD1, Wade Sexton, MD1, Michael Poch, MD1 and Philippe E Spiess, MD1
1H. Lee Moffitt Cancer Center, Tampa, Florida; 2University of South Florida, Tampa, Florida
(Presented by: Gautum Agarwal)

Poster #21
CLINICO-BIOLOGICAL PROGNOSTIC SCORE FOR PREDICTION OF ONCOLOGICAL OUTCOMES AFTER RADICAL CYSTECTOMY FOR SQUAMOUS CELL CARCINOMA OF THE BLADDER
Ramy Youssef, Payal Kapur, MD1, Dina Wahib, MD1, Ahmed Mosbah, MD2, Hassan Abol-Enein, MD2, Mohamed Ghoniem, MD2 and Yair Lotan, MD3
1Pathology, UT Southwestern Medical Center, Dallas, Tx; 2Urology, Urology and Nephrology Center, Mansoura, Egypt; 3Urology, UT Southwestern Medical Center, Dallas, Texas
(Presented by: Ramy Youssef)

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PROGNOSTIC BIOMARKERS FOR BILHARZIAL AND NON-BILHRAZIAL RELATED BLADDER CANCER: IMMUNOHISTOCHEMISTRY STUDY OF 14 MARKERS
Ramy Youssef, Payal Kapur, MD1, Ahmed Mosbah, MD2, Hassan Abol-Enein, MD2, Mohamed Ghoniem, MD2 and Yair Lotan, MD3
1Pathology, UT Southwestern Medical Center, Dallas, Tx; 2Urology, Urology and Nephrology Center, Mansoura, Egypt; 3Urology, UT Southwestern Medical Center, Dallas, Texas
(Presented by: Ramy Youssef)

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PRECLINICAL MODEL OF DUAL-SPECIFIC, MTOR COMPLEX 1 (TORC1) AND MTOR COMPLEX 2 (TORC2) INHIBITORS FOR BLADDER CANCER TREATMENT
Vladimir Valera, MD, PhD, Sensuke Konno, PhD, Muhammad Choudhury, MD, John Phillips, MD
Department of Urology. New York Medical College. Valhalla NY
(Presented by: Vladimir Valera)

Poster #24
FUNCTIONAL AND CLINICOPATHOLOGIC OUTCOMES OF A MODIFIED VESCICA ILEALE PADOVANA NEOBLADDER TECHNIQUE
Chandra K. Flack, MD, M. Francesca Monn, MD, MPH, Hristos Z. Kaimakliotis, MD, Michael O. Koch, MD
Indiana University School of Medicine, Indianapolis, IN
(Presented by: Chandra K. Flack)

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INVESTIGATING PATTERNS OF CARE FOR TREATMENT OF MUSCLE-INVASIVE BLADDER CANCER IN A MULTI-PAYER STATE DATABASE
Peter Greene, MD, Matthew Lyons, MD, E. Sophie Spencer, MD, Anne Marie Meyer, PhD, Ke Meng, PhD, Raj Pruthi, MD, Eric Wallen, MD, Michael Woods, MD, Matthew Nielsen, MD, MS, Angela Smith, MD, MS
University of North Carolina– Chapel Hill
(Presented by: Peter Greene)
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FUNCTIONAL OUTCOMES FOLLOWING RADICAL CYSTECTOMY IN WOMEN WITH BLADDER CANCER: A SYSTEMATIC REVIEW
Matthew Lyons, MD¹, Angela Smith, MD, MS², Karen Crowell MLIS², E. Sophie Spencer, MD², Peter Greene, MD², Michael Woods, MD², Eric Wallen, MD², Raj Pruthi, MD², Matthew Nielsen, MD, MS² and Cheryl Lee, MD³
¹University of North Carolina– Chapel Hill; ²University of North Carolina–Chapel Hill; ³University of Michigan
(Presented by: Matthew Lyons)

Poster #27
UNDERSTANDING THE RELATIONSHIP BETWEEN 30- AND 90-DAY EMERGENCY ROOM VISITS AND READMISSIONS FOLLOWING RADICAL CYSTECTOMY
Matthew Lyons, MD, Peter Greene, MD, E. Sophie Spencer, MD, Anne Marie Meyer, PhD, Ke Meng, PhD, Raj Pruthi, MD, Eric Wallen, MD, Michael Woods, MD, Matthew Nielsen, MD, MS, Angela Smith, MD, MS
University of North Carolina– Chapel Hill
(Presented by: Matthew Lyons)

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DELAY IN DIAGNOSIS OF BLADDER CANCER FROM TIME OF INITIAL SYMPTOMS IN THE MEDICARE POPULATION: URINARY TRACT INFECTION AND SEX DISPARITIES
Kyle Richards, MD¹, Sandra Ham, MS², Joshua Cohn, MD³ and Gary Steinberg, MD³
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(Presented by: Kyle Richards)

Poster #29
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Tracy Rose, MD, MPH¹, Allison Deal², Matthew Lyons³, E. Sophie Spencer³, Peter Greene³, Matthew Nielsen³, Raj Pruthi³, Eric Wallen⁴, Michael Woods⁴, Matthew I Milowsky¹ and Angela B Smith⁴
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(Presented by: Tracy Rose)

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SURGICAL APGAR SCORE IS ASSOCIATED WITH AN INCREASED RISK FOR DEATH AND READMISSION FOLLOWING RADICAL CYSTECTOMY
Timothy Ito¹, Philip Abbosh¹, Jason Mannion², Jeffrey Tomaszewski³, Reza Mehrazin⁴, Serge Ginzburg⁵, Daniel Canter⁶, Richard Greenberg¹, Rosalia Viterbo¹, David Chen¹, Alexander Kutikov¹, Marc Smaldone¹ and Robert Uzzo¹
¹Fox Chase Cancer Center, Philadelphia, PA; ²Temple University School of Medicine; ³MD Anderson Cooper, Camden, NJ; ⁴Mount Sinai School of Medicine, New York, NY; ⁵Einstein Healthcare Network, Philadelphia, PA
(Presented by: Timothy Ito)

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MOLECULAR ANALYSIS OF BLADDER AND UPPER TRACT UROTHELIAL CARCINOMA: RESULTS FROM A MICROARRAY COMPARISON
Thomas Sanford, MD¹, Sima Porten, MD² and Maxwell Meng, MD²
¹University of California San Francisco, San Francisco CA; ²University of California San Francisco, San Francisco, CA
(Presented by: Thomas Sanford)
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BLADDER CANCER EXOSOMES PROMOTE EPITHELIAL TO MESENCHYMAL TRANSITION IN BLADDER EPITHELIAL CELLS
Carrie Franzen, PhD, Kristin Greco, MD, Robert Blackwell, MD, Kimberly Foreman, PhD, Gopal Gupta, MD
Loyola University Chicago
(Presented by: Carrie Franzen)

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IMPACT OF UNCONTROLLED DIABETES ON OUTCOMES AFTER CYSTECTOMY IN PATIENTS WITH BLADDER CANCER: A POPULATION-BASED STUDY
Izak Faiena, MD, Viktor Y. Dombrovskiy, MD, PhD, MPH, Raymond C. Sultan, MD, Yana Barbalat, MD, Amirali H. Salmasi, MD, Robert E. Weiss, MD
Rutgers Cancer Institute of New Jersey and Robert Wood Johnson Medical School
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Ahmed Haddad, Payal Kapur, MD, Nirmish Singla, MD, Jay Raman, MD, Matthew Then, MD, Philipp Nuhn, MD, Alexander Buchner, MD, Patrick Bastian, MD, Christian Seitz, MD, Shahrokh Shariat, MD, Karim Bensalah, MD, Nathalie Rioux-Leclercq, MD, Arthur Sagalowsky, MD, Yair Lotan, MD and Vitaly Margulis, MD
1University of Texas Southwestern Medical Center, Dallas, TX; 2Penn State Milton S. Hershey Medical Center; 3University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania; 4University of Munich, Munich, Germany; 5Paracelsus-Klinik Golzheim, Dusseldorf, Germany; 6Central Hospital of Bolzano, Bolzano, Italy; 7Medical University of Vienna, Vienna General Hospital, Vienna, Austria; 8University of Rennes, Rennes, France
(Presented by: Ahmed Haddad)

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ROBOTIC-ASSISTED HEALTHY MARGIN VS ENUCLEO-RESECTION PARTIAL NEPHRECTOMY FOR T1 RENAL TUMORS: A MULTI-INSTITUTIONAL ANALYSIS OF PERI-OPERATIVE OUTCOMES
Robert Blackwell, MD, Jeromy Hackney, MD, Jessica Wetterlin, MD, Clinton Bahler, MD, Ronald Boris, MD, Chandru Sundaram, MD, Marcus Quek, MD and Gopal Gupta, MD
1Loyola University Medical Center, Department of Urology, Maywood, IL; 2Indiana University, Department of Urology, Indianapolis, IN
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CLEAR CELL RENAL CELL CARCINOMA: SOCIOECONOMIC PREDICTORS OF METASTATIC DISEASE AT DIAGNOSIS
Zachary Klaassen, MD, John M. DiBianco, R.P. Jen, MPH, Lael Reinstatler, MPH, Austin J. Evans, Qiang Li, MD, PhD, Rabii Madi, MD and Martha K. Terris, MD
1Medical College of Georgia – Georgia Regents University, Augusta, GA; 2Ross University School of Medicine, Dominica, West Indies
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IMPACT OF SYSTEMIC THERAPY ON CHARACTERIZATION OF PERIPHERAL CIRCULATING TUMOR CELLS IN METASTATIC RENAL CELL CARCINOMA
Richard Joseph, MD, Peixuan Zhu, PhD, Melissa Stanton, MD, Erik Castle, MD, Alan Bryce, MD, Estrella Carballido, MD, Cha-Mei Tang, PhD and Thai Ho, MD
1Mayo Clinic; 2Creatv MicroTech, Inc
(Presented by: Thai Ho)
Poster #39
PHYSICAL 3D KIDNEY TUMOR MODELS CONSTRUCTED FROM 3D PRINTERS IMPROVE TRAINEE PERFORMANCE
Margaret Knoedler, BS¹, Andrew Lange, BS¹, Allison Feibus, BS, MS¹, Michael Maddox, MD², Elisa Ledet, PhD¹, Raju Thomas, MD, FACS² and Jonathan Silberstein, MD²
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(Presented by: Jonathan Silberstein)

Poster #40
PERCENTAGE OF SARCOMATOID DEDIFFERENTIATION AS A PROGNOSTIC INDICATOR FOR SURVIVAL IN SARCOMATOID RENAL CELL CARCINOMA
Mehrad Adibi, MD, Dae Kim, MD, Arun Thomas, MD, Kanishka Sircar, MD, Rebecca Slack, PhD, Christopher Wood, MD, Jose Karam, MD
MD Anderson Cancer Center, Houston, TX
(Presented by: Mehrad Adibi)

Poster #41
SURGICAL MANAGEMENT OF RENAL CELL CARCINOMA IN OCTOGENARIANS AND NONAGENARIANS: DEFINING APPROPRIATE TREATMENT STANDARDS
Zachary Klaassen, MD¹, Rita P. Jen, MPH¹, John M. DiBianco², Lael Reinstatler, MPH¹, Daniel Belew¹, Qiang Li, MD, PhD¹, Rabii Madi, MD¹ and Martha K. Terris, MD¹
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(Presented by: Zachary Klaassen)

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ONCOLOGIC SURVEILLANCE FOLLOWING SURGICAL RESECTION FOR RENAL CELL CARCINOMA: A NOVEL RISK-BASED APPROACH
Suzanne Stewart, MD, R. Houston Thompson, MD, Stephen Boorjian, MD, Sarah Psutka, MD, Christine Lohse, MD, John Cheville, MD, Bradley Leibovich, MD, Igor Frank, MD
Mayo Clinic, Rochester, MN
(Presented by: Suzanne Stewart)

Poster #43
CLINICAL AND RADIOGRAPHIC PREDICTORS OF THE NEED FOR RESECTION OF THE INFERIOR VENA CAVA DURING NEPHRECTOMY FOR PATIENTS WITH RENAL CELL CARCINOMA AND CAVAL TUMOR THROMBUS
Sarah Psutka, MD¹, Stephen Boorjian, MD¹, R. Houston Thompson, MD¹, Grant Schmit, MD², John Schmitz, MD², Thomas Bower, MD³, Suzanne Stewart, MD¹, Christine Lohse, MS⁴, John Cheville, MD⁵ and Bradley Leibovich, MD¹
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(Presented by: Sarah Psutka)

Poster #44
CONCOMMITANT SURGERY FOR HEPATIC INVOLVEMENT AT THE TIME OF NEPHRECTOMY FOR RENAL CELL CARCINOMA: A MATCHED COHORT STUDY
Sarah Psutka, MD¹, R. Houston Thompson, MD¹, Stephen Boorjian, MD¹, John Cheville, MD², Suzanne Stewart, MD¹, Christine Lohse, MS³, Brian Costello, MD⁴, Florencia Que, MD⁵ and Bradley Leibovich, MD¹
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(Presented by: Sarah Psutka)
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Poster #45
PRETREATMENT NEUTROPHIL-TO-LYMPHOCYTE RATIO CAN PREDICT TUMOR AGGRESSIVENESS IN NEWLY DIAGNOSED RENAL LESIONS
Boyd Viers, MD, R. Houston Thompson, MD, Stephen Boorjian, MD, Christine Lohse, BS, Bradley Leibovich, MD, Matthew Tollefson, MD
Mayo Clinic Rochester, MN
(Presented by: Boyd Viers)

Poster #46
PATIENT IDENTIFICATION AND ELIGIBILITY INSIGHTS IN THE SYNCHRONOUS MRCC POPULATION: AN UPDATE FROM THE ONGOING ADAPT* PHASE 3 STUDY EXPERIENCE
Brian Lane, MD, PhD, FACS1, Robert Uzzo, MD, FACS2, Robert Figlin, MD3, Christopher Wood, MD, FACS4 and the ADAPT Study Group
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(Presented by: Brian Lane)

Poster #47
MULTICENTER VALIDATION OF ABILITY OF SURGEON ASSESSMENT OF RENAL PRESERVATION IN COMPARISON TO MEASUREMENT WITH 3D IMAGE ANALYSIS
Conrad Tobert, MD1,2, Toshio Takagi3, Michael Liss, MD4, Hak Lee, MD4, Ithaar Derweesh, MD4, Steven Campbell, MD, PhD5 and Brian Lane, MD, PhD, FACS6
1Michigan State University College of Human Medicine (Grand Rapids, MI); 2University of Iowa Hospitals and Clinics (Iowa City, IA); 3Spectrum Health Hospital System (Grand Rapids, MI); 4University of California San Diego (San Diego, CA); 5Cleveland Clinic Foundation (Cleveland, OH); 6Division of Urology, Spectrum Health Hospital System (Grand Rapids, MI)
(Presented by: Brian Lane)

Poster #48
SURGICAL APGAR SCORE AND NEPHROMETRY SCORE PREDICT INCREASED RISK FOR MAJOR COMPLICATION AND DEATH FOLLOWING RENAL MASS EXCISION
Timothy Ito1, Philip Abbosh1, Reza Mehrzarin2, Jeffrey Tomaszewski3, Serge Ginzburg4, Daniel Canter4, Tianyu Li5, Richard Greenberg1, Rosalia Viterbo1, David Chen1, Alexander Kutikov1, Marc Smaldone1 and Robert Uzzo1
1Fox Chase Cancer Center, Philadelphia, PA; 2Mount Sinai Medical Center, New York, NY; 3MD Anderson Cooper, Camden, NJ; 4Einstein Healthcare Network, Philadelphia, PA
(Presented by: Timothy Ito)

Poster #49
A NEW MOLECULAR TARGETED THERAPEUTIC APPROACH FOR RENALCELL CARCINOMA WITH A P16 FUNCTIONAL PEPTIDE USING A NOVEL TRANSPORTER SYSTEM
Kenji Zennami, MD1, Yoshikawa Kazuhiro, PhD2, Kento Kanao, MD1, Kogenta Nakamura, MD1, Hirotugu Uemura, MD3, Toru Shimazui, MD4 and Makoto Sumitomo, MD5
1Department of Urology, Aichi Medical University School of Medicine, Aichi, Japan; 2Division of Advanced Research Promotion, Institute of Comprehensive medical Research, Aichi Medical University, Nagakute, Japan; 3Department of Urology, Kinki University School of Medicine, Osaka, Japan; 4Department of Urology, Ibaraki Clinical Education and Training Center, Faculty of Medicine, University of Tsukuba, Tsukuba, Japan; 5Aichi Medical University School of Medicine, Aichi, Japan
(Presented by: Kenji Zennami)
**Poster Session I – Summary**

**Poster #50**  
**METHOD OF OBESITY MEASUREMENT IMPACTS THE RELATIONSHIP BETWEEN OBESITY AND RENAL MASS COMPLEXITY**  
Laura Bertrand, MD¹, Lewis J. Thomas, MD¹, James A. Brown, MD¹,², Lyse A. Norian, PhD²,³,⁴ and Kenneth G. Nepple, MD¹,²  
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(Presented by: Laura Bertrand)

**Poster #52**  
**ACCELERATED GROWTH RATE OF MULTIFOCAL TUMORS AFTER INITIAL RADIOFREQUENCY ABLATION**  
Mario Taylor, Jason Rothwax¹, W. Marston Linehan, MD¹, Brad Wood, MD² and Adam Metwalli, MD¹  
¹Urologic Oncology Branch, National Cancer Institute National Institutes of Health, Bethesda, MD, USA; ²Center for Interventional Oncology, National Cancer Institute National Institutes of Health, Bethesda, MD, USA  
(Presented by: Mario Taylor)

**Poster #53**  
**HIGHER LEVELS OF SECRETED S100 A8/9 LEVELS FROM PERITUMOR PERIRENAL ADIPOSE TISSUES ARE ASSOCIATED WITH RENAL CELL CARCINOMA (RCC)**  
Zhamshid Okhunov, MD, Christopher Blair, Farahnaz Rahmatpanah, Shujuan Shao, Dan Mercola, Xiaolin Zi  
University of California, Irvine  
(Presented by: Zhamshid Okhunov)

**Poster #54**  
**PIPERLONGUMINE: A MULTITARGETED NATURAL AGENT FOR RENAL CANCER TREATMENT AND SECONDARY PREVENTION**  
Sei Naito¹, Peter Makov², Konstantin Golovine², Yoshihiko Tomita³, Robert Uzzo² and Vladimir Koloenko²  
¹Foxchase Cancer Center, Philadelphia, PA; ²Foxchase cancer center, Philadelphia, PA; ³Yamagata University Faculty of Medicine, Yamagata, Japan  
(Presented by: Sei Naito)

**Poster #55**  
**TITLE: COMPARING OUTCOMES FOR RHABDOID VERSUS SARCOMATOID FEATURES IN RENAL CELL CARCINOMA**  
Michael L. Blute, Jr., MD¹, Wei Huang, MD², Fangfang Shi, MS¹, Tracy M. Downs, MD¹, David F. Jarrard, MD¹ and E. Jason Abel, MD¹  
¹University of Wisconsin Department of Urology; ²University of Wisconsin Department of Pathology  
(Presented by: Michael L. Blute, Jr.)

**Poster #56**  
**REPEAT ROBOTIC PARTIAL NEPHRECTOMY FOR COMPLEX RENAL TUMORS: CHARACTERISTICS AND COMPLICATIONS**  
Annerleim Walton-Diaz, MD¹, Gennady Bratslavsky, MD², Peter A Pinto, MD¹, W Marston Linehan, MD¹ and Adam R Metwalli, MD¹  
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(Presented by: Annerleim Walton-Diaz)

**Poster #57**  
**TUMOR PURITY AND IMMUNE CELL INFILTRATION AS A PROGNOSTIC RISK PREDICTOR FOR CLEAR CELL RENAL CELL CARCINOMA**  
Andrew Winer, MD, Yasin Senbabaoglu, PhD, Samuel Kaffenberger, MD, Nils Weinhold, PhD, Debra Bemis, PhD, Jonathan Coleman, MD, Paul Russo, MD, James Hsieh, MD, PhD, Chris Sander, PhD, Ari Hakimi, MD  
Memorial Sloan Kettering Cancer Center, New York, NY  
(Presented by: Andrew Winer)
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Kenan Celtik, MS, Paras Shah, MD, Arvin George, MD, Simpa Salami, MD, Manaf Alom, MD, Christopher Hartman, MD, Jessica Kreshover, MD, Michael J. Schwartz, MD, Joph Steckel, MD, Lee Richstone, MD, Manish Vira, MD, Louis R. Kavoussi, MD
Hofstra North Shore LIJ School of Medicine, The Arthur Smith Institute for Urology, North Shore LIJ Health System, New Hyde Park, NY
(Presented by: Kenan Celtik)

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Jamie Pak, BA, Danny Lascano, BA, G. Joel DeCastro, MD, James McKiernan, MD, Mitchell Benson, MD
Columbia University College of Physicians and Surgeons, Department of Urology, New York, NY
(Presented by: Jamie Pak)

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H.Lee Moffitt Cancer Center and Research Institute, Tampa, FL
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Adam Weiner, BS, Sanjay Patel, MD, Scott Eggener, MD
University of Chicago, Chicago, IL
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1Mayo Clinic, Rochester, MN; 2Queen’s University, Kingston, ON, Canada; 3Bostwick Laboratories, Inc., Glen Allen, VA, USA; 4Duke University School of Medicine, Durham, NC, USA; 5Washington University School of Medicine, St. Louis, MO, USA; 6GlaxoSmithKline Inc., Metabolic Pathways and Cardiovascular R&D Unit, King of Prussia, Pennsylvania, PA, USA
(Presented by: Daniel Moreira)

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Khanh Pham, MD1, Claudio Jeldres, MD1, Christopher Porter, MD1 and Peter Nelson, MD2
1Virginia Mason, Seattle, WA; 2Fred Hutchinson Cancer Research Center, Seattle, WA
(Presented by: Khanh Pham)
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1Virginia Mason, Seattle, WA; 2Institute of Translational Health Sciences, Seattle, WA; 3University of Michigan, Ann Arbor, MI
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1Mayo Clinic, Rochester, MN; 2University of Toronto; 3Duke University
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1Brady Urological Institute, Johns Hopkins University, Baltimore, MD; 2GenomeDx Biosciences Inc, Vancouver BC
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1Brady Urological Institute; 2GenomeDX Biosciences Vancouver, BC, Canada; 3Brady Urological Institute, Baltimore, MD
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Johns Hopkins Medical Institutions, Baltimore, Maryland
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3Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH, USA; 4Quantitative Health Sciences, Cleveland Clinic, Cleveland, OH, USA; 5Anatomic Pathology, Cleveland Clinic, OH, USA
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1Mount Sinai Hospital/Icahn School of Medicine; 2Genomic Health, Inc., Redwood City, CA; 3New York–Presbyterian Hospital/Columbia University, New York, NY; 4Delaware Valley Urology, LLC, Voorhees, NJ
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(Presented by: Mark Gonzalgo)

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E. David Crawford, MD1, Gary Gustavsen, MS2, Doria Cole2 and Nico Lewine2
1University of Colorado at Denver, Aurora, CO; 2Health Advances, LLC, Weston, MA
(Presented by: E. David Crawford)

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(Presented by: Isabell Sesterhenn)
Poster Session I – Summary

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Kathleen McGinley, DO1, Stephanie (Xizi) Sun, BS2,3, Lauren Howard, MS2,3, William Aronson, MD4,5, Martha Terris, MD6,7, Christopher Kane, MD8, Christopher Amling, MD9, Matthew Cooperberg, MD, MPH10 and Stephen Freedland, MD11,3,12
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(Presented by: Kathleen McGinley)

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OUTCOMES OF ACTIVE SURVEILLANCE AFTER INITIAL SURVEILLANCE PROSTATE BIOPSY
Evan Kovac, MD, CM, FRCSC, Gregory Lieser, MD, Ahmed El-Shafei, MD, J. Stephen Jones, MD, Eric A. Klein, MD, Andrew J. Stephenson, MD
Cleveland Clinic, Cleveland Ohio
(Presented by: Evan Kovac)

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Steven V. Kardos, MD, Shu Pan, MD, Cayce Nawaf, MD, Richard Fan, BS, Daniel Cornfeld, MD, Jeffrey Weinreb, MD, Peter Schulam, MD, PhD, Preston Sprenkle, MD
Yale, New Haven, CT
(Presented by: Steven V. Kardos)

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PROJECTING THE LIFETIME COSTS OF MULTI-PARAMETRIC MRI BASED ACTIVE SURVEILLANCE IN LOW RISK PROSTATE CANCER – A BREAK-EVEN ANALYSIS
Noah Kalman, MD1, Michael Chang, MD1,2 and Drew Moghanaki, MD1,2
1Department of Radiation Oncology, Virginia Commonwealth University, Richmond, VA; 2Hunter Holmes McGuire VA Medical Center, Richmond, VA
(Presented by: Noah Kalman)
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Edouard J. Trabulsi, MD1, Kasra Yousefi, MSc2, Firas Abdollah, MD3, Leonard G. Gomella, MD1, Felix Y. Feng, MD4, Adam P. Dicker, MD, PhD1, Elai Davicioni, PhD2, Robert B. Den, MD1 and R. Jeffrey Karnes, MD5
1Sidney Kimmel Medical College of Thomas Jefferson University, Philadelphia, PA, USA; 2GenomeDx Biosciences Inc., Vancouver, BC, Canada; 3Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI, USA; 4University of Michigan, Ann Arbor, MI, USA; 5Department of Urology, Mayo Clinic, Rochester, MN, USA
(Presented by: R. Jeffrey Karnes)

Poster #83
OUTCOMES FOLLOWING IMMEDIATE VERSUS DELAYED RADICAL PROSTATECTOMY
Pauline Filippou, BS, Christopher Welty, MD, MS, Janet Cowan MA, Peter Carroll, MD, MPH
University of California, San Francisco, San Francisco, CA
(Presented by: Pauline Filippou)

Poster #84
LOSS OF MYD88 LEADS TO MORE AGGRESSIVE TRAMP PROSTATE CANCER AND INFLUENCES TUMOR INFILTRATING LYMPHOCYTES
Arnold Chin, MD, PhD1, Elizabeth Peek2, Hanwei Zhang, MD2 and Jiaoti Huang, MD, PhD2
1UCLA, Los Angeles CA; 2UCLA, Los Angeles, CA
(Presented by: Arnold Chin)

Poster #85
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William Sohn, MD1, David Penson, MD, MPH1, Matthew Resnick, MD1, Tatsuki Koyama, PhD1, Alicia Morgans, MD1, Sharon Phillips, MSPH1, Vivien Chen, MPH, PhD2, Matthew Cooperberg, MD, MPH3, Michael Goodman, MD, MPH4, Sheldon Greenfield, MD5, Ann Hamilton, PhD6, Karen Hoffman, MD, MHS7, Sherrie Kaplan, MPH, MS, PhD8, Lisa Paddock, MPH, PhD8, Antoinette Stroup, PhD8, Xiao-Cheng Wu, MD, MPH2 and Daniel Barocas, MD, MPH1
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(Presented by: William Sohn)

Poster #86
OLDER AGE PREDICTS UPGRADING ON CONFIRMATORY BIOPSY FOR MEN ON ACTIVE SURVEILLANCE
Christopher B. Anderson, MD, Itay Sternberg, MD, Gal Karen Paz, MD, Philip H. Kim, MD, Karim Touijer, MD, James Eastham, MD, Behfar Ehdai, MD
Memorial Sloan Kettering Cancer Center
(Presented by: Christopher B. Anderson)
**Poster Session I — Full Abstracts**

**Poster #1**

**PREDICTORS OF METASTATIC DISEASE AT DIAGNOSIS IN PATIENTS WITH UROTHELIAL CARCINOMA OF THE BLADDER**

Zachary Klaassen, MD, Rita P. Jen, MPH, Lael Reinstatler, MPH, John M. DiBianco, Austin J. Evans, Qiang Li, MD, PhD, Rabii Madi, MD and Martha K. Terris, MD

1Medical College of Georgia – Georgia Regents University, Augusta, GA; 2Ross University School of Medicine, Dominica, West Indies
(Presented by: Zachary Klaassen)

**Introduction:** Poor performance status and the presence of visceral metastasis are factors associated with poor prognosis in patients undergoing treatment for metastatic urothelial carcinoma (UC). However, to our knowledge factors that predict metastatic UC at diagnosis have not been reported. The objective of this study was to use a population-based cohort to identify independent predictors of metastatic disease at diagnosis in patients with UC of the bladder.

**Methods:** Patients with UC of the bladder were extracted from the SEER database from 2004–2010 (n=108,417). The primary outcome was metastatic disease at diagnosis. Demographic and socioeconomic variables were compared using descriptive statistics, and multivariable logistic regression models were performed to generate odds ratios (OR) and identify predictors of metastatic disease at diagnosis.

**Results:** There were 3,018 (2.8%) patients who had metastasis at diagnosis and 105,399 (97.2%) patients who had non-metastatic disease. Patients with metastatic disease were more likely to be female (29.6% vs 23.6%, p<0.0001), black (9.4% vs 5.0%, p<0.0001) and single/divorced/widowed (SDW) (44.1% vs 32.5%, p<0.0001) compared to patients with non-metastatic disease at diagnosis. Furthermore, patients with metastatic disease at diagnosis were more likely to be residing in a county with more people living in poverty (p=0.0002), unemployed (p<0.0001), poorly educated (% <9th grade, p<0.0001), foreign born (p<0.0001) and uninsured (p<0.0001) compared to patients with non-metastatic disease at diagnosis. After adjusting for age, gender, race, marital status, unemployed and foreign-born status, independent predictors of metastatic disease at diagnosis included female gender (vs male; OR 1.21, 95%CI 1.11–1.32), black race (vs white; OR 1.71, 95%CI 1.50–1.95), SDW status (vs married; OR 1.46, 95%CI 1.35–1.58), being unemployed (OR 1.02, 95%CI 1.01–1.03) and being foreign born (OR 1.01, 95%CI 1.00–1.01).

**Conclusion:** Female gender, black race, unmarried, unemployed and foreign-born status are independent predictors of metastasis at diagnosis. Consistent with other non-urologic malignancies, surrogates of poor socioeconomic status are predictors of metastasis at presentation. Urologists and oncologists should be aware of these potential health care disparities when assessing patients for UC.
Poster #2
GENETIC VARIANTS RELATED TO PRESENCE OF BLADDER CANCER IN A HIGH RISK, ARSENIC-EXPOSED POPULATION IN NORTHERN CHILE (ANTOFAGASTA)

Mario Fernández, MD¹,², Cecilia Vial, PhD¹, Karena Espinoza¹, Eduardo Chaparro, MD³, Patricio Valdebenito, MD³ and Gabriela Repetto, MD¹

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(Presented by: Mario Fernández)

Introduction: Inhabitants of a city in Northern Chile (Antofagasta) were exposed to arsenic levels up to seventeen times over the WHO recommendation between 1958 and 1971. Following this, incidence of bladder cancer (BC) in this city is currently 4 to 5 times higher than in the rest of the country (24.8 vs. 6/100,000). Specific mechanisms of arsenic-related carcinogenesis are so far unknown. Therefore, we aimed to perform a genome-wide association study on individuals exposed to arsenic, looking for genetic variants related to BC susceptibility among cases and controls.

Methods: Individuals were invited to participate after signing an informed consent. Epidemiologic data (demographics, smoking history, family history of cancer and medical history) were collected during an interview using a structured questionnaire and a blood sample was obtained. Patient characteristics were assessed by means of the Pearson χ² test, comparing cases with controls. Differences in continuous variables were evaluated by the Student’s t test. DNA samples were analyzed using Affymetrix Genome-Wide SNP Array 6.0. After filtering by missingness per individual, missingness per marker allele frequency and Hardy Weinberg Equilibrium we obtained 788,705 SNPs to be analyzed.

Results: Epidemiological data showed that males were predominant among cases and controls and there were no significant differences concerning mean age, familial history of BC, occupational exposure or smoking status between groups. Smoking prevalence was similarly high among cases and controls (59.5 and 58.3% respectively; p=0.55). The study population was found to be homogeneous after using principal component analysis for population stratification, clustering the different patients with the identity by state. After association tests comparing cases and controls two regions with a significant association were identified: (a) rs4838646 in chromosome 10 (p=3.8E−06) and (b) rs12371702 in chromosome 12 (p=5.8E−06). Previous studies have linked polymorphisms in the former region to BC susceptibility.

Conclusion: Initial results of a BC genomic case-control study in an arsenic exposed population are presented and yield candidate risk SNPs that need to be further validated in independent analyses. This study also provides additional insights into the genetics and biology of BC. However, further analysis is warranted after completion of recruitment. Funding: Fondecyt 1120987
Poster #3
MITOCHONDRIAL DNA CONTENT: ASSOCIATION WITH RISK OF BLADDER CANCER AND DETERMINATION OF SIGNIFICANT MITOCHONDRIAL DNA POLYMORPHISMS
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(Presented by: Stephen Williams)

Introduction: Mitochondrial DNA (mtDNA) content (also termed mtDNA copy number) has been shown to be associated with cancer susceptibility, however, the extent to which this association exists remains to be determined. The association between mtDNA content as well as polymorphisms in peripheral blood leukocytes and risk of bladder cancer has not been reported.

Methods: We identified 1,026 bladder cancer patients and compared these to 980 healthy-controls enrolled in an ongoing bladder cancer study at the MD Anderson Cancer Center. Multivariable logistic regression analysis was used to examine the association between mtDNA content in peripheral blood lymphocytes and the risk of bladder cancer. We then assessed mtDNA single nucleotide polymorphisms (SNPs) in a subset of these patients to identify potential SNPs associated with bladder cancer risk.

Results: Patients diagnosed with bladder cancer had significantly decreased mtDNA content when compared to control subjects (median: 0.98 vs. 1.04, p<0.001). Low mtDNA content (ie, less than the median in control subjects) was associated with a statistically significant increased risk of bladder cancer, when compared with high mtDNA content (odds ratio = 1.40, 95% CI = 1.16 to 1.68, p<0.001). In a trend analysis, a statistically significant dose–response relationship was detected between lower mtDNA content and increasing risk of bladder cancer (P for trend <0.001). When stratified by host characteristics, advanced age (>65 years), male/ female sex and positive smoking history were all significantly associated with low mtDNA content and increased risk of bladder cancer. We identified two unique mtDNA polymorphisms significantly associated with risk of bladder cancer: mitot10464c (Odds Ratio (OR) 95%CI: 1.39 (1.00–1.93), p=0.048) and mitoa4918g (OR 95% CI: 1.40 (1.00–1.95), p=0.049). Analysis of the joint effect of low mtDNA copy number and unfavorable mtDNA polymorphisms revealed a 2.5 fold increased risk of bladder cancer (OR 95% CI: 2.50 (1.60–3.94), p<0.001) with a significant interaction for genotype mitoa4918g (p for interaction = 0.028). Limitations include lack of external validation.

Conclusion: Low mtDNA content appears to be associated with increased risk of bladder cancer. We identified new susceptibility mtDNA alleles for bladder cancer risk that require further investigation into the biological underpinnings of bladder carcinogenesis.

Poster #4
DISTANCE TO TREATMENT FACILITY AND SURVIVAL OUTCOMES FOLLOWING RADICAL CYSTECTOMY FOR BLADDER CANCER
Ahmed Haddad, Nirmish Singla, MD, Neil Gupta, BSc, Ganesh Raj, MD, Arthur Sagalowsky, MD, Vitaly Margulis, MD, Yair Lotan, MD
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(Presented by: Ahmed Haddad)

Introduction: Regionalization of complex surgical oncology procedures has resulted in increased travel burden for many patients, with unknown consequences to quality of care and survival outcomes. To assess this further, we examined the association of travel distance on quality outcome measures for bladder cancer patients undergoing radical cystectomy as primary definitive therapy.

Methods: 408 patients who underwent radical cystectomy for bladder cancer at a single institution from 2007–2013 were included. We evaluated quality of care indicators including neoadjuvant chemotherapy use and time to cystectomy stratified by distance from treatment facility. Survival was assessed by multivariable Cox regression.

Results: 57% of patients lived within 50 miles of the treatment facility. There was no difference in time to cystectomy or the utilization of neoadjuvant chemotherapy between patients in different distance groups. On multivariate analysis, distance to treatment facility was the strongest predictor of 90-day mortality (OR 5.79, 95%CI 1.64–20.48, p=0.006, for patients traveling >150 vs. <50 miles). Although there was no difference in recurrence and cancer specific survival between distance groups, greater distance was associated worse overall survival (HR 1.59, 95% CI 1.00–2.52, p= 0.05, for patients traveling >150 vs. <50 miles) on multivariate analysis.

Conclusion: Distance to treatment facility did not impact quality measures including time to cystectomy or use of neoadjuvant chemotherapy, and there was no difference in cancer mortality between distance groups. There was a detrimental association of increased travel distance with 90-day mortality and overall survival which could reflect disparities in access to care after cystectomy.
Introduction: Noninvasive methods to detect circulating or urine tumor DNA (utDNA) are expected to transform the management of cancer patients. Given the importance of surveillance in management of non-muscle invasive bladder cancer (NMIBC), the ability of next generation sequencing (NGS) methods to identify the presence of utDNA was explored. A Genomic Health funded feasibility study using comprehensive NGS on 2 patients was performed to evaluate the value of global and individual markers for the detection of utDNA in clarified urine and urine sediment, focusing on detecting copy number aberrations (CNAs), differentially methylated regions (DMRs), and somatic single nucleotide variations (SNVs).

Methods: DNA was isolated from fixed paraffin embedded primary tumor, buffy coat cells, clarified urine and urine sediment from 2 patients diagnosed with Tis high grade NMIBC. One patient had a recurrence with multiple tumors 1.5 months after original resection and the other was newly diagnosed with a 4.4 cm lesion. CNAs and DMRs were detected using whole genome bisulfite sequencing (WGBS), and SNV by targeted-sequencing of 346 cancer-associated markers. Percent utDNA was estimated from the ratio (urine:tumor) of SNV, CNA or methylation sites compared to buffy coat.

Results: WGBS detected tumor specific CNA and methylation alterations in each primary tumor compared to buffy coat. By analyzing the genome using 100 Kb bins, we observed over 240 bins with detectable CNA signal. We observed over 75,000 CpG sites with differential methylation signal. Only one of the patient tumor samples had informative somatic SNV sites. CNA and DMR, and SNV for one patient, provided similar estimates of utDNA fraction within each patient, indicating around 50% in one patient and nearly 100% in the other. Estimates of tumor fraction were similar for clarified urine and sediment. Interestingly, measures for CNA and DMR allowed the detection of more aberrant regions than were detected in the sample obtained from the primary tumor.

Conclusion: Individual somatic SNVs in urine can be detected in recurrent disease, but one of two tumors was not informative for SNVs. Measuring and integrating CNAs or DMRs across the genome provided consistent estimates of utDNA fraction in urine. The ability to detect utDNA alterations not observed in primary tumor sample may ultimately provide insight into tumor heterogeneity, progression and response to therapy.
Poster #6
AN INDIVIDUALIZED APPROACH TO BLADDER CANCER TREATMENT USING PATIENT-DERIVED CELL LINES TO PREDICT RESPONSE TO CHEMOTHERAPEUTIC AGENTS
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(Presented by: LaMont Barlow)

Introduction: Chemotherapy (both intravesical and systemic) can reduce the risk of recurrence and progression in various stages of bladder cancer. However, recurrence after treatment failure is associated with an increased risk of progression. There are currently no established methods for predicting patient-specific responses to treatment prior to drug selection. In our studies, we have developed a novel protocol for efficient establishment of cell lines from primary human bladder tumors, which enables in vitro drug sensitivity assays using chemotherapeutic agents.

Methods: Using an IRB-approved tissue acquisition protocol, informed consent was obtained prior to specimen acquisition for all samples. Specimens were obtained during standard transurethral resection of papillary bladder tumors. Following generation of a single-cell suspension, epithelial cells were isolated using immunomagnetic cell separation and used to establish adherent cell cultures using a novel protocol. We performed immunohistochemistry on parental tissue as well as cultured cells to confirm that the urothelial cancer phenotype was maintained during serial passaging. For sensitivity assays, cultured cells were passaged and treated with chemotherapeutic agents, followed by assessment of cell viability.

Results: To date, nine specimens from patients with papillary urothelial carcinoma have been obtained, resulting in the establishment of eight adherent cell lines. All established lines have been serially passaged (as high as P17) without significant decline in growth rate, and maintained expression of CK7, uroplakin III, p53, and Ki67 in patterns similar to parental tissue. Cells from line #7 were treated with mitomycin C, docetaxel, gemcitabine, and rapamycin at three different equivalent concentrations, resulting in a unique sensitivity profile that was reproduced in a replicate experiment performed at a later passage.

Conclusion: We have established a novel protocol for culture and rapid expansion of primary cells from human bladder tumors for assays of drug response. Ultimately, we envision that this approach will provide a basis for the design of patient-specific therapeutic regimens for bladder cancer.

Funding: Urology Care Foundation

Drug sensitivity profile for line #7. Drug sensitivity performed after 24-hour drug exposure followed by MTT proliferation assay. Optical density from MTT assay is proportional to viable cells present. Mean optical densities with 95% confidence intervals for six technical replicates of each drug dilution are shown. Statistical comparisons were made between DMSO only (pink bar) and each drug dilution.
Poster #7
MULTI-INSTITUTIONAL VALIDATION OF THE PREDICTIVE VALUE OF KI−67 IN PATIENTS WITH HIGH-GRADE UROTHELIAL CARCINOMA OF THE UPPER URINARY TRACT
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(Presented by: Laura-Maria Krabbe)

Introduction: To validate the independent predictive value of Ki−67 in patients with high-grade upper tract urothelial carcinoma (UTUC).

Methods: 475 patients from the international UTUC collaboration who underwent extirpative surgery for high-grade UTUC were included in this study. Immunohistochemical staining for Ki−67 was performed on tissue microarray (TMA) formed from this patient cohort. Ki−67 expression was assessed in a semi-quantitative fashion and considered overexpressed at a cut-off of 20%. Multivariate analyses (MVA) were performed to assess independent predictors of oncological outcomes and Harrell's C indices (HCl) were calculated for predictive models.

Results: Median age of the cohort was 69.7 years and 55.2% of patients were male. Ki−67 was overexpressed in 25.9% of patients. Ki−67 overexpression was significantly associated with ureteral tumor location, higher pT−stage, lymphovascular invasion, sessile tumor architecture, tumor necrosis, concomitant carcinoma in situ (CIS), and regional lymph node metastases. In Kaplan-Meier analyses, overexpressed Ki−67 was associated with worse recurrence-free (RFS) (HR 12.6, p<0.001) and cancer-specific survival (CSS) (HR 15.8, p<0.001). In MVA, Ki−67 was an independent predictor of RFS (HR 1.6, 95% CI 1.07−2.30, p=0.021) and CSS (HR 1.9, 95% CI 1.29−2.90, p=0.001). Ki−67 improved HCl from 0.66 to 0.70 (p<0.0001) for both RFS and CSS in our preoperative model, and from 0.81 to 0.82 (p=0.0018) for RFS and 0.81 to 0.83 (p=0.005) for CSS in our post-operative model.

Conclusion: Ki−67 was validated as an independent prognostic predictor of RFS and CSS in patients treated with extirpative surgery for high-grade UTUC in a large, multi-institutional cohort.
Poster #8
THE IMPACT OF DEFINITIVE PROSTATE CANCER TREATMENT ON POSITIVE MARGINS AT TIME OF RADICAL CYSTECTOMY
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(Presented by: Adam Luchey)

Introduction: Positive soft tissue surgical margins (PSM) during the time of radical cystectomy (RC) drastically diminish cancer specific survival (CSS). Definitive treatment of prostate cancer (DTPC) has been linked to a delay in bladder cancer diagnosis, higher grade at time of RC, and more aggressive histological variants leading to a poorer survival. Our objective was to evaluate an existing link between DTPC and its effect on PSM.

Methods: There were 749 patients that underwent RC between 2000–2013. After excluding females and non-urothelial histologies, there were 561 men identified, of which 69 (12.3%) received single or multimodal DTPC (external beam radiation [7.1%], brachytherapy [7.0%], prostatectomy [1.1%], cryotherapy [0.2%] or hormonal therapy [3.4%]). We evaluated whether DTPC was associated with PSM as well as survival. Comparisons between categorical and continuous variables were analyzed using Fisher’s Exact Test and Wilcoxon Rank-Sum Test, respectively. Univariate and multivariable logistic regressions were used to determine the association between DTPC and PSM. Univariate and Multivariable Cox regression models were used to investigate the impact of DTPC and PSM on overall survival (OS) and recurrence-free survival (RFS). Competing risk regressions were also used to evaluate factors associated with CSS.

Results: Median age for the male population was 70.0 (IQR: 62.5, 76.5). There were 57 PSM in our cohort of 561 men (10.2%). In men who underwent DTPC, 20/69 (29.0%) had PSM compared to 37/492 (7.5%) in men who never received DTPC (p < 0.0001). Brachytherapy (OR =6.89, CI: 3.30−14.36), radiotherapy (OR=3.57, CI: 1.58–8.06), hormonal therapy (OR=3.28, CI: 1.04−10.39) and prostatectomy (OR=6.15, CI: 1.09–34.69) alone or in combination significantly increased the PSM rate in the univariate analysis. Brachytherapy remained an independent predictor when controlling for other PSM-related variables (OR=4.79, CI: 1.83–12.55). PSM was associated with OS (HR=2.79, CI: 1.74–4.44), RFS (HR = 3.11, CI: 2.00–4.83), and CSS (HR = 4.16, CI: 2.36–7.33). Although a history of DTPC increased PSM, it did not have a direct impact on OS or RFS.

Conclusion: Patients with a history of DTPC, specifically brachytherapy, are at increased risk of having PSM. In addition, PSM decreased OS, RFS and CSS. Careful planning along with wide surgical excision is crucial in dealing with patients undergoing a RC with a history of DTPC.
Poster #9
CHANGE IN CO2 PREDICTS HOSPITAL READMISSION FOR FAILURE TO THRIVE AFTER RADICAL CYSTECTOMY: A SERIES OF OVER 600 PATIENTS
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(Presented by: Mark Tyson)

Introduction: Failure to thrive (FTT) is one of the most common reasons patients are readmitted after radical cystectomy. In this study, we evaluate the predictive factors associated with this reason for readmission.

Methods: Our institutional cystectomy dataset was queried for patients who underwent cystectomy from 1998 to 2013 (n=643). Of these, 22.9% (n=144) were readmitted to our institution within 90 days of discharge. Of these readmissions, 25.6% (n=37) were admitted with the primary diagnosis of FTT (which includes dehydration, anorexia, weakness, etc). To determine the predictors of FTT, a logistic regression analysis was performed which included terms for age, sex, diversion type, pathologic stage and change in postoperative CO2 levels. Interaction terms were included to assess the impact of age and renal function on CO2 levels.

Results: On univariate analysis, two variables were associated with hospital readmission for FTT: age greater than 75 years and mean change in CO2. Approximately 11.2% of patients older than 75 years were readmitted for FTT compared to 4.1% of patients under the age of 75 (p=0.001). The mean change in CO2 for patients readmitted for FTT was −2.4 mmol/L compared to −0.8 mmol/L among patients that were not readmitted (p=0.02). There were no differences with respect to surgical approach (robotic vs. open), gender, type of diversion (conduit vs continent), total operative time, body mass index, total lymph node yield, lymph node positivity, estimated blood loss, total number of units of blood transfused, American Society of Anesthesiology score, or pathologic stage. On multivariable logistic regression analysis, age greater than 75 years (OR 3.35; 95% CI: 1.51−7.39; p=0.003), continent forms of diversion (OR 2.39; 95% CI: 1.01−5.72; p=0.049), and a drop in CO2 >= 6mmol/L (OR 3.31; 95% CI: 1.44−7.58; p=0.005) retained their significant association with readmission for FTT. An interaction term was included to determine the impact of age and baseline renal function on change in CO2, which was nonsignificant.

Conclusion: Among patients undergoing radical cystectomy, the risk of readmission for FTT is highest among patients older than 75 years who undergo continent forms of diversion and experience a drop in CO2 greater than 6mmol/L.
**Poster #10**  
**BLADDER UROTHELIAL CARCINOMA: PREDICTORS OF SUICIDE IN A POPULATION-BASED COHORT**  
Zachary Klaassen, MD¹, Rita P. Jen, MPH¹, Lael Reinstatler, MPH¹, John M. DiBianco², Daniel Belew¹, Qiang Li, MD, PhD¹, Rabii Madi, MD¹ and Martha K. Terris, MD¹  
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(Presented by: Zachary Klaassen)

**Introduction:** Patients diagnosed with bladder cancer (BC) may experience emotional distress and anxiety, potentially developing clinical levels of depression that require medical intervention. The American College of Surgeons' Commission on Cancer and the National Comprehensive Cancer Network have developed protocols for screening and identifying levels of emotional distress in cancer patients. To our knowledge, the burden of suicide in patients with BC has not been completely elucidated. We sought to identify predictors of suicide in patients diagnosed with BC using a population-based cohort.  

**Methods:** All patients with BC (urothelial carcinoma) were extracted from the SEER database from 1988–2010 (n=235,262). Among these patients, 439 (0.2%) were dead of suicide, 112,102 (47.7%) were dead of other causes, and 122,721 (52.1%) were alive. Standardized Mortality Ratios (SMR) were used to compare suicide rates to the general population based on data from the US National Center for Injury Prevention and Control. Multivariable logistic regression (after adjusting for appropriate sociodemographic and clinical variables) was performed to generate odds ratios (OR) to identify factors associated with suicide.  

**Results:** The SMR for the overall study population was 2.71 (95%CI 2.02–3.63) compared to the general population. Other significant SMRs compared to the general population include: males (1.84, 95%CI 1.40–2.38), single divorced, widowed (SDW) status (3.41, 95%CI 2.57–4.38), Caucasian (2.60, 95%CI 1.91–3.40), no cystectomy (2.66, 95%CI 1.95–3.53), regional (5.90, 95%CI 4.80–7.24) and distant disease (8.28, 95%CI 6.90–9.79). On multivariable analysis, independent predictors of suicide include age (continuous) (OR 1.03, 95%CI 1.03–1.04), male (OR 6.63, 95%CI 4.29–10.25), SDW status (vs married, OR 1.65, 95%CI 1.34–2.03), regional disease (vs localized, OR 3.67, 95%CI 2.77–4.86), distant disease (vs localized, OR 5.43, 95%CI 2.51–11.76), and no cystectomy (vs cystectomy, OR 1.72, 95%CI 1.17–2.53).  

**Conclusion:** Based on this population-level analysis, older age, male, Caucasian, and SDW status, in addition to aggressive, non-operative disease are independent risk factors for suicide in patients diagnosed with BC. Although a potentially morbid procedure, radical cystectomy was not a risk factor for suicide. This information may be useful for clinicians when counseling patients with BC and in screening for emotional distress and depression.
Introduction: Exosomes are 30–100nM membrane-bound vesicles that participate in intercellular communication and facilitate tumor microenvironments. The mechanisms by which exosomes modify tumor niches are not fully understood. One possibility is that exosomes deliver biologically active molecules like mRNA, protein, miRNA and long non coding RNA (lncRNA) that alter the metabolism of recipient cells to produce pathological phenotypes. Exosomes may also activate the expression of genes involved in tumor progression in recipient cells. Overexpression of the lncRNA HOTAIR (HA) is associated with poor prognosis and affects tumor progression, in part, by recruiting PRC2 and LSD1 chromatin repressive complexes to thousands of target genes.

Objective: Identify if HA regulates exosome-mediated bladder cancer (BC) tumor progression.

Methods: With IRB approval, tumors, distal normal tissue and urinary exosomes were collected from BC patients and HA levels were determined by qRT−PCR. qRT−PCR was also used to determine HA levels in BC cell lines: 5637, T24, TCC−SUP. HA was knocked down in T24 and TCC−UP cells with an shRNA lentiviral vector. Exosomes were harvested from shHOTAIR (shHA) and shScramble (shScr) BC cell lines. Migration and invasiveness was determined by wound-healing and trans-well assays, respectively. Changes in epithelial-to-mesenchyme transition (EMT) gene expression were measured by qRT−PCR. RNA−sequencing (RNA−Seq) of shHA vs shScr cells was performed and Ingenuity software was used for pathway analysis.

Results: HA is enriched in BC patient tumors, urinary exosome as well as BC cell lines. knockdown of HA in BC cell lines significantly reduces migration and invasion, which correlates with EMT gene expression changes. Exosomes isolated from shHA vs shScr cells fail to facilitate migration of lower-grade BC cell line. HA-containing exosomes facilitate increased migration and invasion of recipient cells, this phenotype correlates with elevated expression of EMT genes in recipient cells. RNA−Seq revealed several key pathways affected by HA expression.

Conclusion: HA is an important player in exosome-mediated BC tumor progression possibly through affects on gene expression of critical cellular pathways like EMT, PI3K/AKT and PTEN. Exosomes have the biochemical profile of their producer cell, suggesting that shHA exosomes have important shifts in biologically active contents resulting in loss of the ability to facilitate tumor progression.
Poster #12

DOES SQUAMOUS DIFFERENTIATION IN UROTHELIAL BLADDER CANCER HAVE A PROGNOSTIC SIGNIFICANCE?

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(Presented by: David Y. Yang)

Introduction: Understanding the impact of variant histology on prognosis is critical for patient management and counseling. We assessed whether squamous differentiation (SQD) conferred worse prognosis than non-variant (NV) urothelial bladder cancer in a contemporary cohort of radical cystectomy patients.

Methods: We identified patients with SQD or NV histology on TURBT and/or cystectomy pathology over a ten-year period. Disease-specific and overall survival were evaluated using Kaplan-Meier methodology. Cox regression assessed variables associated with mortality.

Results: 617 NV and 118 SQD patients were identified. 75% of SQD had muscle invasive disease at diagnosis compared with 59% of NV (p=0.002). Non-organ confined disease at cystectomy was more common in SQD (57% vs. 44%, p=0.009). 23% of patients received systemic chemotherapy (p=0.836). Median follow-up was 52 months. SQD and NV patients had similar overall survival when compared based on organ-confined disease at time of cystectomy or muscle invasion at TURBT (Figure). Adjusted for demographics, pathologic stage, and chemotherapy, SQD was not associated with increased risk of disease specific (HR 1.26, 95%CI 0.84−1.90, p=0.267) or all-cause mortality (HR 0.83, 95%CI 0.60−1.15, p=0.268).

Conclusion: Although SQD patients present at an advanced stage, squamous histology itself does not signify worse survival following cystectomy and management algorithms should be the same for traditional NV and SQD patients.
Poster #13
CAN WE DO BETTER?: THE DISCREPANCY BETWEEN PERCEPTION AND PRACTICE OF ENHANCED RECOVERY AFTER CYSTECTOMY PRINCIPLES AMONG UROLOGIC ONCOLOGISTS
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(Presented by: Janet Baack Kukreja)

Introduction: The concept of enhanced recovery after surgery (ERAS) has been around since the 1980s when it was first introduced as a means to improve post-operative recovery of general surgical patients. In the field of urology, the uptake of enhanced recovery pathways has been slow for unclear reasons. Recently, interest in enhanced recovery after cystectomy (ERAC) has been increasing but, the current urologic oncology practice patterns remain unclear. In this study, we investigate modern perioperative patterns of care and ERAC principle application rates by cystectomy surgeons.

Methods: Core ERAC principles were identified by reviewing urology and general surgery literature. An adapted version of The Royal College of Surgeons of England fast-track surgical principles survey was used. Surveys were distributed electronically to faculty of Society of Urologic Oncology fellowships with bladder cancer as a special area of interest. Additional participants were identified by publications on cystectomies for bladder cancer in the past 3 years. 128 surveys were e-mailed to the previously identified experts. Of these 60 (47%) completed the survey. The ERAC and non-ERAC group's responses were classified as congruent with commonly accepted ERAC principles (ERAC group) or non-congruent (non-ERAC group).

Results: Of the urologists who classified themselves in the ERAC group (67%), only 20% were practicing all the significant core interventions, not practicing one principle was seen in 13%, two in 35%, and three in 23% of the ERAC group. The average length of stay for the ERAC group was estimated at 6.1 days versus the non-ERAC group with 7.2 days (p=0.04). Significant differences were found between the two groups in regards to preoperative education (p=0.04), use of bowel prep (p=0.01), nasogastric tube use (p=0.02), alvimopan (Entereg) use (p<0.001), and early feeding (p=0.01). There were no differences in postoperative ambulation, opiate or NSAID use. Lack of convincing evidence was cited as the top reason why the non-ERAC group had not yet implemented an ERAC pathway, followed by lack of resource availability.

Conclusion: Urologists who consider themselves as practicing ERAC do not universally practice all of the pathway tenets. A significant gap exists between self-perception and ERAC principles being applied. ERAC implementation is challenging, but represents a significant opportunity to improve the care of patients undergoing cystectomy.
Poster #14
THE IMPACT OF SUBSEQUENT BLADDER MALIGNANCY AFTER PRIMARY UPPER TRACT UROTHELIAL CARCINOMA: A POPULATION BASED STUDY
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(Presented by: Qiang Li)

Introduction: The prognostic significance of bladder occurrence after primary upper tract urothelial carcinoma (UTUC) is controversial. We sought to determine the impact of subsequent bladder malignancy on urothelial cancer specific mortality (CSM) in a large population based dataset.

Methods: A cohort of 5005 patients who had a primary diagnosis of UTUC between 1988 and 2011 was identified within the nine registries of the SEER database. The Multiple Primary Standardized Incidence Ratios (MP–SIR) was calculated as a measure of the relative risk of a subsequent bladder cancer based on the incidence in the general population. Kaplan-Meier and Cox regression analysis were used to compare the urothelial cancer specific mortality between UTUC patients with or without a secondary bladder malignancy.

Results: UTUC patients had a significantly higher risk of being diagnosed with subsequent bladder malignancy compared with the general population (SIR=29.5, 95% CI 27.7–31.5). The respective SIR for subsequent bladder malignancy were 101.6 (95% CI 92.5–111.5) at less than 1 year; and 35.3 (95% CI 32.1–38.7) at 1 to 5 years; 6.9 (95% CI 5.2–8.3) at 5 to 10 years; and 2.9 (95% CI 1.8–4.5) at >= 10 years. Of 5005 UTUC patients, 939 (19%) patients had a secondary bladder malignancy. The median latency from the UTUC to subsequent bladder malignancy was 12 months (IQR 7, 24). The UTUC patients with subsequent bladder malignancy were less likely to present with distant stage (OR=0.07, CI 0.03–0.14) and poorly differentiated grade (OR 0.62, CI 0.45–0.85). The five-year urothelial cancer specific survival rate of those with subsequent bladder malignancy was 78.3%, compared to 60.2% of those without subsequent bladder malignancy (p<0.0001). After adjusting for age, gender, grade, stage, and primary tumor location, a subsequent bladder malignancy was associated with improved urothelial CSM [HR 0.73, CI 0.64–0.85].

Conclusion: UTUC survivors remain at a significantly higher risk of a subsequent bladder malignancy, however a secondary bladder tumor was associated with improved CSM. These findings highlight the need for rigorous long-term bladder surveillance for patients with UTUC. The survival difference could be a result of more aggressive UTUC patients not surviving to develop bladder malignancy whereas lower grade and stage UTUC may have subsequent bladder recurrence.
Poster Session I – Full Abstracts

Poster #15
THE EFFECT OF CONCOMITANT CARCINOMA IN SITU ON NEOADJUVANT CHEMOTHERAPY: INFERIOR PATHOLOGIC OUTCOMES, BUT NO EFFECT ON SURVIVAL
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(Presented by: William Parker)

Introduction: It is generally believed that carcinoma in-situ is refractory to chemotherapy but specific data validating this is lacking. The purpose of this study was to evaluate the effect of concomitant clinical carcinoma in situ (cCIS) on cancer specific outcomes following neoadjuvant chemotherapy (NAC) for muscle-invasive bladder cancer.

Methods: We performed an IRB approved multi-institutional, retrospective review of patients treated with NAC followed by radical cystectomy for muscle invasive bladder cancer from 2008−2012. Pre-treatment clinical variables were collected and the patients were stratified by the presence or absence of cCIS on pre-cystectomy transurethral resection of bladder tumor (TURBT) specimens. Pathologic outcomes, including rates of complete response (pT0N0Mx) following NAC were compared between the two groups. Recurrence-free, cancer-specific and overall survivals were analyzed.

Results: 189 patients met the criteria for evaluation, of whom 56 (29.6%) had concomitant carcinoma-in-situ. The presence of cCIS was associated with a significant reduction in the rate of pathologic complete response (10.7% versus 26.3%, p=0.02). This difference was significant in both univariate (OR 0.34; CI 0.13−0.85, p=0.02) and multivariable (OR 0.31; CI 0.12−0.81, p=0.02) analyses. Despite the reduction in complete response rates, the presence of cCIS was not associated with a difference in recurrence-free, cancer specific, or overall survival. Additionally, if down-staging to pCIS-only disease was considered as a complete response, there was no significant change in the recurrence-free, cancer specific, or overall survival.

Conclusion: Concomitant CIS is associated with a reduction in pathologic complete response rates but this does not appear to have an impact on survival outcomes.
Introduction: Metformin, a first-line oral therapy to treat type 2 diabetes, has gained interest for its anti-neoplastic properties as laboratory, animal, and clinical studies have shown beneficial effects of its use for various malignancies. Our objective was to evaluate the association between metformin use and oncologic outcomes in diabetic patients undergoing radical cystectomy (RC) for bladder cancer (BC).

Methods: A retrospective cohort (January 1997 – June 2013) of diabetic patients undergoing RC for BC at our institution was assembled. Use of anti-diabetic medication was assessed at the time of surgery. The outcome measures were recurrence-free (RFS), BC-specific (BCSS) survival, and overall survival (OS). Multivariable Cox-proportional hazards models were used. To create a parsimonious model, the change of estimate approach (10% threshold) was used as a variable selection strategy for final models of each outcome measure.

Results: Out of 421 patients, 85 (20.2%) had diabetes. There were 39 (45.9%) patients on metformin. Among diabetics, there were 21 patients with BC recurrence, 16 who died of BC, and 30 who died overall. In univariate Cox models, metformin use among diabetic patients was associated with significantly improved RFS (HR=0.54, 95% CI = 0.33–0.88, p=0.013) and near-significant improvement in BCSS (HR=0.65, 95% CI = 0.40–1.07, p=0.087), but not OS (HR=0.95, 95%CI=0.50–1.78, p=0.87). In multivariable Cox models, metformin use among diabetic patients was associated with significantly improved RFS (aHR=0.38, 95% CI = 0.20–0.72, p=0.003, adjusted for stage and margin status) and BCSS (aHR=0.53, 95% CI = 0.30–0.92, p=0.025, adjusted for stage and Charlson score), but not OS (HR=1.05, 95%CI=0.49–2.26, p=0.89, adjusted for stage and presence of CIS).

Conclusion: Clinical studies reporting on metformin use and outcomes in patients with BC are limited. Our study found an association between metformin use and improved RFS and BCSS in diabetic patients undergoing RC. Given that metformin has demonstrated safety among non-diabetics, and given its low cost, further studies are warranted to evaluate potential therapeutic and preventative roles of metformin in patients with BC.
Poster Session I – Full Abstracts

Poster #17
PREDICTING SURVIVAL AFTER RADICAL CYSTECTOMY: VALIDATION OF THE SPARC SCORE
Brian Hu, MD¹, Manuel Eisenberg, MD², Stephen Boorjian, MD³, Igor Frank, MD², Leo Dalag¹, Kamran Movassaghi¹, Prabin Thapa², Gus Miranda¹ and Siamak Daneshmand, MD¹
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(Presented by: Brian Hu)

Introduction: The Survival Prediction After Radical Cystectomy (SPARC) score (Eisenberg et al, J Urol 2013) incorporates clinical and pathologic features to predict cancer specific survival (CSS) for urothelial carcinoma of the bladder. Validation of this model would improve its generalizability.

Methods: Using the IRB-approved bladder cancer database at the University of Southern California (USC), we identified patients who underwent radical cystectomy (RC) for urothelial carcinoma of the bladder for curative intent from 1971–2009. Clinical factors (Charlson comorbidity index, ECOG performance status, hydronephrosis, adjuvant chemotherapy, smoking status) and pathologic factors (pathologic T stage, nodal status, multifocality, and lymphovascular invasion) included in the SPARC score were obtained. Patients were excluded if there were missing variables or if they underwent neoadjuvant chemotherapy. Associations between clinicopathologic factors and CSS were evaluated using Cox proportional hazards. Calibration plots were generated comparing actuarial CSS with SPARC predicted CSS by deciles. A c–index was generated to determine accuracy of the prediction. Kaplan Meier curves estimated CSS stratified by SPARC score and were compared with the log rank test.

Results: A total of 2045 patients underwent RC and 1123 (55%) met inclusion criteria with a median follow-up of 4.7 years (IQR 2.0–8.9 years). Of the 1123 patients, 332 (30%) died of bladder cancer. All the clinical and pathologic variables used in the SPARC scoring model were associated with CSS except for smoking status and tumor multifocality. Calibration plots demonstrated concordance between the SPARC-predicted and actuarial CSS with a c–index of 0.75. Kaplan Meier curves demonstrated significant differences in CSS based upon SPARC score, p<0.001 (Figure).

Conclusion: The SPARC score represents a valid instrument for predicting bladder CSS after RC. The model can be utilized to better tailor adjuvant therapy and surveillance.
Poster #18
PERSISTENT CANCER WITHIN THE PROSTATE AT THE TIME OF RADICAL CYSTOPROSTATECTOMY FOLLOWING PELVIC RADIATION THERAPY
Pranav Sharma, MD, Adam Luchey, MD, Shohreh Dickinson, MD, Jasreman Dhillon, MD, Philippe Spiess, MD, Julio Pow-Sang, MD, Wade Sexton, MD, Michael Poch, MD
Moffitt Cancer Center, Tampa, FL
(Presented by: Pranav Sharma)

Introduction: Although radical cystoprostatectomy (RC) is the accepted standard for the treatment of muscle-invasive bladder cancer (MIBC), functional outcomes such as potency and urinary control have yet to be optimized. This study analyzed the incidence of residual malignancy in the prostatic specimens of patients previously treated for prostate cancer (PCa) with pelvic radiation therapy (XRT) who subsequently developed bladder cancer (BC) requiring RC to determine if they would be appropriate candidates for prostate-sparing cystectomy (PSC) in the future.

Methods: We identified 62 men who were previously treated with pelvic XRT for PCa that subsequently developed BC and underwent a RC at our institution from July 2001 to 2013. Pathological reports were reviewed to assess for residual adenocarcinoma and/or urothelial carcinoma (UC) within the prostate. The volume and severity of residual prostatic malignancy were determined, and risk factors related to UC involvement of the prostate were analyzed.

Results: In our cohort of 62 men, 28 (45.2%) patients were previously treated with brachytherapy for PCa, 23 (37.1%) with external beam radiation therapy (EBRT), and 11 (17.7%) with both. On review of the pathology from the RC specimen, 13 (21.0%) patients had persistent adenocarcinoma within the prostate, 21 (33.9%) had UC, and 11 (17.7%) had both. Only 17 (27.4%) patients had no evidence of residual disease. Median residual prostatic adenocarcinoma tumor volume was 2.3 cm³ (interquartile range [IQR]: 1.3 – 2.7 cm³). Twenty-four of the 32 (75%) patients with residual UC within the prostate had stromal invasion (62.5% were pT4a), while 5 (15.6%) had ductal invasion, and 3 (9.4%) had CIS. Bladder tumors located at the bladder neck (BN) or trigone during initial TUR were strongly associated with prostatic involvement of UC, but this finding did not reach statistical significance (p=0.075; 95% confidence interval [CI]: 0.91 – 7.74).

Conclusion: Despite presumed treatment of PCa with XRT, less than one-third of patients had no evidence of residual disease within the prostatic specimen at the time of RC. The volume and severity of residual prostatic tumor was also higher than expected. PSC, therefore, would inappropriately compromise oncological outcomes despite possible improvements in quality of life (QOL). This study further reinforces RC as the appropriate treatment option for MIBC in this unique patient population.
Poster #19
EMETINE DIHYDROCHLORIDE PREFERENTIALLY MODULATES HIFα EXPRESSION IN BLADDER CANCER CELLS
Kimberly Foreman, PhD, Deval Patel, BS, Valerie Davidson, BS, Gopal Gupta, MD
Loyola University Chicago, Maywood IL
(Presented by: Gopal Gupta)

Introduction: Hypoxia is a common feature of solid tumors that induces a cascade of tumor glycolysis, angiogenesis, and other cell survival responses by activating transcription through hypoxia inducible factors (HIFs). HIFs are transcription factors that are constitutively expressed and tightly regulated in an oxygen dependent manner. Aberrant hypoxia signaling is considered a significant tumor-promoting event, and previous reports suggest HIFα is aberrantly overexpressed in bladder cancer, even under physiologic oxygen conditions. We have confirmed expression of functionally active HIF1α and HIF2α in cultured bladder cancer cell lines, but not normal urothelial cells. We recently reported that low, nanomolar concentrations of emetine dihydrochloride (emetine) act synergistically with cisplatin and gemcitabine to inhibit bladder cancer cell proliferation in vitro. Here, we examined the effect of emetine on HIF1α and HIF2α expression in bladder cancer cell lines and begin to elucidate the mechanisms by which emetine inhibits HIFα expression.

Methods: UMUC3, HT1376, and T24 invasive bladder cancer cell lines were cultured under standard conditions. As indicated, cells were treated with emetine, MG132 (a proteasome inhibitor), or cycloheximide (a protein synthesis inhibitor). Western blot was performed using nuclear extracts from treated cells and antibodies directed against HIF1α, HIF2α, and HIF1β.

Results: Treatment of bladder cancer cells with emetine decreased expression of HIF1α and HIF2α, but not HIF1β in a dose dependent manner. Using reverse transcriptase quantitative PCR, we demonstrated that emetine did not modulate HIFα at the transcriptional level. Instead, HIFα was modulated at both the level of protein synthesis and proteasome degradation as demonstrated by western blot of bladder cancer cells treated with cycloheximide or MG132 and emetine.

Conclusion: Emetine is a known inhibitor of protein synthesis at micromolar concentrations. However, we found low nanomolar concentrations of emetine completely inhibit expression of HIF1α and HIF2α, but not HIF1β. The decrease in HIFα expression was due in part to protein synthesis inhibition, but proteasome degradation also contributed significantly to the results. Given the important role of HIF proteins and hypoxia signaling in promoting tumor growth and progression, patients may benefit from treatment with a HIFα inhibitor, like emetine, in addition to their standard therapeutic regimen.
Poster #20
RADICAL CYSTECTOMY WITH CURATIVE INTENT FOR REFRACTORY CARCINOMA IN SITU OF THE BLADDER: INSIGHT INTO PATIENT OUTCOMES AND PATTERNS OF CARE
Gautum Agarwal, MD1, Oscar Valderrama, MD1, Patrick Espiritu, MD1, Adam Luchey, MD1, Jorge Lockhart, MD2, Julio Powsang, MD1, Wade Sexton, MD1, Michael Poch, MD1 and Philippe E Spiess, MD1
1H. Lee Moffitt Cancer Center, Tampa, Florida; 2University of South Florida, Tampa, Florida
(Presented by: Gautum Agarwal)

Introduction: Determining whether to recommend radical cystectomy (RC) for patients with carcinoma in situ (CIS) of the bladder is dependent upon multiple factors including patient preference, accurate clinical staging and response to intravesical therapy. The purpose of this study was to determine the effects on upstaging and complications of late compared to early RC in patients with primary CIS of the bladder.

Methods: We performed a single institution, IRB approved, retrospective review of patients who underwent RC for bladder cancer (BC) from 2001–2013. Statistical analyses (Kaplan-Meier) were performed between multiple variables including: age, number of TURBT’s performed, number of induction intravesical instillations (IVT), time from initial diagnosis to RC, complications based on the Clavien-Dindo scoring system, and ASA score. The early RC group included patients who had ≤ 2 IVT’s, or < 24 months between diagnosis and RC.

Results: 732 patients were identified who underwent RC for BC; of this group 42 patients had primary CIS prior to surgery. There were 21 patients each in the early and late cystectomy cohorts. The median age of all patients was 73 years old (IQR 66–77), time from diagnosis to RC was 27 months (IQR 11–59), number of TURBT’s performed 3.5 (IQR 2.8–5) and IVT’s 2.5 (IQR 2–4). The median overall survival (OS) was 5 years (95% CI 3.3–6.8) and there was no significant difference in OS between early and late RC groups, p=0.37. Overall 31% of patients were upstaged (from CIS to cT1–T4 disease), with 43% upstaging in the late group compared to 21% for the early group. Older patients (p= 0.048) and those with higher ASA scores (p = 0.02) were more likely to have > 2 IVT’s and ≥ 24 months between diagnosis and RC respectively. Patients who had a late cystectomy were subject to a complication rate of 67% compared to 42% for those with early cystectomy. All patients except 2 received an induction course of BCG after their first TURBT.

Conclusion: Our results demonstrate an increase in the number of patients that were upstaged and a higher complication rate in the late compared to early RC group for CIS of the bladder. In addition, patients who have a higher ASA score or are older are more likely to undergo late RC. In order to achieve optimal outcomes for patients with BCG refractory CIS of the bladder, it is imperative to perform radical cystectomy in a timely manner.
**Poster Session I – Full Abstracts**

**Poster #21**

**CLINICO-BIOLOGICAL PROGNOSTIC SCORE FOR PREDICTION OF ONCOLOGICAL OUTCOMES AFTER RADICAL CYSTECTOMY FOR SQUAMOUS CELL CARCINOMA OF THE BLADDER**

Ramy Youssef, Payal Kapur, MD\(^1\), Dina Wahib, MD\(^1\), Ahmed Mosbah, MD\(^2\), Hassan Abol-Enein, MD\(^2\), Mohamed Ghouiem, MD\(^2\) and Yair Lotan, MD\(^3\)

\(^1\)Pathology, UT Southwestern Medical Center, Dallas, TX; \(^2\)Urology, Urology and Nephrology Center, Mansoura, Egypt; \(^3\)Urology, UT Southwestern Medical Center, Dallas, Texas

(Presented by: Ramy Youssef)

**Introduction:** Clinico-pathological and molecular profiles were correlated to clinical outcomes in patients treated with radical cystectomy due to squamous cell carcinoma (SCC) of the urinary bladder to identify a prognostic model that combines both clinical and pathological prognostics.

**Methods:** Immunohistochemistry for 14 biomarkers (p53, p21, p27, cyclin E, ki67, COX−2, EGFR, FGF−2, VEGF, Bcl−2, Caspace−3, Bax, ERK, TSP−1) was performed on tissue microarray sections of 151 radical cystectomy specimens with pure SCC. The prognostic biomarkers were determined and a 3 risk category molecular score was defined based on number of alterations. A 3 risk category clinical score was defined based on disease free survival (DFS) probabilities estimated by MSKCC post cystectomy nomogram combining 7 clinico-pathological parameters (http://nomograms.mskcc.org/Bladder/PostSurgery.aspx). The sum of 2 scores was used to define a poor prognostic score (> 3 prognostic sum) and was correlated to DFS.

**Results:** The study included 151 patients (98 men and 53 women, mean age 52 years, 122 (81%) associated with bilharziasis). The pathological stage was T2 in 50%, T3 in 38%, T1 and T4 in 6% each; low grade in 53%; lymph node metastasis in 30.5% and lymphovascular invasion in 16% of patients. Median follow up was 63.2 months. The best prognostic panel of markers included (COX−2, FGF−2, P53, Bax) according to significance in Kaplan-Meier analyses. COX−2 was associated with advanced stage and high grade; FGF−2 was associated with high grade, LN and LVI; and p53 was associated with high stage (p ≤ 0.05). The marker score was defined as (1 or low risk if no or 1 marker altered, 2 or intermediate risk if 2 markers were altered, and 3 when > 2 markers were altered). The clinical score was defined as (1 or low risk if DFS probability is > 80%, 2 or intermediate risk if DFS is 60–80%, and 3 when DFS < 60%). The poor prognostic score was defined if the sum of 2 scores was > 3). The poor prognostic score was associated with disease recurrence in Kaplan Meier analysis (P < 0.001); and was an independent predictor of disease recurrence (HR 3.2, and p=0. 02, CI 1.168–8.524)

**Conclusion:** Biomarkers can help classic clinic-pathological prognostics for prediction of poor outcome after radical cystectomy for SCC. A prognostic score combining clinical and molecular prognostics can be utilized for patient counseling, selection for adjuvant therapies and design of clinical trials.
Introduction: Herein we define the best prognostic biomarkers in bilharzial and non-bilharzial related bladder cancer (BBC and NBBC) after radical cystectomy (RC). We also determine the clinico-pathological differences between BBC and NBBC.

Methods: Immunohistochemical (IHC) staining for 14 markers (p53, p21, p27, cyclin E, ki67, COX−2, EGFR, FGF−2, VEGF, Bcl−2, Caspace−3, Bax, ERK, TSP−I) was performed in 315 patients treated with RC. Patients were divided into 2 groups: Group 1 comprised 205 patients (65%) with BBC and group 2 comprised 110 patients (35%) with NBBC. Clinico-pathological differences were compared and markers were correlated to clinical outcome in both groups.

Results: The study included 315 patients (239 males and 76 females) with median age 54 y (range 31−79). There was significant difference in histological types, tumor stage, grade, and architecture between both groups (P < 0.05). BBC presented with lower grade, higher stage, and non-papillary non-urothelial carcinoma. COX−2 expression was the best independent predictor of disease recurrence (HR 1.9, CI 0.99−3.626 and P= 0.05) and cancer specific mortality (HR 2.8, CI 1.155−6.73 and P= 0.023) in BBC. Ki−67 was the only marker associated with disease recurrence in NBBC in Kaplan-Meier survival analyses (HR 4.2, p =.038)

Conclusion: BBC differs pathologically and biologically from NBBC. BBCs present more frequently as low-grade, high stage non-papillary and non-urothelial cancers. Our findings support the need for further evaluation of COX−2-targeted prevention and therapies in bladder cancers developing on top of chronic inflammation. Ki−67 might represent a good prognostic marker regardless to histological type of BC at Western countries, but this should be further studied.
Poster #23  
PRECLINICAL MODEL OF DUAL-SPECIFIC, MTOR COMPLEX 1 (TORC1) AND MTOR COMPLEX 2 (TORC2) INHIBITORS FOR BLADDER CANCER TREATMENT  
Vladimir Valera, MD, PhD, Sensuke Konno, PhD, Muhammad Choudhury, MD, John Phillips, MD  
Department of Urology. New York Medical College. Valhalla NY  
(Presented by: Vladimir Valera)

Introduction: The mammalian Target of Rapamycin (mTOR) pathway has been consistently shown to be deregulated in bladder cancer. More specifically, key regulators of this pathway such as Insulin Growth Factor (IGFR), PTEN and TP53 have been found to be either overexpressed or inactivated. In the clinical setting, first and second generation mTOR inhibitors such as Rapamycin and other rapalogs (Temsirolimus, Everolimus) have failed to show significant single-agent antitumor efficacy as a result of the inability of the rapalogs to maintain a complete blockade of mTOR-mediated signaling or the selective inactivation of the mTOR complex 1 (TORC1). New generation, dual specific ATP binding mTOR complex 1 and 2 (TORC1/TORC2) antagonist have shown promising results in several solid tumors in preclinical trials. In this study, we aimed to evaluate the impact of TORC1/TORC2 inhibitors on bladder cancer in vitro as a potential novel therapeutic approach.  

Methods: Three TP53 null, PTEN −/− bladder cancer cell lines derived from primary tumors (5637, T24, UM−UC−3) were analyzed for in vitro cell viability and induction of apoptosis after treatment with increasing amounts (0−100 µM) of two TORC1/TORC2 inhibitors (INK128 and Palomid 529) for 6, 12, 24 and 48 hours. After obtaining IC50 values, treated cells were assayed for the impact of inhibitors on cell apoptosis as evaluated by activated Caspase−3 activity on cell lysates and PARP cleavage by Western Blot. Downstream effectors activity for TORC1 and TORC2 pathways were also evaluated by Western Blotting. Impact on cell motility was evaluated by cell migration (scratch) assay.

Results: In vitro, both dual specific mTOR inhibitors INK128 and Palomid 529 inhibited bladder cancer cell proliferation in a dose and time dependent manner with IC50 in the 2−20 nM range. They also significantly induced apoptosis as demonstrated by a 2 to 6-fold increase in Caspase−3 activity and PARP cleavage compared to untreated cells. Such apoptosis induction was cell−dependent with UM−UC−3 cells being the most sensitive. Treatment also significantly reduced the phosphorylation status TORC1/ TORC2 pathways downstream effectors such as S6K, 4EBP1, AKT and PKC−α in a dose dependent manner.

Conclusion: The results shed light on the significance of mTOR pathway and the potential use of dual-specific mTOR (TORC1/ TORC2) inhibitors for bladder cancer treatment.
**Poster #24**  
FUNCTIONAL AND CLINICOPATHOLOGIC OUTCOMES OF A MODIFIED VESCICA ILEALE PADOVANA NEOBLADDER TECHNIQUE  
Chandra K. Flack, MD, M. Francesca Monn, MD, MPH, Hristos Z. Kaimakliotis, MD, Michael O. Koch, MD  
Indiana University School of Medicine, Indianapolis, IN  
(Presented by: Chandra K. Flack)  

**Introduction:** Modified creation of the Vescica ileale Padovana (VIP) neobladder has been performed at our institution over a 25-year period. We sought to evaluate the clinicopathologic and functional outcomes of this technique.  

**Methods:** Data for 160 patients at a single institution who underwent radical cystectomy and orthotopic VIP neobladder creation between 1998 and 2013 was analyzed. Functional and clinicopathologic outcomes were the primary outcomes of interest. Modified VIP technique involved longitudinal opening of the small bowel close to the mesenteric border instead of along the true anti-mesentery. This allowed for a longer neourethral funnel and a large serosal surface for ureteral anastomosis distant from any suture lines.  

**Results:** Mean age for the entire cohort was 59.5, with 9% female and 64% with muscle invasive disease at diagnosis. Sixteen patients (10%) developed a Clavien grade 3−4 complication within 30 days of surgery and no patients died within 30 days of surgery. Ninety-six percent reported minor or no daytime urinary leakage at 12 months, and 70% reported minor or no nighttime urinary leakage. Two- and five-year overall survival rates were 84.2% and 72.6%, respectively. Eight patients had a ureteral stricture, five had bladder neck contractures, one experienced urethral recurrence, and there were no vesicovaginal fistulas.  

**Conclusion:** This modified VIP neobladder achieves favorable functional outcomes similar to other published orthotopic continent diversions. It allows for a longer funnel, which may contribute to nighttime continence, and it creates a large uretero-enteric anastomosis site distant from bowel suture lines, which may decrease stricture rates. Lack of posterior overlapping suture lines also mitigates the risk of fistulae formation should anterior vaginal wall excision or entry be unavoidable. Excellent functional outcomes and low complication rates may increase utilization of this orthotopic neobladder technique.  

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<th>Quality of life outcomes and complications</th>
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<td>Patients (%)</td>
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<td><strong>Patients experiencing 30 day complications</strong></td>
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<tr>
<td>Clavien 4</td>
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<tr>
<td>Clavien 5</td>
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<tr>
<td>Mild hydrenephrosis at 3 weeks*</td>
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<tr>
<td>Mild hydrenephrosis at 12 months*</td>
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<tr>
<td>Need to catheterize 1/2 day at 12 months*</td>
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<td>Need to catheterize to empty at 12 mo.*</td>
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<tr>
<td>Daytime control at 12 months**</td>
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<td>No leakage</td>
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<td>Major leakage</td>
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<td>Nighttime control at 12 months***</td>
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<td>No leak</td>
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<td>Occasional low leakage</td>
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<td>Occasional high leakage</td>
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<td>Ureteral stricture</td>
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<td>Urethral stricture/ bladder neck contracture</td>
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<td>Vesicovaginal fistula</td>
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<td>Urethral recurrence</td>
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*15 patients died without returning for a twelve-month appointment  
**daytime control available for 97 patients  
***nighttime control available for 106 patients

(a) A 40-50 cm distal ileal segment is chosen approximately 15-20 cm from the ileocecal valve and (b) is folded into a sideways “U” configuration. The small bowel is opened longitudinally, close to the mesenteric border instead of along the true anti-mesentery. (c) The distal segment of bowel is tubularized into the neourethra and (d) the proximal segment is folded into a spiral configuration with adjacent bowel sutured together to approximate the new posterior wall. (e) The pouch is folded onto itself in a cephalad to caudal fashion and both ureters are reimplanted anteriorly on their respective sides.
Poster #25
INVESTIGATING PATTERNS OF CARE FOR TREATMENT OF MUSCLE-INVASIVE BLADDER CANCER IN A MULTI-PAYER STATE DATABASE
Peter Greene, MD, Matthew Lyons, MD, E. Sophie Spencer, MD, Anne Marie Meyer, PhD, Ke Meng, PhD, Raj Pruthi, MD, Eric Wallen, MD, Michael Woods, MD, Matthew Nielsen, MD, MS, Angela Smith, MD, MS
University of North Carolina– Chapel Hill
(Presented by: Peter Greene)

Introduction: Although cystectomy or trimodality therapy (chemo-radiation) represents the gold standard treatment for muscle-invasive bladder cancer (MIBC), SEER-Medicare studies suggest that utilization remains low. To address age-related limitations of Medicare analyses, our objective was to evaluate patterns of care for MIBC in a unique multi-payer database including private and public payers in the state of North Carolina (NC). We hypothesized that patients with private and Medicare insurance would be more likely to receive guidelines-concordant therapy when compared with Medicaid patients.

Methods: Using a linked data resource combining NC Central Cancer Registry with administrative claims data from Medicare, Medicaid, and private insurance plans, we included adult patients diagnosed with Stage 2 bladder cancer from 2003–2008. We then created two mutually exclusive treatment groups (standard treatment: cystectomy or chemo-radiation; non-standard treatment: “other therapy” or no treatment). Univariable and bivariable analyses were performed and multivariable logistic regression was used to model the probability of receiving non-standard treatment.

Results: A total of 683 patients were identified with 302 patients included in the analytic sample. Mean age of those undergoing standard treatment was 73.4 compared to 77.6 years in the non-standard group (p<0.001). Other differences noted on bivariable analysis included race, insurance status (with more black and Medicaid patients receiving non-standard treatment) (p<0.01). On multivariable analysis, older age, non-Hispanic black race, and Medicaid insurance remained significant predictors of receipt of non-standard treatment, when controlling for other covariates (see table).

Conclusion: In a multi-payer state database, receipt of standard therapy appears to be associated with non-Hispanic black race, Medicaid insurance, and older age. More research into the underlying reasons for these disparities is needed.
Poster 26
FUNCTIONAL OUTCOMES FOLLOWING RADICAL CYSTECTOMY IN WOMEN WITH BLADDER CANCER: A SYSTEMATIC REVIEW
Matthew Lyons, MD1, Angela Smith, MD, MS2, Karen Crowell MLIS2, E. Sophie Spencer, MD2, Peter Greene, MD2, Michael Woods, MD2, Eric Wallen, MD2, Raj Pruthi, MD2, Matthew Nielsen, MD, MS2 and Cheryl Lee, MD3
1University of North Carolina– Chapel Hill; 2University of North Carolina–Chapel Hill; 3University of Michigan
(Presented by: Matthew Lyons)

Introduction: While bladder cancer (BC) is more common among men, women often present with more advanced stage at diagnosis, leading to radical cystectomy (RC). Gender-specific differences in RC technique may lead to differences in functional outcomes. Our objective was to conduct a systematic review to assess female-specific functional outcomes following RC for bladder cancer.

Methods: With the aid of a librarian, a systematic review was conducted of published observational studies from 1966 to current, evaluating functional outcomes of women undergoing RC with urinary diversion for BC. Outcomes of interest included urinary and sexual function, and quality of life (QoL). Relevant studies were identified in a literature search of MEDLINE, EMBASE, and reference lists of relevant studies through July 2014.

Results: A total of 1,375 citations were retrieved, and 358 abstracts were reviewed. Although guidelines, systematic reviews, and other review articles were not considered eligible for inclusion, the references they cited were also examined to identify other possibly eligible studies. 80 total manuscripts were read in their entirety for the review, with a total of 44 included in the systematic review. A total of 32 studies investigated urinary function among women with neobladders. Definitions of incontinence varied greatly across studies, with rates for daytime incontinence ranging from 0–82%, nighttime incontinence 8–76%, and hypercontinence 0–58%. Mean cystometric capacity ranged from 240–631mL. Ten studies evaluated female sexual function following RC, with half using a validated questionnaire. The majority of studies reported significantly diminished sexual function following the procedure. Eight studies investigated QoL using a variety of validated and non-validated instruments. No differences in QoL were noted between diversion types. Contradictory findings were noted for preop and postop QoL with some studies noting no difference and others showing significant detriments. A single study investigated QoL as it relates to urinary function, with nocturnal incontinence associated with worse QoL.

Conclusion: Few studies investigate female-specific functional outcomes following RC, with the majority limited by small sample size & non-validated instruments. Sexual dysfunction, urinary continence, and QoL rates range significantly. Further studies examining the impact of gender-specific functional outcomes in a systematic way are greatly needed.
Poster #27
UNDERSTANDING THE RELATIONSHIP BETWEEN 30- AND 90-DAY EMERGENCY ROOM VISITS AND READMISSIONS FOLLOWING RADICAL CYSTECTOMY
Matthew Lyons, MD, Peter Greene, MD, E. Sophie Spencer, MD, Anne Marie Meyer, PhD, Ke Meng, PhD, Raj Pruthi, MD, Eric Wallen, MD, Michael Woods, MD, Matthew Nielsen, MD, MS, Angela Smith, MD, MS
University of North Carolina− Chapel Hill
(Presented by: Matthew Lyons)

Introduction: Readmissions are particularly common following radical cystectomy (RC) for bladder cancer, with several institutional case series demonstrating rates approximating 24%. Our objective was to determine the frequency of ER visits and readmissions within 30 and 90 days following RC for bladder cancer and establish the relationship between emergency room (ER) visits and readmissions at both time points using a state-wide multi-payer database.

Methods: Using a linked data resource combining North Carolina Central Cancer Registry with administrative claims data from Medicare, Medicaid, and private insurance plans, we included adult patients diagnosed with bladder cancer from 2003–2010 who received RC within 1 year after diagnosis. We identified readmissions and ER visits 30 and 31–90 days after discharge. Comparisons between 30– and 90–day readmissions and ER visits were performed using the chi-squared test.

Results: 842 patients were identified as receiving RC within 1 year of diagnosis. Mean age was 69 years, with 72% male. Approximately 19% (n=161) presented to the ER within 30 days, and 18% (n=152) presented to the ER within 31–90 days (total n=313). Of those who presented to the ER within 30 and 31–90 days, 63% and 74% were subsequently readmitted, respectively. Only 26% of the patients presenting to the ER were observed at both time points (see table). 30– and 90–day overall readmissions were also evaluated with 22% (n=189) readmitted within 30 days, and 21% (n=178) within 31–90 days. Approximately 30% of those readmitted within 30 days were also readmitted at 31–90 days. Finally, we evaluated those readmitted through the ER, with 12% (n=103) and 14% (n=115) readmitted within 30 days and 31–90 days after discharge, respectively. One quarter of patients readmitted through the ER within 30 days were also readmitted through the ER between 31–90 days.

Conclusion: To our knowledge, these results represent the first evaluation of 30– and 90–day readmissions following RC for BC in a population–based sample. An equal proportion of readmissions occur within 30 and 31–90 days following RC for bladder cancer with anywhere from one quarter to one third being readmitted at both time points.
Poster #28
DELAY IN DIAGNOSIS OF BLADDER CANCER FROM TIME OF INITIAL SYMPTOMS IN THE MEDICARE POPULATION: URINARY TRACT INFECTION AND SEX DISPARITIES
Kyle Richards, MD¹, Sandra Ham, MS², Joshua Cohn, MD³ and Gary Steinberg, MD³
¹The University of Wisconsin School of Medicine and Public Health Madison, WI; ²The Center for Health and the Social Sciences, University of Chicago, Chicago, IL; ³Department of Surgery, Section of Urology, University of Chicago Medical Center, Chicago, IL
(Presented by: Kyle Richards)

Introduction: Women have been shown to have an increased delay in bladder cancer (BCa) diagnosis compared to men, which might partially explain the disparate oncologic outcomes seen by sex. Our objective was to determine the delay in BCa diagnosis from initial symptoms by sex and its impact on pathologic and oncologic outcomes.

Methods: Using the Surveillance, Epidemiology and End Results (SEER) cancer registry linked with Medicare claims, we identified Medicare beneficiaries aged 66 years or older diagnosed with BCa from 2007−2009. We derived a cohort of patients with a claim for hematuria or urinary tract infection (UTI), whichever came first, within one year of their BCa claim. Furthermore, patients were required to have been present within the SEER/Medicare database for 2 years prior to their initial symptom claim without claims for hematuria, UTI, or BCa within this precedent period. We examined the impact of sex, demographic, and clinical factors on time from initial symptom claim to BCa diagnosis. We also examined the impact of sex and symptom claim on delay in diagnosis, pathologic, and oncologic outcomes.

Results: A total of 12,195 patients (9,326 men; 2,869 women) met inclusion criteria. The mean time from initial symptom claim to BCa claim was prolonged for women (72.2 days) compared to men (58.9 days, p<0.0001). A multinomial logistic regression model identified the greatest predictors of pT4 pathology were both women (OR 2.79, 95% CI 2.04−3.83) and men (OR 2.08, 95% CI 1.56−2.79) with UTI as initial diagnosis (men with hematuria as referent group). Cox proportional hazards analysis assessing risk factors for BCa−specific and overall mortality identified an increased risk of death in the women that presented with UTI (HR 1.72, 95% CI 1.46−2.03, and HR 1.41, 95% CI 1.28−1.56) compared to the men with hematuria as referent group.

Conclusion: Women experience delays in diagnosis compared to men. Both women and men initially presenting with UTI are at greatest odds of significant delays in diagnosis, adverse pathology, and risk of death from bladder cancer. Symptoms of UTI in older patients might be a harbinger of BCa and misdiagnosis may lead to inferior oncologic outcomes.
**Poster Session I — Full Abstracts**

**Poster #29**

**TRENDS AND PREDICTORS OF PALLIATIVE CARE SERVICES AND MORTALITY IN THE TREATMENT OF ADVANCED BLADDER CANCER**

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(Presented by: Tracy Rose)

**Introduction:** Palliation is an important therapeutic approach in patients with advanced bladder cancer when options for curative therapy are limited by extensive disease, comorbidities or poor performance status. Little data exist describing patterns of care in these patients. The objective of this study is to explore the frequency and predictors of different types of palliative treatment, as well as associated mortality, in advanced bladder cancer.

**Methods:** We identified patients with AJCC clinical stage II–IV bladder cancer from 2003–2010 using the National Cancer Data Base (NCDB), a national outcomes database that includes about 70% of all newly diagnosed cancer cases in the US. Palliative care in the NCDB was defined as care provided to aid symptoms without attempt to diagnose or treat the primary tumor.

**Results:** 2613 patients were identified who received palliative care as initial therapy for advanced bladder cancer. 36% were female, 87% Caucasian, and 67% were treated at a community program. 54% had stage IV disease. Mean age was 72. The most common type of palliative treatment was radiotherapy (XRT) for all stages. Patients with stage IV disease were more likely to receive chemo in 2007–2010 compared to 2003–2006 (p<0.01). Younger patients were more likely to receive chemo than surgery or XRT (p<0.01). Patients at academic centers were more likely to receive surgery than at community centers (p<0.01). Patients who had surgery were more likely to live further from their treating institution compared to patients receiving XRT or chemo (p<0.05). Chemotherapy was associated with the longest overall survival (OS) in stage III and IV patients (11.1 and 7.5 months, respectively). Multivariate analysis showed that type of care predicts OS after controlling for age, stage, metastases, distance to treating facility, facility type, and comorbidities (p<0.01).

**Conclusion:** The most common palliative treatment for advanced bladder cancer was XRT. Age, facility type, and distance to treating facility were predictive of type of palliative care received. Chemotherapy was associated with the longest OS in stage III and IV patients. Type of palliative care received predicts OS on multivariate analysis.
SURGICAL APGAR SCORE IS ASSOCIATED WITH AN INCREASED RISK FOR DEATH AND READMISSION FOLLOWING RADICAL CYSTECTOMY

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(Presented by: Timothy Ito)

Introduction: The Surgical Apgar Score (SAS) is an objective measure of the operative course based on EBL, lowest intraoperative heart rate and mean arterial pressure. It is a validated tool demonstrated to predict major complications and death following general/vascular surgery, where a lower SAS is associated with increasing rates of adverse postoperative events, but its use in urologic cohorts has been limited to date. We aimed to assess the performance of the SAS in patients undergoing radical cystectomy (RC).

Methods: Data for patients undergoing RC at a single institution from 2006–2011 was extracted from a prospectively collected database. Major complications (Clavien grade III or higher), readmissions, and deaths within 90 days of surgery were examined in addition to relevant preoperative data. SAS was calculated utilizing electronic anesthesia records.

Results: Of a final cohort of 308 patients, 32% of patients experienced a complication Clavien grade III or higher. The 90-day mortality rate was 6%. Major complications were associated with a significantly higher hospital length of stay (12 vs 8 days, p<0.0001) and readmission rate (54% vs 17%, p<0.0001). Lower SAS was significantly associated with readmission (SAS 6.0 vs 6.4, p=0.02) and trended towards having a significant association with 90-day mortality (SAS 5.6 vs 6.3, p=0.07) on univariate analysis. SAS however was not significantly associated with major complications. Significant predictors of 90-day mortality included advanced age (75 vs 68yo, p=0.004), lower preoperative hemoglobin (11.0 vs 12.6, p=0.0002) and lower preoperative albumin (3.5 vs 3.9, p=0.0008). Continent diversion was significantly associated with readmission (22% vs 13%, p=0.02). On multivariate analysis controlling for age, albumin, hemoglobin, and diversion type, SAS was an independent predictor of readmission (OR=0.81, p=0.02), and trended towards independent prediction of 90-day mortality (OR 0.74, p=0.06).

Conclusion: The SAS is associated with adverse postoperative outcomes in RC patients including 90-day mortality and postoperative readmission. Identification of patients who are at increased risk for readmission may allow for higher intensity postoperative management, and improve on overall post-RC patient outcomes. Prospective examination will further delineate the benefit for the SAS in the guidance of postoperative care in patients undergoing RC.
Poster #31

MOLECULAR ANALYSIS OF BLADDER AND UPPER TRACT UROTHELIAL CARCINOMA: RESULTS FROM A MICROARRAY COMPARISON

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(Presented by: Thomas Sanford)

Introduction: Although the renal pelvis, ureter, and bladder are all lined by urothelium, the renal pelvis and ureter are derived from a different embryologic origin than the bladder. Additionally, the urothelium of the upper tract is at particular risk in certain familial conditions (i.e. Lynch Syndrome), raising the possibility of unique oncologic processes in the development of upper tract urothelial carcinoma. In this study, we utilize microarray technology to evaluate the differences in gene expression between upper tract and bladder urothelial carcinoma.

Methods: A search of publicly available microarray datasets was performed using the Gene Expression Omnibus (GEO) search engine. Datasets with tumors of both upper tract and bladder origin were included. Unsupervised analysis was performed using hierarchical clustering on all samples, and a separate hierarchical clustering analysis was performed for samples within each T stage. Supervised analysis was performed using a T-test with a random variance model. Differentially expressed genes were then interrogated individually. Gene ontology was interrogated using DAVID as well as Parametric Gene Set Enrichment analysis.

Results: One dataset was identified with 16 upper tract and 29 bladder urothelial carcinoma samples. Hierarchical clustering of the overall samples failed to reveal identifiable differences in clustering between upper and bladder samples. When separated by T stage, there was evidence of differential clustering among T3 tumors. Supervised analysis of T3 tumors revealed 61 genes differentially expressed between upper and lower tract tumors. Gene ontology analysis showed genes involved in tyrosine kinase signaling, apoptosis, and embryologic morphogenesis were over-represented in upper tract compared with bladder tumors. Parametric Gene Set Enrichment Analysis revealed differences in HGF and TNF signaling pathways. One of the genes most over-expressed in upper tract tumors, SLITRK5, is the target of an antibody drug conjugate (AGS15E) currently in development.

Conclusion: Tumors are known to become increasingly molecularly heterogeneous as they become larger. After correcting for T stage, we found upper tract urothelial tumors had distinct and unique molecular characteristics when compared to bladder tumors. The genetic changes observed in this study may help elucidate mechanisms of carcinogenesis and may have implications for chemotherapy or targeted therapy.
Poster #32
BLADDER CANCER EXOSOMES PROMOTE EPITHELIAL TO MESENCHYMAL TRANSITION IN BLADDER EPITHELIAL CELLS
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(Presented by: Carrie Franzen)

Introduction: Exosomes contain proteins, mRNA, and miRNA, thus potentially modulating signaling pathways in recipient cells. Epithelial-mesenchymal transition (EMT) is a process by which epithelial cells lose their cell polarity and cell-cell adhesion, and gain migratory and invasive properties to become mesenchymal stem cells. EMT has been implicated in the initiation of metastasis for cancer progression.

Methods: Exosomes were isolated by ultracentrifugation from T24 or UMUC3 invasive bladder cancer cell conditioned media. T24 exosomes were added to primary bladder epithelial cells for 24–72 hours. RNA or protein was collected from the bladder epithelial cells and qRT–PCR or western blotting was performed to measure expression of EMT markers. T24– or UMUC3-derived exosomes were added to bladder epithelial cells and plated in transwell inserts for migration and invasion assays.

Results: Bladder epithelial cells treated with T24 or UMUC3 bladder cancer exosomes showed an increased expression in several mesenchymal markers, including α–SMA, S100A4, and Snail, as compared to PBS treated cells. Moreover, treatment of bladder epithelial cells with T24– or UMUC3–derived exosomes resulted in decreased expression of epithelial markers, including e–cadherin and Claudin–1, as compared to the control, PBS treated cells. T24– and UMUC3–derived exosomes also increased the migration and invasion of bladder epithelial cells, and this was partially blocked by heparin pre-treatment.

Conclusion: In this study, we established that exosomes from invasive bladder cancer cells are able to induce EMT in recipient bladder epithelial cells. We further showed that exosomes from invasive bladder cancer cells can promote migration and invasion of recipient urothelial cells. Finally, we demonstrated that the effect on migration and invasion is mediated, in part, by heparin.
**Poster #33**

**IMPACT OF UNCONTROLLED DIABETES ON OUTCOMES AFTER CYSTECTOMY IN PATIENTS WITH BLADDER CANCER: A POPULATION-BASED STUDY**

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(Presented by: Izak Faiena)

**Introduction:** To evaluate if patients with uncontrolled diabetes have worse postoperative outcomes after radical cystectomy for bladder cancer than non-diabetic patients.

**Methods:** The data for this analysis was captured from the NIS (Nationwide Inpatient Sample) 2002–2009. Among patients who underwent radical cystectomy we selected those who experienced uncontrolled diabetes (ICD-9 diagnosis code 250.02). Using the appropriate ICD-9-CM diagnosis codes for the secondary diagnoses we identified postoperative complications. Patient socio-demographic characteristics, principal and secondary diagnoses, principal and secondary procedures, comorbid diseases (AHRQ comorbidity measures), disposition of patient at discharge, hospital length of stay, and hospital cost for our analysis. A univariable and multivariable logistic regression analysis were employed.

**Results:** There were significant differences in the postoperative outcomes between patients in both groups. In the univariable analysis, patients with uncontrolled diabetes compared to those without diabetes were more likely to have complications (OR=3.21; 95% CI= 2.59–4.00) including infectious complications (OR=2.46; 95% CI= 1.98–3.06) and were more likely to die during the index hospitalization (OR=3.27; 95% CI= 1.41–7.61). Hospital resource utilization was also significantly greater in patients with uncontrolled diabetes. Mean length of stay in this group was 17.3 days compared to 11.4 days in non-diabetic group; total hospital cost was $47,960 and $32,422, respectively.

**Conclusion:** This study demonstrates a significant association between uncontrolled diabetes and in-hospital post-cystectomy complications, mortality, and hospital resource utilization. This study highlights the recognition of uncontrolled diabetes as a potential modifiable risk factor for patients undergoing cystectomy.
Poster #34
NEOADJUVANT CHEMOTHERAPY IS NOT ASSOCIATED WITH INCREASED RISK OF PERIOPERATIVE COMPLICATIONS, MORTALITY, NOR READMISSION RATES IN PATIENTS UNDERGOING RADICAL CYSTECTOMY
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(Presented by: Philip Abbosh)

Introduction: Neoadjuvant chemotherapy (NAC) usage prior to radical cystectomy (RC) is underutilized in part due to concerns of increased surgical complications. Patients undergoing RC are already at high risk for perioperative morbidity, and the impact of NAC on perioperative outcomes is a justified clinical concern. We examined the impact of NAC on 90 day complication, mortality and readmission rates at our institution.

Methods: We identified 315 patients undergoing RC at our institution between 2006 and 2011. Demographic and clinicopathologic variables along with complications (clavien grade ≥3), readmissions, and mortality within 90 days were indexed retrospectively. Univariate analysis was performed using chi-square and t-tests where appropriate. Multivariate analysis (MVA) was performed using logistic regression.

Results: Muscle-invasive bladder cancer (MIBC) was the indication for surgery in 234 patients. 79 of 172 patients (46%) with MIBC with eGFR>60 mL/min/1.73m^2 and urothelial cell carcinoma on pre-RC pathology received NAC. Patients undergoing NAC were younger (mean age 65 vs 70 years old, p<0.001) and had lower preoperative hemoglobin (11.8 vs 12.7 g/dL, p<0.001). They more frequently underwent minimally-invasive surgery (MIS; 24% vs 9%, p<0.001) although the time period after the commencement of NAC and MIS significantly overlapped. NAC was associated with continent diversions (24% vs 11%, p=0.008). Patients who received NAC were more likely to have non-MIBC final specimens (49% vs 9%, p<0.001) but the N+ rate was the same (18% vs 18%, p=0.9). There was no difference in readmission (both 21% vs 32%, p=0.08), 90 day mortality (4% vs 7%, p=0.3) or complication rates (25% vs 34%, p=0.14). Median hospital length of stay was 8 days for both groups (mean 10 vs 13 days, p=0.3). On MVA controlling for age, surgical approach and diversion type, indication, and preoperative albumin and hemoglobin, NAC was not an independent predictor of perioperative readmission, complication, or mortality. On MVA, lower preoperative albumin was an independent predictor of complication (OR 0.44, p=0.002) and death (OR 0.42, p=0.01), while a continent diversion was predictive of the need for readmission (OR 4.0, p=0.005).

Conclusion: At our institution, NAC did not confer a higher risk of adverse outcomes within 90 days of RC. As such this consideration should not impact decisions to administer NAC.
Poster #35
VALIDATION OF MAMMALIAN TARGET OF RAPAMYCIN BIOMARKER PANEL IN PATIENTS WITH CLEAR CELL RENAL CELL CARCINOMA
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(Presented by: Ahmed Haddad)

Introduction: External validation of prognostic benefit of mammalian target of rapamycin (mTOR) marker panel in patients with clear cell RCC (ccRCC).

Methods: Immunohistochemistry for 5 mTOR pathway markers was performed on tissue microarrays of patients with non-metastatic ccRCC treated surgically at four centers. The markers employed were phosphatase and tensin homolog (PTEN), phosphoinositide 3-kinase (PI3K), phosphorylated-mTOR (p-mTOR), phosphorylated-S6 (p-S6), and phosphorylated 4E-binding protein-1 (p-4EBP1). Cox regression was used to correlate marker status and oncologic outcomes. Discrimination of the models was determined using area under the curve (AUC) and net reclassification improvement (NRI).

Results: 528 patients with a median follow-up of 56.5 months were included. Expression of PI3K, PTEN, p-mTOR, p-4EBP1 and p-S6 was altered in 52%, 78%, 25%, 86% and 30% of patients, respectively. The number of altered biomarkers predicted recurrence free survival (RFS) in multivariate analysis adjusted for stage, grade and lymph node status (HR 3.20, p=0.02 for patients with 4–5 altered biomarkers compared to 0–1 altered markers). A biomarker panel consisting of only 2 markers (p-S6 and p-4EBP1) independently predicted for worse RFS (HR 4.38, p=0.003 for patients with 2 altered markers compared to patients with 0 altered markers). The biomarker score increased predictive accuracy when added to the clinical cox regression model.

Conclusion: mTOR pathway biomarkers add prognostic information in addition to standard clinicopathologic variables in ccRCC patients and may identify patients who could benefit from additional treatments or closer post-operative surveillance.
Poster #36
ROBOTIC-ASSISTED HEALTHY MARGIN VS ENUCLEO-RESECTION PARTIAL NEPHRECTOMY FOR T1 RENAL TUMORS: A MULTI-INSTITUTIONAL ANALYSIS OF PERI-OPERATIVE OUTCOMES
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(Presented by: Robert Blackwell)

Introduction: Nephron sparing surgery is the standard of care for treatment of renal masses when technically feasible. Both traditional healthy margin partial nephrectomy (HMPN) and enucleo-resection (ENPN) have been described by open techniques to maximally preserve renal parenchyma. We evaluate our initial experience performing robotic ENPN and compare this with a robotic HMPN group.

Methods: Retrospective chart review of consecutive patients who underwent robotic-assisted laparoscopic HMPN or ENPN at either Loyola University Medical Center or Indiana University between 3/2008 and 9/2013. Surgical approach was determined by surgeon preference. Patients selected for ENPN had cT1 masses, often with an exophytic component. Patient characteristics and perioperative outcomes were recorded.

Results: A total of 249 patients underwent robotic-assisted partial nephrectomy. There were 194 HMPN and 55 ENPN. Median follow-up was 7.31 months (IQR: 3.8–16). Collecting system entry and repair occurred in 34% of HMPN cases, but only 6% of ENPN cases (p<0.05). Positive surgical margins were present in 3.6% and 6.5% in the HMPN and ENPN patients, respectively. In the setting of ENPN, tumor abutting but not invading the pseudocapsule (n=7) was considered negative.

Preoperative mean GFR in the HMPN and ENPN groups were 76.4 and 77.5 ml/min/1.73m², respectively. Postoperative mean GFR was minimally changed for HMPN and ENPN at 74.8 and 77.1 ml/min/1.73m², at mean 3.8 and 3.4 months, respectively.

Conclusion: Robotic ENPN appears to be a safe and feasible approach to renal mass excision along with decreased collecting system entry as well as comparable blood loss, operative time, and length of stay compared with HMPN.
Poster #37
CLEAR CELL RENAL CELL CARCINOMA: SOCIOECONOMIC PREDICTORS OF METASTATIC DISEASE AT DIAGNOSIS
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(Presented by: Zachary Klaassen)

Introduction: In patients with advanced clear cell renal cell carcinoma (ccRCC), lymph node and/or liver metastases, as well as poor performance status is associated with poor prognosis. To our knowledge, no previous studies have assessed possible predictors of metastatic ccRCC at diagnosis. Using a population-based cohort, we sought to identify independent predictors of metastatic disease at diagnosis in patients with ccRCC.

Methods: Patients with ccRCC were extracted from the SEER database from 2004–2010 (n=63,589). The primary outcome was metastatic disease at diagnosis. Demographic variables included age, gender, race, and marital status. Socioeconomic variables investigated included insurance status and the patient’s home county median income, as well as % living in poverty, % unemployed, and % with <9th grade education. Descriptive statistics and multivariable logistic regression models were performed to generate odds ratios (OR) and identify possible predictors of metastatic disease at diagnosis.

Results: There were 9,623 (15.1%) patients with metastatic disease at diagnosis and 53,966 (84.9%) patients with non-metastatic disease. Patients with metastatic disease were more frequently older (65 vs 63 years, p<0.001), male (66.3% vs 60.8%, p<0.001), and single, divorced, or widowed (SDW) (38.9% vs 33.4%, p<0.001) compared to patients with non-metastatic disease. Patients with metastatic disease at diagnosis were more often uninsured (p<0.001) and residing in a county with higher % people living in poverty (p<0.001) and poorly educated (% <9th grade, p<0.001). Adjusting for age, gender, race, marital status and % of people living in poverty, independent predictors of metastatic disease at diagnosis included older age (OR 1.02, 95%CI 1.02−1.02), male (OR 1.38, 95%CI 1.32−1.45), non-black or Caucasian race (vs Caucasian OR 1.08, 95%CI 1.02−1.15), SDW status (vs married OR 1.32, 95%CI 1.26−1.38), and home county % poverty (OR 1.01, 95%CI 1.00−1.01).

Conclusion: Older age, male, non-black or Caucasian race, SDW status, and home county % poverty are independent predictors of ccRCC metastasis at diagnosis. Consistent with non-urologic malignancies and urothelial carcinoma of the bladder, surrogates of poor socioeconomic status are predictors of ccRCC metastasis at presentation. All clinicians should be aware of these potential health care disparities when assessing patients for ccRCC.
IMPACT OF SYSTEMIC THERAPY ON CHARACTERIZATION OF PERIPHERAL CIRCULATING TUMOR CELLS IN METASTATIC RENAL CELL CARCINOMA

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(Presented by: Thai Ho)

Introduction: Circulating tumor cells (CTCs) are emerging as a potential biomarker in metastatic cancers. However, the impact of systemic therapy on the detection of CTCs in metastatic clear cell renal cell carcinoma (ccRCC) is unknown. Furthermore, CTC capture methods dependent on cell surface expression of epithelial and/or cytokeratin markers may miss CTCs in RCC if they display a mesenchymal phenotype.

Methods: The CTC assay protocol was developed using three RCC cell lines, 786–O, Caki–1, and Caki–2. Persons with metastatic RCC (N=40) on systemic therapy or undergoing evaluation as a kidney donor (N=10) were consented. RCC tumor specimens from consented subjects were stained for CD10 and Vimentin. CellSieveTM microfilters, which have 7 µm diameter pores in a uniform array, with 160,000 pores in a 9 mm diameter area, were used for separation of CTCs in the matched blood specimen. The cells collected on the filter were post-fixed, permeabilized, and stained with DAPI and fluorescent antibodies specific to CD10, Vimentin, and CD45.

Results: The capture efficiencies for 786–O, Caki–1, and Caki–2 cell lines were determined to be 98%, 98% and 97%, respectively. On-filter antibody staining revealed heterogeneous expressions of vimentin and CD10 in RCC cell lines. The typical CTCs (3−50 cells) display abnormal morphology, including large nuclei (typically 15−30 µm in size), irregular cell size and shape, and high nucleus-to-cyttoplasm ratio, and they were stained as vimentin+, CD10+ and CD45−. These cells were not detected in persons undergoing evaluation as kidney donors. The antibodies for CD10 and vimentin, showed some cross-reactivity with a portion of white blood cells, but the CTCs could be further distinguished from WBC based on morphology, cell size, and CD45 staining.

Conclusion: We demonstrated that CellSieveTM microfiltration can isolate CTCs from RCC patients while on systemic therapy. This technology might greatly facilitate detection of CTCs with a mesenchymal phenotype in blood specimens because they are often lack expression of the typical epithelial and/or cytokeratin markers. Molecular genetic classifications have been identified in ccRCC and future studies will be focused on examining the concordance of these molecular markers between primary specimens and CTCs.
PHYSICAL 3D KIDNEY TUMOR MODELS CONSTRUCTED FROM 3D PRINTERS IMPROVE TRAINEE PERFORMANCE
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(Presented by: Jonathan Silberstein)

Introduction: To evaluate the impact of 3D printed physical renal models with enhancing masses on medical trainee appreciation, characterization, localization and understanding of renal malignancy.

Methods: Specialized software was utilized to import standard computerized tomography (CT) cross-sectional imaging into 3D printers to create physical 3D models of renal units with enhancing renal lesions in situ. Six different 3D models were printed from a translucent plastic resin with a red hue delineating the enhancing renal lesion. Medical students, who had completed their first year of training, were given an overview and then asked to complete a R.E.N.A.L. nephrometry score, separately using conventional CT imaging and physical 3D models. Trainees were also asked to complete a questionnaire about their experience. Variability between trainees was determined using Intraclass Correlation Coefficients (ICC), and kappa statistic and weighted kappa were used to compare the trainee to experts.

Results: Overall trainee nephrometry score accuracy was significantly improved with the physical 3D model versus CT scan (p<0.01). Furthermore, three of the four calculated components of the nephrometry score (radius, nearness to collecting system, and location) each showed significant improvement (p <0.001) using the models. There was also more consistent agreement among trainees when using the 3D models instead of CT scans to assess the nephrometry score (ICC 0.28 CT scan vs 0.72 models). Qualitative evaluation with questionnaires filled out by the trainees at the conclusion of the study showed universal agreement that the 3D physical models improved their ability to understand and conceptualize the renal mass.

Conclusion: Physical 3D models using readily available printing techniques improve trainees understanding and characterization of individual patients’ enhancing renal lesions.
Poster #40

PERCENTAGE OF SARCOMATOID DEDIFFERENTIATION AS A PROGNOSTIC INDICATOR FOR SURVIVAL IN SARCOMATOID RENAL CELL CARCINOMA

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(Presented by: Mehrad Adibi)

Introduction: Renal cell carcinoma (RCC) with sarcomatoid dedifferentiation is characterized by the microscopic spectrum of spindle cells within a background of a histopathological subtype of RCC. Estimated to be present in as high 10% of RCCs, the presence of sarcomatoid elements is associated with higher stage of presentation and decreased patient survival. The objective of this study is to examine the clinicopathological characteristics associated with overall survival (OS), specifically examining the percentage of sarcomatoid dedifferentiation to stratify risk.

Methods: We retrospectively reviewed clinicopathologic data for all radical nephrectomy patients with pathologically confirmed sarcomatoid dedifferentiation from 1987–2011. All histologic slides were re-reviewed by a GU pathologist to ascertain percentage of sarcomatoid involvement. Patient characteristics were tabulated overall and by disease status (metastatic vs. localized). Cutpoints in the percent sarcomatoid providing a meaningful difference in OS were identified by recursive partitioning analysis (RPA) as univariate and combined with patient characteristics. Factors selected included age, gender, race, clinical stage, tumor histology, and treatment. The Kaplan-Meier method and two-sided log-rank test was used to assess differences in OS.

Results: Among 186 patients with sarcomatoid dedifferentiation, 64 (34%) had localized and 122 (66%) metastatic disease. Patients were primarily white (76%) males (63%) with clear cell histology (73%), and did not receive neoadjuvant or adjuvant therapy (87%). The median follow-up time was 12.1 months (range, 0.1 to 242.2 months). The median OS was 12.6 months (95% confidence interval (CI) 10.7–14.9 months). Two subgroups were identified with a cut-point of 12.5% for percent sarcomatoid after univariate RPA. Patients with percent sarcomatoid ≥ %12.5 were at higher risk of death compared to patients with <%12.5 (45% vs. 61% 1 year OS; P−value=0.04). Mutlivariate RPA revealed clinical stage and percent sarcomatoid were significantly associated with OS. Patients with localized disease were most likely to be alive at 1 year (74%). Among patients with metastatic disease with <42.5 sarcomatoid had 1-year OS of 44% vs. 27% for patients with ≥42.5 cutoff (P<0.001).

Conclusion: The percentage of sarcomatoid dedifferentiation appears to be a prognostic factor in the OS of patients with RCC, with larger percentage of involvement portending a worse survival.
Introduction: Nearly 25% of all cases of renal cell carcinoma (RCC) are diagnosed in patients ≥80 years of age. Additionally, in the United States, the life expectancy at 80 years is 8.10 years for men and 9.61 years for women. Using a population-based cohort, we sought to evaluate the surgical treatment patterns and survival outcomes in octogenarians and nonagenarians with RCC.

Methods: Patients ≥80 years of age with RCC treated either with radical nephrectomy (RN), partial nephrectomy or cryoablation were extracted from the SEER database from 1988−2010 (n=7,453). Sociodemographic variables, surgical treatment modality, cause of death, and median overall survival (OS) and disease specific survival (DSS) were reported. Descriptive statistics and Kaplan Meier analysis were performed to compare variables between stages and between treatment modalities.

Results: There were 4528 patients (60.7%) with Stage I, 844 patients (11.3%) with Stage II, 1398 patients (18.8%) with Stage III, and 683 patients (9.2%) with Stage IV RCC. Females were more likely to have advanced disease compared to males (female Stage I – 46.6% vs IV – 34.7%; male Stage I – 53.4% vs IV – 65.4%, p<0.0001). Furthermore, females were more likely to receive aggressive treatment for localized disease (Stage I RN – female 83.1% vs male 78.3%, p=0.001; Stage II RN – female 98.5% vs male 94.4%, p=0.009). Caucasians were more likely to have advanced disease compared to African Americans (AA) (Caucasian Stage I – 89.8% vs IV – 91.3%; AA Stage I – 6.0% vs IV – 4.1%, p =0.0007), however there were no differences in treatment modality between races for localized disease. Among patients with Stage I RCC, 10.6% were dead of disease (DOD) and 36.5% were dead of other causes (DOC) (OS 41 mos; DSS 22 mos). For patients with Stage II, 20.2% were DOD and 37.0% were DOC (OS 35 mos; DSS 21 mos); Stage III, 30.1% were DOD and 26.1% were DOC (OS 23 mos; DSS 14 mos); Stage IV, 39.1% were DOD and 48.5% were DOC (OS 33 mos; DSS 15 mos) (p<0.0001).

Conclusion: Octogenarians and nonagenarians with Stage I RCC are likely over treated and those with Stage IV disease likely do not enjoy a survival benefit from surgical management. Appropriately selected patients with Stage II and III disease may benefit from aggressive surgical treatment. We detected no racial disparities in the delivery of surgical treatment, however female patients are more likely to receive aggressive management for localized RCC.
Poster #42
ONCOLOGIC SURVEILLANCE FOLLOWING SURGICAL RESECTION FOR RENAL CELL CARCINOMA: A NOVEL RISK-BASED APPROACH
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(Presented by: Suzanne Stewart)

Introduction: The appropriate duration of surveillance for renal cell carcinoma (RCC) following radical or partial nephrectomy remains unknown. Uniform adherence to current guidelines has the potential for over utilization of resources in some patients and deficiency of testing in others. Herein, we provide an age−, stage−, and relapse site-specific duration for the oncologic surveillance of RCC, balancing the risks of recurrence versus non-RCC death.

Methods: We identified 3651 patients who underwent surgery for M0 RCC between 1970 and 2008. Patients were stratified by pathologic stage: pT0Nx−0, pT2Nx−0, pT3/4Nx−0, and pTAnyN1; relapse site (abdomen-locoregional, abdomen-visceral, chest, bone, and other); and age (< 50, 50−59, 60−69, 70−79 and >80yrs). Recurrence risk stratified by stage and relapse site along with risk of non-RCC death by age were estimated using parametric models for time-to-failure data using a Weibull distribution. Time points when the risk of non-RCC death exceeded the risk of recurrence were determined.

Results: At a median follow-up of 9.5yrs (IQR 6.6−14.1), a total of 1088 patients developed a recurrence. As shown in the Table, we found significant differences in the duration of site-specific follow-up needed for various stage and age groups before risk of non-RCC death exceeded the risk of recurrence. For example, we found that the risk of non-RCC death for patients >80 years with pT1Nx−0 disease remained greater than their risk of recurrence at any site and at any time point following surgery, indicating that prolonged RCC surveillance for this age and stage group may not be of high utility. In contrast, for patients <50 years with pTAnyN1 disease, the risk of recurrence at any site remained greater than the risk of non-RCC death for 20 years or longer, suggesting that continued surveillance for this patient group remains valuable for decades.

Conclusion: Using a novel statistical approach, we present age−, stage− and relapse site-specific surveillance options following surgery for RCC. This individualized strategy may optimize the capturing of recurrences while improving resource allocation.
Poster #43

CLINICAL AND RADIOGRAPHIC PREDICTORS OF THE NEED FOR RESECTION OF THE INFERNOR VENA CAVA DURING NEPHRECTOMY FOR PATIENTS WITH RENAL CELL CARCINOMA AND CAVAL TUMOR THROMBUS

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(Presented by: Sarah Psutka)

Introduction: To evaluate clinical and radiographic predictors of need for resection of the inferior vena cava (IVC−R) requiring complex vascular reconstruction during venous tumor thrombectomy at the time of nephrectomy for renal cell carcinoma (RCC).

Methods: We performed a retrospective review of 172 patients treated for RCC with IVC (level I−IV) venous tumor thrombus at the Mayo Clinic between 2000 and 2010. Preoperative imaging was re-reviewed by two radiologists blinded to the patient's surgical procedure. Univariable and multivariable associations of clinical and radiographic features with IVC−R were evaluated by logistic regression. Secondary analysis assessed the ability of the model to predict histologic invasion of the IVC by the tumor thrombus.

Results: Of the 172 patients, 38 (22%) underwent IVC−R procedures during nephrectomy. Optimal radiographic cut-points determined to predict need for IVC−R based on preoperative imaging included a renal vein (RV) diameter at the RV ostium (RVo) of 15.5 mm, maximal AP diameter of the IVC of 34.0 mm and AP and coronal diameters of the IVC at the RVo of 24 mm and 19 mm respectively. On multivariable analysis, the presence of a right-sided tumor (OR 3.3; p=0.017), a measured AP diameter of the IVC at the RVo ≥ 24.0 mm (OR 4.4; p=0.017), and radiographic identification of complete occlusion of the IVC at the RVo (OR 4.9; p<0.001) were associated with a significantly increased risk of IVC−R. The c−index for the model predicting IVC−R was 0.8. The AP diameter of the IVC at the RVo > 24 mm was also independently associated histologic invasion of the IVC wall by the tumor thrombus (OR 5.04, p<0.001; c−index 0.7).

Conclusion: We present a multivariable model detailing radiographic features associated with the need for IVC−R during tumor thrombectomy that may be used for preoperative planning, patient counseling, and planned involvement of vascular surgical colleagues in anticipation of need for complex vascular repair.
Poster #44
CONCOMMITTANT SURGERY FOR HEPATIC INVOLVEMENT AT THE TIME OF NEPHRECTOMY FOR RENAL CELL CARCINOMA: A MATCHED COHORT STUDY
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(Presented by: Sarah Psutka)

Introduction: There are few reported series regarding outcomes following simultaneous hepatic resection (HRx) of renal cell carcinoma (RCC) involving the liver and nephrectomy. Expert opinion varies regarding the safety and benefit of such aggressive surgical intervention, with some authors suggesting that the risks of simultaneous hepatic resection at the time of cytoreductive nephrectomy outweigh the benefits, and, therefore, recommending that the practice should be abandoned. Herein, we report our experience with simultaneous HRx and nephrectomy.

Methods: We identified 34 cases where patients underwent simultaneous nephrectomy and HRx for direct hepatic invasion or metastasis. These patients (HRx) were matched 2:1 to controls (non−HRx, n=68) undergoing nephrectomy and metastasectomy without hepatic resection by year, age, and TNM classification. Perioperative complication rates were compared. Overall survival (OS) was estimated using the Kaplan Meier method.

Results: Of the 34 cases, 17 patients underwent HRx for pT4 hepatic involvement and 21 patients underwent simultaneous nephrectomy and hepatic metastasectomy. In the non-HRx group, 38 patients had non-hepatic pT4 disease and 37 underwent metastasectomy for non-hepatic distant metastasis. The incidence of DVT was significantly higher among the HRx group (15% vs. 1%, p=0.02), and there was a trend towards higher rates of Clavien grade 3–4 complications (11.8% vs. 1.5%, p=0.1). No significant difference in perioperative mortality was appreciated (3% vs. 0%, p=0.7) between those who underwent HRx and those who did not. At last follow-up, 31/34 HRx and 65/68 non-HRx controls had died, including 30 and 61 who died of RCC at a median of 1.2 and 0.9 years, respectively. Two-year OS rates for HRx and non-HRx were 40% and 28%, (HR 0.65 p=0.14).

Conclusion: In selected patients, aggressive surgical resection of RCC involving the liver is associated with acceptable morbidity and does not appear to significantly diminish perioperative or overall mortality when compared to matched controls.
Poster #45
PRETREATMENT NEUTROPHIL-TO-LYMPHOCYTE RATIO CAN PREDICT TUMOR AGGRESSIVENESS IN NEWLY DIAGNOSED RENAL LESIONS
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(Presented by: Boyd Viers)

Introduction: Aside from a biopsy, little information exists to guide a clinician when evaluating a patient with a solid renal mass. An elevated neutrophil-lymphocyte ratio (NLR) has been associated with adverse outcomes in clear cell renal cell carcinoma (ccRCC). However, its ability to distinguish aggressive RCC from benign, or indolent, renal tumors remains unknown. Therefore, we evaluate the association of NLR with pathologic outcomes at nephrectomy, including the ability to distinguish benign and malignant renal lesions.

Methods: From 1995−2008, 2402 patients underwent nephrectomy for localized renal masses. Of these, 2039 had an NLR collected ≤ 90 days prior to nephrectomy. Comparisons of NLR by tumor size, histologic subtype and nuclear grade were evaluated.

Results: Overall, benign renal masses had a significantly lower NLR than malignant renal tumors (median 2.92 vs. 3.12; p =0.037) with the greatest difference noted among renal lesions > 7 cm (median 2.79 vs 3.87; p <0.001). Among patients with benign lesions there was no difference in NLR based upon histologic subtype (p =0.27). However, there was a difference among RCC subtypes (p =0.002), with cystic ccRCC demonstrating the lowest (median 2.48) and collecting duct RCC the highest NLR (median 5.99). Among all RCC subtypes, there was a significant increase in NLR with larger tumor size and greater nuclear grade (both p <0.001). Specifically, in patients with ccRCC, an incremental increase in tumor size (≤ 4 cm = 2.80, >4 but ≤ 7 cm = 3.09 and > 7 cm = 3.95) and nuclear grade (G1 = 2.68, G2 = 2.87, G3 = 3.48 and G4 = 5.18) was associated with greater NLR (both p < 0.001). Finally, after stratifying ccRCC by tumor size, there was a continual increase in NLR with greater nuclear grade.

Conclusion: An elevated NLR is associated with an increased risk of RCC at the time of nephrectomy as well as higher grade tumors and more aggressive histologic subtypes. Therefore, NLR appears to be a preoperative marker of aggressive RCC and may be useful in predicting malignancy and guiding management among patients with suspicious renal lesions.
Introduction: While targeted therapies have yielded improved efficacy, durable remissions and long-term survival are rare, particularly in newly diagnosed, unfavorable risk metastatic RCC (mRCC). Recent findings from the International mRCC Database Consortium (IMDC) indicate that newly diagnosed, unfavorable risk mRCC patients have an expected median PFS of 5.6 months and median OS of 14.7 months, despite treatment with targeted therapies. Thus, significant unmet need persists for patients with synchronous mRCC who present with unfavorable risk factors at diagnosis. AGS-003 is an autologous, fully personalized immunotherapy designed to induce a memory T-cell response specific to a patient’s tumor antigens. Sunitinib is a TKI and first-line therapy for mRCC which can decrease the immune suppression observed in mRCC. In a single arm phase 2 study, AGS-003 plus sunitinib was safe and yielded encouraging survival in unfavorable risk mRCC patients, which resulted in the initiation of the ongoing ADAPT phase 3 study.

Methods: The ADAPT study is a randomized (2:1) international phase 3 study comparing standard targeted therapy plus AGS-003 to standard therapy alone. The primary objective is to compare the median OS between treatment arms. Adults with synchronous, clear cell, mRCC who are good candidates for surgery and targeted therapy, KPS ≥ 70%, life expectancy ≥ 6 months, 1–4 Heng risk factors, and adequate end organ function are eligible. All potentially eligible patients have a tumor sample collected post-nephrectomy; only those randomized to the combination arm require a leukapheresis to manufacture AGS-003 for subsequent treatment in combination with standard therapy.

Results: More than 130 global sites have been activated. To date >500 mRCC patients have been consented for tumor collection and >200 patients have been randomized to the treatment phase. To date, approximately 50% of patients consented for tumor collection have been excluded in the treatment phase of the study after surgery. Nearly half of all screen failures have been due to presence of non-clear cell histology. Other reasons for exclusion included a lack of measurable metastatic disease after nephrectomy, presence of cardiac/renal/GI abnormalities prohibiting treatment with sunitinib, and diminished performance status or poor overall prognosis following nephrectomy.

Conclusion: Further details regarding study progress and eligibility disposition will be presented.

Clinical Trial #: NCT1582672
MULTICENTER VALIDATION OF ABILITY OF SURGEON ASSESSMENT OF RENAL PRESERVATION IN COMPARISON TO MEASUREMENT WITH 3D IMAGE ANALYSIS

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(Presented by: Brian Lane)

Introduction: Baseline renal function and preservation of functioning renal parenchyma are the strongest predictors of function after partial nephrectomy (PN) for presumed renal cancer. Prior studies have confirmed that measurement of volume preservation with 3D imaging (3DVP) is accurate, but limited data exist to compare this time-consuming approach with surgeon assessment of volume preservation (SAVP). We validated the findings of a prior, single-surgeon series with a multi-institutional comparison of 3DVP and SAVP as predictors of renal function after PN.

Methods: 3DVP and SAVP were calculated for 157 patients with cross-sectional imaging available from before and after PN. Renal functional outcomes were assessed with univariable and multivariable linear regression methods.

Results: Median parenchymal preservation was 92% by 3DVP (72%–102%) and 92% by SAVP (70%–97%). 3DVP and SAVP were strongly correlated (p<0.0001) and no significant differences observed in the precision of SAVP assessments made by 13 individual surgeons (p>0.05). Both 3DVP and SAVP were strongly correlated with post-operative GFR (p<0.0001). Univariable analyses revealed that age, preoperative GFR, RENAL score, and each assessment were significant predictors of renal function (p<0.05), and parenchymal preservation was the strongest predictor in multivariable analyses (p<0.0001). Models using 3DVP and SAVP were statistically similar in ability to predict nadir GFR and latest GFR.

Conclusion: SAVP has now been validated in a multi-center cohort of PN patients, demonstrating it to provide a reliable estimate of renal functional preservation that is reproducible in contemporary practice. We propose that SAVP reporting should be performed routinely to facilitate analysis of PN outcomes.

Funding: Funding was provided in part by the Spectrum Health Foundation and through the Betz Family Endowment for Cancer Research.
Poster #48
SURGICAL APGAR SCORE AND NEPHROMETRY SCORE PREDICT INCREASED RISK FOR MAJOR COMPLICATION AND DEATH FOLLOWING RENAL MASS EXCISION
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(Presented by: Timothy Ito)

Introduction: Tailoring of perioperative management to minimize postoperative complication rates depends on reliable prognostication of those patients most at risk. The Surgical Apgar Score (SAS) is an objective measure of the operative course based on EBL, lowest heart rate and mean arterial pressure. It has been validated to predict major complications and death following general/vascular surgery, where a lower SAS is associated with increasing rates of adverse postoperative events. We aimed to assess the ability of the SAS and Nephrometry Score (NS) to identify the cohort of patients most likely to benefit from more intensive perioperative care algorithms.

Methods: Data for 886 patients undergoing renal mass excision via radical or partial nephrectomy from 2010−2013 was extracted from a prospectively collected database at a single institution. SAS was calculated utilizing electronic anesthesia records. NS was calculated via review of preoperative imaging. Major postoperative complications examined included cardiac events, significant leak/hemorrhage, and any readmission or re-operation within 30 days of surgery and 90-day mortality.

Results: 13.3% of patients experienced major postoperative complications. Clavien grade I, II, III, IV and V complications were experienced by 27%, 6%, 48%, 9% and 10% respectively. The 90-day mortality rate was 1.4%. SAS was significantly lower (mean 7.3 vs 7.8, p=0.004) and NS was significantly higher (8.8 vs 8.0, p=0.0001) in patients experiencing major postoperative complications. Patients experiencing major complications also were significantly older (mean 62 vs 59yo, p=0.009), and more likely to have undergone open surgery (55% vs 32%, p<0.0001). SAS was also significantly lower in patients dying within 90 days of surgery (6.3 vs 7.7, p=0.03). Patients with complex renal lesions (NS 10–12) experiencing a low SAS £ 4 were 8.2 times more likely to experience a major complication (p=0.0008) and 16 times more likely to die within 90 days of surgery (p=0.003) than patients with simple renal lesions (NS 4–6) experiencing an SAS ≥ 8.

Conclusion: SAS and NS are simply collected metrics that can identify patients at a higher risk for major complication and death following renal mass excision. A prospective trial to help further delineate optimal utilization of both tools in an adjusted perioperative management approach to patients undergoing complex renal mass excision is warranted.
Poster #49

A NEW MOLECULAR TARGETED THERAPEUTIC APPROACH FOR RENAL CELL CARCINOMA WITH A P16 FUNCTIONAL PEPTIDE USING A NOVEL TRANSPORTER SYSTEM

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(Presented by: Kenji Zennami)

Introduction: Molecular targeting agents have become formidable anticancer weapons, which show much promise against the refractory tumors. Functional peptides are among the more desirable of these nanobio-tools. Intracellular delivery of multiple functional peptides forms a basis for potent, non-invasive mode of delivery, providing distinctive therapeutic advantages. In this report, we examined growth suppression efficiency of human renal carcinomas by peptide targeting system.

Methods: We examine the growth suppression efficiency of human renal cell carcinoma (RCC) by single-peptide targeting. We simultaneously introduced p16INK4a tumor suppressor peptides by Wr−T-mediated peptide delivery. Wr−T-mediated transport of p16INK4a functional peptide into 10 RCC lines, lacking expression of the p16INK4a molecule, reversed the specific loss of p16 function, thereby drastically inhibiting tumor growth in all but 3 lines by >95% within the first 96 h. In vivo analysis using SK−RC−7 RCC xenografts in nude mice demonstrated tumor growth inhibition by the p16INK4a peptide alone, however, inoculation of Wr−Tand the p16INK4a functional peptide mixture, via the heart resulted in complete tumor regression.

Results: Immunoblotting analysis showed that none of the 10 RCC lines expressed the p16 protein product, but expressed p27 protein, and 6 out of 10 cell lines expressed p21 protein, all renal cancer cell lines expressed the phosphorylated form of the pRB protein. RT−PCR analysis detected Cyclin D, CDK4 and CDK6 in RNAs from all 10 RCC lines, but not p16. Wr−T-mediated transport of p16 peptide was effective to inhibition of growth for p16−/pRb+ cell lines. FACS analysis with propidium iodide staining showed that SK−RC−7 cells incubated with the Wr−T/r9−p16 MIS mixture preferentially accumulated at the G0−G1 phase, compared with mock-treated cells and cells treated only with r9−p16 MIS. After transport of p16 peptide, number of Annexin−V positive renal cancer cells were increased. After transport of p16 peptide, phosphorylated pRB (Ser780 phosphorylation) was decreased in the cells. Injection of p16 peptide could inhibit growth of tumor in vivo. TUNEL analysis showed an increase in the presence of positively stained apoptotic bodies in tumor treated with the Wr−T/r9−p16 MIS mixture.

Conclusion: Wr−T-mediated molecular targeting using antitumor peptides is highly effective against growth of renal cancer cells.

Financial Funding: None
METHOD OF OBESITY MEASUREMENT IMPACTS THE RELATIONSHIP BETWEEN OBESITY AND RENAL MASS COMPLEXITY

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(Presented by: Laura Bertrand)

Introduction: Obesity is an established risk factor for developing renal cell carcinoma (RCC). Renal mass complexity, as assessed by the nephrometry scoring system, has been associated with more aggressive disease and an increased risk of malignant and high-grade renal cancer. However, the relationship between obesity and renal mass complexity has not been extensively evaluated. We hypothesized obesity would be associated with more complex renal masses, suggestive of more aggressive tumors.

Methods: In a cohort of 85 subjects (36% female, 57% BMI > 30) who were undergoing surgical resection of confirmed renal masses, we calculated nephrometry scores based on preoperative imaging (CT or MRI). Obesity was assessed as a continuous variable using three different metrics: body mass index (BMI), waist circumference (WC) on CT scan, and contralateral kidney retro-renal fat (RRF) diameter. Potential associations between obesity and tumor sizes or nephrometry scores were evaluated for each obesity assessment metric. In patients with RCC (n=80/85), Fuhrman grade and tumor stage were also evaluated.

Results: Subjects with greater WC were found to have larger renal masses on preoperative imaging (p=0.03) and higher total nephrometry scores (p=0.02), but no similar relationships were found for BMI or RRF (p>0.05). Both greater WC and increased BMI were associated with higher tumor stage at diagnosis (p < 0.04), whereas RRF had no association with tumor stage (p=0.55). Subjects with higher BMI tended to present with higher Fuhrman grade tumors (p = 0.002), an association that was not present when WC or RRF were used as obesity metrics (p>0.05 for both).

Conclusion: Obesity significantly increases preoperative renal tumor size, complexity, staging, and grade. However, different statistical relationships were revealed when each of the three obesity metrics (BMI, WC, and RRF) were used, thus these metrics were not interchangeable in our patient cohort. Although BMI is the most commonly used obesity metric, in our study WC was more sensitive than either BMI or RRF during evaluation of renal mass complexity, as determined by higher total nephrometry score, increased diameter on imaging, and higher Fuhrman grade. As obesity is a major risk factor for RCC, and the incidence of both is on the rise, further evaluation of WC in RCC may reveal previously unrecognized associations between obesity and patient outcome. This study was funded by NIH grant #1R01CA181088-01 (LAN).
Poster #51
EFFECT OF OBESITY ON THE PERIPHERAL IMMUNE SIGNATURE IN CLEAR CELL RENAL CELL CARCINOMA (CCRCC)
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(Presented by: Laura Bertrand)

Introduction: Obesity is a risk factor for ccRCC and is associated with poor prognosis. For metastatic ccRCC, multiple immunotherapies exist but ccRCC is inherently immunosuppressive and complete response rates remain <10%. Our objective was to understand how obesity impacts the immune response in subjects with ccRCC.

Methods: Preoperative peripheral blood of obese subjects (BMI ≥30, n = 39) and non-obese subjects (BMI<30, n = 27) with pathologically confirmed ccRCC were analyzed. Forty-five pro-tumorigenic and pro-inflammatory plasma proteins were analyzed via Multiplex array and multiple leukocyte populations were evaluated via flow cytometry. ccRCC subjects were compared to age- and BMI-matched control subjects.

Results: Obese ccRCC subjects had elevated levels of pro-tumorigenic cytokines (angiopoietin, endoglin, TGFα, VEGF−A, VEGF−C and VEGF−D), as compared to both non-obese subjects with ccRCC and obese controls (all p< 0.05). When comparing obese ccRCC subjects to obese controls, ccRCC subjects had higher levels of pro-inflammatory cytokines IL−6 and TNF−α (p< 0.01), whereas the same relationships were not present in non-obese ccRCC subjects versus non-obese controls (p<0.05). Both obese and non-obese ccRCC subjects demonstrated a robust Th2 response, with high levels of IL−4, IL−5 and IL−13 (all p< 0.05 versus BMI-matched controls). Obese ccRCC subjects had lower circulating frequencies of suppressive myeloid cells and PD1+ exhausted CD4 T cells (p< 0.05 versus non-obese ccRCC subjects or tumor-free obese controls).

Conclusion: The effects of obesity on systemic immune responses in patients with ccRCC are complex. Obese ccRCC subjects had higher levels of pro-inflammatory and pro-tumorigenic cytokines, and HIF−1α mediators VEGF and TGFα. Together, these factors may contribute to the poorer prognoses previously reported several studies of obese ccRCC subjects. Both obese and non-obese ccRCC subjects showed evidence of robust Th2 responses, which have been shown to portend poorer outcomes in other genitourinary malignancies. At the same time, decreased circulating frequencies of exhausted T cells and myeloid derived suppressor cells in obese ccRCC subjects may indicate that a protective cellular immune response could be induced in response to immune-stimulatory therapies. This study was funded by NIH grant #1R01CA181088–01.
Poster #52
ACCELERATED GROWTH RATE OF MULTIFOCAL TUMORS AFTER INITIAL RADIOFREQUENCY ABLATION
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(Presented by: Mario Taylor)

Introduction: Radiofrequency ablation (RFA) is a minimally-invasive treatment for patients with localized renal cell carcinoma (RCC). We report a subset of patients with multifocal RCC treated with RFA who subsequently demonstrated accelerated growth rates (AGR) in non-treated renal tumors after RFA.

Methods: A database of patients with multifocal RCC enrolled in a Phase II prospective clinical trial of RFA between 1999 and 2004 was reviewed. Patients who underwent ipsilateral secondary intervention following RFA were recorded and a subset of patients with AGR of subsequent renal tumors was identified. The ipsilateral tumors were measured and assessed for growth rate. AGR was defined as >0.5 cm/year in longest measurement on axial imaging. Clinical data was collected and included proximity to initial RFA site, timing of onset of accelerated growth, enhancement measured in Hounsfield units, tumor measurements in two dimensions, surgical history and presence of germline genetic mutations for known hereditary RCC conditions. Growth rates prior to initial RFA were recorded when available. Incompletely ablated tumors were excluded from the study.

Results: 63 patients were enrolled and 113 lesions were treated with RFA. Eighteen tumors in 15 patients (24%) demonstrated AGR following RFA. For all 18 tumors, average growth rate after RFA was 1.10 cm/year. The average follow-up was 9.06 years. 10 of 18 AGR tumors were visible on pre-RFA radiologic imaging. For these lesions, the average pre-RFA growth rate was 0.26 cm/year and the average post-RFA growth rate was 1.31 cm/year. The mean size of the tumors was 3.24 cm (Range: 1.38–6).

Conclusion: 24% of patients with multifocal RCC demonstrated AGR after RFA. The majority of tumors were not in proximity of initial RFA lesion. The mechanism for this is unclear and larger studies are necessary to validate these findings.

Poster #53
HIGHER LEVELS OF SECRETED S100 A8/9 LEVELS FROM PERITUMOR PERIRENAL ADIPOSE TISSUES ARE ASSOCIATED WITH RENAL CELL CARCINOMA (RCC)
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(Presented by: Zhamshid Okhunov)

Introduction: To define the relationship between obesity and RCC, we studied the interaction between perirenal adipose tissues (PAT) and RCC.

Methods: PAT directly over tumors, PAT away from tumors, subcutaneous adipose tissues (AT) and renal sinus AT were collected and conditioned medium (CM) was generated from 90 patients undergoing surgery for renal cortical neoplasms. We evaluated the CM for its effect on proliferation and migration of ccRCC cell line Caki−2 by MTT assay and Boyden chamber cell migration assay, respectively, and for secreted levels of S100 A8/9 by ELISA.

Results: Compared to patients with benign histopathology, peritumor PAT CM from pT3 ccRCC patients significantly increased CaKi−2 cell migration (P<0.05), but did not affect the proliferation (P>0.05). Patients with ccRCC at stage pT2 and pT3 had higher levels of S100 A8/9 in peritumor PAT and sinus AT CM than those with benign pathology or ccRCC at stage pT1. Sinus AT exhibits the highest level of S100 A8/9 (9.13± 2.75ng/ml), followed by peritumor PAT (2.40±0.64ng/ml), Skin AT (0.71±0.22ng/ml) and PAT away from tumors (0.70±0.20ng/ml). The mean BMI values from ccRCC patients at stage pT1, pT2 and pT3 are not significantly different, which are 30.1±7.3, 28.9±4.6 and 28.9±4.0kg/m2, respectively (P>0.05).

Conclusion: The higher S100 A8/9 levels in peritumor PAT and sinus AT CM associated with higher stage ccRCC may have potential prognostic value. Further studies are in progress to determine cellular mechanisms of S100 A8/9’s action. Fat specific metrics will likely be superior to BMI for predicting tumor status and behavior.
Poster #54
PIPERLONGUMINE: A MULTITARGETED NATURAL AGENT FOR RENAL CANCER TREATMENT AND SECONDARY PREVENTION
Sei Naito1, Peter Makov2, Konstantin Golovine2, Yoshihiko Tomita3, Robert Uzzo2 and Vladimir Koloenko2
1Foxchase Cancer Center, Philadelphia, PA; 2Foxchase cancer center, Philadelphia, PA; 3Yamagata University Faculty of Medicine, Yamagata, Japan
(Presented by: Sei Naito)

Introduction: Renal cell carcinoma (RCC) is a lethal disease with incidence on the rise. While significant advances in systemic approaches have been achieved, two distinct groups of patients are at high risk of death from RCC: those who present with metastatic disease and those who recur following surgery. Therefore, the development of novel therapeutic strategies for the treatment of renal cancer represents a goal with enormous clinical and scientific merit. Recent literatures have indicated that Piperlongumine (PL), a naturally occurring alkaloid present in the Long pepper (Piper longum), suppresses several malignant cell growth, including in sarcoma, bladder, breast, melanoma, lung and prostate tumors. And specific chemical modification of PL (i.e. dimerization) strengthens the anti-tumor activity.
We examined the cell growth, Akt/mTOR signaling, and NF–kappaB signaling after PL and dimerized PL treatment in patient-derived RCC cells in vitro and in vivo.

Methods: We established a cell line (named PNX0010) from surgically resected primary tumor of renal cell carcinoma patient who had metastatic lesions. And then we examined Akt/mTOR signaling using Western blotting method, NF–kappaB signaling using luciferase assay, and cell viability using cell titer blue assay after PL and dimerized PL treatments in PNX0010. In vivo study, the effects of these medications were assessed in a PNX0010 xenograft rodent model.

Results: Both PL and PL–dimer treatments suppressed Akt and Akt down-stream molecules phosphorylation and NF–kappaB activity. In vitro and in vivo, the treatments suppressed the tumor growth.

Conclusion: We demonstrated that PL and dimerized PL suppress the malignant potential of long-term cultured and patient-derived RCC cells both in vitro and in vivo, acting as a multifocal inhibitor concurrently affecting Akt/mTOR and NF–kappaB signaling in tumor cells. Provided that PL is a natural constituent with a favorable safety profile, our studies suggest that PL and PL derivatives can be used as therapeutic agents for the treatment and prevention of postoperative recurrence of RCC.
**Poster Session I – Full Abstracts**

**Poster #55**

**TITLE: COMPARING OUTCOMES FOR RHABDOID VERSUS SARCOMATOID FEATURES IN RENAL CELL CARCINOMA**

Michael L. Blute, Jr., MD, Wei Huang, MD, Fangfang Shi, MS, Tracy M. Downs, MD, David F. Jarrard, MD and E. Jason Abel, MD

1University of Wisconsin Department of Urology; 2University of Wisconsin Department of Pathology

(Presented by: Michael L. Blute, Jr.)

**Introduction:** The International Society for Urological Pathology has recently defined rhabdoid and sarcomatoid features as separate pathologic entities, which can occur with any RCC morphotype.

**Objective:** The purpose of this study was to compare predictors of overall (OS) and cancer-specific (CSS) in RCC patients with sarcomatoid or rhabdoid features.

**Methods:** An institutional database identified patients with grade 4 RCC treated with nephrectomy from 2000 to 2014. Cox proportional hazards models were used to evaluate associations with common clinical and pathological variables including rhabdoid and sarcomatoid features.

**Results:** Of 80 patients, 37 (47%) had grade 4 conventional RCC, 28 (34%) had sarcomatoid features, and 15 (19%) had rhabdoid features. At initial diagnosis, patients with rhabdoid features were less likely to present with metastatic disease compared to conventional or sarcomatoid RCC, 26% compared to 43% and 68% respectively (p<0.01). Forty patients (50%) died from RCC during follow-up. Clinical and pathologic characteristics associated with CSS are summarized in Table 1. Factors associated with decreased OS included stage T4 (p=0.01), nodal metastases (p=0.03), distant metastases (p=0.0003), and adjuvant therapy (p=0.02). Factors associated with decreased CSS included stage T4 (p=0.02), nodal metastases (p=0.01), distant metastases (p=0.0001), and adjuvant therapy (p=0.01). When stratified by International Metastatic RCC criteria, poor risk was significantly associated with decreased CSS (HR 3.56, 95% CI 1.20–10.55). Median CSS was not different in patients presenting with rhabdoid vs. sarcomatoid features, 17.2 months vs. 19.9 months (p=0.35).

**Conclusion:** Grade 4 RCC including rhabdoid or sarcomatoid differentiation is associated with aggressive disease. When stratified by stage, patients with rhabdoid and sarcomatoid features have similar cancer outcomes.

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**Table 1.** Clinopathologic features associated with CSS rates.

<table>
<thead>
<tr>
<th>Cancer-specific survival</th>
<th>P-value</th>
<th>Hazard Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>T1a/T1b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2a/T2b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3a/T3b/T3c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional lymph node involvement</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>pN1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pN1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distant metastases</td>
<td>&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjuvant therapy</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heng criteria (Risk group)</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Histologic subtype</td>
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<td></td>
</tr>
<tr>
<td>RCC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCC/sarcomatoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCC/rhabdoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCC rhabdoid/sarcomatoid</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>N0M0 vs. N1M1 (NoYes)</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCC/sarcomatoid</td>
<td>2.80</td>
<td>(0.56-11.65)</td>
</tr>
<tr>
<td>RCC/rhabdoid</td>
<td>1.54</td>
<td>(0.17-13.97)</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCC</td>
<td>6.02</td>
<td>(2.03-20.94)</td>
</tr>
<tr>
<td>Sarcomatoid</td>
<td>7.53</td>
<td>(2.59-24.19)</td>
</tr>
<tr>
<td>Rhabdoid</td>
<td>6.41</td>
<td>(1.38-27.60)</td>
</tr>
</tbody>
</table>
Poster Session I – Full Abstracts

Poster #56
REPEAT ROBOTIC PARTIAL NEPHRECTOMY FOR COMPLEX RENAL TUMORS: CHARACTERISTICS AND COMPLICATIONS
Annerleim Walton-Diaz, MD1, Gennady Bratslavsky, MD2, Peter A Pinto, MD1, W Marston Linehan, MD1 and Adam R Metwalli, MD1
1Urologic Oncology Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD; 2Department of Urology, Upstate Medical University, Syracuse, NY
(Presented by: Annerleim Walton-Diaz)

Introduction: Repeat and salvage open renal surgeries have been shown to have higher blood loss and complication rate compared to first time renal surgery. We present characteristics and complications of patients who underwent repeat robotic partial nephrectomy (RRPNx).

Methods: We reviewed our prospectively maintained database to identify patients who underwent a single or ≥ 2 ipsilateral renal or adrenal surgery, the second one being RRPNx between 2007 and 2013. Clinical characteristics, surgical parameters and complications using Clavien classification system were recorded and compared between patients undergoing initial ipsilateral robotic partial nephrectomy (iRPNx) vs RRPNx.

Results: From 124 patients undergoing robotic partial nephrectomy (RPNx), 26 had RRPNx (21%). 16 patients underwent previous open ipsilateral surgery, 8 had previous minimally invasive ipsilateral procedures, 4 underwent prior ipsilateral thermal ablation and 4 had combined ipsilateral therapies. 15.4% (4/26) of cases were converted to open; and 1 (3.8%) from partial to radical nephrectomy. Mean age was 48.8±12.8 years. Mean number of tumors resected was 4.3± 5.8 (1−29), mean EBL was 1426±1769 cc for the RRPNx and 793.1±877.5 for the iRPNx group. 19.2% (5/26) of patients had urine leak in the RRPNx group vs 3% (3/98) in the iRPNx group. 46.2% (12/26) presented Clavien grade I−II complications in the RRPNx vs 31.6% (31/98) in the iRPNx group. 11.5% (3/26) had Clavien grade III complications in the RRNpx vs 6.1% (6/98) in the iRPNx group. Conclusion: RRPNx is feasible in highly selected patients. Consistent with published open series, complications, predominantly Grade I−II, increase in RRPNx setting.
**Introduction:** Clear cell renal cell carcinoma (ccRCC) has been characterized as among the most highly immunogenic tumors, however, to date these findings have not been clinically correlated. Therefore, we investigated the relationship between extent of tumor purity and clinical outcomes. Additionally, we analyzed specific mutations from the TCGA dataset to examine their relationship to tumor purity.

**Methods:** Purity values and immune scores are derived from the ESTIMATE algorithm using TCGA RNAseq data on human RCC tumors, such that the higher the ESTIMATE score the less pure the tumor. (Yoshihara, Nat Comm) Values greater than and less than 75% are denoted as low and high purity samples, respectively. Immune scores higher and lower than 5% are denoted as high and low immunity, respectively. Kaplan-Meier survival curves were generated for the two groups, and a chi-square test for the difference of the curves was computed using a log-rank test. Specific mutational relationships were calculated using a Mann-Whitney U-test.

**Results:** We found that lower tumor purity, based on a higher ESTIMATE score, was statistically correlated with improved CSS (p=0.0498, Fig 1). Additionally, increased tumor immune infiltration was strongly associated with prolonged RFS (p=0.0025). Of note, a strong negative correlation was demonstrated between the immune score and tumor purity calculation highlighting the infiltrative nature of ccRCC. Furthermore, we found that wild-type PBRM1 (p=0.038) and wild-type ARID1A (p=0.048) were significantly associated with higher ESTIMATE scores.

**Conclusion:** Using the ESTIMATE algorithm, we have demonstrated that a higher degree of tumor impurity and immune infiltration within renal tumors is associated with improved CSS and RFS. Also, the presence of wild-type PBRM1 and wild-type ARID1A are independently associated with higher ESTIMATE scores and thus may indicate less aggressive tumor behavior. As such, this study opens the possibility for use of the individual ESTIMATE score as a potential prognostic risk predictor and biomarker for immunotherapeutic response.
ACTIVE SURVEILLANCE FOR LOCALIZED RENAL CELL CARCINOMA IN ELDERLY PATIENTS

Kenan Celtik, MS, Paras Shah, MD, Arvin George, MD, Simpa Salami, MD, Manaf Alom, MD, Christopher Hartman, MD, Jessica Kreshover, MD, Michael J. Schwartz, MD, Joph Steckel, MD, Lee Richstone, MD, Manish Vira, MD, Louis R. Kavoussi, MD
Hofstra North Shore LIJ School of Medicine, The Arthur Smith Institute for Urology, North Shore LIJ Health System, New Hyde Park, NY
(Presented by: Kenan Celtik)

Introduction: Although surgical extirpation is the gold standard for management of localized renal cell carcinoma (RCC), evidence suggests many small renal masses (SRMs) follow an indolent course. We sought to understand the natural history of suspicious SRMs in patients ≥80 years of age undergoing active surveillance (AS).

Methods: After IRB approval, we identified 760 elderly subjects evaluated at our institution for a localized SRM. Eligible patients were ≥80 years of age with either an enhancing solid mass or Bosniak IV cyst followed with serial imaging for at least 6 months. Subjects were excluded if they had a history of upper tract urothelial carcinoma, metastatic disease at time of diagnosis, solitary kidney, or previous extirpative or ablative procedure of the kidney. Eighty-eight patients met inclusion criteria and were longitudinally followed until their last follow-up visit or death.

Results: Median age of the AS cohort was 83.7 years at time of diagnosis. Patients were followed for a median length of 30.1 months (IQR 14.3 to 43.7 months). The mean diameter of lesions at time of diagnosis was 2.85 cm (range 0.6 cm to 8.7 cm) and the median growth rate was 0.18 cm/year. During the surveillance period, 6 patients (6.8%) underwent delayed intervention and 4 subjects progressed to metastatic disease (4.5%). Nine patients (10.2%) died after a median follow-up of 21.2 months with two (2.3%) patient deaths attributed to RCC.

Conclusion: Given questions surrounding the absolute benefit derived from intervention, conservative management for SRMs is being increasingly utilized amongst elderly patients. This study demonstrates acceptable oncologic outcomes for octogenarians who are placed on active surveillance for SRMs with the majority of lesions behaving in an indolent manner and thus unlikely to impact survival. Competing causes of mortality as well as the potential for complications with surgical intervention likely trump the risk of progression and death from small RCCs in this cohort. Relative life expectancy may be beneficial in guiding management of SRMs in patients who are candidates for ablative or elective partial nephrectomy.

Table 1. Subject Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Active Surveillance</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of subjects</td>
<td>88</td>
</tr>
<tr>
<td>Median age at diagnosis, y</td>
<td>83.7</td>
</tr>
<tr>
<td>Median length of follow-up, mo (IQR)</td>
<td>30.1 (14.3 - 43.7)</td>
</tr>
<tr>
<td>Mean tumor size at diagnosis, cm (IQR)</td>
<td>2.88 (1.80 - 3.65)</td>
</tr>
<tr>
<td>Median growth rate, cm/y</td>
<td>0.18</td>
</tr>
<tr>
<td>No. tumor stage at diagnosis</td>
<td></td>
</tr>
<tr>
<td>T1a</td>
<td>73</td>
</tr>
<tr>
<td>T1b</td>
<td>13</td>
</tr>
<tr>
<td>T2a</td>
<td>2</td>
</tr>
<tr>
<td>No. delayed intervention (%)</td>
<td>5 (6.8)</td>
</tr>
<tr>
<td>No. radical nephrectomy</td>
<td>3</td>
</tr>
<tr>
<td>No. partial nephrectomy</td>
<td>2</td>
</tr>
<tr>
<td>No. cryoablation</td>
<td>1</td>
</tr>
<tr>
<td>No. progressed to metastasis (%)</td>
<td>4 (4.5)</td>
</tr>
<tr>
<td>No. all-cause mortality (%)</td>
<td>9 (10.2)</td>
</tr>
<tr>
<td>No. RCC-specific mortality (%)</td>
<td>2 (2.3)</td>
</tr>
</tbody>
</table>
**Poster #59**

**MODIFIED FRAILITY INDEX PREDICTS MORTALITY AND ADVERSE OUTCOMES IN NEPHRECTOMY PATIENTS**

Jamie Pak, BA, Danny Lascano, BA, G. Joel DeCastro, MD, James Mckierman, MD, Mitchell Benson, MD

Columbia University College of Physicians and Surgeons, Department of Urology, New York, NY

(Presented by: Jamie Pak)

**Introduction:** Frailty, a concept of growing interest in light of the aging population, describes the gradual loss of physical and mental capacity with or without clinical disease. Practically, an objective measure of frailty can replace the often subjective assessment of a patient’s ability to tolerate a surgical intervention. We propose that a modified version (mFI) of the Canadian Study of Health and Aging Frailty Index (CSHA−FI) can predict 30-day mortality and other adverse postoperative outcomes in nephrectomy patients.

**Methods:** We accessed the NSQIP database for all nephrectomies in years 2005–2012 and matched eleven CSHA−FI variables to the NSQIP database. The mFI of each patient was calculated as the ratio of the number of positive CHSA−FI risk factors to the number assessed. The primary outcome was 30-day mortality; secondary outcomes were MI, cardiac arrest requiring CPR, DVT/PE, surgical site infection (SSI), septic shock, ventilator dependence >48 hours, unplanned intubation, ARF (acute renal failure) requiring dialysis, any Clavian IV complication (any life-threatening complication requiring IC/ICU management), and any occurrence (any secondary outcome). Chi-square analysis was performed, with Fisher’s exact test when appropriate.

**Results:** A total of 8,542 nephrectomy patients were identified. Higher mFI was most strongly associated with 30-day mortality, septic shock, ventilator dependence, unplanned intubation, any Clavian IV complication, and any occurrence (p<0.0005). mFI was also associated with MI and ARF requiring dialysis (p<0.05), and association with cardiac arrest requiring CPR approached significance (p=0.06). There was no association of mFI with DVT/PE or SSI.

**Conclusion:** The mFI was predictive of 30-day mortality, septic shock, ventilator dependence, unplanned intubation, any Clavian IV complication, any adverse occurrence, MI, and ARF requiring dialysis. This supports the utility of mFI as a predictor of adverse outcomes in patients undergoing nephrectomy and potentially urologic surgery in general.
Poster #60
IS A 12-CORE BIOPSY OF ANY VALUE IN PATIENTS WITH A PREVIOUS NEGATIVE PROSTATE BIOPSY AND VISIBLE LESION ON MAGNETIC RESONANCE IMAGING?
Simpa Salami, MD, MPH, Eran Ben-Levi, MD, Oksana Yaskiv, MD, Laura Ryniker, MD, Baris Turkbey, MD, Louis Kavoussi, MD, MBA, Robert Villani, MD, Ardeshir Rastinehad, DO
(Presented by: Simpa Salami)

Introduction: We sought to evaluate the performance of multiparametric MRI (MP−MRI) in predicting CaP on repeat biopsy; and to compare the cancer detection rates (CDR) of MRI/TRUS fusion-guided biopsy with standard 12-core biopsy in men with at least one previous negative biopsy.

Methods: We prospectively enrolled men with elevated or rising PSA and/or abnormal DRE into our MRI/TRUS fusion-guided prostate biopsy trial. Participants underwent a 3T MP−MRI with an endorectal coil. Three radiologists graded all suspicious lesions on a 5-point Likert scale. MRI/TRUS fusion-guided biopsies of suspicious prostate lesions and standard TRUS-guided 12-core biopsies were performed. Analysis of 140 eligible men with at least one previous negative biopsy was performed. We calculated CDR and estimated area under curves (AUCs) of MP−MRI in predicting any and clinically significant CaP.

Results: The overall CDR was 65.0% (91/140). Higher level of suspicion on MP−MRI was significantly associated with prostate cancer detection (p< 0.001). The AUC of MP−MRI in predicting clinically significant was 0.817 compared with 0.637 and 0.694 for PSA and PSA density respectively (p< 0.001; Figure 1). The CDRs of MRI/TRUS fusion-guided and standard 12-core biopsy modalities were 52.1% (73/140) and 48.6% (68/140) respectively (p = 0.435). However, fusion biopsy was more likely to detect clinically significant CaP (as defined by Epstein’s criteria) when compared with the 12-core modality (47.9% vs. 30.7%; p < 0.001). Of the cancers missed by 12-core, 20.9% (19/91) were clinically significant. Most cancers missed by 12-core (69.6%) were located in the anterior fibromuscular stroma and central gland. Using a Fusion biopsy only approach in men with an MRI lesion suspicion score of ≥ 4 would have missed only 3.5% of clinically significant CaP.

Conclusion: MP−MRI and subsequent MRI/TRUS fusion-guided biopsy platform may improve detection of clinically significant CaP in men with previous negative biopsies. Conventional 12−core prostate biopsy added little clinical value to a Fusion biopsy only approach in patients with an overall suspicion score of greater than or equal to 4.
Introduction: There is a lack of tools to determine the best treatment sequence for mCRPC patients due to tumor heterogeneity and computational models can aid treatment decisions based on tumor characteristics.

Methods: We generated a computational model to predict response of mCRPC to different treatment sequences including standard and targeted therapies against AR, AKT, and JAK2/STAT5 pathways, which are frequently expressed in bone metastases. We tested the expression of AR, Stat5 and PTEN by IHC on 35 PCa bone metastases samples between 2000 and 2010. Chart review was done for clinical and survival information. We modeled a cancer cell population characterized by 8 subpopulations for possible permutations of heterogeneity based on presence or absence of activation of AR, Jak2/Stat5, and/or AKT (PTEN loss). We looked at the impact of various therapies on interactions within this system in bone microenvironment: hormonal therapies (Hx), chemotherapy (Cx), bone remodeling agents (Rx), AKT inhibitor (Px) and JAK2 inhibitor (Jx). Simple ordinary differential equations were generated to represent the number of each cell type, hormone level, and amount of bone formation over time. The model was validated with our patient cohort.

Results: The coupled equations describe changes in the CRPC bone metastases tumor population (1) and bone microenvironment (2) over time. A genetic algorithm (GA) was developed to determine the best treatment sequence. After obtaining original fitness, GA was applied repeatedly to evolve new, better solutions until the Best Fitness (best OS) for a specific patient was reached. These results were compared to the actual outcomes of patients after standard of care therapies. Preliminary results not only recapitulate clinical findings but also imply that there may be more optimal personalized treatment sequences for different tumor compositions.

Conclusion: Based on initial model outputs, this novel mathematical model can be a useful tool to offer patient-directed therapies in CRPC based on biomarkers involved in disease progression. Importantly, any target of interest that can be incorporated into the model to guide how best to sequence novel targeted drugs with standard therapies.

\[
\dot{T}_i = T_i \left( \frac{g}{\text{proliferation}} + \frac{\beta B}{\text{bone stimulation}} + \gamma_j m_j (1 - \delta_j \tau_j) + \gamma_p m_p (1 - \delta_p \tau_p) + \gamma_A m_A H - \delta_c \tau_c \right) 
\]

\[
\dot{B} = \sigma \sum_{i=1}^k T_i + B \left( \frac{H}{\text{androgen stimulation}} - \frac{V_c \tau_c}{\text{chemotherapy}} - \frac{V_p \tau_p}{\text{AKT inhibitor}} - \frac{V_j \tau_j}{\text{JAK/STAT inhibition}} - \frac{V_R \tau_R}{\text{RANK ligand}} \right)
\]
**Poster Session I – Full Abstracts**

**Poster #62**

**PATHOLOGIC OUTCOMES FOR LOW-RISK PROSTATE CANCER AFTER DELAYED RADICAL PROSTATECTOMY IN THE UNITED STATES**

Adam Weiner, BS, Sanjay Patel, MD, Scott Eggener, MD

University of Chicago, Chicago, IL

(Presented by: Adam Weiner)

**Introduction:** Recent guidelines on active surveillance for low-risk prostate cancer will likely increase the number of men delaying definitive treatment. However, studies investigating the effect of delaying radical prostatectomy (RP) on adverse pathology have conflicting results and have been limited by small sample size. We sought to use a large, population-based database to determine whether delaying RP increases adverse pathology for patients with low-risk radical prostatectomy.

**Methods:** From the National Cancer Database, we derived our cohort of 17,943 low-risk prostate cancer patients (biopsy Gleason 3+3, PSA <10ng/ml, and cT1−T2) who received RP without prior radiation or systemic treatment between 2010 and 2011. We measured the effect of delaying RP >6 months after diagnosis and other factors on adverse pathology upon RP.

**Results:** A total of 16,818, 894, 169, and 62 men received RP within 6 months, between 6 and 9 months, between 9 and 12 months, and after 12 months, respectively. Nodal metastases occurred in 0.3%, upgrading in 43%, upstaging in 9%, and at least one of the preceding outcomes in 45%. Positive surgical margins were present in 16%. These proportions did not differ significantly between the four groups. Upon multivariable analysis, higher prostate-specific antigen (4.1–9.9ng/ml vs. 0.1–2.4ng/ml: OR 1.87 95% CI 1.66–2.10), greater than 2 positive biopsy cores (vs. <3: OR 1.68 95% CI 1.57–1.81), greater than or equal to 34% positive biopsy cores (vs. <34%: OR 1.28 95% CI 1.18–1.39), Black race (vs. White race: OR 1.16 95% CI 1.05–1.28), and time from biopsy to RP >12 months (vs. ≤6 months: OR 1.70 95% CI 1.01–2.84) each independently increased the composite risk of upstaging, upgrading, or nodal metastases (all p<0.05).

**Conclusion:** In the United States, nearly half of men with low-risk prostate cancer experience at least one adverse pathological outcome at RP. Delaying RP up to 12 months did not increase the risk but delays >12 months were associated higher risks, restaging biopsies for men considering active surveillance are strongly recommended.

Funding: Urology Cares Foundation

Herbert Brendler, MD, medical student summer fellowship
Introduction: Atrophy is a very common histological finding in the prostate. Yet, the clinical significance of atrophy is not known. Therefore, we evaluated whether the presence and severity of baseline prostate atrophy among men with initial negative biopsy for prostate (PCa) increased the risk of subsequent PCa detection among subjects in the Reduction by Dutasteride of PCa Events (REDUCE) trial.

Methods: Retrospective analysis of 5,907 men 50–75 years-old with prostate-specific antigen between 2.5–10ng/mL and a prior negative biopsy in the REDUCE trial who completed at least a 2-year biopsy. PCa (defined as present or absent) and prostate atrophy (graded as absent, mild, moderate or marked) were assessed by central pathology review. The association of baseline atrophy with positive 2- and 4-year repeat biopsies was evaluated with logistic regression controlling for baseline covariates.

Results: Prostate atrophy was detected in 4,107 (69.5%) and graded as mild, moderate and marked in 3,527 (59.7%), 575 (9.7%) and 5 (0.1%) baseline biopsies, respectively. Patients with atrophy were significantly older and had larger prostates (all P<0.001). At 2-year biopsy, PCa prevalence was 15% (N=851). In univariable and multivariable analysis, baseline atrophy regardless of grade was significantly associated with lower PCa risk (OR=0.609; P<0.001 and OR=0.628; P<0.001, respectively). Similarly, at 4-year biopsy the prevalence of PCa was 9.9% (N=406). In univariable and multivariable analysis, baseline atrophy was significantly associated with lower risk of PCa (OR=0.654; P<0.001 and OR=0.700; P=0.001, respectively). Stratified by severity, both mild and moderate atrophy were associated with lower PCa risk in univariable (mild: OR=0.624; P<0.001 and moderate: OR=0.523; P<0.001) and multivariable analysis (mild: OR=0.642; P<0.001 and moderate: OR=0.553; P<0.001) at 2-year biopsy. Similar results were observed at the 4-year biopsy.

Conclusion: Among men undergoing repeat prostate biopsy 2 and 4 years after a negative baseline biopsy, baseline prostate atrophy was independently associated with lower PCa risk. Prostate atrophy in a negative biopsy for PCa may lower the risk of subsequent PCa detection on repeat biopsy.
AVERAGE TELOMERE LENGTH IN PERIPHERAL LEUKOCYTES AND PROSTATE CANCER PROGRESSION IN MEN UNDER ACTIVE SURVEILLANCE – RESULTS FROM THE CANARY PROSTATE ACTIVE SURVEILLANCE STUDY (PASS) COHORT
Khanh Pham, MD1, Claudio Jeldres, MD1, Christopher Porter, MD1 and Peter Nelson, MD2
1Virginia Mason, Seattle, WA; 2Fred Hutchinson Cancer Research Center, Seattle, WA
(Presented by: Khanh Pham)

Introduction: Biomarkers to better predict tumor aggressiveness in men with clinically localized prostate cancer (CaP) are lacking. Shortened telomere length has been associated with chromosomal instability, which is characteristic of metastatic lesions. We assessed the association between average telomere length (ATL) in peripheral leukocytes and CaP progression in men on active surveillance (AS), as well as the association between ATL and unfavorable pathological features at radical prostatectomy (RP).

Methods: ATL was measured in 779 men in the Canary Prostate Active Surveillance Study (PASS) cohort using Quantitative-PCR. Men with >10 year interval between diagnosis and study entry were excluded. Progression was defined as an increase in Gleason score sum, increase in primary Gleason score, or increase in volume (<34% positive cores to >34% positive cores). Analysis was performed by non-pairwise two-sided t-test. Hazard and odds ratios of the effect of ATL on AS failure and unfavorable pathological features (Gleason score >7 or pT3) at RP were estimated using Cox regression and logistic regression models, respectively. Sub-analysis was also performed on men <65 years of age with >1 year follow-up. Individuals who did not progress were censored.

Results: 775 men met the inclusion criteria for analysis. Mean age was 63 years (range 38–81) and mean PSA was 5.00 ng/ml (0.40–28.77). When compared to long ATL, short ATL was not associated with CaP progression (aHR 1.22, 95% CI 0.82–1.83; p=0.32) or unfavorable pathological features at RP (aOR 1.15, 95% CI 0.31–4.34; p=0.84). In a sub-analysis of the 357 men <65 years of age [mean age 60 years (39–65) years and mean PSA 4.57 ng/ml (0.40–14.85)], short ATL was significantly associated with CaP progression (aHR 2.80, 95% CI 1.53–5.14; p=0.001) when compared to long ATL, but not unfavorable pathological features at RP (aOR 1.38, 95% CI 0.37–5.19; p=0.63).

Conclusion: In our analysis of men in the Canary PASS cohort, short ATL in peripheral leukocytes is associated with disease progression in younger (<65 years of age) men with CaP under AS. ATL is not associated with unfavorable pathology among those who progress and are subjected to RP. Measurement of ATL in peripheral leukocytes may potentially play a role as a biomarker for young men managed with AS.
Poster #65
TRANSPERINEAL TEMPLATE-GUIDED PROSTATE BIOPSY IN PATIENTS INITIATING ACTIVE SURVEILLANCE: A MULTI-INSTITUTIONAL COMPARISON
Khanh Pham, MD, Katherine Odem-Davis, PhD, Claudio Jeldres, MD, Christopher Porter, MD, John Wei, MD and Todd Morgan, MD
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(Presented by: Khanh Pham)

Introduction: Most prostate cancer (CaP) active surveillance (AS) protocols recommend a confirmatory biopsy within 3–6 months of diagnosis. Transperineal template-guided biopsy (TP BX) is one approach to detect previously missed high-grade CaP. Since the optimal TP BX technique is unknown, we compared the rates of upgrade and procedure-related morbidity for two TP BX approaches, 24 cores vs. a mean of 62 cores.

Methods: IRB approved prospective databases from Virginia Mason and University of Michigan were utilized to evaluate men who underwent TP BX between 2005–2014 and were eligible for AS based on initial 12-core biopsy demonstrating NCCN guideline low-risk CaP. Confirmatory TP BX was performed within 6 months of diagnosis using either a 24-core template with 12 anterior and 12 posterior cores (TP−24) or a template with cores systematically obtained based on gland volume at an average of 1 core per cc (TP−V). An upgrade probability difference equivalence margin of 6.7%, corresponding to a number needed to treat of 15, was pre-specified. Statistical estimates were by Wilcoxon, Chi-Squared, Fisher’s Exact and linear regression.

Results: A total of 46 men underwent TP−24 biopsy and 89 underwent TP−V biopsy. Median age was 66 and 64 years (p=0.08), median PSA was 4.9 and 5.3 (p=0.70), and median [IQR] prostate volume was 44 [33, 55] cc and 51 [39, 63] cc (p=0.06) in the TP−24 and TP−V cohorts, respectively. Men in the TP−24 cohort had a lower median [IQR] number of cores obtained (24 [24, 24] vs. 62 [55, 74]; p<0.001). No significant differences in rates of upgrading (34.8% vs. 29.2%; p=0.64) or complications (8.7% vs. 15.7%; p=0.38) were noted. The estimated difference in probability of upgrade comparing TP−V to TP−24, adjusted for age, PSA, prostate volume, and clinical stage, was 0.4% (95% CI: −16.4 to 17.2%; p=0.96).

Conclusion: We found no statistically significant difference in upgrading or morbidity between a 24-core and a prostate volume-based template (mean 62 cores). A less invasive 24-core TP BX may be sufficient to identify men appropriate for AS.
Introduction: Perineural invasion (PNI) on prostate biopsy of patients with prostate cancer (PC) has been associated with disease upgrading among those undergoing radical prostatectomy. However, the clinical significance of PNI in men on active surveillance (AS) has been evaluated by a limited number of studies. Therefore, we sought to evaluate the association of PNI with time to clinical and pathological progression in men with PC on AS.

Methods: Retrospective analysis of 289 men 48 to 82 years old on AS for low-risk PC (T1c–T2a), Gleason ≤6, ≤3 positive cores, ≤50% of any core involved, prostate-specific antigen (PSA) ≤11ng/ml, life expectancy >5 years and follow-up data in the REduction by Dutasteride of clinical progression Events in Expectant Management study. Progression was divided in pathological (>3 positive cores, >50% core involvement or Gleason >6 in a repeat biopsy) or therapeutic (any treatment for PC) or both. Time to progression was analyzed with Kaplan-Meier plots, log-rank tests and Cox model adjusting for age, PSA density, percent cores involved, maximum core involvement and treatment.

Results: A total of 11 (4%) patients had PNI on baseline biopsy. PNI was associated with higher tumor length and maximum core involvement (all P<0.05). PNI was not associated with patient’s age, race, PSA levels or density, percent or number of positive cores. After a median follow-up of 37 months, 125 (43%) patients developed progression. Of these, 95 (76%) patients had pathological and 30 (24%) had therapeutic progression. In univariable analysis, patients with baseline PNI had a shorter time to overall and pathological progression (HR=2.62, 95%CI=1.31–5.23, P=0.006 and HR=2.42, 95%CI=1.03–5.66, P=0.041, respectively). Figure shows the overall progression-free survival comparing patients with and without PNI. Similar results were obtained in multivariable analysis for overall and pathological progression (HR=2.26, 95%CI=1.10–4.68, P=0.028 and HR=2.13, 95%CI=0.88–5.13, P=0.092, respectively).

Conclusion: Among patients with PC on AS, PNI is independently associated with shorter time to progression. Thus, PNI may be used to help select patients for AS and stratify them according to the risk of disease progression.
Poster #67
RACIAL DISPARITIES IN ONCOLOGIC OUTCOMES AFTER RADICAL PROSTATECTOMY: LONG-TERM FOLLOW-UP
Farzana Faisal1, Debasish Sundi, MD1, John Cooper1, Ashley Ross, MD, PhD1, Voleak Choeurng, MSc2, Elai Davicioni, PhD2, Elizabeth Humphreys, BS1, Alan Partin, MD, PhD1, Misop Han, MD1 and Edward Schaeffer, MD, PhD1
1Brady Urological Institute, Johns Hopkins University, Baltimore, MD; 2GenomeDx Biosciences Inc, Vancouver BC
(Presented by: Farzana Faisal)

Introduction: Studies describing racial disparities in outcomes following radical prostatectomy (RP) are conflicting. We report race-based outcomes after RP in a cohort stratified by NCCN risk category with updated follow-up.

Methods: We studied 15993 white and 1634 African American (AA) pre-treatment-naïve men who underwent RP at Johns Hopkins (1992–2013) with complete pre-operative and pathologic data. Pathologic outcomes were compared between races using appropriate statistical tests; biochemical recurrence (BCR) outcomes for men with complete follow-up were compared using multivariable models that controlled separately for pre-operative and post-operative covariates. Expression of genomic biomarkers were compared using the Decipher® Genomic Classifier (GC) – an independently validated prognostic model that assesses metastatic risk – within a matched set of NCCN very-low risk patients (n=138).

Results: AA men were more likely to have positive surgical margins (p<0.05 for very-low, low, intermediate risk classes), adverse pathological features (p<0.05 for very-low, low, intermediate risk classes), and be upgraded at RP (p<0.01 for very-low, low risk classes). With a median follow-up of 4.0 years after RP, AA race was an independent predictor of BCR among NCCN low (HR 2.16, p<0.001) and intermediate risk (HR 1.34, p=0.024) classes and among pathologic Gleason score (GS) ≤6 (HR 2.42, p<0.001) and GS 7 (HR 1.71, p<0.001). BCR-free survival for very-low risk AA men was similar to that of low risk white men (p=0.890); BCR-free survival for low risk AA men was similar to that of intermediate risk white men (p=0.060). The distribution of GC scores were significantly higher for very-low risk AA men compared to white men of the same risk stratum (p=0.012).

Conclusion: When stratified by NCCN risk, AA men with very-low, low or intermediate risk PCa who undergo RP are more likely to have adverse pathologic findings and biochemical recurrence compared to white men. Moreover, within the very-low risk group, AA men are at a higher risk of metastatic disease based on their GC scores. AA men with “low risk” PCa, especially those considering active surveillance, should be counseled that their recurrence risks can resemble those of whites in higher risk categories.
Poster #68
UTILITY OF NORMOGRAMS IN DECISION MAKING AFTER RADICAL PROSTATECTOMY: LESSONS FROM A NATURAL HISTORY COHORT OF INTERMEDIATE AND HIGH RISK MEN
Ashley Ross, MD, PhD1, Kasra Yousefi, MS2, Mercedeh Ghadessi, MS2, Debasish Sundi, MD3, Misop Han, MD3, Elizabeth Humphreys, MS3, Elai Davicioni, MD, PhD2, Alan Partin, MD, PhD3, Patrick Walsh, MD3 and Edward Schaeffer, MD, PhD3
1Brady Urological Institute; 2GenomeDX Biosciences Vancouver, BC, Canada; 3Brady Urological Institute, Baltimore, MD
(Presented by: Ashley Ross)

Introduction: With use of active surveillance there is an increase in treatment of men with intermediate or high risk localized prostate cancer. Compared to historic cohorts these men are at elevated risk for adverse pathologic features (pT3 disease or positive surgical margins, APF) at prostatectomy (RP). Current guidelines suggest adjuvant radiation therapy for these men. Here we examine at risk men treated only with RP until the time of metastasis and evaluate whether nomograms can help determine who would benefit from additional therapy.

Methods: Men with NCCN intermediate or high risk localized prostate cancer undergoing RP at the Johns Hopkins Medical Institute in the PSA era and having at least 5 years of post-operative follow up were identified. Of these, only men with initial undetectable PSAs after surgery and who received no therapy prior to metastasis were included.

Results: 49% of the cohort (1739 men) had APF at RP. With a median follow up of 10 yrs, 7% developed metastases. Among these men, 58% had APF. Among those not developing metastasis, 44% had APF. In the overall cohort, median CAPRA−S scores and 1−Stephenson probabilities were higher in men who developed metastasis (6 vs 2 and 0.28 vs 0.04 (p<0.001 for both)) but the range was broad and overlapping, particularly when considering only men with APF or those with BCR. For example, choosing a cut off of CAPRA−S (>5) scores (i.e., >50% chance of BCR) to treat patients with APF with adjuvant therapy would result in potential over- and under-treatment of 73% and 9% of men, respectively.

Conclusion: Adjuvant therapy for all men with APF may represent substantial overtreatment. While current nomograms do show increased risk among men with unfavorable outcomes, they have more limited discriminatory ability in APF and BCR patients. Men with APF at prostatectomy and those not treated until BCR may derive the most benefit from new molecular tests to guide clinical decision-making.
Poster #69
RECLASSIFICATION RATES ARE HIGHER AMONG AFRICAN AMERICAN MEn THAN CAUCASIANS ON ACTIVE SURVEILLANCE
Debasish Sundi, MD, Farzana Faisal, BA, Bruce Trock, PhD, Patricia Landis, BA, Zhaoyong Feng, MS, Ashley Ross, MD, PhD, H. Ballentine Carter, MD, Edward Schaeffer, MD, PhD
Johns Hopkins Medical Institutions, Baltimore, Maryland
(Presented by: Debasish Sundi)

Introduction: To evaluate the risk of reclassification on serial biopsy for Caucasian and African American (AA) men with very low risk PCa enrolled in a large prospective AS registry.

Methods: The Johns Hopkins AS registry is a prospective observational study that has enrolled 982 men since 1994. Including only men who met all National Comprehensive Cancer Network VLR criteria (clinical stage ≤T1, Gleason ≤6, PSA <10 ng/ml, PSA density <0.15 ng/ml/cc, positive cores <3, percent cancer per core ≤50), we analyzed a cohort of 654 men (615 Caucasian, 39 AA). The association of race with reclassification on serial biopsy was assessed with competing risks regressions. Research funding during the study period was generously provided by NIH grant T32DK007552.

Results: AA on AS were more likely than Caucasians to experience upgrading on serial biopsy (36% vs 16%, adjusted p<0.001). Adjusting for PSA, prostate size, volume of cancer on biopsy, treatment year, and BMI, AA race was an independent predictor of biopsy reclassification (subdistribution hazard ratio [sHR] 1.8, p=0.003). Examining specific modes of reclassification, AA race was independently associated with reclassification by grade (sHR 3.0, p=0.002) but not by volume.

Conclusion: AA with VLR PCa followed on AS are at significantly higher risk of grade reclassification as compared to Caucasians. Therefore, if the goal of AS is to selectively monitor men with low grade disease, AA men may require alternate selection criteria.
**Poster Session I – Full Abstracts**

**Poster #70**

**A GENOMIC CLASSIFIER IMPROVES PREDICTION OF RAPID METASTATIC DISEASE IN NODE-NEGATIVE HIGH-RISK PROSTATE CANCER PATIENTS MANAGED BY RADICAL PROSTATECTOMY WITHOUT ADJUVANT THERAPY**

Eric Klein, MD\(^1\), Kasra Yousefi, MSc\(^2\), Zaid Haddad, BSc\(^2\), Voleak Choeurng, MSc\(^2\), Christine Buerki, PhD\(^2\), Andrew J. Stephenson, MD\(^3\), Jianbo Li, PhD\(^4\), Michael W. Kattan, PhD\(^4\), Cristina Magi-Galluzzi, MD, PhD\(^5\) and Elai Davicioni, PhD\(^2\)

\(^1\)Cleveland Clinic, Glickman Urological And Kidney Institute, Cleveland, OH; \(^2\)GenomeDx Biosciences, Vancouver, BC, Canada; \(^3\)Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH, USA; \(^4\)Quantitative Health Sciences, Cleveland Clinic, Cleveland, OH, USA; \(^5\)Anatomic Pathology, Cleveland Clinic, OH, USA

(Presented by: Eric Klein)

**Introduction:** Surgery is a standard first line therapy for most intermediate-high risk men diagnosed with prostate cancer. While clinical factors such as tumor grade, stage and prostate specific antigen (PSA) are currently used to identify patients at risk of cancer recurrence, novel biomarkers that can improve risk stratification and distinguish local from systemic recurrence are needed. The Decipher® Genomic Classifier (GC) is a validated model for predicting men at risk of metastasis. We evaluated its performance in predicting metastatic disease within 5 years after surgery (rapid metastasis, RM) in an independent cohort.

**Methods:** Tumors and clinicopathologic data were obtained from a cohort of 2,641 RP patients treated between 1987–2008 at Cleveland Clinic. The final study cohort consisted of 15 RM patients and 154 patients as non-RM controls who met the following criteria: 1) preoperative PSA>20 ng/mL, stage pT3 or margin positive, or Gleason score ≥8; 2) pathologic node negative; 3) undetectable post-RP PSA; 4) no neoadjuvant or adjuvant therapy; and 5) minimum 5 year follow-up for the controls.

**Results:** RM patients developed metastasis with a median of 2.3 (IQR: 0.8–5) years. In multivariable analysis, GC was a significant predictor of RM (OR=1.48, p=0.018) after adjusting for clinical risk factors. GC had the highest c-index, 0.77, compared to the Stephenson model (c-index 0.75) and CAPRA−S (c-index 0.72) as well as a panel of previously reported prostate cancer biomarkers unrelated to GC. Integration of GC into the Stephenson nomogram increased the c-index from 0.75 (95% CI: 0.65−0.85) to 0.79 (95% CI: 0.68−0.89).

**Conclusion:** GC was independently validated as a genomic metastasis signature for predicting RM in a cohort of high-risk men treated with RP and managed conservatively without any adjuvant therapy. Integration of GC into clinical nomograms led to improvement in prediction of RM. GC may further allow identification of men most at risk for metastatic progression who should be considered for multimodal therapy or inclusion in clinical trials.
THE IMPACT OF THE ONCOTYPE DX GENOMIC PROSTATE SCORE (GPS) ON INITIAL TREATMENT RECOMMENDATIONS (TR) FOR MEN WITH NEWLY DIAGNOSED CLINICALLY LOW-RISK PROSTATE CANCER (PCA)

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(Presented by: Ketan Badani)

Introduction: The 17-gene GPS has been clinically validated to predict likelihood of adverse pathology (dominant Gleason pattern [GP] 4, any GP 5 and/or pathologic stage T3 at radical prostatectomy [RP]) in men with National Comprehensive Cancer Network (NCCN) very low (VL)–, low– or low-intermediate (LI)–risk PCA. A prospective clinical utility study assessed the impact of incorporating GPS into initial TRs in high-volume urology practices.

Methods: Men with newly diagnosed PCAs meeting target NCCN criteria were eligible. Biopsy tissue was analyzed at Genomic Health Inc (GHI). Urologists indicated TRs on pre- and post-GPS questionnaires. Men with GPS results and pre/post-GPS TRs were included in the analysis. Primary objectives: assess all changes in treatment modality and/or treatment intensity post-GPS. Secondary objectives: assess post-GPS physician confidence in TR, perceived GPS utility and appropriate use.

Results: 158 men were included (NCCN VL [22%]; low [45%]; LI [33%]). GPS-predicted biological risk differed from NCCN clinical risk alone in 62 men (39%). Overall, 18% of TRs between active surveillance (AS) and immediate treatment changed post-GPS. The relative TR increase for AS was 24% (41–51%; Table). Change in TR modality and/or intensity occurred in 26% of men (25 decreased; 14 increased; 2 equivocal). All TR changes were directionally consistent with GPS. The NCCN low-risk (LR) group saw the greatest change (37%) in TR post-GPS; in 17/57 (30%) men, an initial TR of RP was changed to AS post-GPS. In 85% of cases, urologists indicated greater confidence in TRs and found incorporation of the GPS useful in 79% of cases, including where biological risk confirmed clinical risk category.

Conclusion: GPS resulted in a TR change in 26% of men with newly diagnosed PCAs. These data indicate that the GPS, by providing an individual biologic assessment of tumor aggressiveness, can influence TRs, particularly in men with NCCN LR disease. GPS provides substantial utility and increased confidence in TRs, including cases in which clinical risk is confirmed, which may lead to increased acceptance of physician TR for AS and patient compliance with treatment decisions.

Funding Source: GHI

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<th>Pre-GPS</th>
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<td>iTx (All Types) (n=77)</td>
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<tr>
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aThere were differences in TRs by site; bTR changes include changes in treatment intensity: DECREASE (multi-modal to any single therapy; any treatment to AS; decrease in the extent of planned LN dissection), INCREASE (AS to any iTx; any increase in the extent of planned LN dissection; any single therapy to multimodal), or EQUIVOCAL (change between EBRT and RP or any other single therapies); cRP included RP ± standard or extended lymph node dissection. EBRT, external beam radiation therapy; iTx, immediate treatment.
Poster #72
TRANSKRIPOME-WIDE ANALYSIS OF MATCHING TUMOR AND NON-NEOPLASTIC BIOPSY AND RADICAL PROSTATECTOMY SPECIMENS: IMPLICATIONS FOR PROSTATE CANCER BIOMARKER SIGNATURES
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(Presented by: Hyung L. Kim)

Introduction: Molecular tests are becoming more prevalent in the management of low risk prostate cancer, often guiding treatment decisions such as enrollment into active surveillance programs. We explore some of the challenges in utilizing molecular tests for this purpose including limited material found in biopsy (Bx) specimens, tumor and specimen heterogeneity and fragmentation of RNA.

Methods: A total of 152 samples from 33 patients with matched formalin-fixed paraffin-embedded (FFPE) Bx and radical prostatectomy (RP) specimens were identified at UHN, UCSF and Cedars Sinai. For most patients matching samples were taken from tumor and non-neoplastic tissue. RNA was extracted and 100ng was used for cDNA amplification, which was then hybridized to the 1.4 million feature Affymetrix Human Exon 1.0 ST arrays to measure RNA expression. Gene expression profiles of four published prognostic signatures were evaluated using Pearson correlations coefficients between Bx and RP (CCP, Decipher, GPS and Penney). Outlier analysis of ERG, other ETS family members and SPINK1 were used to classify tumor specimens as one of the following mutually exclusive categories: ERG+, ETS+, SPINK1+ or Triple Negative subtypes.

Results: From 1 mm cylindrical cores punched from FFPE blocks, 68/75 (91%) of the Bx specimens and 76/77 (97%) of the RP specimens had sufficient RNA and cDNA to generate expression data that passed quality control. Quality of RNA, cDNA and microarray expression data were comparable between Bx and RP specimens. Unsupervised principle components analysis showed the largest source of variation in expression between Bx and RP, followed by tumor and non-neoplastic tissue. Molecular subtyping revealed that 36% of Bx–RP matched pairs were discordant (e.g. Bx ERG+ but RP Triple Neg) and overall tumor Bx–RP correlations for Decipher (0.64) and the imputed CCP (0.19), GPS (0.58) and Penney (0.66) signatures were low. When discordant pairs were removed these correlations changed: CCP (0.52), Decipher (0.82), GPS (0.35), and Penney (0.86).

Conclusion: High quality transcriptome-wide expression data was successfully generated from FFPE Bx specimens containing biologically relevant signal. After discordant cases (i.e., clonally distinct Bx and RP) were removed, prognostic signatures were found to be well correlated between Bx and RP tumor samples from the same patient. These results suggest that tumor clonality may be a potential source of variance for molecular signatures.
Poster #73

IMpact of CCP TEST ON PERSONALIZING Treatment decisiOns: results from a large prospective registry of newly diagnosed prostate cancer patients

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(Presented by: Mark Gonzalgo)

Introduction: The cell cycle progression (CCP) test is a validated molecular assay that assesses risk of prostate cancer-specific disease progression and mortality when combined with standard clinicopathologic parameters. PROCEDE−1000 is the largest clinically-controlled, prospective registry to evaluate the impact of the CCP test towards personalizing prostate cancer treatment. Results of an interim analysis of 816 patients are presented.

Methods: Untreated patients with newly diagnosed (≤6 months), clinically localized prostate adenocarcinoma were enrolled. The physician’s initial therapy recommendation (pre−CCP), based on clinicopathologic parameters, was recorded on the first questionnaire. The CCP test was then conducted on prostate biopsy tissue. Three consecutive post-CCP questionnaires recorded the physician’s revised treatment recommendation, physician/patient consensus treatment decision, and actual treatment administered after sufficient clinical follow-up. Changes in treatments between the initial recommendation and post-CCP questionnaires demonstrate the impact of CCP testing on treatment decision at each stage.

Results: Visual analog scale measurements indicated a significant increase (p=0.0125) in the physician’s likelihood of recommending non-interventional treatment post-CCP test; there was an increase in active surveillance from the initial interventional therapy recommendation. From pre-CCP therapy recommendation, the CCP risk score caused a change in actual treatment administered in 44% of patients; of these changes, 72% were reductions in treatment. These reductions occurred in radical prostatectomy (27%), radiation therapy (44% primary; 56% adjuvant), brachytherapy (46% interstitial; 66% HDR) and hormonal therapy (33% neoadjuvant; 68% concurrent) treatments. Although a considerably high percentage of patients (35.9%; 293/816) were recommended for conservative management pre-CCP testing, a further 6.5% increase overall was recorded for non-interventional treatments during actual follow-up. In general, there was a significant reduction in the number of treatment options recorded at each successive evaluation (p<0.0001).

Conclusion: The CCP risk assessment score has a significant impact in helping physicians and patients reach consensus on an appropriate personalized treatment decision, often with major reductions in interventional treatment burden.

Source of Funding: Myriad Genetic Laboratories, Inc.
EVALUATION OF THE ECONOMIC IMPACT OF THE CCP ASSAY IN LOCALIZED PROSTATE CANCER
E. David Crawford, MD1, Gary Gustavsen, MS2, Doria Cole2 and Nico Lewine2
1University of Colorado at Denver, Aurora, CO; 2Health Advances, LLC, Weston, MA
(Presented by: E. David Crawford)

Introduction: Stratification of localized prostate cancer based on disease aggressiveness remains challenging, resulting in overtreatment of low-risk patients and undertreatment of high-risk patients. A biopsy-based, cell cycle progression (CCP) gene expression assay can aid physicians in predicting prostate cancer aggressiveness, leading to more appropriate patient management. The purpose of this study was to quantify the economic impact of the CCP assay on a US commercial health plan.

Methods: A fact-based economic model was developed for a hypothetical cohort of prostate cancer patients with localized disease. Patients were followed in the model for 10 years with management and progression assumptions based on published clinical data and interviews with board-certified physicians. Total cost of care was calculated for a reference scenario (current clinical practice) and a test scenario where patient management was altered based on CCP test results. Cost inputs were established for each unit of care that a patient might undergo (diagnostic/surgical/ radiotherapy procedures and pharmacological therapy) and costs were assigned based on published costs of care. Total cost of care was compared between the two scenarios to determine overall system economic impact. To assess the model's sensitivity, each input was changed in a way that lowered or increased cost savings and the overall cost savings was recalculated.

Results: The CCP test reduced costs by $2,850/patient tested over 10 years after accounting for test cost. For a health plan with 10 million members, this would translate to over $16 million in savings with two-thirds of those savings achieved in the first year after testing. The majority of savings came from increased use of active surveillance in AUA low- and intermediate-risk patients. No single model input, when changed within a range of values, caused the model to show that the test was no longer cost saving. Costs of the test scenario were never greater than the reference scenario, resulting in cost savings over the 10 years modeled.

Conclusion: Use of the CCP test in a US commercial health plan has the potential to result in cost savings to payers. Savings are due to increased use of active surveillance in low- and intermediate-risk patients with less aggressive disease, but also from reduced progression rates in high-risk patients with more aggressive disease who transition to multi-modality therapy.

Funding: Myriad Genetics, Inc.
A BIOPSY-BASED 17-GENE GENOMIC PROSTATE SCORE PREDICTS ADVERSE SURGICAL PATHOLOGY AND RECURRENCE AFTER RADICAL PROSTATECTOMY IN MEN WITH CLINICALLY LOW AND INTERMEDIATE-RISK PROSTATE CANCER (PCA)

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Introduction: Validated biomarkers are needed to improve risk assessment for men with newly diagnosed PCa. A racially diverse cohort (21% African-American –AA) of men enrolled in the Center for Prostate Disease Research (CPDR) multicenter national database was used to confirm the association of the clinically validated Oncotype DX® Genomic Prostate Score (GPS) with adverse pathology (AP) and recurrence after radical prostatectomy (RP).

Methods: Specimens from 431 men treated with RP for NCCN very low, low, or intermediate risk PCa at 2 US military medical centers were tested to validate the association between GPS and AP, and biochemical (BCR) and metastatic recurrence (MR) after RP, using logistic regression and Cox proportional hazard models. Central pathology review was performed by one uropathologist (IAS). AP was defined as high-grade (primary Gleason pattern 4 or any pattern 5) and/or pT3 disease at RP. BCR was defined as 2 successive PSA levels >0.2 ng/mL.

Results: GPS (scale 0–100) was successfully obtained in 402 cases (93%). GPS values were similar between AA and Caucasians. 382 cases were evaluable for AP; 163 (43%) had AP (21% high-grade, 34% pT3). In univariable analysis, age, PSA, biopsy GS and NCCN risk group were associated with AP, but race was not. GPS was strongly associated with AP – OR/20 GPS units = 3.3 (95% CI: 2.1 – 5.1; p < 0.001), high-grade disease – OR/20 units = 2.5 (95% CI: 1.6 – 4.0; p < 0.001) and pT3 disease – OR/20 units = 3.6 (95% CI: 2.3 – 5.7; p < 0.001), adjusted for NCCN risk group. GPS was predictive of AP in patients grouped by age, race, PSA, biopsy GS and NCCN risk group. All 4 gene groups (androgen signaling, cellular organization, stromal response and proliferation) in GPS contributed to the prediction of AP. GPS was significantly predictive of time to BCR (HR/20 GPS units = 2.9; p < 0.001) and MR (HR/20 units = 3.8; p = 0.032).

Conclusion: GPS is an independent predictor of AP and BCR in men treated with RP for localized PCa, complementing standard risk factors such as GS and PSA. Tumor aggressiveness, as measured by GPS, and clinical outcomes were similar in AA and Caucasian men in this equal access health care system.
Utilization and Impact of Surgical Technique on the Performance of Pelvic Lymph Node Dissection at Radical Prostatectomy: Results from the SEARCH Database

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Introduction: Completion of a pelvic lymph node dissection (PLND) during radical prostatectomy (RP) is critical for staging and treatment of high-risk prostate cancer (PC). Conversely, performance of a PLND in low-risk PC contributes to morbidity with minimal benefit. Robot-assisted laparoscopic RP (RARP) is known to be associated with decreased PLND use. We evaluated PLND use over time, stratified by PC risk group and surgical technique.

Methods: We used the SEARCH database to identify men undergoing open RP (ORP) or RARP from 2006−2013 with complete data. All SEARCH sites are academically affiliated VA hospitals that perform RARP. Univariable logistic regression was used to test the association between age, race, BMI, number of positive cores, AUA risk group, surgery year, center, and surgical technique on PLND use. Multivariable logistic analysis was used to examine surgical technique and PLND utilization stratified by AUA risk-group. Spearman correlation was used to examine temporal changes in PLND utilization stratified by risk-group and surgical technique.

Results: 1439 men met our inclusion criteria. Of these, 66% had a PLND. On univariable analysis, age, surgery year, number of positive cores, AUA risk group, surgery year, center, and surgical technique were significantly associated with PLND performance (all p<0.02). On multivariable analysis, when adjusted for age, race, BMI, number of positive cores, surgery year, and center, RARP was associated with a 89% decreased use of PLND in the low-risk group, 85% decreased in intermediate risk, and 86% decreased in high risk men (all p≤0.002). Over time, PLND was increasingly used with RARP in low-risk patients (p=0.022); a trend of increased PLND performance with RARP in high risk men was noted (p=0.077) reaching ~85% in 2012−2013 vs. ~95% in ORP. For ORP, PLND use did not significantly change over time except a trend of fewer PLND in low-risk men which decreased to ~35% (p=0.064) in 2012−2013.

Conclusion: Regardless of risk group, PLND is markedly less likely to be performed when a RARP is done. Over time, PLND was increasingly performed in RARP reaching high but still sup-optimal levels in high-risk men. However, this was accompanied by increased use in low-risk men. Likewise, PLND use in ORP remains over-utilized in low-risk men. While improved over time, PLND remains over-utilized in low-risk men and under-utilized in high-risk men regardless of surgical technique.
Introduction: Overtreatment of low-risk prostate cancer (PC) is a major problem. Increasing use of active surveillance (AS) will minimize this burden. Limited data are available on including men with intermediate risk PC (i.e. Gleason 7) into AS protocols. We examined if a subset of men with Gleason 7 (3+4) PC could be reasonable AS candidates.

Methods: We used the SEARCH database to identify men undergoing radical prostatectomy from 2001−13 with ≥8 cores on prostate biopsy and complete demographic, pathological, and follow-up data. We compared men who fulfilled low-risk disease criteria (clinical stage T1c/T2a; biopsy Gleason ≤6; PSA ≤10 ng/mL) with the exception of biopsy Gleason 7 (3+4) vs. men who met all 3 low-risk criteria. Uni- and multivariable logistic regression models were used to test the association between biopsy Gleason 3+4 vs. ≤6 and pathological features. Biochemical recurrence (BCR) was examined using multivariable Cox hazards analysis adjusted for clinical and demographic features. To examine whether there was a subset of men with low-volume Gleason 7 who would have comparable outcomes to low-risk men, we repeated all analyses limiting the percentage positive cores to ≤33% and positive cores to ≤4, ≤3, or ≤2.

Results: 885 men met study inclusion criteria, of which 505 had low-risk disease and 380 had Gleason 7 low-risk disease. Overall, the Gleason 7 low-risk group had increased risk of pathological Gleason ≥4+3 (p<0.001), positive margins (p=0.069), extracapsular extension (p<0.001), and seminal vesicle invasion (p=0.001) on univariable analysis. Men in the Gleason 7 low-risk group had significantly higher BCR risk (HR 1.65, p=0.004). Analyses were then repeated using increasingly strict definitions of low-volume disease. With the exception of higher pathological Gleason score (p<0.001), at ≤3 positive cores, there was no difference in adverse pathological features between groups (all p>0.1). Among men with ≤3 positive cores who met the other low-risk criteria (clinical stage T1c/T2a; PSA ≤10 ng/mL), BCR risk was similar in men with Gleason 6 or Gleason 7 (3+4) (HR 1.30; p=0.347) disease.

Conclusion: Among men with PSA≤10 ng/mL and clinical stage T1c/T2a, those with Gleason 7 (3+4) PC in ≤3 positive cores have similar rates of adverse pathology and BCR as men with Gleason ≤6 disease. This finding, if confirmed in additional cohorts, may expand the inclusion criteria of AS protocols to further reduce PC overtreatment.
OUTCOMES OF ACTIVE SURVEILLANCE AFTER INITIAL SURVEILLANCE PROSTATE BIOPSY
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(Presented by: Evan Kovac)

Introduction: Among men with >10 year life expectancy, active surveillance (AS) is a recognized treatment option for those with very low and low-risk prostate cancer by NCCN criteria. Routine surveillance prostate biopsy (SPBx) every 1−3 years is considered the most reliable tool to identify disease progression. The potential discomfort and complications associated with surveillance biopsies has limited the appeal of surveillance among patients and urologists. We endeavored to determine the likelihood of disease reclassification and treatment based on the result of the initial SPBx to identify men who would benefit from a more or less intensive surveillance protocol.

Methods: From a prospective database, 203 men were identified who had undergone initial SPBx on AS (> 1 year after diagnosis). Patient selection and AS protocol used at our institution is consistent with other centers and has been described previously (Miocinovic et al. Urology 2012). Disease reclassification at initial SPBx was defined as any biopsy Gleason upgrading and/or > 50% positive cores. Progression on AS was defined by two methods: Type (1) reclassification as defined above (any progression) and (2) presence of primary Gleason pattern 4−5 and/or >50% positive cores (important progression). Outcomes after initial SBPx were analyzed using the Kaplan-Meier method. The median follow-up after initial SPBx was 58 months (IQR: 43−78).

Results: The median age at diagnosis was 67 years (IQR: 62−70). Of the patients included in our final analysis, 143 (70%), 29 (14%), and 29 (14%) were classified as very low, low, and intermediate risk disease, respectively. At the time of initial SPBx, 84 (41%) had type 1 disease reclassification, and 35 (17%) had type 2 disease reclassification. NCCN risk group (P = 0.051), maximum percentage of core positive (P = 0.021), and biopsy Gleason score (P = 0.023) were associated with disease reclassification at initial SBPx. At 5 years, 5−8% of patients without any disease reclassification at initial SPBx had important progression of their disease.

Conclusion: Among AS patients, rates of important disease reclassification at initial SPBx are low (17%). The probability of important progression at 5 years among those without any disease reclassification at initial SPBx is low (5−8%). Our data suggests patients without evidence of disease reclassification at initial SPBx may safely delay subsequent SPBx beyond the traditional 1−2 year interval.
Poster #79
METFORMIN REPRESSIONS CANCER CELLS VIA ALTERNATE PATHWAYS IN N−CADHERIN WILD TYPE AND N−CADHERIN DEFICIENT CELLS
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(Presented by: Aria Olumi)

Introduction: Metformin, one of the most commonly used medications for treatment of diabetes, has emerged as a potential anticancer agent. The molecular mechanisms associated with the antitumor effect of metformin are still poorly understood. We show that metformin represses cancer cells via alternate pathways in N−cadherin wild type and N−cadherin deficient cells.

Methods: Cell viability and apoptosis were determined. Stable cell lines were generated. Xenografted mice were treated with doxorubicin (every 5 days × 4 cycles, 4 mg/kg) or p.o. metformin (200 ug/ml). In a cohort of 984 patients who were surgically treated for prostate cancer (1993−99), 49 who were treated with metformin were identified and levels of N−cadherin, p65 and AMPK were assessed and correlated with prostate cancer recurrence.

Results: We demonstrate that metformin has an anti-tumor effect by repressing N−cadherin, independent of AMPK in wild-type N−cadherin cancer cells. Ectopic expression of N−cadherin develops metformin-resistant cancer cells, while suppression of N−cadherin sensitizes cancer cells to metformin. Manipulation of AMPK does not alter sensitivity of cancer cells to metformin in N−cadherin wild type cells. We show that NF−kB is downstream of N−cadherin and metformin regulates NF−kB via suppressing N−cadherin. Moreover, we show that TWIST1 is upstream of N−cadherin and NF−kB and manipulation of TWIST1 expression changes the sensitivity of cancer cells to metformin. In contrast to the cells that express N−cadherin, in N−cadherin deficient cells, metformin’s anti-tumor activity requires AMPK. Therefore, we suggest that metformin’s anti-cancer therapeutic effect is mediated through different molecular mechanism in wild-type vs. deficient N−cadherin cancer cells. At last, we identified 49 patients on metformin from a cohort of 984 who were treated by radical prostatectomy (selection criteria: Gleason score ≥ 7 and patients treated with metformin) and showed levels of N−cadherin, p65 and AMPK correlated with post-surgical recurrence in prostate cancer after treatment of metformin.

Conclusion: Metformin’s anti-cancer therapeutic effect in N−cadherin wild-type cells is mediated through repression of the TWIST/N−cadherin/NF−kB signaling pathway, independent of AMPK. However, in N−cadherin deficient cells, metformin plays an antitumor role via activating AMPK. Biomarkers may serve as a useful tool for surgically treated prostate cancer patients who are being treated with metformin.
Poster #80
SIMPLIFIED PROSTATE LESION GRADING FOR MAGNETIC RESONANCE IMAGING YIELDS IMPROVED CANCER DETECTION AT FUSION TARGETED PROSTATE BIOPSY
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(Presented by: Steven V. Kardos)

Introduction: Prostate cancer (PCa) is the most common solid organ malignancy in men and the second leading cause of cancer related death; however, it is the only tumor that is diagnosed by a non-targeted sampling method. Fusion targeted prostate biopsy is emerging as a more accurate way to detect PCa. The use of a multiparametric MRI (MP−MRI) with an endorectal coil (ERC) has traditionally been used in many centers, though the benefit for detection of an ERC is controversial. In addition, there is significant heterogeneity in the classification of MRI−identified prostatic lesions. We provide an initial report of a single center experience with fusion biopsy without an ERC and utilizing a simplified 3-point Likert scale for grading prostatic lesions.

Materials: Consecutive patients underwent MRI−USG fusion prostate biopsy for elevated PSA, abnormal DRE, or prior negative biopsy. Lesions visible on MRI were outlined in 3 dimensions and assigned increasing cancer suspicion levels using a simplified 3-point Likert scale by a team of dedicated pelvic radiologists. The ArtemisTM biopsy tracking system was used to fuse the MRI with real-time ultrasound generating a 3D prostate model with MR−identified lesions. Using the 3D model, a 12-core systematic biopsy, as well as a targeted biopsy of any suspicious areas, was performed by a single urologist (PS).

Results: A total of 190 patients underwent MRI and fusion biopsy between 12/2012 and 8/2014. The overall cancer detection rate (CDR) for systematic biopsy was 52.3% and the CDR for fusion biopsy was 55.0%. However, the detection rate for clinically significant PCa (Gleason 7 or greater) with systematic biopsy was 28.7% and that for targeted biopsy was 43.8% (p=0.02). Evaluation of cancer suspicion level for each ROI revealed that patients with high suspicion scores had a higher overall CDR (p <0.0001) and higher risk of detecting clinically significant cancer under the Cochran Armitage Trend tests (p=0.0001).

Conclusion: MRI−USG fusion prostate biopsy using MP−MRI without an ERC and a read by multiple radiologists using a simplified 3-point prostate lesion risk-stratification grading scale demonstrate improved detection of clinically significant PCa compared to a systematic 12 core TRUS biopsy, and further demonstrate that lesion suspicion correlates with cancer detection. Cancer detection rates and lesion stratification are comparable to the published literature when using methodologies that may be more practical in a larger number of medical centers.
PROJECTING THE LIFETIME COSTS OF MULTI-PARAMETRIC MRI BASED ACTIVE SURVEILLANCE IN LOW RISK PROSTATE CANCER – A BREAK-EVEN ANALYSIS
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(Presented by: Noah Kalman)

Introduction: Rates of active surveillance (AS) in men with Gleason’s score (GS) 6 prostate cancer can be increased with a staging multi-parametric MRI to rule out GS ≥7 disease. However, there is concern that the costs of repeated mpMRI scans, and targeted biopsies when indicated, over a patient’s lifetime may outweigh the savings from avoided treatment.

Methods: A decision tree was developed to model the rates of AS for men with GS 6 prostate cancer using peer-reviewed published literature. This included the one-year AS rate at our institution using mpMRI staging. The costs of the mpMRI, targeted biopsies, and definitive treatment were estimated to be $538, $894, and $27,084, respectively. Patient lifetime costs were then compared for patients managed with or without mpMRI. A break-even analysis was performed to test the financial robustness of the mpMRI-based approach.

Results: When comparing men with biopsy-proven GS 6 prostate cancer managed with and without mpMRI, the initial rate of AS was 100% versus 50%, respectively (p <0.001). After a confirmatory biopsy or mpMRI, the rates of AS were 93% versus 44%, respectively (p <0.001). At 3 years, rates of AS declined to 80% versus 33%, respectively (p <0.001). Per-patient lifetime costs for men with GS 6 prostate cancer was $5,400 lower when mpMRI was routinely used ($45,700 versus $40,300). Break-even analysis demonstrated the costs of routine mpMRI scans can be offset with a modest increase in AS rates at 3 years from 33% to 50%.

Conclusion: The routine use of mpMRI for all men with GS 6 prostate cancer, with targeted biopsies of suspicious lesions, results in significant lifetime cost reduction. The savings are driven primarily by avoiding the costs of treatment and treatment-related side effects. Cost equivalence can be achieved with a modest increase in men choosing AS.
Poster #82
USING A GENOMIC CLASSIFIER TO IDENTIFY MEN WITH ADVERSE PATHOLOGY AFTER RADICAL PROSTATECTOMY WHO BENEFIT FROM ADJUVANT RADIATION THERAPY
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(Presented by: R. Jeffrey Karnes)

Introduction: Radiation therapy (RT) can be offered post radical prostatectomy (RP) in men with adverse prostate cancer (PCa) pathological characteristics. However, cancer outcomes in these men vary. We hypothesized that the genomic classifier (GC; Decipher®) score would predict clinical metastases in men receiving post-RP RT.

Methods: GC scores were calculated from 188 patients with pT3 and/or R1 PCa, who received post-RP RT in two academic centers (Thomas Jefferson University, n=137) and (Mayo Clinic, n=51), between 1990 and 2009. Patients who received neo-adjuvant hormone therapy and/or had lymph node invasion were excluded. The primary endpoint was metastasis (regional or distant) as evidenced by positive CT and/or bone scans. Cumulative incidence accounting for competing risks, and multivariable penalized Cox regression analyses tested the relationship between GC (continuous variable) and clinical metastasis, after adjusting for all covariates. Using pre-specified GC cut-points, exploratory analyses tested whether GC can predict men who will benefit from adjuvant vs. salvage RT.

Results: Nineteen (10%) patients developed metastasis. The c−index for predicting metastasis following postoperative RT was 0.66, 0.83 and 0.85 for CAPRA−S, GC and the combination of CAPRA−S and GC. The cumulative incidence of metastasis at 5 years post-RT was 0%, 9%, and 29% for low (<0.4), intermediate (0.4–0.6), and high (>0.6) GC scores, respectively (p=0.002). At multivariable analysis, GC (hazard ratio [HR]: 1.90, 95% confidence interval [95%CI]: 1.31−2.75 for every 0.1 unit increase) and pre-RP PSA (HR: 2.12, 95%CI: 1.31−3.45) were the independent predictors of clinical metastasis (all p<0.01). Within the low GC score group (<0.4), there were no significant differences in the cumulative incidence of metastasis comparing those who received adjuvant or salvage RT (p=0.79). However, for patients with higher GC scores (≥0.4) cumulative incidence of metastasis at 5-year was 6% vs. 23% for patients treated with adjuvant vs. salvage RT (p<0.01).

Conclusion: In patients treated with post-RP RT, GC improves the prediction of metastasis beyond routine clinicopathologic predictors. Moreover, GC might help distinguishing patients that would benefit from adjuvant vs. salvage post-RP RT. Thus, GC could greatly improve decision-making and quality of care in post-RP men with adverse pathological characteristics.
Introduction: Little is known about the risk of delaying radical prostatectomy (RP) until biopsy progression following active surveillance (AS) for prostate cancer. This study examines the clinical and pathological outcomes associated with surgery following biopsy upgrading on AS compared to immediate treatment of prostate cancer with similar grades.

Methods: Men who underwent RP between 1997−2013 at University of California San Francisco were included. All men were diagnosed with PSA <= 10, clinical stage T1 or T2 cancer, biopsy cores <= 33% positive, and single core <= 50% positive. Patients had either immediate RP within 6 months of diagnostic biopsy Gleason 3+4 or delayed RP within 6 months of upgrade from diagnostic 3+3 to 3+4 during AS. Immediate and delayed RP patients were matched 3:1 using age, PSA, clinical T stage and year of diagnosis. The outcome was adverse pathology at RP, defined as upstage to pT3/pN1, positive surgical margins, and/or upgrade >=4+3. Logistic regression was used to determine associations of RP group with the outcome, adjusting for age, race, relationship status, clinical CAPRA, diagnostic serum PSA and PSA density, and percentage of positive cores at last biopsy.

Results: Of 3,372 research-consented men who have undergone RP, 241 men were included in the present study. Median time was 3 months to immediate RP (n=162) and 22 months to delayed RP (N=54). Delayed RP patients had low (0−2) CAPRA clinical risk (92% vs. 40%), fewer positive cores at diagnosis (median 2 vs. 5) and a smaller percentage of tissue positive at diagnosis (median 3% vs. 12.5%) compared to the immediate RP group (all p<0.01). Adverse pathologic features were present in 40% of cases overall. The timing of RP was not associated with adverse pathology on univariate or multivariate analyses, while PSA density was associated with the presence of adverse pathology for the cohort as a whole (OR 1.9 95%CI 1.1−3.1).

Conclusion: There was no difference in the risk of adverse pathology at RP for those who were upgraded to GS 3+4 while on AS and those who had immediate treatment for GS 3+4 disease. Additional follow-up of this and other cohorts is needed to assess long term clinical outcomes following delayed RP.

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LOSS OF MYD88 LEADS TO MORE AGGRESSIVE TRAMP PROSTATE CANCER AND INFLUENCES TUMOR INFILTRATING LYMPHOCYTES
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(Presented by: Arnold Chin)

Introduction: The influence of pattern recognition receptor (PRR) signaling in the prostate tumor microenvironment remains unclear. Although there may be a role for PRR agonists as adjuvants to therapy, prior evidence suggests tumor promoting as well as tumor inhibiting mechanisms. The purpose of this study is to examine the role of the key Toll-like receptor (TLR) signaling adaptor protein myeloid differentiation primary response gene 88 (MyD88) in prostate cancer development.

Methods: MyD88−/− mice in a C57Bl6 background were crossed with transgenic adenocarcinomas of the mouse prostate (TRAMP) mice to create MyD88−/− TRAMPTg+/− animals, which were compared to MyD88+/+ TRAMPTg+/− animals and their non-transgenic counterparts at 30 weeks. Prostates were examined histologically and by immunohistochemistry and immunofluorescence staining to examine modulation of tumor-infiltrating immune populations as well as activation of the downstream NF-κB pathway and androgen receptor (AR) expression. Splenocytes were examined for development of distinct immune cell populations.

Results: Absence of MyD88 led to increased prostatic intraepithelial neoplasm (PIN) and areas of well-differentiated adenocarcinoma in TRAMP transgenic mice. Analysis of infiltrating immune populations revealed an increase in CD11b+ cells and a deficiency in NK cells in prostates from MyD88−/− TRAMPTg+/− compared to MyD88+/+ TRAMPTg+/− animals, whereas a decrease in splenocytic NK cell differentiation was observed in MyD88−/− mice. Prostate tumors revealed no significant differences in NF-κB or AR expression in MyD88+/+ TRAMPTg+/− compared to MyD88−/− TRAMPTg+/− mice.

Conclusion: During prostate cancer development in the TRAMP model, MyD88 may play a role in limiting prostate tumorigenesis by altering tumor-infiltrating immune populations. This suggests that in the context of specific cancers, distinct PRRs and signaling pathways of innate immune signaling may influence the tumor microenvironment and represent a novel therapeutic strategy.

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Introduction: Quality of care may be quantified by measuring compliance with quality indicators that have been endorsed by organizations such as the National Quality Forum. Our objective was to determine the contemporary adherence to quality measures in the management of localized prostate cancer.

Methods: The Comparative Effectiveness Analysis of Surgery and Radiation (CEASAR) study is a population-based, prospective cohort study that enrolled 3691 men with clinically localized prostate cancer during 2011 and 2012, of which 2,781 underwent chart abstraction. Compliance with seven quality measures was assessed, including appropriate use of imaging, hormonal therapy (ADT) in high-risk patients undergoing radiation therapy, documentation of prostate cancer characteristics, discussion of treatment options, and documentation of pathologic features after surgery.

Results: Compliance with three out of seven quality indicators was greater than 80%. In particular, documentation of disease characteristics approached 100% in those patients undergoing definitive primary therapy (Table). However, compliance with imaging guidelines (68.3–76.5%) and the appropriate use of ADT (75.0–77.1%) was lower.

Conclusion: Adherence to quality measures involving documentation of disease characteristics is fairly consistent, perhaps owing to standardization of medical documentation. By contrast, compliance with process measures involving clinical judgment or use of potentially morbid therapies is lower. This may represent opportunities to improve quality of care versus appropriate variation based on unique clinical scenarios and patient preferences. It remains to be determined whether adherence to quality measures influences patient-centered outcomes.

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OLDER AGE PREDICTS UPGRADING ON CONFIRMATORY BIOPSY FOR MEN ON ACTIVE SURVEILLANCE
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(Presented by: Christopher B. Anderson)

Introduction: Active surveillance is increasingly recommended for elderly men with low risk prostate cancer. Although older men have higher all-cause mortality, they also have higher prostate cancer-specific mortality. We hypothesized that older age was associated with an increased risk of upgrading at confirmatory biopsy when controlling for prostate volume.

Methods: We identified all men with prostate cancer treated with active surveillance from 1991–2011 (n=1,130). The analytic cohort included patients who had clinical Gleason 6 stage ≤T2a prostate cancer, a confirmatory biopsy within two years of diagnostic biopsy and prostate MRI prior to the confirmatory biopsy (n=646). The primary outcome was Gleason upgrading to 7 or greater on confirmatory biopsy. The secondary outcome was low risk disease on confirmatory biopsy among men who were low risk on diagnostic biopsy. Low risk disease was defined as ≤cT2a, Gleason ≤6, ≤2 positive cores and ≤50% of single core positivity. We used logistic regression to estimate the effect of age on each outcome, adjusting for MRI prostate volume and other potential confounders.

Results: The median age was 66 years (IQR 61, 72) and MRI prostate volume was 40.8 mL (IQR 28.6, 55). Most men were white (88%) and had low risk disease at diagnostic biopsy (91%). At confirmatory biopsy 9% were upgraded, 45% were unchanged and 46% had a negative biopsy. Older age was associated with higher odds of being upgraded (adjusted OR 1.05, 95% CI 1.01–1.09), and larger prostate volume was associated with lower odds of being upgraded (adjusted OR 0.98, 95% CI 0.96–0.99). Among men with low risk disease at diagnostic biopsy (n=588), 17% were not low risk at confirmatory biopsy, 35% remained low risk and 48% had a negative biopsy. Among men with low risk disease on diagnostic biopsy, age was not associated with being classified as low risk on confirmatory biopsy (adjusted OR 0.98, 95% CI 0.95–1.01). However, larger prostate size increased the odds of being classified as low risk on confirmatory biopsy (adjusted OR 1.02, 95% CI 1.01–1.04).

Conclusion: Our results support the hypothesis that older men treated with active surveillance have an increased risk of upgrading at confirmatory biopsy. Age had no impact on being classified as low risk on confirmatory biopsy. These findings reinforce the need to recommend confirmatory biopsy to older men with low risk prostate cancer who are treated with active surveillance.
COMBINED ELL2 AND EAF2 LOSS IN PROSTATE CANCER
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(Presented by: Brian Cross)

Introduction: Eleven-nineteen lysine-rich leukemia 2 (ELL2) is an RNA polymerase II elongation factor with functional properties similar to ELL. ELL2 was also found to be an androgen response gene in the prostate and is up-regulated in benign prostatic hyperplasia (BPH), suggesting that ELL2 may have a function in prostate homeostasis. The role of ELL2 in the prostate has not been fully elucidated; however, transfected ELL2 has been shown to interact with the prostate tumor suppressor gene ELL-associated factor 2 (EAF2). EAF2 protein is down-regulated in advanced prostate cancer. Overexpression of EAF2 in prostate cancer cell lines induced apoptosis and inhibited the growth of xenograft tumors. EAF2 knockout mice developed high-grade murine prostatic intraepithelial neoplasia (mPIN). Since both EAF2 and ELL2 are up-regulated in BPH and EAF2 is down-regulated in prostate cancer, they may have overlapping roles in maintaining prostate homeostasis. In the current study, the expression and functional interaction of ELL2 and EAF2 in prostate cancer were explored in both human specimens and murine model.

Methods: C57BL/6 mice with combined deficiency in ELL2 and EAF2 were generated. The mice were sacrificed at 15−18 months of age and examined for histologic defects in the prostate. Also, human radical prostatectomy specimens were analyzed via laser capture microdissection and qPCR for ELL2 and EAF2 gene expression.

Results: Mice with combined ELL2 and EAF2 deficiency had an increased severity of prostatic intraepithelial neoplasia (PIN) lesions compared to ELL2 or EAF2 loss alone. Concurrent down-regulation of ELL2 and EAF2 occurred in 5/22 (23%) radical prostatectomy specimens compared to normal adjacent tissues. Additionally, 4/5 (80%) of these specimens with concurrent loss of ELL2 and EAF2 were Gleason grade 9. Furthermore, expression of ELL2 correlated with EAF2 (p<0.0001).

Conclusions: Combined ELL2 and EAF2 loss is frequent in high Gleason grade prostate cancer and also predisposes to more severe premalignant lesions. The correlation between ELL2 and EAF2 expression in human prostatectomy specimens suggests a possible synergistic role for these two proteins in maintaining prostate homeostasis. Future studies will determine if combined loss of ELL2 and EAF2 is associated with overall clinical prognosis.

This study was supported by NIH grants R01CA186780 and P50CA90386. This study was supported in part by award P30CA047904.
Poster #88
INGUINAL LYMPH NODE DISSECTION FOR PENILE CANCER: REVISITING THE PREDICTORS OF LYMPH NODE METASTASIS IN A CONTEMPORARY COHORT
Adam Luchey, MD, Patrick Espiritu, MD, Gautum Agarwal, MD, Jasreman Dhillon, MD, Julio Pow-Sang, MD, Michael Poch, MD, Wade Sexton, MD, Philippe Spiess, MD
H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL
(Presented by: Adam Luchey)

Introduction: Limited evidence exists to identify the optimal patient to undergo an inguinal lymph node dissection (ILND) for squamous cell carcinoma of the penis. The study objective was to identify both clinical and pathological factors that predict lymph node metastasis (LNM).

Methods: A retrospective review of 51 patients that underwent ILND + pelvic lymph node dissection from 1999–2013 was conducted. Multiple variables including: significant lymphadenopathy (nodes > 1cm) on imaging, palpable lymphadenopathy, lymphovascular invasion (LVI), pathological depth of invasion, tumor diameter, body mass index (BMI), and grade of primary tumor were analyzed to determine the predictability of LNM. Survival was estimated using the Kaplan-Meier method. Statistical significance was set at p < 0.05.

Results: On univariate analysis, age (p = 0.02), palpable lymphadenopathy (p = 0.005), inguinal lymphadenopathy on imaging (p < 0.001), and LVI (p = 0.04) were associated with LNM. Both lymphadenopathy on imaging (p = 0.001) and > median age of 65 years (p = 0.049) were predictive of LNM on multi-variate analysis. Although imaging displayed an area under the curve of 0.826, pre-operative imaging only displayed a sensitivity and specificity of 33% and 12%, respectively, for nonpalpable nodes. The median overall and cancer specific survival for patients with LNM was significantly lower than that of patients without LNM (16 vs 33 months for overall survival, 17 vs 45 months for cancer specific survival, p < 0.001).

Conclusion: Of all variables, inguinal lymph nodes > 1cm on pre-operative imaging appears to better predict nodal metastasis. However, its utility for nonpalpable nodes remains unconvincing and its widespread adaptation to assess patients for LNM cannot be supported.
Introduction: Despite advances in imaging and treatment regimens over the past 20 years, survival outcomes in patients with adrenocortical carcinoma (ACC) continue to remain poor. Therefore, clinicians must seek additional factors to optimize outcomes in this select group of patients. The objective of this study was to analyze the association of marital status and survival for patients with ACC using a population-based database.

Methods: Patients with ACC were abstracted from the SEER database from 1988–2010 (n=1271). Variables included marital status (married vs single/divorced/widowed (SDW)), gender, age, race, tumor (T) and node (N) classification, receipt of surgery, and SEER stage. Statistical analysis was performed using Cox proportional hazard models to generate hazard ratios and 95% confidence intervals.

Results: There were 728 (57.3%) females and median age was 56 years (IQR 44–66). Patients who were alive were more frequently married (65.6% vs 61.6%, p=0.008), female (61.1% vs 58.0%, p=0.001), younger (median 51 vs 57 years, p=0.0001), had adrenalectomy (88.6% vs 63.8%, p<0.0001), and more favorable SEER stage (p<0.0001) compared to patients dead of disease. On multivariable analysis, factors significantly associated with all-cause mortality were SDW status (HR 1.28, 95% CI 1.09–1.51), older age (HR 1.43, 95% CI 1.31–1.55), non-operative management (HR 3.18, 95% CI 2.57–3.95), and N+ disease (HR 2.27, 95% CI 1.74–2.97). Risk factors for disease-specific mortality included SDW status (HR 1.30, 95% CI 1.07–1.56), older age (HR 1.46, 95% CI 1.32–1.61), non-operative management (HR 3.56, 95% CI 2.80–4.52), T-classification (TX vs T1 – HR 2.58, 95% CI 1.30–5.13; T2 vs T1 – HR 2.19, 95% CI 1.14–4.22; T3 vs T1 – HR 3.66, 95% CI 1.87–7.14; T4 vs T1 – HR 3.97, 95% CI 2.05–7.69), and N+ disease (HR 2.37, 95% CI 1.76–3.19).

Conclusion: ACC is a disease with an overall poor prognosis due to aggressive biological behavior. SDW status is associated with poorer survival in patients with ACC, suggesting that the decreased survival seen among SDW individuals in other urologic malignancies may also be relevant for patients with ACC. Health care providers caring for unmarried patients with ACC should be aware of the poor outcomes in these patients, highlighting an area for further research and implementation of improved support systems to reduce this disparity and improve their survival to that of married patients.
TRENDS IN TESTICULAR CANCER SURVIVAL: A LARGE POPULATION-BASED ANALYSIS
Nicholas Hellenthal, MD, Wilson Sui, David Morrow, MD
Bassett Medical Center, Cooperstown, NY
(Presented by: Wilson Sui)

Introduction: The literature has described worse survival outcomes for non-whites, particularly African Americans however few studies have examined these discrepancies over time. Our objective was to characterize the trends in the race-related survival discrepancy for testicular cancer in a population based setting.

Methods: Utilizing the Surveillance, Epidemiology, and End Results registry, we identified 29,803 patients diagnosed with histologically confirmed testicular cancer between 1983 and 2011. Of these, 12,650 patients (42%) had 10-year follow-up data available. We stratified the patients by age group, stage, race, histologic subtype and year of diagnosis. We then assessed 10-year overall and cancer-specific survival in each cohort. Cox proportional hazard model analysis was used to determine the relative contributions of each independent stratum to cancer-specific survival.

Results: Predicted overall 10-year survival for Caucasian patients with testicular cancer increased slightly from 88% to 89% over the time period studied. Predicted cancer-specific 10-year survival dropped slightly from 94% to 93% for this group. In contrast, non-Caucasian men demonstrated larger changes in 10-year overall (84% to 86%) and cancer specific (88% to 91%) survival. On univariate analysis, race was significantly associated with testicular cancer death, with non-Caucasian men being 1.69 times more likely to die of testicular cancer than Caucasians (HR 1.33–2.16, 95% CI <0.001). On multivariate analysis, when accounting for year of diagnosis, age group, and tumor stage, non-Caucasian race was associated with a 1.58 times higher likelihood of testicular cancer death (HR 1.23–2.03, 95% CI <0.001).

Conclusion: Historically, non-Caucasian race has been associated with worse survival from testicular cancer. These data show a convergence in cancer-specific survival between racial groups over time, with non-Caucasian survival approaching that of Caucasians. This suggests that while there is still a significant survival discrepancy, diagnostic and treatment discrepancies may be improving for non-Caucasians.
**Introduction:** Penoscrotal extramammary Paget’s disease (PS−EMPD) is the most common site of presentation for this rare intraepithelial neoplasm in men. In EMPD, increased depth of invasion (DI) correlates with worsened disease outcome. We herein report our experience with the management of this disease.

**Methods:** IRB approved retrospective review of patients treated for PS−EMPD from 1997−2013 by the MSKCC Urology Service. Collected data included demographics, date of symptoms, initial treatment, pathology, surgical margin (SM) and DI. All patients underwent extensive workup to rule out secondary cancers. Disease progression was defined as extension of disease to inguinal lymph nodes or beyond. All time intervals in months were measured from date of tissue diagnosis to last follow up (FU) or death.

**Results:** Sixteen men were treated for PS−EMPD with 14 (87.5%) undergoing WLE at our institution. Patient clinicopathologic characteristics are listed in the Table. Median age at tissue diagnosis was 69.4 years (interquartile range [IQR] 64.3−74.6), median FU of 31 months (IQR 14−77) and median delay in tissue diagnosis of 26 months (IQR 13−47). In 3 patients (19%) other cancers preceded EMPD diagnosis: skin (2) and multiple myeloma (1), and 3 patients (19%) were diagnosed with other cancers after PS−EMPD workup: bladder (1), kidney (1) and pancreas (1). Seven patients (44%) had intra-epidermal (IE) disease, 1 became micro-invasive (MI), all 5 patients with positive SM did not progress and all 7 remain with no evidence of disease (NED) at median FU of 47.5 months (IQR 32−84). Seven patients (44%) had invasive disease (IV) with disease progression in 6, 2 remain NED (200 and 5 months FU), 1 alive with disease (20 months FU) and 4 died of disease with a median survival of 29 months (IQR 20−52). 2 patients had short FU.

**Conclusion:** Our findings are consistent with the literature of over two year delay in tissue diagnosis of PS−EMPD, high association with other malignancies and the increased DI association with disease progression and death.

Source of Funding: This investigation was supported by the Sidney Kimmel Center for Prostate and Urologic Cancers
Introduction: The role of ureteroscopy (URS) prior to nephroureterectomy (NU) for upper tract urothelial carcinoma (UTUC) has been questioned in regard to oncologic contamination that may result from this procedure. We compared the outcomes of patients undergoing NU with and without prior URS.

Methods: With IRB approval we reviewed records of all patients with no prior history of bladder cancer that underwent NU at our institution from 1994 to 2012 (n = 201). We investigated patients who underwent URS prior to NU and patients who proceeded directly to NU based on imaging alone. After excluding patients undergoing URS with therapeutic intent (defined as > 2 URS or documentation of complete tumor eradication), we used multivariable Cox proportional hazards models, adjusting for grade, tumor size with cancer specific survival (CSS) as the endpoint, and additionally adjusted for age and hydronephrosis, with intravesical recurrence (IR) free survival and overall survival (OS) as endpoints.

Results: 144 (72%) patients underwent URS prior to NU and 57 (28%) patients proceeded directly to NU. Patients who underwent URS were more likely to be male (60% vs. 40%, p =0.012), have tumor located in ureter (28% vs. 12%, p=0.028), and have pathologic stage < pT2 (55% vs. 35%, p=0.031). The median follow up time for survivors was 5.4 years from diagnosis. The 5-year IR-free survival probability for those undergoing URS prior to NU was 38% (95% CI 29%, 47%) and 69% (95% CI 53%, 80%) for those not undergoing URS. The performance of diagnostic URS prior to NU was not significantly associated with CSS (HR 0.75; 95% CI 0.39, 1.45; p=0.4), although it was significantly associated with IR (HR 2.58; 95% CI 1.47, 4.54; p = 0.001).

Conclusion: Patients are at higher risk for tumor recurrence after NU when they have undergone prior diagnostic URS although CSS is not statistically significantly affected. Treating physicians must weigh the benefits derived from pre-NU URS, including more accurate staging and possibility of endoscopic ablation, with the increased risk of post-NU tumor recurrence.
Poster #93
OPTIMIZING VALUE AFTER MAJOR BLADDER AND KIDNEY CANCER SURGERY
Hung-Jui Tan, MD1,2, Alan Kaplan, MD1,2, Lorna Kwan, MPH1,2, Christopher Filson, MD, MS1,2 and Mark Litwin, MD, MPH1,2
1University of California, Los Angeles; 2Los Angeles, CA
(Presented by: Hung-Jui Tan)

Introduction: Operative morbidity serves as a major barrier to high-quality, high-value cancer care. While the Affordable Care Act provides several new payment and delivery reforms, high-yield opportunities to generate value in urologic cancer care remain unclear. In this context, we assessed postoperative complications and associated contributions to health care cost among older patients undergoing major surgery for kidney or bladder cancer

Methods: Using data from the Healthcare Cost and Utilization Project’s Nationwide Inpatient Sample (NIS) from 2007 through 2011, we identified major surgical admissions for kidney and bladder cancer among adults aged 55 years and older. For each admission, we measured the occurrence of any postoperative complication including geriatric, medical, and surgical events. We then employed multivariable, mixed-effect models to estimate the marginal cost associated with complications, adjusting for patient characteristics, operative technique, and hospital factors.

Results obtained: Among weighted samples of 131,865 and 46,308 admissions for major kidney and bladder cancer surgery, respectively, postoperative complications occurred in 36.0% (95% CI 35.0–37.1%) of kidney cancer cases and 59.1% (95% CI 57.2–60.9%) of bladder cancer cases. Accounting for the above-listed factors, adverse events added $7,328 and $12,045 to the cost of surgical care for kidney and bladder cancer, respectively, largely due to increases in length of stay (p<0.05). While surgical complications occurred most frequently, medical complications generated $2,616 and $7,009 more in cost on a per episode basis for kidney and bladder cancer cases, respectively (Figure).

Conclusion: Many patients undergoing major surgery for kidney or bladder cancer experience a postoperative complication, prolonging the hospitalization and adding substantially to health care costs. As the Affordable Care Act comes into full effect, the goal of optimizing health care value should focus attention on postoperative complications—especially more medically-driven events—as an immediate opportunity for both quality improvement and cost savings.
Poster #94

PATHOLOGIC RISK FACTORS FOR OCCULT METASTATIC DISEASE IN ADOLESCENT AND ADULT PATIENTS WITH CLINICAL STAGE I TESTICULAR STROMAL TUMORS

Kyle O. Rove, MD1, Paul D. Maroni, MD1, Carrye R. Cost, MD2, Diane L. Fairclough DrPH, MSPH3, Gianluca Giannarini, MD4, Anne Harris, MPH5, Kris Ann P. Schultz, MD5 and Nicholas G. Cost, MD1

1University of Colorado, Department of Surgery, Division of Urology, Aurora, CO; 2University of Colorado, Department of Pediatrics, Division of Pediatric Oncology, Aurora, CO; 3University of Colorado, Department of Biostatistics and Informatics, Aurora, CO; 4Department of Experimental and Clinical Medical Sciences, Urology Unit, University of Udine, Academic Medical Centre Hospital Udine, Udine, Italy; 5Department of Pediatrics, Division of Pediatric Oncology, Children’s Hospitals and Clinics of Minnesota, Minneapolis, MN

(Presented by: Kyle O. Rove)

Introduction: Testicular stromal tumors (TSTs) represent only 3–5% of testicular tumors, of which 90% present with clinically-localized disease, Clinical Stage I (CS I). However, up to 10% will behave in a malignant fashion. We reviewed existing literature to analyze the impact of pathologic risk factors on harboring occult metastatic disease (OMD) in post-pubertal patients with CS I TSTs.

Methods: A PubMed literature search was conducted using the terms: “testicular stromal tumors,” “testicular leydig cell tumors,” “testicular sertoli tumors,” “testicular interstitial tumors,” “testicular granulosa tumor,” and “testicular sex cord tumors.” Post-pubertal patients with CS I TSTs were included. Exclusion criteria were: publication pre-1980, non-English articles, and those lacking data on: stage, pathologic risk factors, or post-orchiectomy follow-up. Pathologic risk factors were: tumor >5cm, ≥3 mitoses/HPF, positive margins at orchiectomy, rete testis and lymphovascular invasion, cellular atypia, and necrosis. OMD was defined as positive primary retroperitoneal lymph node dissection (RPLND) or relapse on surveillance. We hypothesized patients with ≥2 risk factors would experience lower 5yr OMD Free Survival (OMDFS) than those with <2 risk factors. Comparison was performed using log-rank analysis.

Results: 231 patients from 44 publications were included with median age at diagnosis of 35yrs (range 12–76). Median follow-up was 49mo(1–249). A total of 21 patients (9.1%) had OMD. 5yr OMD-free survival (OMDFS) and overall survival in patients with CS I TSTs were 91.2% and 93.2%, respectively. When comparing those with OMD to those without, we observed increased risk of OMD for each additional risk factor (p<0.001). 5yr OMDFS was 98.1% for those with <2 risk factors vs. 49.9% for those with ≥2 risk factors (p<0.001). Additionally, we observed a 5yr OMDFS of 94.9% for those≤50yr vs. 84.6% for those >50yr (p< 0.001).

Conclusion: Existing literature on pathologic risk factors for OMD is insufficient to make broad clinical recommendations. However, these factors and patient age appear to be able to risk-stratify patients with CS I TSTs and may be useful for future research of adjuvant therapy (i.e., RPLND).
Poster #95
DECLINING RATES OF RETROPERITONEAL LYMPH NODE DISSECTION FOR STAGE I NON-SEMINOMATOUS GERM CELL TUMORS: RESULTS FROM THE NATIONAL CANCER DATABASE
Mohammed Haseebuddin, MD, Elizabeth Handorf, Alexander Kutikov, MD, Nikhil Waingankar, MD, Yu-Ning Wong, MD, Elizabeth Plimack, MD, Robert Uzzo, MD, Marc Smaldone, MD
(Presented by: Mohammed Haseebuddin)

Introduction: Per existing best practice guidelines, careful observation with serial imaging or primary chemotherapy have supplanted primary retroperitoneal lymph node dissection (RPLND) for stage I non seminomatous germ cell tumors (NSGCT) for most patients. Hypothesizing that rates of primary RPLND have declined over the past decade, our objective was to assess temporal trends in primary treatment employed for stage I NSGCT using the National Cancer Database (NCDB).

Methods: The NCDB was queried for all patients diagnosed with stage I NSGCT from 1998−2011. Temporal trends for receipt of primary RPLND, chemotherapy, or observation (defined as no treatment) were assessed. Adjusting for patient, demographic, and clinicopathologic characteristics, multivariable logistic models were used to examine the association between available covariates and receipt of primary RPLND.

Results: Of 15,822 patients identified over the study period, 9001 (56.9%), 2937 (18.6%), and 3884 (24.5%) underwent observation, RPLND, and chemotherapy respectively. While rates of observation minimally changed over time (56.3 to 55.0%, p=0.85), rates of primary chemotherapy increased (20.7 to 32.5%, p<0.001) while rates of RPLND decreased (23.0 to 12.4%, p<0.001). Significant differences were observed between patients undergoing RPLND and those undergoing alternative treatments with respect to age (p<0.001), hispanic ethnicity (p=0.04), urban/rural location (p=0.03), insurance status (p=0.007), pT stage (p<0.001), and facility location (p<0.001), while no changes were seen in race, or socioeconomic status. Following adjustment, increasing age was associated with reduced performance of RPLND compared to patients younger than 30 years (30−39 years: OR 0.92 (CI 0.84−1.01); 40−49 years: OR 0.83 (CI 0.72−0.94); ≥50 years: OR 0.66 (CI 0.52−0.82)).

Conclusion: Rates of primary RPLND for stage I NSGCT have markedly decreased over the last decade. Surprisingly, utilization of primary chemotherapy has significantly increased over the same period while rates of observation remain unchanged.
Poster #96
RPLND AS FIRST-LINE TREATMENT FOR STAGE II SEMINOMA
Brian Hu, MD, Sepehr Shojaei, Siamak Daneshmand, MD
USC Institute of Urology, Los Angeles, CA
(Presented by: Brian Hu)

Introduction: The long-term morbidities associated with treating metastatic seminoma can be significant. RPLND has established oncologic benefit in the management of small volume (stage IIA) metastatic non seminomatous germ cell tumors and is associated with less long-term toxicity. We describe our experience with RPLND as a front-line treatment for stage II seminoma.

Methods: We reviewed our IRB-approved institutional testis cancer database including all patients with pure seminoma treated with primary RPLND. Patients who received any other treatment prior to RPLND were excluded. Clinical and pathologic variables were obtained. Follow-up data was used to determine recurrence or death. Patients without evidence of recurrence were censored at the time of last follow-up.

Results: A total of four patients were identified with a mean age of 37 years. All patients had normal tumor markers and had retroperitoneal lymphadenopathy measuring 1.1, 1.5, 1.8 and 5.5 cm prior to surgery (Table). Three patients had pure seminoma diagnosed at orchiectomy and one patient (with 5.5cm retroperitoneal lymphadenopathy and burned out primary testis mass) had pure seminoma diagnosed at RPLND after 2 non-diagnostic biopsies of the retroperitoneal mass. All patients underwent nerve-sparing template midline extraperitoneal RPLND and all were discharged home on post-operative day 3. All patients had pathologic N1 disease with a mean of 3 positive lymph nodes. The largest positive lymph node averaged 1.6cm in size. Extranodal extension was present in one case. No patients underwent adjuvant therapy. With a mean follow-up of 24 months, no patients experienced disease recurrence (retroperitoneal or distant) or death. There was one Clavien grade 1 complication of an ileus necessitating overnight observation and all patients maintained antegrade ejaculation.

Conclusion: Our small series demonstrated encouraging oncologic efficacy when RPLND was used as a primary treatment for stage IIA retroperitoneal seminoma. A multi-institutional phase II trial of RPLND in this disease space is being developed.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Orchiectomy pathology</th>
<th>Retroperitoneal mass prior to RPLND (cm)</th>
<th>Number of lymph nodes positive</th>
<th>Total lymph nodes removed</th>
<th>Largest positive lymph node (cm)</th>
<th>Retroperitoneal pathology</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Pure seminoma</td>
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<td>5</td>
<td>55</td>
<td>1.5</td>
<td>Pure seminoma</td>
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<td>Pure seminoma</td>
</tr>
<tr>
<td>3</td>
<td>Pure seminoma</td>
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<td>2</td>
<td>35</td>
<td>2.0</td>
<td>Pure seminoma</td>
</tr>
<tr>
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<td>Scar with dystrophic calcification</td>
<td>5.5</td>
<td>4</td>
<td>48</td>
<td>1.9</td>
<td>Pure seminoma</td>
</tr>
</tbody>
</table>
Introduction: Management of testicular cancer has evolved worldwide and indications for local therapies, such as retroperitoneal lymph node dissection (RPLND) are currently more limited. Differences in patterns of care and utilization of RPLND may exist between different types of hospital and may also reflect accessibility to this treatment modality and/or compliance to national guidelines. Since there are no population-based reports in the US that measure the utilization of RPLND, we sought to characterize its use and stratify according to the type of hospital.

Methods: The National Cancer Data Base (NCDB) was queried for patients with seminoma or non-seminoma (includes mixed histology) testicular cancer, between 1998 and 2011. The rates of RPLND were calculated for each stage of the disease and were later stratified according to the treatment facility type, namely, community, comprehensive and academic centers. Results were obtained by cross-tabulation, proportions were compared with the chi-square test, and trends were assessed with the Cochran-Armitage test.

Results: Within the NCDB, of 59,652 patients with testicular cancer, 5475 (9.2%) underwent RPLND. The utilization of RPLND varied significantly different between the types of facility across all stages (Figure) and the highest rates of use were recorded in academic centers (all p<0.001). For example, in Stage III non-seminoma, RPLND rates for community, comprehensive and academic centers were 8, 10 and 25%, respectively. Trends over time have shown an increase use of RPLND in academic centers and a significant decrease in community centers, especially for Stage I and Stage III non-seminoma (all p<0.001).

Conclusion: In the US, use of RPLND varies significantly according to type of treatment facility, and these differences increased during the last decade. Further studies are needed to address the potential effect of these differences on survival outcomes.
DISPARITIES IN INTERPRETATION OF PRIMARY TESTICULAR GERM CELL TUMOR PATHOLOGY
Pranav Sharma, MD, Gautum Agarwal, MD, Jasreman Dhillon, MD, Wade Sexton, MD
Moffitt Cancer Center, Tampa, FL
(Presented by: Pranav Sharma)

**Introduction:** The high cure rate for testicular cancer is dependent upon precise histopathological diagnosis and staging as this guides future therapy. Accurate pathologic interpretation can be problematic due to the low incidence of primary testicular germ cell tumors (GCTs) and due to variations in histologic patterns. By analyzing changes in diagnosis of primary testicular specimens after secondary review by pathologists at our institution (MCC), we hoped to determine the degree of histological variation of GCTs and how these can impact prognosis and treatment.

**Methods:** From 1999–2013, 388 patients were evaluated at our tertiary referral center with a diagnosis of testicular GCT. Of these patients, 235 underwent radical orchiectomy at an outside facility and had pathology specimens re-analyzed by our center’s pathologists with expertise in genitourinary (GU) malignancies. We identified variations and discrepancies in pathological reporting. Clinically significant differences that could alter subsequent management were noted.

**Results:** In our study group of 235 patients, 50 (21.3%) had some variation in the interpretation of their radical orchiectomy specimens. A clinically significant alteration in pathologic findings was identified in 16 patients (6.8%) most commonly due to the recognition (or misrecognition) of lymphovascular invasion (LVI) associated with nonseminomatous germ cell tumors (NSGCTs). Ninety patients (38.3%) were referred with clinical stage I GCTs, and 7 (7.8%) of these were identified to have clinically significant differences in their histopathological findings that resulted in changes in subsequent therapeutic interventions. The identification (or misidentification) of LVI resulted in upstaging or downstaging from cStage IA to cStage IB or vice versa in 6 patients with NSGCTs. Additionally, one patient with clinical stage I classic seminoma had been misclassified with nonseminoma.

**Conclusion:** Testicular GCTs are rare malignancies. Inaccurate interpretation of primary orchiectomy specimens is not uncommon and may lead to incorrect tumor staging, imprecise assignment of progression risk, and inappropriate management recommendations. Secondary opinions of primary GCT orchiectomy specimens potentially facilitate appropriate rates of cancer cure.
Poster #99
SARCOPENIA AS A PREDICTOR OF COMPLICATIONS IN PENILE CANCER PATIENTS UNDERGOING INGUINAL LYMPH NODE DISSECTION
Pranav Sharma, MD, Kamran Zargar-Shoshtari, MD, Jamie Caracciolo, MD, Julio Pow-Sang, MD, Wade Sexton, MD, Michael Poch, MD, Philippe Spiess, MD
Moffitt Cancer Center, Tampa, FL
(Presented by: Pranav Sharma)

Introduction: Lymphadenectomy (LND) is an important part of the surgical management of penile cancer (PeCa) since early dissection of involved lymph nodes improves survival in high-risk patients. LND, however, does have significant perioperative morbidity. The purpose of this study is to determine if sarcopenia, a novel marker of nutritional status measuring loss of skeletal muscle mass, is a predictor of postoperative complications in patients undergoing LND for PeCa.

Methods: Of the 79 patients that underwent LND for PeCa at our institution from 1999 to 2014, 44 had available preoperative cross-sectional abdominal imaging for analysis. Lumbar skeletal muscle index (SMI) was calculated at L3 on axial computed tomography (CT) or magnetic resonance (MR) images, and a threshold SMI of 55 cm²/m² was used to classify patients as sarcopenic versus not sarcopenic. This classification was then correlated with postoperative complications to determine if sarcopenia, in addition to other standard preoperative variables, was a predictor of postoperative morbidity.

Results: In our study group of 44 patients, median lumbar SMI was 55 cm²/m² with 22 (50%) patients categorized as sarcopenic versus 22 (50%) that were not sarcopenic. Twenty-seven postoperative complications occurred in 20 patients within 30 days, of which 4 (14.8%) were major (Clavien score >IIIb) and 23 (85.2%) were minor. The most common complications were wound dehiscence (n=7; 25.9%), wound infection (n=5; 18.5%), lymphocele (n=5; 18.5%), flap necrosis (n=4; 14.8%), lymphedema (n=3; 11.1%), and seroma formation (n=3; 11.1%). On univariate analysis, the presence of sarcopenia, nodal disease (pN >1), and lymphovascular invasion (LVI) were all predictors of postoperative complications. On multivariate analysis, however, only sarcopenia was an independent predictor of complications (p=0.015; 95% CI: 1.4−26.9) (Table).

Conclusion: Sarcopenia can be a useful prognostic tool to predict the likelihood of postoperative complications after LND for PeCa. Additional larger, prospective studies are necessary to understand the impact of sarcopenia on the long-term survival of these patients.

<table>
<thead>
<tr>
<th>Univariate</th>
<th>P-value</th>
<th>95% C.I.</th>
<th>Multivariate</th>
<th>P-value</th>
<th>95% C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.327</td>
<td>0.974–1.01</td>
<td>+Sarcopenia</td>
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<td>BMI</td>
<td>0.444</td>
<td>0.88–1.057</td>
<td>pN ≥1</td>
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<td>0.468</td>
<td>0.464–5.324</td>
<td>+LVI</td>
<td>0.483</td>
<td>0.154–52.162</td>
</tr>
<tr>
<td>CCI ≥5</td>
<td>0.956</td>
<td>0.314–3.406</td>
<td></td>
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<tr>
<td>ASA ≥3</td>
<td>0.647</td>
<td>0.389–4.576</td>
<td></td>
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<tr>
<td>+Sarcopenia</td>
<td>0.004</td>
<td>1.006–27.861</td>
<td></td>
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<tr>
<td>Primary ILND vs other</td>
<td>0.741</td>
<td>0.249–2.69</td>
<td></td>
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<tr>
<td>pT≥1b (high-risk)</td>
<td>0.88</td>
<td>0.222–5.788</td>
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<tr>
<td>pN ≥1</td>
<td>0.036</td>
<td>1.106–20.785</td>
<td></td>
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</tr>
<tr>
<td>+LVI</td>
<td>0.081</td>
<td>0.631–24.376</td>
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**Poster #100**

**SURVIVAL ANALYSIS OF PATIENTS TREATED WITH NEPHROURETERECTOMY FOR UPPER TRACT UROTHELIAL CARCINOMA USING A CONTEMPORARY POPULATION-BASED COHORT**

Shreyas S. Joshi, MD, Sanjay G. Patel, MD, Daniel A. Barocas, MD, Matthew J. Resnick, MD, Joseph A. Smith, MD, Sam S. Chang, MD

Vanderbilt University Medical Center, Nashville, TN

(Presented by: Shreyas S. Joshi)

**Introduction:** Due to the rarity of the disease, few large-scale studies have evaluated long-term outcomes after radical nephroureterectomy for upper tract urothelial carcinoma (UTUC). Using a large, population-based database, we sought to identify patient and pathologic factors associated with poor outcomes after nephroureterectomy for UTUC. We also sought to evaluate the current UTUC staging system with respect to survival.

**Methods:** Data on 8,284 patients treated for UTUC in the United States between 1998 and 2006 were identified from the National Cancer Data Base (NCDB). All patients were treated with radical nephroureterectomy +/- bladder cuff excision. At the time of treatment, patients were cN0/cNx, cM0, and had no prior malignancies. A Cox proportional hazards model was used to identify patient and pathologic factors associated with worse overall survival.

**Results:** The cohort was nearly balanced by gender (55.4% male, 44.6% female). The majority of patients were ≥60 years old (81.5%). Most patients were white (93%), had high grade disease (82%), had renal pelvis (as opposed to ureteral) tumors (68%), and were pN0 status (68%). The five-year survival for the entire cohort was 64.1% (63.1%–65.1%). Five-year overall survival for stage pT0/Ta/TIS was 82.6% (81.0%–84.1%) and decreased with each successive increase in pT stage. Survival was worse for pN+, high-grade tumors, and tumor size ≥ 3.5cm. Multivariate survival analysis indicated that predictors of survival include age, comorbidity (using the Charlson Comorbidity Index), tumor size, high-grade tumor pathology, pathologic T stage, and nodal status. The site of primary tumor had no significant effect on survival outcome. (Table 1)

**Conclusion:** This study analyzes a contemporary cohort of >8k patients who underwent radical nephroureterectomy for UTUC, which is the largest cohort of such patients to date. We used this unique dataset to validate the current staging system. Each successive increase in pathologic T stage was associated with a significant increase in risk of mortality even when controlling for other factors. Nephroureterectomy offers considerable five-year survival for patients with low T stage and low-grade pathology (>80% for each).

**Table 1. Cox proportional hazards model for mortality risk at 5 years. Also included in the 5-year overall survival by T stage, N stage, and tumor grade. Note the worse overall survival and significantly increased hazard ratio per increase in stage.**
Poster #101
CRITICAL ASSESSMENT OF COMPLICATIONS IN PATIENTS UNDERGOING RETROPERITONEAL LYMPH NODE DISSECTION (RPLND): THE MD ANDERSON EXPERIENCE
Stephen Williams, MD, Bryan Fellman, PhD, Diana Urbauer, PhD, Lance Pagliaro, MD, Sh-Ming Tu, MD, Christopher Wood, MD, John Ward, MD, Louis Pisters, MD, Jose Karam, MD
MD Anderson Cancer Center, Houston, TX
(Presented by: Stephen Williams)

Introduction: In patients with testicular cancer, the morbidity of primary retroperitoneal lymph node dissection (P−RPLND) and post-chemotherapy RPLND (PC−RPLND) has not been evaluated using standardized methodology. Our objective was to determine and accurately identify postoperative morbidity after RPLND using a standardized reporting system.

Methods: Patients who had undergone RPLND for testicular cancer at our institution from 1993 to 2012 were identified and clinical charts reviewed. 91 patients underwent P−RPLND and 577 patients underwent PC−RPLND. All complications within 90 d of surgery were defined and categorized by a five-grade and 10-domain modification of the Clavien system. Univariable and multivariable logistic regression analyses were used to identify predictors of complications.

Results: Baseline characteristics were similar for age, race, and BMI. PC−RPLND were more likely to have advanced clinical stage disease (p<0.001) and have larger retroperitoneal masses (p<0.001) than patients who underwent P−RPLND. Moreover, pathologic data revealed greater pathologic stage (p<0.001) and large masses resected (p<0.001) in patients who underwent PC−RPLND. Moreover, there were 0% vs. 4.5% intraoperative complications in patients who underwent P−RPLND vs. PC−RPLND, respectively (p<0.038). Eight percent of P−RPLND patients versus 27% of PC−RPLND patients experienced any postoperative complication (p<0.001). Of those complications, there were 0% vs. 18% grade 3 or higher complications in patients who underwent P−RPLND vs. PC−RPLND, respectively (p<0.001). Ileus (4.3% vs. 13.4%, p=0.010) and chylous leak (0% vs. 5.9%, p=0.009) were significantly different for patients who underwent P−RPLND vs. PC−RPLND, respectively. There was no significant difference in any other complication category.

Conclusion: To our knowledge, this is the first study of complications following RPLND, using a standardized reporting system. Our analysis of postoperative morbidity in patients following RPLND identified a significantly different intraoperative and postoperative complication rate between patients who underwent primary versus PC−RPLND. Moreover, the greatest difference was in regards to ileus and chylous leak with no complications in patients who underwent P−RPLND versus 18% being grade 3 or higher.
Poster Session II – Summary

Poster Session
Thursday, December 4, 2014
4:00 p.m. – 5:30 p.m.
Poster Walks
See page 168 for full abstracts

Poster #102
SIRNA SILENCING OF SURVIVIN ENHANCES ACTIVITY OF MITOMYCIN C IN HUMAN BLADDER RT4 XENOGRAFTS
Minjian Cui, BS¹, Jessie L.-S. Au, PhD, PharmD¹, M. Guillaume Wientjes, PhD¹, Michael O’Donnell, MD², Kevin Loughlin, MD³ and Ze Lu, PhD¹
¹Optimum Therapeutics LLC, San Diego, CA; ²University of Iowa, Iowa City, IA; ³Brigham and Women’s Hospital, Boston, MA
(Presented by: Jessie L.-S. Au)

Poster #103
LONG-TERM FUNCTIONAL OUTCOME AND COMPLICATIONS AFTER RADICAL CYSTECTOMY AND ORTHOTOPIC NEOBLADDER DIVERSION
Michael Maidaa, BS, Gus Miranda, Inderbir Gil, MD, Sia Daneshmand, MD, Hooman Djaladat, MD
USC Institute of Urology, Los Angeles, CA
(Presented by: Hooman Djaladat)

Poster #104
THE ADMINISTRATION OF ANY ADDITIONAL BACILLUS CALMETTE-GUÉRIN BEYOND INDUCTION THERAPY IMPROVES OVERALL SURVIVAL IN HIGH-GRADE T1 BLADDER CANCER
Zachary Smith, MD¹, Senthil Jayarajan, MD², Matthew Sterling, MD¹, Daniel Canter, MD³, Muta Issa, MD⁴, Ryan Dobbs, MD⁴, Bruce Malkowicz, MD¹ and Thomas Guzzo, MD, MPH¹
¹University of Pennsylvania, Philadelphia, PA; ²Temple University, Philadelphia, PA; ³Atlanta VA Medical Center, Atlanta, GA; ⁴Emory University, Atlanta, GA
(Presented by: Zachary Smith)

Poster #105
LONG-TERM OUTCOMES OF HIGH RISK BLADDER CANCER SCREENING COHORT
Nathan Starke, MD¹, Ahmed Haddad, MD², Nirmish Singla, MD² and Yair Lotan, MD²
¹UT Southwestern Dallas, TX; ²UTSW Dallas, TX
(Presented by: Nathan Starke)

Poster #106
POST OPERATIVE PAIN MANAGEMENT AFTER RADICAL CYSTECTOMY: COMPARING TRADITIONAL AND ERAS PROTOCOLS AT USC
Weichen Xu BA¹, Hamed Ahmadi, MD², Jie Cai, MS², Gus Miranda, BS², Anne Schuckman, MD², Siamak Daneshmand, MD² and Hooman Djaladat, MD³
¹Keck School of Medicine of USC; ²USC Institute of Urology; ³USC Institute of Urology, Los Angeles, CA
(Presented by: Hooman Djaladat)

Poster #107
THE ASSOCIATION OF ABO BLOOD TYPE WITH DISEASE RECURRENCE AND MORTALITY AMONG PATIENTS UNDERGOING RADICAL CYSTECTOMY
Boris Gershman, MD, Matthew Tollefson, MD, Igor Frank, MD, Daniel Moreira, MD, Prabin Thapa, MS, Robert Tarrell, MS, R. Houston Thompson, MD, Stephen Boorjian, MD
Mayo Clinic (Rochester, MN)
(Presented by: Boris Gershman)
Poster #108
BLADDER CANCER POST-RECURRENCE OUTCOMES FOLLOWING CYSTECTOMY BASED ON SITE OF METASTASIS
Anirban P Mitra, MD, PhD, David I Quinn, MD, PhD, Eila C Skinner, MD, Tanya B Dorff, MD, Anne K Schuckman, MD and Siamak Daneshmand, MD
1University of Southern California, Los Angeles, CA; 2Stanford University, Stanford, CA
(Presented by: Siamak Daneshmand)

Poster #109
TISSUE IS THE ISSUE: THE IMPACT AND BENEFIT OF PATHOLOGICAL REVIEW FOR UROTHELIAL CARCINOMA OF THE BLADDER AT A TERTIARY CARE CANCER CENTER
Adam Luchey, MD, Neal Manimala, MD, Shohreh Dickinson, MD, Jasrman Dhillon, MD, Gautum Agarwal, MD, Scott Gilbert, MD, Philippe Spiess, MD, Wade Sexton, MD, Julio Pow-Sang, MD, Michael Poch, MD
H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL
(Presented by: Adam Luchey)

Poster #110
ASSESSING EARLY TREATMENT RESPONSE USING 18F-FDG - PET/CT AT 4 VERSUS 8 WEEKS OF THERAPY WITH CABOZANTINIB IN PATIENTS WITH ADVANCED UROTHELIAL CARCINOMA
Dereck Paul, MS, M. Liza Lindenberg, MD, Karen Kurzziel, MD, Seth Steinberg, PhD, Howard Barnes, MD and Andrea Apolo, MD
1Genitourinary Malignancies Branch, Center for Cancer Research (CCR), National Cancer Institute (NCI), National Institutes of Health (NIH), Bethesda, MD; 2Molecular Imaging Program, CCR, NCI, NIH, Bethesda, MD; 3Biostatistics and Data Management Section, CCR, NCI, NIH, Bethesda, MD; 4Division of Cancer Prevention, NCI, Rockville, MD
(Presented by: Dereck Paul)

Poster #111
QUALITY OF LIFE AND SEXUAL HEALTH FUNCTION IN BLADDER CANCER SURGERY PATIENTS WHO UNDERWENT CYSTECTOMY
Rujuta Umarji, MSW, Cheryl Lee, MD, Heather Goltz, PhD, LMSW, MEd, David Latini, PhD, PLP, LPC-S and Daniela Wittman, PhD, LMSW
1University of Michigan, Ann Arbor, MI; 2University of Houston-Downtown and Baylor College of Medicine, Houston, TX; 3Baylor College of Medicine, Houston, TX
(Presented by: Rujuta Umarji)

Poster #112
PERIOPERATIVE BLOOD TRANSFUSION INCREASES THE RISK OF INFECTIOUS COMPLICATIONS AFTER RADICAL CYSTECTOMY
Jen-Jane Liu, MD, Bryan Maxwell, MD, MPH, Max Kates, MD, Hiten Patel, MD, Gregory Joice, MD, Nilay Gandhi, MD and Trinity Bivalacqua, MD, PhD
1James Buchanan Brady Urologic Institute at Johns Hopkins University, Baltimore, MD; 2Department of Anesthesiology & Critical Care Medicine Johns Hopkins University, Baltimore, MD
(Presented by: Jen-Jane Liu)

Poster #113
RISK FACTORS FOR PERIOPERATIVE BLOOD TRANSFUSION IN PATIENTS UNDERGOING RADICAL CYSTECTOMY FOR UROTHELIAL CARCINOMA OF THE BLADDER
Gautum Agarwal, MD, Patrick Espiritu, MD, Adam Luchey, MD, Jorge Lockhart, MD, Julio Pow-Sang, MD, Philippe E Spiess, MD, Michael Poch, MD, Wade Sexton, MD
H. Lee Moffitt Cancer Center, Tampa, Florida
(Presented by: Gautum Agarwal)
Poster #114
VALIDATION OF THE MODIFIED FRAILTY INDEX TO PREDICT ADVERSE OUTCOMES AFTER CYSTECTOMY
Max Kates, MD, Hiten Patel, MD, Gregory Joice, MD, Jeffrey Tosoian, MD, MPH, Nikolai Sopko, MD, PhD, Jen-Jane Liu, MD, Phillip Pierorazio, MD, Trinity Bivalacqua, MD, PhD
James Buchanan Brady Urological Institute, The Johns Hopkins Medical Institutions, Baltimore, MD
(Presented by: Max Kates)

Poster #115
OUTCOMES FOR A MODERN CYSTECTOMY ENHANCED RECOVERY PATHWAY
Janet Baack Kukreja, MD, Maureen Kiernan RN, NP, Bethany Schempp, MS, RN, WOCN, Adriana Hontar PA, Ahmed Ghazi, MD, Hani Radhli, MD, Guan Wu, MD, PhD, Edward Messing, MD
University of Rochester, Rochester, NY
(Presented by: Janet Baack Kukreja)

Poster #116
SIMPLIFIED FRAILTY INDEX PREDICTS ADVERSE OUTCOMES IN PATIENTS UNDERGOING RADICAL CYSTECTOMY BUT DOES NOT PREDICT MORTALITY
Danny Lascano BA, Jamie S. Pak BA, G. Joel DeCastro, MD, MPH, Mitchell C. Benson, MD, James M. McKiernan, MD
Columbia University, College of Physicians and Surgeons, NY, NY
(Presented by: Danny Lascano)

Poster #117
MANAGEMENT OF UNRESECTABLE BLADDER CANCER AT TIME OF PLANNED CYSTECTOMY
Kashyap Shatagopam, BS, Hristos Kaimakiotis, MD, Jose Pedrosa, MD, Paul Gellhaus, MD, Michael Koch, MD
Indiana University School of Medicine, Department of Urology, Indianapolis, Indiana
(Presented by: Kashyap Shatagopam)

Poster #118
MOLECULAR TARGETED PHOTOIMMUNOTHERAPY AS A TREATMENT FOR BLADDER CANCER
Reema Railkar, PhD1, Q. Quentin Li, MD, PhD2, Srinivas Vourganti, MD3, Sam J. Brancato, MD4, Peter L. Choyke, MD, FACR5, Hisataka Kobayashi, MD, PhD6 and Piyush K. Agarwal, MD7
1Post-Doctoral Fellow, UOB, NCI, NIH, Bethesda, MD; 2Research Biologist, UOB, NCI, NIH, Bethesda, MD; 3Asst. Prof., Dept. of Urology, SUNY Upstate Medical Univ., Syracuse, NY; 4Clinical Fellow, UOB, NCI, NIH, Bethesda, MD; 5Program Director, Molecular Imaging Program, NCI, NIH, Bethesda, MD; 6Associate Scientist, Molecular Imaging Program, NCI, NIH, Bethesda, MD; 7Investigator, Urologic Oncology Branch, NCI, NIH, Bethesda, MD
(Presented by: Reema Railkar)

Poster #119
RESIDENT INVOLVEMENT IN ENDOSCOPIC BLADDER CANCER SURGERY IS ASSOCIATED WITH INADEQUATE PATHOLOGY SPECIMENS AND PROLONGED TIME TO CYSTECTOMY
Christopher Allard, MD1, Derek Bos, MD2, Shawn Dason, MD2, Vladimir Ruzhynsky, MD2, Anil Kapoor, MD, FRCSC2 and Bobby Shayegan, MD, FRCSC2
1Massachusetts General Hospital, Brigham and Women’s Hospital, Boston, MA; 2McMaster University, Hamilton, Ontario
(Presented by: Christopher Allard)

Poster #120
TITLE: CLINICAL SIGNIFICANCE OF RENIN-ANGIOTENSIN SYSTEM INHIBITION ON NON-MUSCLE INVASIVE BLADDER CANCER
Michael L. Blute, Jr., MD1, Timothy J. Rushmer2, Fangfang Shi, MS1, Benjamin Fuller2, E. Jason Abel, MD1, David F. Jarrard, MD1 and Tracy M. Downs, MD1
1University of Wisconsin Department of Urology; 2University of Wisconsin School of Medicine
(Presented by: Michael L. Blute, Jr.)
Poster #121
PROOF OF PRINCIPLE: HIGH-THROUGHPUT SCREENING AS A TOOL TO IDENTIFY NOVEL THERAPIES IN BLADDER CANCER
Achuth Nair¹, Reema Railkar, PhD², Sam J. Brancato, MD³, Iauwen Hsu, PhD², Q. Quentin Li, MD, PhD¹, Lesley Griner, PhD⁵, Xiaohu Zhang, MD⁴, Rajarshi Guha, PhD⁴, Marc Ferrer, PhD⁸ and Piyush K. Agarwal, MD⁹
¹Summer Intern, Urologic Oncology Branch, NCI, NIH, Bethesda, MD; ²Post-Doctoral Fellow, UOB, NCI, NIH, Bethesda, MD; ³Clinical Fellow, UOB, NCI, NIH, Bethesda, MD; ⁴Research Biologist, UOB, NCI, NIH, Bethesda, MD; ⁵Research Scientist, Division of Pre-Clinical Innovation, NCATS, NIH, Rockville, MD; ⁶Biologist, DPI, NCATS, NIH, Rockville, MD; ⁷Research Scientist, DPI, NCATS, NIH, Rockville, MD; ⁸Team Leader, Division of Pre-Clinical Innovation, NCATS, NIH, Rockville, MD; ⁹Investigator, Urologic Oncology Branch, NCI, NIH, Bethesda, MD (Presented by: Reema Railkar)

Poster #122
PRIMARY PREVENTION OF BLADDER CANCER: DOES THE PUBLIC KNOW THE RISK FACTORS?
Erika L. Wood MPH¹, Vishnukamal Golla MPH¹, Rohit Goswamy¹, Bryan Fellman¹, Diana Urbauer¹, Steven Canfield, MD² and Jay B. Shah, MD¹
¹MD Anderson Cancer Center (Houston, TX); ²University of Texas Medical School at Houston (Houston, TX) (Presented by: Erika L. Wood)

Poster #123
EVALUATING THE DOCUMENTATION OF MALNUTRITION DURING INPATIENT HOSPITALIZATION AFTER CYSTECTOMY: IMPLICATIONS FOR BOTH PATIENT CARE AND HOSPITAL REIMBURSEMENT
Lewis Thomas, MD¹,², Sheala Mullaney, BS³,², Douglas Robertson RDN, LD¹,², Mary Brooks RN, MSN, CPHQ⁴,², Bridget Drapeaux MA, RDN, LD⁴,², Larry Newman DNP, BSN, AGPCNP-C⁴,² and Kenneth Neppe, MD¹,²
¹University of Iowa Department of Urology; ²Iowa City, IA; ³University of Iowa Carver College of Medicine; ⁴University of Iowa Department of Food and Nutrition Services; ⁵University of Iowa Office of Clinical Quality, Safety, and Performance Improvement (Presented by: Lewis Thomas)

Poster #124
RECURRENCE PATTERNS AND RISK OF LOCAL AND DISTANT RECURRENCE AFTER OPEN AND ROBOT-ASSISTED RADICAL CYSTECTOMY FOR BLADDER CANCER: A COMPARATIVE ANALYSIS
Daniel P. Nguyen, MD, Bashir Al Hussein Al Awamlh, MD, Igor M. Inoyatov BA, Abimbola Ayangbesan BA, Padraic O’Malley, MD, Douglas S. Scherr, MD
Cornell University, New York, New York (Presented by: Daniel P. Nguyen)

Poster #125
MEASURING SUCCESS AFTER RADICAL CYSTECTOMY: FEASIBILITY OF A NOVEL COMPOSITE ENDPOINT (“POOR RECOVERY”) TO QUANTIFY OUTCOMES AFTER SURGERY
Erika L. Wood MPH¹, Janet E. Baack Kukreja, MD², Sima Porten, MD³, Wei Qiao¹, Raphael Ezeagu¹, Neema Navai, MD¹, Ashish M. Kamat, MD¹, Colin P. Dinney, MD¹ and Jay B. Shah, MD¹
¹MD Anderson Cancer Center (Houston, TX); ²University of Rochester Medical Center (Rochester, NY); ³University of California at San Francisco (San Francisco, CA) (Presented by: Erika L. Wood)
Poster Session II – Summary

Poster #126
**UROTHELIAL BLADDER CANCER GRADING – MICROSCOPE OR NEXT GENERATION SEQUENCER?**
Aidan Noon MB ChB, MD, Yu Liu, PhD, Jess Shen, Cynthia Kuk, Thomas Hermanns, Azar Azad, PhD, Joan Sweet, Eva Comperat, PhD, Theodorus van der Kwast, PhD, James Catto, PhD, Alexandre Zlotta, PhD, and Jeffrey Wrana, PhD
1Lunenfeld-Tanenbaum Research Institute, Mount Sinai Hospital, Toronto, Ontario, Canada; 2Department of Surgery, Division of Urology, University of Toronto, Mount Sinai Hospital and University Health Network, Toronto, Ontario, Canada; 3Pathology and Laboratory Medicine, Mount Sinai Hospital, Toronto, Ontario, Canada; 4Department of Pathology, Toronto General Hospital, University Health Network, Toronto, Ontario, Canada; 5Department of Pathology, Groupe Hospitalier Pitié-Salpêtrière, Paris, France; 6The Academic Urology Unit and Academic Unit of Molecular Oncology, University of Sheffield, Sheffield, UK
(Presented by: Aidan Noon)

Poster #127
**AROMATASE EXPRESSION IN UROTHELIAL CARCINOMA, FURTHER EVIDENCE OF A HORMONAL EFFECT ON ONCOLOGICAL FACTORS AND OUTCOMES IN BLADDER CANCER**
Padraic O’Malley, MD, Nicholas Hauser, MD, Daniel P Nguyen, MD, Bashir Al Hussein Al Awamlh, MD, Nigel P Mongan, PhD, Brian D Robinson, MD, Gerald Wang, MD, and Douglas S Scherr, MD
1Urology, Weill-Cornell Medical College, New York, NY; 2Pharmacology, Weill-Cornell Medical College, New York, NY; 3Pathology and Laboratory Medicine, Weill-Cornell Medical College, New York, NY
(Presented by: Padraic O’Malley)

Poster #128
**PATIENTS FOUND TO BE LYMPH NODE POSITIVE FOLLOWING NEOADJUVANT CHEMOTHERAPY AND RADICAL CYSTECTOMY HAVE A VERY POOR PROGNOSIS**
Eugene Cha, MD, John Sfakianos, MD, Ranjit Sukhu BA, Alyssa Yee, MD, Daniel Sjoberg BA and Bernard Bochner, MD
1Memorial Sloan Kettering Cancer Center, New York, NY; 2Mt. Sinai School of Medicine, New York, NY
(Presented by: Eugene Cha)

Poster #129
**LATE RECURRENCE FOLLOWING RADICAL CYSTECTOMY FOR UROTHELIAL CARCINOMA OF THE BLADDER**
Eugene Cha, MD, Alyssa Yee, MD, John Sfakianos, MD, Philip Kim, MD and Bernard Bochner, MD
1Memorial Sloan Kettering Cancer Center, New York, NY; 2Mt. Sinai School of Medicine
(Presented by: Eugene Cha)

Poster #130
**BRANCHED EVOLUTION AND INTRATUMOR HETEROGENEITY OF UROTHELIAL CARCINOMA OF THE BLADDER**
Eugene Cha, MD, John Sfakianos, MD, Hikmat Al-Ahmadie, MD, Sasinya Scott BA, Philip Kim, MD, Gopa Iyer, MD, Dean Bajorin, MD, Jonathan Rosenberg, MD, Michael Berger, PhD, Bernard Bochner, MD and David Solit, MD
1Memorial Sloan Kettering Cancer Center, New York, NY; 2Mt. Sinai School of Medicine
(Presented by: Eugene Cha)

Poster #131
**ASSESSING THE CLINICAL UTILITY OF TWIST1 AND NID2 DNA METHYLATION MARKERS IN BLADDER CANCER**
Matthew Ingham, MD, Robert Given, MD, Raymond Lance, MD, Michael Williams, MD
Eastern Virginia Medical School, Norfolk, VA
(Presented by: Matthew Ingham)

Poster #132
**EFFECT OF NEOADJUVANT CHEMOTHERAPY ON ELEVATED PRECYSTECTOMY SERUM LEVELS OF EPITHELIAL TUMOR MARKERS IN UROTHELIAL CANCER OF THE BLADDER**
Soroush T.Bazargani, MD, Swar Shah, MD, Hooman Djaladat, MD, Anne Schuckman, MD, David Quinn, MD, Tanya Dorff, MD, Sarmad Sadeghi, MD, Siamak Daneshmand, MD
USC Institute of Urology, Los Angeles, CA
(Presented by: Siamak Daneshmand)
Poster Session II – Summary

Poster #133
IMPACT OF EXTENDED VERSUS STANDARD LYMPH NODE DISSECTION ON POST-CYSTECTOMY SURVIVAL AMONG PATIENTS WITH LYMPH NODE-NEGATIVE UROTHELIAL CANCINOMA OF THE BLADDER
Cesar E. Ercole, MD1, Ranko Miocinovic, MD2, Andrew Stephenson, MD1, Steven Campbell, MD1, Amr Fergany, MD1 and Michael C. Gong, MD1
1Cleveland Clinic Foundation, Cleveland, OH; 2Detroit Medical Center, Detroit, MI
(Presented by: Cesar E. Ercole)

Poster #134
SEQUENTIAL INTRAVESICAL GEMCITABINE/DOCETAXEL FOR THE TREATMENT OF BCG FAILURES WITH NON-MUSCLE INVASIVE BLADDER CANCER
Ryan L. Steinberg, MD, Lewis J. Thomas, MD, Michael A. O’Donnell, MD, Kenneth G. Nepple, MD
Department of Urology, University of Iowa, Iowa City, IA
(Presented by: Ryan L. Steinberg)

Poster #135
REDUCED EGFR (<60 ML/MIN) AT FIRST TRANSURETHRAL RESECTION OF BLADDER TUMOR IS A SIGNIFICANT PREDICTOR OF SUBSEQUENT RECURRENCE AND PROGRESSION
Timothy J. Rushmer1, Michael L. Blute, Jr., MD2, Fangfang Shi, MS2, Benjamin Fuller3, E. Jason Abel, MD2, David Jarrard, MD2 and Tracy Downs, MD2
1University of Wisconsin School of Medicine and Public Health (Madison, Wisconsin); 2University of Wisconsin Department of Urology; 3University of Wisconsin School of Medicine and Public Health
(Presented by: Timothy J. Rushmer)

Poster #136
MODIFIED FRAILTY INDEX PREDICTS ACS NSQIP “NEVER EVENTS” IN NEPHRECTOMY PATIENTS
Jamie Pak, BA, Danny Lascano BA, G. Joel DeCastro, MD, James McKiernan, MD, Mitchell Benson, MD
Columbia University College of Physicians and Surgeons, Department of Urology, New York, NY
(Presented by: Jamie Pak)

Poster #137
THE IMPACT OF ISCHEMIA ON LONG-TERM RENAL FUNCTION FOLLOWING PARTIAL NEPHRECTOMY IN THE TWO KIDNEY MODEL
Michael Patton1, Daniel Salevitz1, Mark Tyson, MD, Rafael Nateras, MD2 and Erik Castle, MD3
1Phoenix, AZ; 2Mayo Hospital Phoenix, AZ; 3Mayo Hospital, Phoenix AZ
(Presented by: Mark Tyson)

Poster #138
PRECLINICAL DEVELOPMENT OF A NOVEL METHOD FOR DETECTING RENAL CELL CARCINOMA CIRCULATING TUMOR CELLS USING THE NEPHRIC-LINEAGE MARKER PAX8
Michael Gorin, MD1, Mark Ball, MD1, Hans Hammers, MD, PhD2, Phillip Pierorazio, MD1, Kenneth Pienta, MD1 and Mohamad Allaf, MD1
1The James Buchanan Brady Urological Institute and Department of Urology, The Johns Hopkins University School of Medicine, Baltimore, MD; 2Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Baltimore, MD
(Presented by: Michael Gorin)

Poster #139
INCREASED NEPHRON-SPARING SURGERY USE MAY UNDERTREAT LOCALLY ADVANCED DISEASE
Matthew Maurice, MD1, Robert Abouassaly, MD., MS1 and Hui Zhu, MD, ScD2
1Urology Institute, University Hospitals Case Medical Center, Cleveland, OH; 2Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH
(Presented by: Matthew Maurice)
Poster #140
IDENTIFYING PATIENTS AT HIGH RISK OF PERI-OPERATIVE DEATH FROM SIMULTANEOUS UROLOGICAL AND CARDIAC SURGERY FOR TUMOURS INVOLVING THE INFERIOR VENA CAVA (IVC)
Archie Fernando, FRCS, MA1, Kay Thomas FRCS2, Conal Austin FRCS2 and Tim O’Brien FRCS2
1Guy’s and St Thomas’ Hospital NHS Trust, London, UK; 2Guys and St Thomas’ Hospital NHS Trust, London, UK
(Presented by: Archie Fernando)

Poster #141
CLINICOPATHOLOGIC OUTCOMES OF CLINICALLY LOCALIZED TYPE1 AND TYPE 2 PAPILLARY RENAL CELL CARCINOMA
Rodrigo Ledezma, MD1, Edris Negron, MD2, Arieh Shalhav, MD3, Gladell Paner, MD3, Chris Rjepaj, MD4, Henry Crist, MD4, Jay Raman, MD4 and Scott Eggener, MD3
1Universidad Catolica, Santiago Chile; 2University of Miami, FL; 3University of Chicago, IL; 4Penn State Milton S. Hershey Medical Center, PA
(Presented by: Rodrigo Ledezma)

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Alice Semerjian1, James Peterson2, Marston Linehan, MD2 and Adam Metwalli, MD2
1George Washington University Department of Urology, Washington, DC; 2Urologic Oncology Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD
(Presented by: Alice Semerjian)

Poster #143
THE EFFECT OF RURAL RESIDENCE AND ACCESS TO UROLOGIC SPECIALISTS: AN INVESTIGATION ON THE MORTALITY OF KIDNEY CANCER IN MINORITIES
Adamantios Mellis, MD1, Lancer Stephens, PhD2, Christopher Aston, PhD3, Jonathan Heinlen, MD1, Michael Cookson, MD1 and Kelly Stratton, MD1
1Department of Urology, University of Oklahoma HSC, Oklahoma City, OK; 2Oklahoma Shared Clinical and Translational Resources, University of Oklahoma HSC, Oklahoma City, OK; 3Department of Pediatrics, University of Oklahoma HSC, Oklahoma City, OK
(Presented by: Adamantios Mellis)

Poster #144
CHANGE IN PLATELET COUNT AS A PROGNOSTIC INDICATOR FOR RESPONSE TO NEO-ADJUVANT TYROSINE KINASE INHIBITOR THERAPY IN METASTATIC RENAL CELL CARCINOMA
Hak Lee, MD1, Juan Himenez, MD2, Song Wang, MS1, Omer Raheem, MD1, Kyle Gillis, BS1, Amy Alagh, BS1, Christopher Kane, MD1, Michael Liss, MD1, Frederick Millard, MD1, Brian Lane, MD, PHD3, Steven Campbell, MD, PHD2 and Ithaar Derweesh, MD1
1UC San Diego Health System, La Jolla, CA; 2Cleveland Clinic, Cleveland, OH; 3Spectrum Health, Grand Rapids, MI
(Presented by: Hak Lee)

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Adam Metwalli, MD1, Mario Taylor BA1, Jason Rothwax, BS1, Hayet Amalou, MD2, W. Marston Linehan, MD1 and Bradford Wood, MD2
1Urologic Oncology Branch, National Cancer Institute, Bethesda, MD; 2Center for Interventional Oncology, NIH, Bethesda, MD
(Presented by: Adam Metwalli)
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MULTICENTER ANALYSIS OF ONCOLOGICAL OUTCOMES AFTER PERCUTANEOUS RENAL TUMOR CRYOTHERAPY IN RENAL CELL CANCER
Hak Lee, MD¹, Song Wang, MS¹, Omer Raheem, MD¹, Kyle Gillis, BS¹, Amy Alagh, BS¹, Michael Liss, MD¹, Gerant Rivera, MD¹, Robert Wake, MD², Anthony Patterson, MD² and Ithaar Derweesh, MD¹
¹UC San Diego Health System, La Jolla, CA; ²University of Tennessee Health Science Center, Memphis, TN
(Presented by: Hak Lee)

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Jaimin Bhatt, Sarah Kawaguchi, Shabbir Alibhai, Patrick Richard, Narhari Timilshina, Michael Jewett, Antonio Finelli
University Health Network, Toronto, ON
(Presented by: Jaimin Bhatt)

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Hak Lee, MD¹, Song Wang, MS¹, Omer Raheem, MD¹, Kyle Gillis, BS¹, Amy Alagh, BS¹, Michael Liss, MD¹, Gerant Rivera, MD¹, Robert Wake, MD², Anthony Patterson, MD² and Ithaar Derweesh, MD¹
¹UC San Diego Health System, La Jolla, CA; ²University of Tennessee Health Science Center, Memphis, TN
(Presented by: Hak Lee)

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MULTICENTER ANALYSIS OF PERIOPERATIVE AND RENAL FUNCTIONAL OUTCOMES OF PARTIAL NEPHRECTOMY FOR COMPLEX RENAL SCORE WITH OR WITHOUT PRE-SURGICAL SUNITINIB
Hak Lee, MD¹, Juan Himenez, MD², Brian Lane, MD, PHD³, Song Wang, MS¹, Omer Raheem, MD¹, Kyle Gillis, BS¹, Amy Alagh, BS¹, Michael Liss, MD¹, Frederick Millard, MD¹, Steven Campbell, MD, PHD² and Ithaar Derweesh, MD¹
¹UC San Diego Health System, La Jolla, CA; ²Cleveland Clinic, Cleveland, OH; ³Spectrum Health, Grand Rapids, MI
(Presented by: Hak Lee)

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GRADE HETEROGENEITY IN SMALL RENAL MASSES: POTENTIAL IMPLICATIONS FOR RENAL MASS BIOPSY.
Mark Ball, MD, Stephanie Bezerra, MD, Michael Gorin, MD, Morgan Cowan, MD, Christian Pavlovich, MD, Phillip Pierorazio, MD, George Netto, MD, Mohamad Allaf, MD
James Buchanan Brady Urological Institute and Department of Urology, Johns Hopkins University School of Medicine, Baltimore, MD
(Presented by: Mark Ball)

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IS FOLLOW UP BEYOND 2 YEARS NECESSARY FOR PT1A RENAL CELL CARCINOMA TREATED WITH NEPHRON SPARING SURGERY? AN ASSESSMENT OF LATE RECURRENTS AND SURVEILLANCE COSTS.
Kamran Zargar-Shoshtari, MD¹, Tim Kim, MD², Ross Simon, MD², Hui-Yi Lin, MS², Binglin Yue, PhD², Pranav Sharma, MD², Philippe Spiess, MD², Michael Poch, MD², Julio PowSang, MD² and Wade Sexton, MD²
¹Moffitt Cancer Center, Tampa, FL; ²Moffitt Cancer Center
(Presented by: Kamran Zargar-Shoshtari)
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Hak Lee, MD1, Juan Himenez, MD2, Song Wang, MS1, Omer Raheem, MD1, Kyle Gillis, BS1, Amy Alagh, BS1, Michael Liss, MD1, Frederick Millard, MD1, Christopher Kane, MD1, Brian Lane, MD, PHD3, Steven Campbell, MD, PHD2 and Ithaar Derweesh, MD1
1UC San Diego Health System, La Jolla, CA; 2Cleveland Clinic, Cleveland, OH; 3Spectrum Health, Grand Rapids, MI
(Presented by: Hak Lee)

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Sevag Demirjian, MD1, Brian Lane, MD2, Ithaar Derweesh, MD3, Toshio Takagi, MD1, Zhiling Zhang, MD1, Liliya Velet, MD1, Cesar E Ercole, MD1, Amr Fergany, MD1 and Steven Campbell, MD1
1Cleveland Clinic Foundation, Cleveland, OH; 2Spectrum Health, Michigan State University School of Medicine, Grand Rapids, MI; 3University of California, San Diego, CA
(Presented by: Sevag Demirjian)

Poster #154
A CRITICAL ANALYSIS AND VALIDATION OF THE RENAL CELL CARCINOMA BIOMARKER LITERATURE USING THE CANCER GENOME ATLAS (TCGA)
Samuel D. Kaffenberger, MD, Andrew G. Winer, MD, Victor Reuter, MD, Jonathan Coleman, MD, Paul Russo, MD, James J. Hsieh, MD, A. Ari Hakimi, MD
Memorial Sloan-Kettering Cancer Center
(Presented by: Samuel D. Kaffenberger)

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Omer Raheem, MD1, Hak Lee, MD1, Song Wang, MS1, Reza Mehrzain, MD2, Ryan Kopp, MD1, Jason Woo, MD1, Michael Liss, MD1, Nishant Patel, MD1, Anthony Patterson, MD2, Jim Wan PHD2 and Ithaar Derweesh, MD1
1UC San Diego Health System, La Jolla, CA; 2University of Tennessee Health Science Center, Memphis, TN
(Presented by: Omer Raheem)

Poster #156
ASSOCIATION OF OBESITY AND OTHER COMORBIDITIES WITH THE AGGRESSIVENESS OF RENAL CELL CARCINOMA
Kevin Cwach, BS1,2,3, Lewis Thomas, MD4,2,3, Laura Bertrand, MD4,2,3, Lyse Norian, PhD5,1,4,2,3 and Kenneth Nepple, MD4,2,3
1Carver College of Medicine; 2University of Iowa; 3Iowa City, IA; 4Department of Urology; 5Interdisciplinary Graduate Program in Immunology
(Presented by: Kevin Cwach)

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Paras Shah, MD1, Michael Siev1, Arvin George, MD2, Simpa Salami, MD1, Manaf Alom, MD1, Jessica Kreshover, MD1, Lee Richstone, MD1, Manish Vira, MD1 and Louis Kavoussi, MD1
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(Presented by: Michael Siev)
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Christopher Allard, MD1, Francisco Gelpi-Hammerschmidt, MD2, Benjamin I Chung, MD3 and Steven L. Chang, MD2
1Massachusetts General Hospital, Brigham and Women’s Hospital, Boston, MA; 2Division of Urologic Surgery, Brigham and Women’s Hospital, Harvard School of Medicine, Boston, MA; 3Department of Urology, Stanford School of Medicine, Palo Alto, California
(Presented by: Christopher Allard)

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(Presented by: Megan Merrill)

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Lucas Dean, MD1, Adrian S. Fairey, MD1, Niels-Erik B. Jacobsen, MD1, Simon Tanguay, MD2, Ricardo Rendon, MD3, David Bell, MD3, Jonathan Izawa, MD4, Joseph Chin, MD4, Anil Kapoor, MD5, Bobby Shayegan, MD5, Edward Matsumoto, MD5, Peter Black, MD6, Alan So, MD6, Jean-Baptiste Lattouf, MD7, Fred Saad, MD7, Darrel Drachenberg, MD8, Ilias Caggianos, MD9, Louis Lacombe, MD10, Yves Fradet, MD10 and Wassim Kassouf, MD2
1University of Alberta, Edmonton, AB; 2McGill University, Montreal, QC; 3Dalhousie University, Halifax, NS; 4University of Western Ontario, London, ON; 5McMaster University, Hamilton, ON; 6University of British Columbia, Vancouver, BC; 7University of Montreal, Montreal, QC; 8University of Winnipeg, Winnipeg, MN; 9University of Ottawa, Ottawa, ON; 10Laval University, Quebec City, QC
(Presented by: Lucas Dean)

Poster #161
THE PROSTATE GENETIC SCORE (PGS) STRATIFIES BASELINE RISK OF PROSTATE CANCER AND IMPROVES PSA PERFORMANCE IN THE PLCO TRIAL
Michael A. Liss, MD, MAS1, Jianfeng Xu, PhD2, Haitao Chen, PhD3 and A. Karim Kader, MD, PhD4
1UTHSCSA, San Antonio, TX; 2Wake Forest, Winston-Salem, NC; 3Fudan University, Shanghai, China; 4UCSD, San Diego, CA
(Presented by: Michael A. Liss)

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Paul Toren, MD, Jared Allman, Martin Gleave, MD, Amina Zoubeidi, PhD
Vancouver Prostate Centre, Department of Urologic Sciences, Vancouver, Canada
(Presented by: Paul Toren)
Poster Session II — Summary

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1University of Montréal, Montréal, QC, Canada; 2Helen Diller Family Comprehensive Cancer Center, University of California, San Francisco, CA; 3Harvard Medical School and Massachusetts General Hospital, Boston, MA; 4Institut Gustave Roussy, University of Paris Sud, Villejuif, France; 5Department of Urology, Charité Berlin, Berlin, Germany; 6Radboud University Medical Centre, Nijmegen, The Netherlands; 7San Camillo and Forlanini Hospitals, Rome, Italy; 8Janssen Research & Development, Los Angeles, CA; 9Janssen Research & Development, Beerse, Belgium; 10Janssen Research & Development, Raritan, NJ; 11Janssen Research & Development, Menlo Park, CA
(Presented by: Fred Saad)

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Neal Patel, MD, Viktor Y. Dombrovskiy, MD, PhD, MPH, Izak Faiena, MD, Rutveej Patel, MD, Parth K. Modi, MD, Amirali H. Salmasi, MD, Eric A. Singer, MD, MA, Isaac Y. Kim, MD, PhD
Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey
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Weichen Xu BA1, Jie Cai, MS2, Gary Lieskovsky, MD2, Siamak Daneshmand, MD2 and Hooman Djaladat, MD3
1Keck School of Medicine of USC; 2USC Institute of Urology; 3USC Institute of Urology, Los Angeles, CA
(Presented by: Hooman Djaladat)

Poster #166
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Steven Stone1, Jack Cuzick, PhD2, Gabrielle Fisher, PhD2, Zi Hua Yang, PhD2, Bernard V. North, PhD2, Daniel M. Berney FRCPATH3, Luis Beltran4, David C. Greenberg, PhD4, Henrik Moller, MD3, Julia E. Reid, MStat1, Alexander S. Gutin, PhD1, Jerry S. Lanchbury, PhD1, Michael K. Brawer, MD1 and Peter T. Scardino, MD6
1Myriad Genetics, Inc., Salt Lake City, UT; 2Wolfson Institute of Preventive Medicine, Queen Mary University of London, London, UK; 3Barts Cancer Institute, Queen Mary University of London, London, UK; 4National Cancer Registration Service (Eastern Office), Public Health England, Cambridge, UK; 5Cancer Epidemiology and Population Health, King’s College London, London, UK; 6Department of Urology, Memorial Sloan-Kettering, New York, NY
(Presented by: Steven Stone)
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PATHOLOGIC GLEASON 8-10: DO ALL MEN DO POORLY? Results: FROM THE SEARCH DATABASE
Sean Fischer¹, Ross Simon, MD¹,², Lauren Howard, MS¹,³, William Aronson, MD⁴,⁵, Martha Terris, MD⁶,⁷, Christopher Kane, MD⁸, Christopher Amling, MD⁹, Matt Cooperberg, MD¹⁰,¹¹,¹², Stephen Freedland, MD¹,² and Adriana Vidal, PhD¹
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(Presented by: Sean Fischer)

Poster #168

A MULTI-INSTITUTIONAL PROSPECTIVE TRIAL IN THE UNITED STATES CONFIRMS THE 4KSCORE ACCURATELY IDENTIFIES MEN WITH HIGH-GRADE PROSTATE CANCER
Sanoj Punnen, MD, Dan Sjoberg¹, Steve Zappala, MD² and Dipen Parekh, MD³
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(Presented by: Sanoj Punnen)

Poster #169

MRI/US FUSION-GUIDED BIOPSY DETECTS CLINICALLY SIGNIFICANT PROSTATE CANCER IN THE CENTRAL GLAND CORRELATING WITH INDEX LESION
Michele Fascelli¹, Arvin George, MD¹, Thomas Frye, MD¹, Steven Abboud¹, Raju Chelluri¹, Richard Ho¹, Annerleim Walton-Diaz, MD¹, Sandeep Sankineni, MD², Bradford Wood, MD², Maria Merino, MD², Baris Turkbey, MD², Peter Choyke, MD² and Peter Pinto, MD¹
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(Presented by: Michele Fascelli)

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SIMPLIFIED FRAILTY INDEX PREDICTS ADVERSE SURGICAL OUTCOMES AND INCREASED LENGTH OF STAY IN RADICAL PROSTATECTOMY PATIENTS
Danny Lascano, BA, Jamie S. Pak, BA, G. Joel DeCastro, MD, MPH, James M. McKiernan, MD, Mitchell C. Benson, MD Columbia University, College of Physicians and Surgeons, NY, NY
(Presented by: Danny Lascano)

Poster #171

IMPROVED RECOVERY OF ERECTILE FUNCTION IN YOUNGER MEN AFTER RADICAL PROSTATECTOMY: DOES IT JUSTIFY IMMEDIATE INTERVENTION IN LOW-RISK PATIENTS?
Mariam Imnadze, MD¹, Daniel Sjoberg², Andrew Vickers, PhD² and Behfar Ehdai, MD²
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(Presented by: Mariam Imnadze)
Poster #172
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Drew Moghanaki, MD, MPH1, Diane Holden, BS2, Noah Kalman, MD, MBA2, Rakesh Agarwal, MD3, Jennifer Hubert, MD3, Rehan Khan, MD3, Harry Lomas, MD3, M. Baruch Grob, MD3, Michael Chang, MD3 and Michael Hagan, MD, PhD3
1Hunter Holmes McGuire Veterans Affairs Medical Center, Richmond, VA; 2Virginia Commonwealth University, Richmond, VA; 3Hunter Holmes McGuire Veterans Affairs Medical Center
(Presented by: Drew Moghanaki)

Poster #173
SURGEON HUMAN CAPITAL DEPRECIATION: THE IMPACT OF DAYS OFF BETWEEN CASES ON PERIOPERATIVE AND FUNCTIONAL OUTCOMES FOR ROBOTIC-ASSISTED LAPAROSCOPIC PROSTATECTOMY
Shane Pearce, MD, Joseph Pariser, MD, Sanjay Patel, MD, Blake Anderson, MD, Scott Eggener, MD, Gregory Zagaja, MD
University of Chicago, Chicago, IL
(Presented by: Shane Pearce)

Poster #174
IMPACT OF PATIENT-SPECIFIC 3D MODEL OF PREOPERATIVE MRI ON NERVE SPARING DURING ROBOT-ASSISTED LAPAROSCOPIC PROSTATECTOMY
Junichi Tokuda, PhD1, Tudor Borza, MD2, Fiona Fennessy, MD, PhD1, Kibel Adam, MD2 and Clare Tempany, MD1
1Department of Radiology, Brigham and Women's Hospital, Boston, MA; 2Division of Urologic Surgery, Brigham and Women's Hospital, Boston, MA
(Presented by: Junichi Tokuda)

Poster #175
BASELINE PSA LEVELS IN MEN AGED 40-60 ARE INFLUENCED BY RACE, BODY MASS INDEX (BMI) AND WAIST-CIRCUMFERENCE: A STUDY USING THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES, 2001-2010)
Mark Preston, MD, MPH1, Julie Batista ScD2, Samuel Peisch2, Quoc-Dien Trinh, MD1, Sarah Markt ScD2, Taylor Medwig2, Adam Kibel, MD1, Meir Stampfer, MD, PhD2 and Lorelei Mucci ScD2
1Brigham and Women's Hospital, Boston, MA; 2Harvard School of Public Health, Boston, MA
(Presented by: Mark Preston)

Poster #176
INTEGRATIVE GENOMICS ANALYSIS REVEALED MICRORNA-MRNA PAIRINGS ASSOCIATED WITH PROSTATE CANCER DISPARITIES
Bi-Dar Wang1, Kristin Ceniccola1, Qi Yang1, Alice Semerjian2, Ramez Andrawis3, Thomas Jarrett3, Harold Frazier3, Vyomesh Patel4, Youngmi Ji5, Jacqueline Olender1, Anastas Popratiloff6, Patricia Latham7, Steven Patierno8 and Norman Lee1
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(Presented by: Alice Semerjian)
Poster #177
DECLINING RATE OF PROSTATE BIOPSY IN THE VETERANS HEALTH ADMINISTRATION IN THE PAST DECADE: AN ALTERNATE APPROACH TO LIMITING OVERDIAGNOSIS AND OVERTREATMENT OF PROSTATE CANCER?
Ryan Levey, MD, Gowtham Rao, MD, PhD, MPH, Azza Shoaibi, Kathryn Haddock, PhD, RN and Sandip Prasad, MD, MPhil
1Department of Urology, Medical University of South Carolina (Charleston, SC); 2J.B. Dorn Veterans Affairs Medical Center (Columbia, SC); 3Department of Epidemiology and Biostatistics, School of Public Health, University of South Carolina (Columbia, SC); 4Department of Urology, Medical University of South Carolina (Charleston, SC), Ralph H. Johnson Veterans Affairs Medical Center (Charleston, SC)
(Presented by: Ryan Levey)

Poster #178
VALIDATION OF GEMCAP AS A DNA BASED BIOMARKER TO PREDICT DISEASE RECURRENCE IN PATIENTS WITH INTERMEDIATE TO HIGH RISK DISEASE UNDERGOING PROSTATECTOMY FOR PROSTATE CANCER.
Hao Nguyen, MD, PhD, Elizabeth Gilbert, BS, MA, Jaime Tawney, BS, Vy Ngo, BS, MA, Janet Cowan, BS, MA, Cristina Magi-Galluzzi, MD, PhD, Noel Krzesinski, BS, Jorge Yao, MD, Eric A. Klein, MD, Peter R. Carroll, MD, MPH and Pamela L. Paris
1University of California, San Francisco, CA; 2UCSF dept. of urology San Francisco, CA; 3Department of Anatomic Pathology, Cleveland Clinic Cleveland, Ohio; 4Department of Pathology, University of Rochester, Rochester, NY.; 5Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, Ohio.
(Presented by: Hao Nguyen)

Poster #179
COMPARISON OF MR-TARGETED PROSTATE BIOPSY BY MRI-US FUSION VERSUS SYSTEMATIC PROSTATE BIOPSY IN PATIENTS WITH PRE-BIOPSY 3T MULTI-PARAMETRIC MRI: SINGLE INSTITUTION EXPERIENCE IN 615 PATIENTS.
Xiaosong Meng, MD, PhD, Andrew B. Rosenkrantz, MD, Michael Fenstermaker, BS, Neil Mendhiratta, BS, Richard Huang, BS, Marc Bjurlin DO, James S. Wysock, MD, Fang-Ming Deng, MD, PhD, Jonathan Melamed, MD, Ming Zhou, MD, PhD, William C. Huang, MD, Herbert Lepor, MD and Samir S. Taneja, MD
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(Presented by: Xiaosong Meng)

Poster #180
THE RELATIONSHIP OF INCREASING MRI SUSPICION SCORE AND THE IDENTIFICATION OF HIGH GRADE PROSTATE CANCER ON MRI-US FUSION BIOPSY.
Xiaosong Meng, MD, PhD, Andrew B. Rosenkrantz, MD, Michael Fenstermaker, BS, Neil Mendhiratta, BS, Richard Huang, BS, Marc Bjurlin DO, James S. Wysock, MD, Fang-Ming Deng, MD, PhD, Jonathan Melamed, MD, Ming Zhou, MD, PhD, William C. Huang, MD, Herbert Lepor, MD and Samir Taneja, MD
1Department of Surgery, New York University Langone Medical Center, New York, NY; 2Department of Radiology, NYU Langone Medical Center, New York, NY; 3School of Medicine, NYU Langone Medical Center, New York, NY; 4Department of Urology, NYU Langone Medical Center, New York, NY; 5Department of Urology, New York Hospital Queens, Flushing, NY; 6Department of Pathology, NYU Langone Medical Center, New York, NY; 7Department of Urology, Department of Radiology, NYU Langone Medical Center, New York, NY
(Presented by: Xiaosong Meng)
Poster Session II – Summary

Poster #181
SALVAGE RADICAL PROSTATECTOMY FOR LOCALLY RECURRENT PROSTATE CANCER AFTER PRIMARY RADIOTHERAPY: A LARGE INSTITUTIONAL SERIES WITH 15 YEAR FOLLOW UP
Vidit Sharma, MD1, Eugene D Kwon, MD2, Laureano J Rangel, PhD2 and R. Jeffrey Karnes, MD2
1Mayo Clinic, Rochester, MN; 2Mayo Clinic Rochester, MN
(Presented by: Vidit Sharma)

Poster #182
METABOLIC SYNDROME AND ONCOLOGIC OUTCOMES IN MEN UNDERGOING RADICAL PROSTATECTOMY FOR PROSTATE CANCER
Bimal Bhindi, Wen Xie, MD1, Robert Hamilton, MD, MPH, FRCSC2, Girish Kulkami, MD, PhD, FRCSC2, Michael Nesbitt2, Robin Kalnin, Shabhir Alibhai, MD, MSc, FRCPC2, Antonio Finelli, MD, MSc, FRCPC2, Alexandre Zlotta, MD, PhD, FRCSC2, John Trachtenberg, MD, FRCSC2 and Neil Fleshner, MD, MPH, FRCSC2
1University of Western Ontario, London, ON, Canada; 2University Health Network, Toronto, ON, Canada
(Presented by: Bimal Bhindi)

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COMPARATIVE EFFECTIVENESS OF TARGETED PROSTATE BIOPSY USING MRI-US FUSION SOFTWARE AND VISUAL COGNITION: PROSPECTIVE, BLINDED STUDY
Behfar Eghaie, MD MPH1, Dan Sjoberg, PhD1, Pedro Recabal, MD1, Dan Lee, MD2, James Eastham, MD1 and Jonathan Coleman, MD1
1Memorial Sloan Kettering Cancer Center, NY, NY; 2Weill-Cornell Medical College, NY, NY
(Presented by: Behfar Eghaie)

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MOLECULAR ALTERATIONS IN PROSTATE CANCER AND ASSOCIATION WITH MRI FEATURES
Daniel Lee, MD, Jacqueline Fontugne, MD, Naveen Gumpeni, MD, Kyung Park, MD, Theresa MacDonald, MS, Brian Robinson, MD, Andrea Sboner, PHD, Juan Miguel Mosquera, MD, Mark Rubin, MD, Christopher Barbieri, MD, PHD
Weill Cornell Medical Center / New York Presbyterian Hospital
(Presented by: Daniel Lee)

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Ryan Kopp, MD1, John Sullivan, MD2, James Hayes1, James Eastham, MD1, Kenneth Offit, MD, MPH1, Joseph Vijai, PhD1 and Robert Klein, PhD3
1Memorial Sloan Kettering Cancer Center, New York, NY; 2Royal College of Surgeons in Ireland, Dublin, Ireland; 3Mount Sinai School of Medicine, New York, NY
(Presented by: Ryan Kopp)

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Massimiliano Spaliviero, MD, Stefan Harmsen, PhD, Ruimin Huang, PhD, Julie R. White DVM, Jason M. Samii, MD, PhD, Hazem Karabeber, MD, Matthew A. Wall, BS, James A. Eastham, MD, Karim A. Touijer, MD, Peter T. Scardino, MD, Moritz F. Kircher, MD, PhD
Memorial Sloan Kettering Cancer Center, New York, NY
(Presented by: Massimiliano Spaliviero)
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Gerald Andriole, MD1, Thomas Keane2, Christopher P. Evans3, Peter Iversen4, David Forer5, Hank Mansbach6, Frank Perabo7, Gabriel Haas7, Tomasz M. Beer6 and Bertrand Tombal18
1Washington University School of Medicine; 2Medical University of South Carolina, Charleston, SC; 3UC Davis Comprehensive Cancer Center, Sacramento, CA; 4Rigshospitalet, Copenhagen, Denmark; 5Medivation Inc., San Francisco, CA; 6Chicago, IL, USA
*Dr Perabo was an employee of Astellas Pharma at the time of project initiation; 7Astellas Global Development, Northbrook IL; 8OHSU Knight Cancer Institute, Portland, OR; 9Cliniques Universitaires Saint-Luc, Brussels, Belgium
(Presented by: Gerald Andriole)

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Sangeet Ghai, MD, FRCR1, Uri Lindner, MD 2, Masoom Haider, MD3, Walter Kucharczyk, MD2, Tristan Barrett, MD2 and John Trachtenberg, MD2
1University Health Network - Toronto, Ontario; 2UHN, Toronto, Ontario; 3Sunnybrook Health Sciences Centre, Toronto, Ontario
(Presented by: Sangeet Ghai)

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TALL SCORE FOR PREDICTION OF ONCOLOGICAL OUTCOMES AFTER RADICAL NEPHROURETERECTOMY FOR HIGH GRADE UPPER TRACT UROTHELIAL CARCINOMA
Ramy Youssef, Laura-Maria Krabbe, MD1, Shahrokh F. Shariat, MD2, Yair Lotan, MD3, Arthur I. I. Sagalowsky, MD3, Jay Raman, MD4, Christopher G. Wood, MD5, Alon Weizer, MD5, Marco Roscigno, MD7, Francesco Montorsi, MD8, Christian Bolenz, MD9, Mesut Remzi, MD10, Karim Bensalah, MD11, Wassim Kassouf, MD12, and Vitaly Margulis, MD3
1University of Muenster Medical Center, Muenster, Germany; 2Medical University of Vienna, Vienna General Hospital, Vienna, Austria; 3UT Southwestern Medical Center, Dallas, Texas, USA; 4Penn State Milton S. Hershey Medical Center, Hershey, PA, USA; 5UT M.D. Anderson Cancer Center, Houston, TX, USA; 6University of Michigan, Ann Arbor, MI, USA; 7AO Papa Giovanni XXIII, Bergamo, Italy; 8Vita Salute University, San Raffaele, Milan, Italy; 9Mannheim Medical Center, University of Heidelberg, Mannheim, Germany; 10Landesklinikum Korleuburg, Korleuburg, Austria; 11Bicètre University Hospital, Le Kremlin Bicêtre, France; 12McGill University Health Center, Montreal, Quebec, Canada
(Presented by: Ramy Youssef)

Poster #190
PRIMARY GENITOURINARY MELANOMA IN MEN AND WOMEN: EPIDEMIOLOGY AND SURVIVAL OUTCOMES
Alejandro Sanchez, MD1, Dayron Rodríguez, MD, MPH1, Seth K. Bechis, MD, MS1, Mark A. Preston, MD, MPH2, Jed-Sian Cheng, MD, MPH1, Glen W. Barrisford, MD, MPH1 and Adam S. Feldman, MD, MPH1
1Massachusetts General Hospital, Boston MA; 2Brigham and Women’s Hospital, Boston MA
(Presented by: Alejandro Sanchez)

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DECLINE IN THE USE OF RADIATION FOR STAGE I SEMINOMA: ANALYSIS OF THE NATIONAL CANCER DATABASE
Nikhil Waingankar, MD, Elizabeth Handorf, PhD, Marc Smaldone, MD, MSHP, Elizabeth Plimack, MD, Yu-Ning Wong, MD, Mohammed Haseebuddin, MD, Eric Horwitz, MD, Robert Uzzo, MD, Alexander Kutikov, MD
Fox Chase Cancer Center, Philadelphia, PA
(Presented by: Nikhil Waingankar)
Poster #192

UPTAKE OF INGUINAL LYMPH NODE DISSECTION FOR T2 PENILE CANCER: Results: FROM THE NATIONAL CANCER DATABASE

Mohammed Haseebuddin, MD, Elizabeth Handorf, PhD, Nikhil Waingankar, MD, Yu-Ning Wong, MD, Rosalia Viterbo, MD, Richard Greenberg, MD, Robert Uzzo, MD, Alexander Kutikov, MD, Marc Smaldone, MD, David Chen, MD

Fox Chase Cancer Center, Philadelphia, PA

(Presented by: Nikhil Waingankar)

Poster #193

AUA OFFICE OF RESEARCH: SUPPORT FOR UROLOGIC ONCOLOGY THROUGH FUNDING, EDUCATION, AND ADVOCACY

Carolyn Best, PhD1, Jessica Ames, MS1, Rodney Cotten MBA1 and Johannes Vieweg, MD2

1American Urological Association, Linthicum, MD; 2Department of Urology, Prostate Disease Center, University of Florida College of Medicine, Gainesville, FL

(Presented by: Carolyn Best)

Poster #194

THE IMPACT OF VARIABLE DEGREES OF SEMINOMATOUS INVOLVEMENT IN MIXED GERM CELL TUMORS ON INTRA-OPTERATIVE COMPLEXITY IN POST-CHEMOTHERAPY RETROPERITONEAL LYMPH NODE DISSECTION

Christopher Russell, BS1, Gautum Agarwal, MD2, David D. Buethe, MD2, Patrick Espiritu, MD2, Adam Luchey, MD2, Phillipe E. Spiess, MD2, Julio Powsang, MD2, Michael Poch, MD2 and Wade J. Sexton, MD2

1USF Morsani College of Medicine, Tampa, Fl; 2H. Lee Moffitt Cancer Center, Tampa, Fl

(Presented by: Christopher Russell)

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COMMON LANGUAGE AS COMPARED TO USE OF THE BOSNIAK CLASSIFICATION SYSTEM (BCS) ACCOUNTS FOR INTER-OBSERVER VARIABILITY AND UNNECESSARY RADIOGRAPHIC FOLLOW UP

Alex Baumgarten BA1, Jenna Bates, BS1, C. Peter Chang, MD2, James Oliver, MD2, James Symanowski, PhD2 and Stephen Riggs, MD1

1Division of Urology, Department of Surgery, Levine Cancer Institute, Carolinas Healthcare System, Charlotte, NC; 2Department of Radiology, Carolinas Healthcare System, Charlotte, NC

(Presented by: Jenna Bates)

Poster #196

INCREASING FRAILTY AS MEASURED BY RISK ANALYSIS INDEX PREDICTS POSTOPERATIVE COMPLICATIONS AND MORTALITY IN UROLOGY PATIENTS

Sudhir Isharwal MBBS, Jason Johanning, MD, Kendra Schmid, PhD, Roy Williams, Chad Lagrange, MD

Omaha, NE

(Presented by: Sudhir Isharwal)

Poster #197

UROLOGIC MEDICARE REIMBURSEMENT IN 2012: ANALYSIS OF CLAIMS AND PAYMENTS

Benjamin Davies, MD, Alireza Moinzadeh, MD, David Canes, MD

Lahey Clinic, Burlington, MA

(Presented by: Benjamin Davies)

Poster #198

THE ROLE OF 18F-FDG PET/CT IN STAGING PENILE SQUAMOUS CELL CARCINOMA

Sumit Isharwal, MD1, Robert Goldfarb, MD2 and Badrinath Konety, MD, MBA2

1University of Minnesota; 2University of Minnesota, Minneapolis, MN

(Presented by: Sumit Isharwal)
Poster #199
THE LANDSCAPE OF WHOLE-GENOME ALTERATIONS AND PATHOLOGIC FEATURES IN GENITOURINARY MALIGNANCIES: AN ANALYSIS OF THE CANCER GENOME ATLAS
Mark Ball, MD, Michael Gorin, MD, Phillip Pierorazio, MD, George Netto, MD, Charles Drake, MD, Hans Hammers, MD, Mohamad Allaf, MD
James Buchanan Brady Urological Institute and Department of Urology, Johns Hopkins University School of Medicine, Baltimore, MD
(Presented by: Mark Ball)

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A SINGLE INSTITUTION REVIEW OF AMYLOIDOSIS OF THE UROTHELIUM DETECTED ON HEMATURIA EVALUATION
Ariel Schulman, MD1, William Hilton, MD2, Ruben Pinkhasov, MD3 and Jonathan Coleman, MD2
1Maimonides Medical Center, Brooklyn, NY; 2Memorial Sloan Kettering Cancer Center, NY, NY; 3Maimonides Medical Center, Brooklyn, NY
(Presented by: Ariel Schulman)

Poster #201
TRENDS IN UTILIZATION, PERIOPERATIVE OUTCOMES, AND COSTS AMONG OPEN, LAPAROSCOPIC, AND ROBOTIC NEPHROURETERECTOMIES: A 10-YEAR POPULATION-BASED ANALYSIS.
Francisco Gelpi-Hammerschmidt, MD1, Christopher Allard, MD2, Benjamin Chung, MD3 and Steven Chang, MD2
1Division of Urologic Surgery, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, USA; 2Division of Urologic Surgery, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, USA.; 3Department of Urology, Stanford School of Medicine, Palo Alto, CA, USA
(Presented by: Francisco Gelpi-Hammerschmidt)
**Poster Session II — Full Abstracts**

Poster #102
**SIRNA SILENCING OF SURVIVIN ENHANCES ACTIVITY OF MITOMYCIN C IN HUMAN BLADDER RT4 XENOGRAFTS**

Minjian Cui, BS¹, Jessie L.-S. Au, PhD, PharmD¹, M. Guillaume Wientjes, PhD¹, Michael O’Donnell, MD², Kevin Loughlin, MD³ and Ze Lu, PhD¹

¹Optimum Therapeutics LLC, San Diego, CA; ²University of Iowa, Iowa City, IA; ³Brigham and Women’s Hospital, Boston, MA

(Presented by: Jessie L.-S. Au)

**Introduction:** Survivin inhibits apoptosis and enables tumor cell escape from therapy-induced senescence. High expression of survivin is associated with bladder cancer aggressiveness and recurrence. The present study evaluated if survivin expression is reduced by siRNA and if survivin silencing enhances the activity of mitomycin C (MMC) in human RT4 bladder transitional cell papilloma tumors in vitro and in vivo.

**Methods:** The effectiveness of siRNA therapy was evaluated using two newly developed pegylated cationic liposome carriers (PCat, PPCat). Both carriers used a fusogenic lipid to destabilize the endosomal membrane, and one carrier (PPCat) further contained paclitaxel to enhance the in vivo delivery and transfection of survivin siRNA (siSurvivin). In vitro antitumor activity was evaluated using short and long term cytotoxicity assays (MTT and clonogenicity). In vivo intravenous therapy was evaluated in mice bearing subcutaneous RT4 tumors.

**Results:** The nontarget–siRNA had no antitumor activity in vitro or in vivo. Treatment of cultured cells with MMC at 50% cytotoxic concentration enhanced survivin mRNA and protein levels; addition of PPCat or PCat containing siSurvivin reversed the survivin induction and enhanced the MMC activity (p<0.05). In tumor-bearing mice, single agent MMC delayed tumor growth and nearly tripled the survivin protein level in residual tumors, whereas addition of PPCat–siSurvivin, which on its own yielded a minor survivin reduction (<10%), completely reversed the MMC-induced survivin and enhanced the MMC activity (i.e., reduced tumor size and proliferation (Ki67-labeling index), increased apoptotic index, Table).

**Conclusion:** The results indicate effective in vivo survivin silencing and synergism between MMC and PPCat–siSurvivin. This combination represents a potentially useful chemo–gene therapy for bladder cancer.

<table>
<thead>
<tr>
<th>Group</th>
<th>Survivin expression at 48 hr post-treatment (3 experiments, 3 samples each)</th>
<th>Time for 50% size increase, Median (Range), days</th>
<th>Molecular endpoints (n=5/group, tumors taken on day 12 after initiation of treatments)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mRNA</td>
<td>Protein</td>
<td>Relative survivin protein level</td>
</tr>
<tr>
<td>Control</td>
<td>1.00 ± 0.10</td>
<td>1.00 ± 0.09</td>
<td>8 (8-12, n=5)</td>
</tr>
<tr>
<td>Nontarget-siRNA</td>
<td>1.08 ± 0.05</td>
<td>0.99 ± 0.25</td>
<td>12 (6-12, n=5)</td>
</tr>
<tr>
<td>siSurvivin</td>
<td>1.82 ± 0.02*</td>
<td>0.58 ± 0.10*</td>
<td>12 (6-12, n=5)</td>
</tr>
<tr>
<td>MMC</td>
<td>1.47 ±0.34</td>
<td>1.5 ± 0.08</td>
<td>37 (35-44, n=10)*</td>
</tr>
<tr>
<td>MMC + nontarget-siRNA</td>
<td>1.53 ± 0.24**</td>
<td>1.33 ± 0.09**</td>
<td>N/A</td>
</tr>
<tr>
<td>MMC + siSurvivin</td>
<td>1.13 ± 0.17***</td>
<td>0.90 ± 0.04***</td>
<td>44 (37-50, n=10)**</td>
</tr>
</tbody>
</table>

*p<0.05 vs. control or nontarget-siRNA. **p<0.05 vs. MMC or MMC+nontarget-siRNA. ***p<0.05 vs. all other groups.
Poster #103
LONG-TERM FUNCTIONAL OUTCOME AND COMPLICATIONS AFTER RADICAL CYSTECTOMY AND ORTHOTOPIC NEOBLADDER DIVERSION
Michael Maidaa, BS, Gus Miranda, Inderbir Gil, MD, Sia Daneshmand, MD, Hooman Djaladat, MD
USC Institute of Urology, Los Angeles, CA
(Presented by: Hooman Djaladat)

Introduction: To evaluate long-term clinical outcome and complications of patients with Urothelial Bladder Cancer (UBC) who underwent radical cystectomy (RC) and orthotopic neobladder (ONB) diversion with minimum of 15 years follow-up.

Methods: Using our IRB approved institutional bladder cancer database, we identified 1,964 patients who underwent RC for UBC at our institution between 1971 and 2008. 121 patients who underwent RC and ONB (Kock pouch to the urethra) with more than 15 years follow-up were subjects of this study. We reviewed the clinicopathological variables, long-term complications and outcome of this cohort. Detailed follow-up were found in 96/121 patients (79.3%). eGFR analysis was done on 32 patients with information available on BMI, pre-op Cr, and at least 2 Cr reading of 3,6,10, 15 years with 1 of the readings being at least 10 years.

Results: Of the 121 patients, 118 were male (97.5%). Mean age at cystectomy was 59.3 years with a median follow-up of 18.3 years (range 15.1 – 23). Pathologic stage at cystectomy was <=pT1 (70, 57.9%), pT2 (32, 26.4%), pT3 (14, 11.6%) and pT4 (5, 4.1%) and pN+ (11, 9.1%) with N1 (4, 3.3%) and N2 (7, 5.8%). Neoadjuvant chemo, radiation and adjuvant chemo were used in 9 (7.4%), 2 (1.7%) and 33 (27%) cases, respectively. There were 6 patients with recurrences (3 urethral, 1 pelvis, 1 distant, and 1 upper tract) at median of 9.23 years (range 1.2 – 17.2) after cystectomy. Only 1 of the patients died of the disease (at 16.3 years); 27 died of non-cancer cause (mean 18.2; 15.2–23.0), 5 died of secondary cancer (17.1; 15.4–20.0), 3 died of unknown cause (15.3; 15.1–15.4), and 85 are alive without evidence of disease (18.5; 15.1–23.0). Of the 96 patients with detailed F/U, 44 had minor complications (Clavien < 3) and 52 had major (>=3).

Conclusion: The most common complications in ONB patients with more than 15 yrs follow-up were pouch-related, with afferent limb stenosis and pouch stones contributing the most. A gradual decrease in GFR over time was seen throughout the patient population, thus making renal insufficiency a prevalent complication in long-term survivors with ONB.

<table>
<thead>
<tr>
<th>Type of Complication</th>
<th># Patients / 96 with detailed F/U</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diversions related</strong></td>
<td></td>
</tr>
<tr>
<td>Afferent Limb Stenosis</td>
<td>26 (27%)</td>
</tr>
<tr>
<td>Urinary Retention (male)</td>
<td>17/93 (18%)</td>
</tr>
<tr>
<td>Urinary Retention (female)</td>
<td>3/3 (100%)</td>
</tr>
<tr>
<td>Incisional Hernia</td>
<td>13 (14%)</td>
</tr>
<tr>
<td>Pouch Stone</td>
<td>27 (28%)</td>
</tr>
<tr>
<td><strong>Infectious</strong></td>
<td></td>
</tr>
<tr>
<td>UTI/Pyelonephritis</td>
<td>45 (47%)</td>
</tr>
<tr>
<td><strong>Renal</strong></td>
<td></td>
</tr>
<tr>
<td>GFR (% decrease) in 32 patients</td>
<td></td>
</tr>
<tr>
<td>6 years</td>
<td>15.1%</td>
</tr>
<tr>
<td>10 years</td>
<td>18.3%</td>
</tr>
<tr>
<td>15 years</td>
<td>25.1%</td>
</tr>
<tr>
<td>B12 Insufficiency</td>
<td>17 (18%)</td>
</tr>
<tr>
<td><strong>GI</strong></td>
<td></td>
</tr>
<tr>
<td>SBO</td>
<td>7 (7%)</td>
</tr>
</tbody>
</table>
Poster #104
THE ADMINISTRATION OF ANY ADDITIONAL BACILLUS CALMETTE–GUÉRIN BEYOND INDUCTION THERAPY IMPROVES OVERALL SURVIVAL IN HIGH–GRADE T1 BLADDER CANCER
Zachary Smith, MD1, Senthil Jayarajan, MD2, Matthew Sterling, MD1, Daniel Canter, MD3, Muta Issa, MD4, Ryan Dobbs, MD4, Bruce Malkowicz, MD1 and Thomas Guzzo, MD, MPH1
1University of Pennsylvania, Philadelphia, PA; 2Temple University, Philadelphia, PA; 3Atlanta VA Medical Center, Atlanta, GA; 4Emory University, Atlanta, GA
(Presented by: Zachary Smith)

Introduction: High–grade T1 (HGT1) bladder cancer (BCa) represents a clinical challenge in that the risk of disease progression must be weighed against the morbidity of early radical cystectomy. Intravesical Bacillus Calmette–Guérin (BCG) has proven the most effective treatment in preventing recurrence and progression of high–risk non–muscle–invasive BCa. The addition of BCG maintenance therapy is associated with further benefit. While a full BCG maintenance course is often difficult for patients to complete, we sought to describe the impact of any BCG administration beyond induction therapy on the survival of patients with an initial presentation of HGT1 BCa.

Methods: We queried the independently established BCa databases at the Atlanta Veterans Affairs Medical Center and the Hospital of the University of Pennsylvania to identify patients who presented with HGT1 as their initial BCa diagnosis. Demographic, clinical, and pathologic variables as well as overall survival (OS), recurrence–free survival (RFS), and progression–free survival (PFS) were examined. Categorical variables were analyzed using Fisher’s exact and Pearson’s chi–squared tests. Survival analyses were performed by Kaplan–Meier via Logrank test.

Results: A total of 224 patients were identified; 199 (88.8%) and 201 (89.7%) were male and non–African American, respectively. Mean patient age was 66.5 years. 203 (90.6%) of the patients presented with isolated HGT1 disease while 21 (9.4%) patients presented with HGT1 and concomitant carcinoma in–situ. Induction BCG was utilized in 174 (77.7%) patients, with 110 (63.2%) of these patients receiving some degree of BCG maintenance therapy. The 5–year and 10–year OS for patients who received only an induction course of BCG (58.5% and 48.7%) were poorer than those that received induction therapy plus any degree of maintenance therapy (84.8% and 74.0%) (p=0.0234). Differences in RFS and PFS were not significant between groups.

Conclusion: In our large cohort of patients with primary HGT1 BCa, administration of any additional BCG after induction therapy yielded a significant impact on OS. This study reaffirms the importance of continuing with additional BCG after completion of induction therapy.
**Poster Session II – Full Abstracts**

**Poster #105**

**LONG-TERM OUTCOMES OF HIGH RISK BLADDER CANCER SCREENING COHORT**

Nathan Starke, MD\(^1\), Ahmed Haddad, MD\(^2\), Nirmish Singla, MD\(^2\) and Yair Lotan, MD\(^2\)

\(^1\)UT Southwestern Dallas, TX; \(^2\)UTSW Dallas, TX

(Presented by: Nathan Starke)

**Introduction:** To evaluate long-term outcomes of a large cohort of patients at high risk of bladder cancer (BC) who participated in a BC screening trial.

**Methods:** Patients enrolled in a screening trial using nuclear matrix protein (NMP-22) assay between March 2006 and November 2007 at the Dallas VA hospital were included. Patients were asymptomatic and classified as high risk for BC based on age ≥50 years, ≥10 pack-years smoking history, and/or ≥15 years environmental exposure to known carcinogenic agents. Those with a history of known cancer or hematuria were excluded. We examined the association of smoking intensity, occupational exposure to chemicals, and screening NMP22 on subsequent detection of BC and survival. We evaluated the risk of other smoking related malignancies (lung and renal cell carcinoma (RCC)).

**Results:** 925 patients (883 males, 42 females) with a median age of 61 years (IQR 57–67 years) were screened with NMP22 assay at VA hospital. Median follow up was 78.4 months (IQR 48.9–84.2 months). 886 patients (95.8%) were smokers, and frequencies of pack-year history of <30, 31–60, 61–90, and >90 were 41.6, 31.5, and 15.5, and 11.4% respectively. 57 (6.1%) patients had positive initial NMP22 test, 2 (0.2%) of whom were found to have BC. Another 9 (1.0%) patients who initially tested negative for NMP22 were subsequently diagnosed with BC during 6.5 years of follow-up. All BCs detected were non-invasive (Ta); 7 were low grade and 4 high grade. 358 patients (38.7%) had either microscopic or gross hematuria, including all 11 BC patients (6 microscopic and 5 gross hematuria). RCC and lung cancer were diagnosed in 11 (1.2%) and 24 (2.6%) patients, respectively. No patients died from BC, while 2 (0.2%) patients died from RCC and 12 (1.3%) from lung cancer. 120 (13%) patients died of other causes. Occupational exposure to carcinogenic chemicals did not correlate with cancer diagnosis or survival. Factors associated with worse overall survival on multivariate analysis included a diagnosis of lung cancer (HR 5.03, p<0.0001), >60 pack year history of smoking (HR 1.97, p=0.005), and microscopic or gross hematuria (HR 1.53, p<0.002).

**Conclusion:** At 6.5 years of follow-up, no patients in this high risk cohort developed muscle invasive BC. Heavy smoking (>60 pack years) and hematuria are significant predictors of mortality in this group. Other cause mortality is an important consideration in patients undergoing BC screening.
Poster Session II – Full Abstracts

Poster #106
POST OPERATIVE PAIN MANAGEMENT AFTER RADICAL CYSTECTOMY: COMPARING TRADITIONAL AND ERAS PROTOCOLS AT USC
Weichen Xu BA1, Hamed Ahmadi, MD2, Jie Cai, MS2, Gus Miranda, BS2, Anne Schuckman, MD2, Si amak Daneshmand, MD2 and Hooman Djaladat, MD3
1Keck School of Medicine of USC; 2USC Institute of Urology; 3USC Institute of Urology, Los Angeles, CA
(Presented by: Hooman Djaladat)

Introduction: Opioids have traditionally been the mainstay of pain management after radical cystectomy (RC) for bladder cancer. Side effects of opioids include mental status changes, respiratory depression and ileus, which is the leading cause of prolonged hospital stay. The efficacy of opioid sparing analgesics after cystectomy, as a part of enhanced recovery after surgery (ERAS) protocol, has yet to be proven. We compare the amount of opioid use, pain score and postoperative ileus for consecutive ERAS and traditional patients after RC.

Methods: Using our IRB approved bladder cancer database, we retrospectively reviewed patients who underwent open RC using either traditional (Feb. 2010−Sept. 2013) or ERAS protocol (May 2012−Dec. 2013) for pain management. Patients with a history of opioid use prior to surgery were excluded. Traditional protocol primarily used epidural and/or IV opioid analgesics including patient controlled analgesia, whereas ERAS protocol primarily used acetaminophen, ketorolac and local anesthetics through sub−fascial catheters with opioid analgesics reserved for breakthrough pain. 205 patients were ultimately enrolled (81: traditional, 124: ERAS). Opioid use and pain scores were analyzed and compared up to postoperative day 4. All routes of opioid use were recorded and converted to morphine equivalent dosage for comparison, and postoperative pain was recorded using VAS scale. Postoperative records were reviewed for incidence of ileus.

Results: Demographic data and results are presented in the following table.

Conclusion: Patients on ERAS protocol used significantly less opioid analgesics, which may have potentially contributed to decreased postoperative ileus and shorter lengths of hospital stay. Multi−institutional studies would be helpful to externally validate these results.

<table>
<thead>
<tr>
<th></th>
<th>ERAS</th>
<th>Traditional</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of patients</td>
<td>124</td>
<td>81</td>
<td>0.6</td>
</tr>
<tr>
<td>Median age (years)</td>
<td>71</td>
<td>70</td>
<td>1</td>
</tr>
<tr>
<td>Female sex (%)</td>
<td>27 (21.8)</td>
<td>18 (22.2)</td>
<td>1</td>
</tr>
<tr>
<td>Charison comorbidity index (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>56 (45.2)</td>
<td>39 (48.1)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27 (21.8)</td>
<td>19 (23.5)</td>
<td></td>
</tr>
<tr>
<td>≥2</td>
<td>41 (33)</td>
<td>23 (28.4)</td>
<td>0.7</td>
</tr>
<tr>
<td>Pathologic organ confined cancer (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>79 (63.7)</td>
<td>52 (64.2)</td>
<td>1</td>
<td></td>
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<td>Orthotopic neobladders (%)</td>
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<td>Median operative time (min)</td>
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<td>350</td>
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<td>Median estimated blood loss (mL)</td>
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<td>Length of hospital stay (day)</td>
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<td>4</td>
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<td>Mean morphine equivalent use (mg/day)</td>
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<td>4.9</td>
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<td>Mean pain VAS score/ day</td>
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<td>3.1</td>
<td>1.14</td>
<td>&lt;0.0001</td>
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<td>Postoperative ileus (%)</td>
<td>9 (7.3)</td>
<td>18 (22.2)</td>
<td>0.0028</td>
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THE ASSOCIATION OF ABO BLOOD TYPE WITH DISEASE RECURRENCE AND MORTALITY AMONG PATIENTS UNDERGOING RADICAL CYSTECTOMY

Boris Gershman, MD, Matthew Tollefson, MD, Igor Frank, MD, Daniel Moreira, MD, Prabin Thapa, MS, Robert Tarrell, MS, R. Houston Thompson, MD, Stephen Boorjian, MD
Mayo Clinic (Rochester, MN)
(Presented by: Boris Gershman)

Introduction: While ABO blood type has been associated with increased risks of disease recurrence and progression for patients with non–muscle invasive bladder cancer, the association of blood type with survival for patients undergoing radical cystectomy (RC) remains understudied. Herein, we evaluated clinicopathologic outcomes and mortality among patients treated with RC, stratified by ABO blood type.

Methods: We identified 2086 consecutive patients who underwent radical cystectomy from 1980–2008 at Mayo Clinic. Postoperative recurrence–free (RFS) and cancer–specific (CSS) survival for patients with O versus non–O blood type were estimated using the Kaplan Meier method and compared with the log–rank test. Cox proportional hazards regression models were used to evaluate the association of ABO blood type with outcomes.

Results: A total of 912 (44%), 882 (42%), 216 (10%), and 76 (4%) patients had blood type O, A, B, and AB, respectively. Median follow–up among survivors was 11.7 years (IQR 7.1, 15.4). Non–O blood type was associated with significantly worse 5–year RFS (65% vs 69%, p=0.03) as well as CSS (64% vs 70%, p=0.02), which was especially pronounced among patients with ≤ pT2 tumors at RC (5–year RFS: 74% vs 79%, p=0.003; 5–year CSS: 76% vs 82%, p=0.005). Moreover, on multivariate analysis (Table), blood type A remained independently associated with an increased risk of cancer–specific mortality (HR 1.24; p=0.007).

Conclusion: Non–O blood type, particularly blood type A, is associated with a significantly increased risk of death from bladder cancer among patients undergoing RC. As such, the utility of adjuvant therapy and/or more frequent postoperative surveillance in this cohort warrants further study.

| Table. Multivariate analyses of clinicopathologic variables associated with disease recurrence and mortality among patients undergoing RC. |
|-------------------------------------------------|----------------|----------------|----------------|----------------|
| Patient age at RC (years)                       | Tumor Recurrence HR | P-value | Cancer-Specific Mortality HR | P-value |
| Decade of surgery (ref=1980–1990)               |                 |              |                     |              |
| 1990–2000                                       | 0.95            | 0.70         | 0.86               | 0.15         |
| 2000–2008                                       | 1.06            | 0.57         | 0.93               | 0.46         |
| Gender (ref=Female)                             | 1.15            | 0.18         | 1.16               | 0.14         |
| ECOG performance status                         | 1.17            | 0.02         | 1.38               | <0.0001      |
| BMI (kg/m2)                                     | 1.00            | 0.82         | 1.00               | 0.95         |
| # lymph nodes removed                           | 0.98            | <0.0001      | 0.98               | <0.0001      |
| pT Stage (ref ≤ pT1)                            |                 |              |                     |              |
| pT2                                             | 1.93            | <0.0001      | 1.95               | <0.0001      |
| pT3/4                                           | 3.13            | <0.0001      | 3.73               | <0.0001      |
| pN+                                             | 1.54            | 0.0001       | 1.64               | <0.0001      |
| Positive Surgical Margin                       | 1.10            | 0.68         | 1.15               | 0.48         |
| Receipt of perioperative chemotherapy (ref=no)  | 1.21            | 0.10         | 1.28               | 0.02         |
| Blood Type (ref=O)                              |                 |              |                     |              |
| A                                               | 1.17            | 0.06         | 1.24               | 0.007        |
| B                                               | 1.03            | 0.83         | 1.00               | 0.99         |
| AB                                              | 1.10            | 0.63         | 1.05               | 0.81         |
Poster #108

BLADDER CANCER POST–RECURRENT OUTCOMES FOLLOWING CYSTECTOMY BASED ON SITE OF METASTASIS

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1University of Southern California, Los Angeles, CA; 2Stanford University, Stanford, CA

(Presented by: Siamak Daneshmand)

Introduction: Disease recurrence following cystectomy for bladder cancer is not uncommon and fatal in over 95% of patients. Recent studies have characterized outcomes following post–cystectomy recurrence. However, there are no substantial series evaluating differential outcomes based on site of distant recurrence. This study identifies prognosticators for bladder cancer post–recurrence survival (PRS) based on sites of distant metastasis.

Methods: The population of 2,029 bladder cancer patients treated at our institution during 1971–2005 was reviewed to identify those who recurred following radical cystectomy with curative intent. Minimum 2-year post–recurrence follow–up was required if patient was alive. Patients with urethral or upper tract primaries and distant metastasis at diagnosis were excluded. Associations were determined by categorical and survival analyses.

Results: 430 (21% of total) patients met the study criteria. 80 (19%) patients had only local soft tissue recurrence; median time to recurrence (TTR) and PRS were 12.5 and 8 mo, respectively. 86 (20%), 134 (31%), 16 (4%) and 177 (41%) patients presented with metastases to liver, bone, brain and lung, respectively; of these, 36, 79, 8 and 55 patients metastasized exclusively to these sites. Median TTRs for these sites were 13.8, 11.7, 17.9 and 12.9 mo. Compared to local recurrence–only, median PRS was shorter for patients with liver (3.4 mo, p<0.001) and bone (4.9 mo, p=0.001) metastases, but was not significantly different to those with brain or lung metastases. Advanced stage was associated with shorter PRS for patients with liver metastasis (p=0.01). Tumor upstaging was associated with poorer PRS for patients with liver metastasis (p=0.012). Node density >10% was associated with poor PRS for patients with liver and lung metastases (both, p<0.001). Patients with lung metastasis also had poorer PRS if they recurred within one year post–cystectomy (p=0.002) or presented with additional sites of metastases (p<0.001). Salvage chemotherapy improved PRS for patients with liver, bone, lung (all, p<0.001) and brain (p=0.012) metastases.

Conclusion: PRS may vary depending on site of metastasis, although overall prognosis following distant recurrence of bladder cancer post–cystectomy is poor. Most patients with distant recurrence present with multiple sites of metastases. Salvage chemotherapy may improve post–recurrence outcomes, although further studies are needed to exclude selection bias.

FUNDING: None
Poster #109

TISSUE IS THE ISSUE: THE IMPACT AND BENEFIT OF PATHOLOGICAL REVIEW FOR UROTHELIAL CARCINOMA OF THE BLADDER AT A TERTIARY CARE CANCER CENTER

Adam Luchey, MD, Neal Manimala, MD, Shohreh Dickinson, MD, Jasreman Dhillon, MD, Gautum Agarwal, MD, Scott Gilbert, MD, Philippe Spiess, MD, Wade Sexton, MD, Julio Pow-Sang, MD, Michael Poch, MD

H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL
(Presented by: Adam Luchey)

Introduction: Treatment for Urothelial Carcinoma (UC) is driven by accurate pathological diagnosis of grade and stage of a transurethral bladder biopsy. Currently there is a paucity of data supporting the benefit of having biopsy tissue re-examined by dedicated GU pathologists. Our objective was to assess the extent of change from a pathological re-review of bladder biopsies performed and read at community hospitals and the impact it has on a patient’s treatment for UC.

Methods: All patients with UC that were referred to our institution from 2009–2013 were eligible for this study. There were 1,386 cases that were reevaluated by GU dedicated pathologists, of which 1,191 had transurethral biopsy of the bladder and/or prostatic urethra. Major treatment changes were defined as altering recommendations for cystectomy, systemic chemotherapy regimen, or primary cancer diagnosis. These differences were secondary to understaging/overstaging or variant histology. Minor treatment changes were considered to be reclassifications in grade or stage that would potentially alter intra-vesical instillation regimens.

Results: There were 322/1191 patients (27.0%) with a pathological change on review: grade 62/1191 (5.2%), stage 115/1191(9.7%), presence or absence of muscle in the specimen 29/1191 (2.4%) as well as the presence or absence of CIS 34/1191 (2.9%). Outside pathology did not address on the presence or absence of LVI in 620/759 (81.7%) of invasive cases (>pT1), of which, 35/620 (5.6%) were found to have LVI on review. Variant histology was detected in 200/1191(16.8%) with 117/200 (68.5%) resulting in reclassification by our pathologists to a distinct diagnosis. Only 2/33 (6%) micropapillary, 8/17 (47%) sarcomatoid and 0/3 plasmacytoid histological variants were accurately identified at referring hospitals.
Any recommended treatment changes accounted for 187/1191 (15.7%) of cases with 141/1191 (11.8%) imparting major changes. There were 82/1191 (6.8%) changes in recommendation for a radical cystectomy, 21/1191 (1.8%) for change in chemotherapy regimen, and 38/1191 (3.2%) had a complete change in primary tumor type.

Conclusion: The large number of patients with major changes in treatment demonstrates the importance of having patients with a diagnosis of UC to have their histology reviewed by high volume GU dedicated pathologists, as the effect on treatment and diagnosis is undeniable.
ASSESSING EARLY TREATMENT RESPONSE USING 18F−FDG−PET/CT AT 4 VERSUS 8 WEEKS OF THERAPY WITH CABOZANTINIB IN PATIENTS WITH ADVANCED UROTHELIAL CARCINOMA

Dereck Paul, MS1, M. Liza Lindenberg, MD2, Karen Kurdziel, MD2, Seth Steinberg, PhD3, Howard Parnes, MD4 and Andrea Apolo, MD1

1Genitourinary Malignancies Branch, Center for Cancer Research (CCR), National Cancer Institute (NCI), National Institutes of Health (NIH), Bethesda, MD; 2Molecular Imaging Program, CCR, NCI, NIH, Bethesda, MD; 3Biostatistics and Data Management Section, CCR, NCI, NIH, Bethesda, MD; 4Division of Cancer Prevention, NCI, Rockville, MD

(Presented by: Dereck Paul)

Introduction: Studies indicate that Fluorodeoxyglucose−positron emission tomography/computed tomography (FDG−PET/CT) detects metastases in patients (pts) with urothelial carcinoma with high sensitivity and specificity and may provide additional diagnostic information to CT/MRI alone. In this study we investigate the value of FDG−PET/CT in evaluating response to therapy at an early time point, 4 weeks (wks) versus the conventional 8 wks of therapy.

Methods: Pts with advanced urothelial carcinoma enrolled in a single arm phase II clinical trial of cabozantinib underwent FDG−PET/CT at baseline, 4 and 8 wks of therapy. Association between 4and 8 wk response classifications compared to baseline was assessed using Positron Emission Tomography Response Criteria in Solid Tumors (PERCIST) (single lesion and multiple lesion criteria) in a patient−based and lesion−based analysis. PERCIST classifications of FDG−PET/CT at 8 wks were compared with conventional CT of the chest, abdomen and pelvis classified by Response Evaluation Criteria in Solid Tumors (RECIST) 1.1 at 8 wks. Percentage concordance and the Jonckheere−Terpstra test for trend are reported.

Results: In total, 151 lesions in 35 pts were analyzed at baseline. In the patient−based analysis, there was a significant association between the PERCIST response at 4 and 8 wk with a 77% concordance rate (95% CI, 0.6−0.9), p<0.0001. The 8 wk PERCIST and 8 wk RECIST classifications were not significantly associated. Response classification using single and multiple lesion PERCIST criteria were closely associated (86% and 89% concordance, and p<0.0001, at both 4 and 8 weeks respectively). In the lesion−based analysis, response at 4 wks was significantly associated with response at 8 wks in bone (p=0.0005), lung (p=0.012), lymph node (p<0.0001) and soft tissue lesions (p=0.006), but not in liver lesions (likely due to high liver uptake of the normal FDG distribution.)

Conclusion: An early FDG−PET/CT at 4 wks can predict the response to therapy seen at 8 wks. This indicates that treatment response can potentially be determined after 4 wks of cabozantinib therapy in pts with urothelial carcinoma, with the exception of liver lesions. However, response classifications by FDG−PET/CT are not in agreement with the response classifications by RECIST criteria; although the methods may be complementary, they are not interchangeable. Further studies are required to validate these findings.

Funding: Intramural NIH research
Poster #111
QUALITY OF LIFE AND SEXUAL HEALTH FUNCTION IN BLADDER CANCER SURGERY PATIENTS WHO UNDERWENT CYSTECTOMY
Rujuta Umarji, MSW¹, Cheryl Lee, MD¹, Heather Goltz, PhD, LMSW, MEd², David Latini, PhD, PLP, LPC–S³ and Daniela Wittman, PhD, LMSW¹
¹University of Michigan, Ann Arbor, MI; ²University of Houston–Downtown and Baylor College of Medicine, Houston, TX; ³Baylor College of Medicine, Houston, TX
(Presented by: Rujuta Umarji)

Introduction: Bladder cancer (Bic) currently affects 563,640 people in the United States. Patients’ decline in sexual function after surgical treatment for Bic has been documented. Studies with female patients have shown mixed results, varying by surgical techniques such as nerve–sparing. The purpose of this study is to assess the impact of cystectomy on sexual function in a large cohort of patients with muscle invasive Bic.

Methods: Sexual function of Bic patients who underwent cystectomy at a Midwestern Cancer Center from 2008 to present (n=414) was assessed pre–surgery and 6 months post–surgery using the Bladder Cancer Index, which measures several disease–specific quality of life domains. Data on demographics and nerve–sparing surgery were also collected.

Results: Subgroup analyses show that, while sexual function at baseline was similar for males and females, males (n=320) experienced significant decrease in sexual function between pre–surgery and post–surgery time points (mean difference=11.58; p<0.01) while women (n=94) experienced slight, non–significant decrease on average. Age was significantly and negatively correlated with sexual function at baseline for males (r=−0.44; p<0.01); females showed a small non–significant negative correlation. We expect that controlling for demographic and clinical variables may reveal a positive relationship between nerve–sparing surgeries and overall sexual function; however, gender–based differences are likely to remain.

Conclusion: While both men and women should be counselled about sexual function recovery after cystectomy, loss and grief may be greater for men and necessary to address in counselling because of significant functional decline. For women, whose sexual function remained unchanged, interest in sexual recovery, not loss and grief may be more appropriately addressed. In contributing to the limited literature on female sexual function in Bic research, we hope to increase support for targeted sexual health interventions in clinical care for Bic patients.
**Poster #112**

**PERIOPERATIVE BLOOD TRANSFUSION INCREASES THE RISK OF INFECTION COMPLICATIONS AFTER RADICAL CYSTECTOMY**

Jen-Jane Liu, MD, Bryan Maxwell, MD, MPH, Max Kates, MD, Hiten Patel, MD, Gregory Joice, MD, Nilay Gandhi, MD and Trinity Bivalacqua, MD, PhD

1James Buchanan Brady Urologic Institute at Johns Hopkins University, Baltimore, MD; 2Department of Anesthesiology & Critical Care Medicine Johns Hopkins University, Baltimore, MD

(Presented by: Jen-Jane Liu)

**Introduction:** Infectious complications are the most common source of morbidity after radical cystectomy (RC), and a growing body of evidence suggests that perioperative blood transfusions (PBT) may have an immunosuppressive effect. While it has been recognized that PBTs may confer an increased risk of adverse oncologic outcomes after RC, no large analyses have assessed whether PBTs increase the risk of perioperative infection.

**Methods:** We used the Nationwide Inpatient Sample (1998 to 2011) to study the use of PBT during RC for urothelial carcinoma and identify infectious complications, including superficial or deep wound infection, urinary tract infection, postoperative pneumonia, and sepsis. We examined the association between PBT and infectious complications and performed a multivariate analysis to control for the effect of age, year of surgery, obesity, chronic kidney disease, Elixhauser comorbidity score, and type of urinary diversion.

**Results:** We reviewed records reflective of an estimated 126,454 RCs performed nationwide during the study period. Of these, 34,203 (27.0%) received a PBT. The use of PBT increased over the study period, from 18.4% in 1998 to 31.6% in 2011 (p for trend <0.0001, Figure 1). Patients who received a PBT had an increased risk of perioperative infectious complications [36.7% vs 27.7%, unadjusted OR (95% CI) = 1.51 (1.43–1.60), p<0.0001]. After adjusting for potential confounders, PBT remained an independent predictor of infectious complications [adjusted OR (95% CI) = 1.46 (1.38–1.55), p<0.0001].

**Conclusion:** This analysis provides strong observational evidence that PBTs are associated with an increased risk of perioperative infectious complications, which may be due to transfusion-related immunomodulation. Avoidance of these complications is additional cause to aggressively pursue blood conservation strategies and use defined transfusion thresholds. Further analysis are needed to explore whether additional interventions (e.g. expanded perioperative antibiotic prophylaxis) are effective in reducing the incidence and severity of perioperative infectious complications in patients who experience significant bleeding and require a transfusion despite measures to avoid them.
Introduction: Perioperative blood transfusion (PBT) in the setting of extirpative surgery for solid organ malignancies has been associated with adverse outcomes. The primary objective of this study was to determine the associations between PBT and patient clinicopathologic characteristics in a cohort of patients undergoing radical cystectomy (RC) for urothelial carcinoma of the bladder (UCB). Our secondary objective was to determine the effect of PBT on survival.

Methods: We performed an IRB approved, retrospective review of patients who underwent RC for UCB between 2001−2013. Patients with histological variants of UCB were included; non−urothelial carcinomas were excluded. Multiple variables were analyzed including: age, sex, BMI, stage of chronic kidney disease (CKD), operative time, PBT, tumor stage, nodal status, margin status, ASA score, length of stay, neoadjuvant chemotherapy, gender, and history of pelvic radiation.

Results: 728 patients were identified; the median age of all patients was 70 years (IQR 63−77), and median PBT was 1 (IQR 0−2). There were 352 patients (48%) who received a blood transfusion. On univariate analysis, PBT was associated with increased age (72 vs. 69 years, p <0.01), decreased renal function (CKD stage 4 and 5 had a 77% rate of PBT, 64% for CKD stage 3, 41% for CKD stage 2, p <0.01), history of radiation (58.6% vs. 49.1% for no radiation, p<0.01), pathologic stage >=T2 (57% vs. 46% for <T2, p<0.01), receipt of NAC (65% vs. 45% without NAC, p<0.01) and female gender (70% vs. 46% for males, p<0.01). BMI and operative time were not associated with PBT. On univariate analysis, PBT was associated with a hazard ratio (HR) of 1.7 for death due to any cause (95% CI: 1.3−2.1), however on multivariate analysis PBT had no effect on overall survival. On multivariate analysis, PBT had a HR of 1.33 for disease recurrence (95% CI: 1.04−1.7).

Conclusion: The receipt of a perioperative blood transfusion during radical cystectomy for urothelial carcinoma of the bladder is more common in females, older patients, as well as those with higher stage disease and a history of pelvic radiation. Blood transfusion is also an independent predictor of disease recurrence.
Poster #114
VALIDATION OF THE MODIFIED FRAILTY INDEX TO PREDICT ADVERSE OUTCOMES AFTER CYSTECTOMY
Max Kates, MD, Hiten Patel, MD, Gregory Joice, MD, Jeffrey Tosoian, MD, MPH, Nikolai Sopko, MD, PhD, Jen−Jane Liu, MD, Phillip Pierorazio, MD, Trinity Bivalacqua, MD,PhD
James Buchanan Brady Urological Institute, The Johns Hopkins Medical Institutions, Baltimore, MD
(Presented by: Max Kates)

Introduction: Frailty has been identified as a marker of physiologic reserve, and a more accurate predictor of adverse postoperative outcomes compared with age. While many definitions of frailty exist, the “modified frailty index” (mFI) has recently been developed to predict adverse outcomes in the lung cancer population undergoing lobectomy. Our goal was to validate this clinical rule among patients undergoing cystectomy.

Methods: Patients undergoing cystectomy were identified from the National Surgical Quality Improvement Program (NSQIP) participant use files (2006−2011). As in previous studies, The mFI was defined using 11 variables based on mapping the Canadian Study of Health and Aging Frailty Index to NSQIP comorbidities and activities of daily living (ADLs). Each variables received 1 point, and the sum was divided by 11 to yield a fraction between 0 and 1. Statistical tests of comparison and logistic regression analyses were performed where appropriate.

Results: Of the 1302 cystectomy patients identified, 30% had mFI of 0, 40% had mFI of 0.09, 21% had mFI of 0.18, and 9% had mFI ≥0.27. Overall, 56% of patients experienced a Clavien complication. Patients with mFI ≥0.27 were older (72 vs 64 yrs) and more likely to be smokers (54%) compared with mFI of 0 (30%, p<0.01). Mean operative times (342−349 minutes) were similar across mFI indices. Reoperation (5% vs 8.5%) and readmission (20.5% vs 25%) were lower when mFI =0 compared with mFI≥0.27 (P<0.01). Clavien 4 and 5 complications occurred in 9.1% (36/396), 10.1% (53/526), 12.9% (35/270) and 13.6% (15/110) among patients with an mFI of 0, 0.09, 0.18, and ≥0.27, respectively (p=0.05). Similarly, the overall mortality rate increased from 2.5% in the lowest frailty index group to 5.4% in the highest.

Conclusion: Among patients undergoing cystectomy, the modified frailty index can identify those patients at greater risk for severe complications, readmissions, and mortality. Given that bladder cancer is increasing in prevalence particularly among the elderly, pre−operative risk stratification is crucial to inform decision−making.
OUTCOMES FOR A MODERN CYSTECTOMY ENHANCED RECOVERY PATHWAY
Janet Baack Kukreja, MD, Maureen Kiernan RN, NP, Bethany Schempp, MS, RN, WOCN, Adriana Hontar PA, Ahmed Ghazi, MD, Hani Radhid, MD, Guan Wu, MD, PhD, Edward Messing, MD
University of Rochester, Rochester, NY
(Presented by: Janet Baack Kukreja)

Introduction: Patients undergoing cystectomy have a prolonged length of stay (LOS) postoperatively. Preoperative, intraoperative, and postoperative care advances have demonstrated a decrease in length of stay through the implementation of enhanced recovery pathways. The Cystectomy Enhanced Recovery Pathway (CERP) implements a series of evidence based interventions and strategies that decrease LOS without compromising patient outcomes. The CERP presented here incorporates all of the modern elements (preoperative education, expectation setting, pre-habilitation, nutrition evaluation, carbohydrate loading, venous thrombosis prophylaxis, maintenance of normothermia, local anesthesia, no naso-gastric tubes, no bowel prep, immediate feeding, and avoidance of opioids), this program is designed for patient discharge between 3 to 5 days after cystectomy. The primary aim of this study was to reduce LOS using a modern CERP without increasing complications or readmissions.

Methods: A quasi-experimental study was conducted, there was no reason other than time the patients were managed with CERP or without. From June 2011 to July 2014, 165 continuous patients underwent robot assisted laparoscopic or open cystectomy (49 CERP and 116 non-CERP). CERP was implemented in July 2013. After implementation patients were followed prospectively for 30 days and previous patients’ data was abstracted retrospectively, ending follow up at 30 days. LOS was calculated as a continuous and a categorical variable where LOS ≤5 days was analyzed between the two groups. There were no exclusions criteria and all patients were included in all calculations.

Results: Non-CERP average age was 68.8 and for CERP was 72.0. Average LOS for CERP was 7 days, and 12 days for non-CERP (p=0.01 (95% Confidence Interval 1.13−9.37). For CERP patients, the median LOS was 5 days, the first quartile and third quartile (Q1–Q3) of 4 to 7.25, respectively. The median LOS for non-CERP was and 8 days (6, 14). There were 25 patients in the CERP group with a LOS ≤5 days, in the non-CERP group this was 12 (p=<0.001). Readmissions (for any reason) were 27% in the non-CERP group and 35% in the CERP group (p=0.30). Cardiac events were recorded in 0.9% of the non-CERP group and none of the CERP group (p=0.30). Sepsis (from any cause) was diagnosed in 33% of non-CERP and 28% of CERP patients (p=0.20).

Conclusion: The modern CERP is a novel way to reduce LOS with no increase in readmissions or complications.
Poster Session II – Full Abstracts

Poster #116
SIMPLIFIED FRAILTY INDEX PREDICTS ADVERSE OUTCOMES IN PATIENTS UNDERGOING RADICAL CYSTECTOMY BUT DOES NOT PREDICT MORTALITY
Danny Lascano BA, Jamie S. Pak BA, G. Joel DeCastro, MD, MPH, Mitchell C. Benson, MD, James M. McKiernan, MD
Columbia University, College of Physicians and Surgeons, NY, NY
(Presented by: Danny Lascano)

Introduction: Frailty is a very difficult attribute to measure but discerned when seeing a patient and determining surgical candidacy. It is an established predictor for adverse health outcomes and very important to take into account in our elderly population. We hypothesize that a frailty index can predict adverse outcomes after surgery.

Objectives: We analyzed data from the American College of Surgeons National Surgical Quality Improvement Program (ACS–NSQIP) and applied a simplified frailty index to assess whether it predicts adverse post-surgical outcomes.

Methods: The ACS–NSQIP Participant Utilization File was accessed for the years 2005–2012 for inpatient radical cystectomy patients (2065 total). Using the Canadian Study of Health and Aging Frailty Index (FI), eleven variables were matched to NSQIP to create a modified frailty index (mFI): diabetes mellitus, functional status, CHF, MI, prior cardiac surgery, hypertension, peripheral vascular disease, impaired sensorium, TIA or CVA with neurological sequela. Four variables specific to cancer that were also included were: chemotherapy or radiation, weight loss, renal failure, and metastasis. Outcomes assessed included 30-day mortality, surgical site infection (SSI), MI, DVT/PE, Clavian IV complications, possible never events (UTI, surgical site infections, DVT/PE), length of stay (LOS), and all combined adverse events. Chi-square was used for comparing categorical variables, Student–T test for continuous variables, and logistic regression for comparing different clinical tests.

Results: An increased ratio of the mFI was associated with increased adverse outcomes of any type, Clavian IV complications, and number of SSI (p = 0.015, 0.029, 0.022, respectively). LOS was increased in those with a mFI greater than 0 (10.3 vs 9.2, p = 0.012). The mFI was not significant for mortality, PE and DVT, or never events. On multivariate analysis, mFI only predicted MI better than existing methodologies including the work relative value unit, Charlson Comorbidity Index Score, American Society of Anesthesiologist (ASA) score, and functional status (odds ratio 1.809, p= 0.044).

Conclusion: Using a large national database, a modified frailty index was shown to correlate with post-cystectomy 30-day morbidity and length of stay but not mortality. This simple tool may be useful for surgical planning and risk assessment for the high-risk elderly population prone to bladder cancer.
**Poster #117**

**MANAGEMENT OF UNRESECTABLE BLADDER CANCER AT TIME OF PLANNED CYSTECTOMY**

Kashyap Shatagopam, BS, Hristos Kaimakliotis, MD, Jose Pedrosa, MD, Paul Gellhaus, MD, Michael Koch, MD

Indiana University School of Medicine, Department of Urology, Indianapolis, Indiana

(Presented by: Kashyap Shatagopam)

**Introduction:** The surgical management of unresectable bladder cancer diagnosed at time of cystectomy is a controversial subject, the options of which include aborting all interventions, performing a cystectomy and urinary diversion while accepting a likely positive margin, or performing a urinary diversion while leaving the bladder in-situ. We sought to determine if extirpative cystectomy confers better outcomes in these patients.

**Methods:** A retrospective cohort analysis of our institutional bladder cancer database was conducted on all patients deemed to be unresectable at time of cystectomy. Analysis was focused on clinicopathologic outcomes, post-operative complications, and ability to undergo perioperative chemotherapy in a population of patients with high-risk features. Chi-squared test and ANOVA were used for categorical and continuous variable analysis. Cancer-specific survival was analyzed using Kaplan-Meier methodology.

**Results:** A total of 89 patients met inclusion criteria. Fifty-five (62%) patients underwent cystectomy, 25 (28%) underwent urinary diversion only, and 9 (10%) had an aborted procedure without interventions. Peri-operative complications (Clavien 3–5) occurred in 33% of cystectomy patients, compared to 11% in those not undergoing cystectomy (p=0.07). Fifteen (17%) patients received pre-operative chemotherapy (12 cystectomy, 3 no cystectomy). Twenty-one (24%) patients received post-operative chemotherapy (12 cystectomy, 9 no cystectomy). Patients who underwent cystectomy had lower overall long-term pain (greater than 30 days) compared to those who did not (67% vs. 92%, p=0.02). Patients who underwent cystectomy had a longer median survival compared to those who did not (7.3 months vs. 3.5 months), but there was no difference in overall survival amongst the two cohorts (p=0.41). The 30-day mortality following surgery was better for patients who underwent cystectomy (p=0.009).

**Conclusion:** Despite a decreased risk of 30-day mortality and a longer median survival, extirpative surgery for unresectable bladder cancer at time of cystectomy did not demonstrate a significant improvement in cancer-specific survival.

Financial Funding: none
Introduction: Bladder cancer remains the most expensive malignancy to treat from diagnosis to death without any new therapeutic advances in over two decades. To address this need, we have applied a technique of employing monoclonal antibodies (mAbs) conjugated with photo-activatable compounds (IRDye 700Dx, a phthalocyanine dye) which are activated by near-infrared light (NIR). When incubated with the conjugate, exposure to NIR destroys only targeted cells. We explored photoimmunotherapy (PIT) in a panel of bladder cell lines. The purpose of this study was to study the efficacy and mechanism of action of PIT using the anti-epidermal growth factor receptor (EGFR) panitumumab (Pan)–IR700 immunoconjugate as a selective therapeutic strategy for bladder cancer.

Methods: Using flow cytometry, the surface expression of EGFR was profiled in several bladder cancer cell lines. The cytotoxicity of Pan–IR700 was analyzed using LIVE/DEAD and Trypan Blue exclusion assays and IC50 was measured using the MTS assay. The type of cell death was examined by fluorimetric caspase assay, Annexin V–PI staining, and transmission electron microscopy (TEM).

Results: Pan–IR700 rapidly killed UMUC–5 cells (high EGFR expressions) with an IC50 of 4 nM at 4 J/cm2 NIR. In TCCSUP cells (low surface EGFR), the same IC50 of Pan–IR700 could be achieved at 64 J/cm2 of NIR. No significant cytotoxicity was observed in the presence of IR700 or NIR alone, or in cell lines without any EGFR expression. Absence of any caspases and presence of most cells in the late apoptosis/necrosis quadrant of Annexin V–PI staining suggested that PIT kills cells by necrosis. In TEM, these cells showed classic features of necrotic cell death. Further experiments are in progress to evaluate possible causes of necrosis including generation of reactive oxygen species/singlet oxygen.

Conclusion: PIT is a new potential targeted treatment for bladder cancer. Our data demonstrate that Pan–IR700–induced PIT selectively and efficiently kills EGFR–expressing bladder cancer cells in vitro and therefore warrants further preclinical therapeutic studies in in vivo bladder cancer models. The effect of other conjugates such as Trastuzumab (Tra)–IR700 against Her2, anti–FGFR3–IR700 and anti–MET–IR700, alone or in combination, on bladder cancer cell lines is currently under investigation.

Funding – NIH Intramural grant
RESIDENT INVOLVEMENT IN ENDOSCOPIC BLADDER CANCER SURGERY IS ASSOCIATED WITH INADEQUATE PATHOLOGY SPECIMENS AND PROLONGED TIME TO CYSTECTOMY

Christopher Allard, MD1, Derek Bos, MD2, Shawn Dason, MD2, Vladimir Ruzhynsky, MD2, Anil Kapoor, MD, FRCSC2 and Bobby Shayegan, MD, FRCSC2

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(Presented by: Christopher Allard)

Introduction: Transurethral resection of bladder tumor (TURBT) specimens which lack detrusor muscle are associated with clinical upstaging and the need for additional procedures which may delay curative treatments. We evaluated whether resident involvement in TURBTs is associated with adequacy of pathology specimens and time to cystectomy at a single academic centre in Ontario, Canada.

Methods: We identified all TURBTs performed at St. Joseph’s Healthcare Hamilton from November 2011 to June 2014. Charts were reviewed to determine baseline characteristics, involvement of residents during TURBT and pathologic findings including presence of detrusor muscle. Among patients who underwent cystectomy, we assessed the time to cystectomy from first high-risk TURBT (high grade [HG], >T1, or CIS), excluding patients with subsequent low-risk TURBTs, BCG, or neoadjuvant chemotherapy. Associations between resident involvement with pathologic outcomes and time to cystectomy were assessed with Chi-square and log rank tests, respectively.

Results: A total 664 TURBTs were performed on 471 patients by 7 attending urologists and 22 residents during the study period. Patient and tumor characteristics were similar for TURBTs performed by attendings and residents. Attendings were more likely to obtain muscle in specimens for all TURBTs (OR1.68 [95%CI 1.09, 2.59] p=0.018) and for the subset of 275 high-risk TURBTs (OR1.99 [95%CI 1.11, 3.55], p=0.019). Senior residents (PGY3–5) had higher odds of muscle in all (OR1.91 [95%CI 1.12, 3.25] p=0.017) and high-risk (OR2.9 [95%CI 1.43, 5.9], p=0.003) specimens compared with juniors. Resident involvement was associated with a non-significant increased need for repeat procedures. The median time from initial high risk TURBT to cystectomy was 73.3 (IQR 51.8, 131.4) and 49.4 (IQR 31.4, 65.7) days for residents and attendings, respectively (p=0.024).

Conclusion: Involvement of residents during TURBTs is associated with inconclusive pathology and delayed time to cystectomy. Future studies should assess educational tools to improve endoscopic surgical training techniques such that effects of resident learning on patient outcomes are minimized. Further studies are needed to clarify the impact of resident involvement on long-term patient outcomes.
Poster #120

**TITLE: CLINICAL SIGNIFICANCE OF RENIN–ANGIOTENSIN SYSTEM INHIBITION ON NON–MUSCLE INVASIVE BLADDER CANCER**

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¹University of Wisconsin Department of Urology; ²University of Wisconsin School of Medicine

(Presented by: Michael L. Blute, Jr.)

**Introduction:** It has been suggested in a prior report (Ann Surg Oncol, 2012) that inhibition of the renin–angiotensin system (RAS) may affect recurrence of non–muscle invasive bladder cancer (NMIBC).

**Objectives:** We sought to validate in our dataset if inhibiting the RAS with ACE–inhibitors (ACE–I) and angiotensin receptor blockers (ARBs) provided a clinical benefit on recurrence and progression of NMIBC.

**Methods:** An institutional bladder cancer database identified 422 patients treated with transurethral resection (TUR) for NMIBC. Three hundred forty patients met inclusion criteria and were taking ACE–I/ARBs at the time of their first TUR. Progression was defined as stage T2. Cox proportional hazards models were used to evaluate associations with recurrence–free (RFS) and progression–free survival (PFS).

**Results:** Median follow–up was 3 years (IQR 1.3–6.1). Median patient age was 69.6. A total of 200 (59%) patients had a recurrence and 14 (4.1%) had stage progression. The number of patients receiving either an ACE–I or ARB was 143. On univariate analysis, factors associated with improved RFS included presence of cis (p=0.040), bacillus Calmette–Guerin (BCG) therapy (p=0.003), and ACE–I/ARB therapy (p=0.009). Multivariate analysis demonstrated that patients treated with BCG therapy (HR 0.68, 95% CI 0.47–0.87; p=0.002) or ACE–I/ARB therapy (HR 0.61, 95% CI 0.45–0.84; p=0.005), were less likely to experience tumor recurrence. The 5–year RFS rate was 45.6% for patients treated with ACE–I/ARBs and 28.1% for patients not treated with ACE–I/ARBs (p=0.009). Subgroup analysis was performed evaluating patients on BCG therapy alone (n=85) and combined with ACE–I/ARB therapy (n=52) on NMIBC pathology (Ta, T1, cis). Multivariate analysis revealed that patients treated with BCG alone (HR 2.19, 95% CI 1.01–4.77; p=0.04) were associated with a worse RFS compared to patients treated with BCG and ACE–I/ARB therapy (HR 0.45, 95% CI 0.21–0.98; p=0.04) for stage Ta.

**Conclusion:** The inhibition of RAS is associated with improved RFS. The reduction in recurrence from RAS inhibitor administration was improved when combined with BCG therapy and thus warrants a prospective randomized trial.
PROOF OF PRINCIPLE: HIGH-THROUGHPUT SCREENING AS A TOOL TO IDENTIFY NOVEL THERAPIES IN BLADDER CANCER

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Introduction: Epithelial to Mesenchymal Transition (EMT) is among the first steps towards metastasis for a tumor. EMT induces a phenotypic change that alters susceptibility to anti-neoplastic drugs. Ideally, novel drugs should be identified that are equally effective with epithelial and mesenchymal cancer cell lines. Here we investigate the ability of high-throughput screening (HTS) to determine the cytotoxic effect of a panel of oncology related drugs (already approved by the FDA or in the pre-clinical development) on bladder cancer cell lines. The objective of the study was to use two bladder cancer lines at opposite ends of the EMT spectrum, to identify possible novel therapies potent in either/both epithelial and mesenchymal bladder cancer lines.

Methods: We screened an epithelial (RT4) and a mesenchymal (UMUC-3) bladder cancer cell line against 1,912 oncology-focused drugs using a 48 hr cell proliferation assay with an ATP-based readout (CellTiterGlo), and determined the activity of the compounds in a dose response manner. We identified three compounds that achieved a full dose response – Bortezomib (Proteasome inhibitor), Doxorubicin, and Idarubicin Hydrochloride (Topoisomerase inhibitors) and analyzed these 3 drugs in 3 different bladder cancer cell lines (UMUC-5, T24, and 5637) using an MTS cell proliferation assay to determine the IC50s of these drugs in multiple bladder cancer cell lines.

Results: 250 compounds inhibited cell proliferation by >70% for both cell lines, including many proteasome and topoisomerase inhibitors. The three drugs, Bortezomib, Doxorubicin, and Idarubicin Hydrochloride produced full responses in all three cell lines. Bortezomib had IC50s of 6nM, 21.5nM, and 25nM for 5637, T24, and UMUC-5 cells, respectively. Doxorubicin had IC50s of 83nM, 77nM, and 42nM respectively, while Idarubicin Hydrochloride, the most potent of the three drugs, produced IC50s of 0.86nM for 5637 cells, 7.5nM for T24 cells, and 9.5nM for UMUC-5 cells.

Conclusion: HTS of a library of oncology compounds is an efficient way to produce a list of novel targets and therapies for cancer. Topoisomerase inhibitor Idarubicin Hydrochloride was found to be a potent drug in all the bladder cancer cell lines tested. We are currently elucidating the mechanism of action of this drug. Also studies are underway to test this drug in combination with other class of drugs active in both cell lines.

Funding – NIH Intramural grants
Poster #122
PRIMARY PREVENTION OF BLADDER CANCER: DOES THE PUBLIC KNOW THE RISK FACTORS?
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(Presented by: Erika L. Wood)

Introduction: Smoking is the single most significant modifiable risk factor for bladder cancer, yet this is not well known outside of the medical community. Previous studies from tertiary referral centers have found that 36–58% of urology patients can identify smoking as a risk factor for bladder cancer. Since those patients represent a highly select group that may not be representative of the general population, we studied the knowledge base of bladder cancer risk factors among people encountered in the general waiting room of an urban county hospital.

Methods: 215 participants over 18 years of age were recruited from the waiting room of an urban county hospital to participate in a brief survey on risk factors for various cancers and sources of information on cancer. Fisher's exact test and McNemar's test were used to detect differences in knowledge between bladder cancer and other cancers.

Results: The survey participant population was mostly female (65.6%), Hispanic (54%) and middle-aged (68% age 35–64). Most (54.8%) had an annual household income of less than $20,000, had either a high school education (49.1%) or did not finish high school (24.1%), and 40.3% were current or former smokers. An overwhelming majority of participants identified smoking as a risk factor for lung cancer (92.2%) with 80.7% choosing smoking as the primary risk factor for lung cancer. In contrast, 31.2% of participants identified smoking as a risk factor for bladder cancer and 7.4% identified it as the primary risk factor for bladder cancer. Knowledge of smoking as a risk factor for bladder cancer was not impacted by education, language (Spanish vs. English), income, smoking status or personal/family history of cancer. Male gender and exposure to industrial chemicals were identified as risk factors for bladder cancer by a minority of patients (19.3% and 28.0%, respectively). Almost half of all participants surveyed (49.1%) incorrectly identified alcohol use as a risk factor for bladder cancer.

Conclusion: Among participants of low socioeconomic status presenting to an urban county hospital, there is a concerning lack of knowledge about the major risk factors for bladder cancer. Given that smoking is a modifiable risk factor, future initiatives to prevent bladder cancer by increasing public education should focus on populations with low socioeconomic status as high-yield targets to affect change.
Poster Session II – Full Abstracts

Poster #123
EVALUATING THE DOCUMENTATION OF MALNUTRITION DURING INPATIENT HOSPITALIZATION AFTER CYSTECTOMY: IMPLICATIONS FOR BOTH PATIENT CARE AND HOSPITAL REIMBURSEMENT

Lewis Thomas, MD<sup>1,2</sup>, Sheala Mullaney, BS<sup>3,2</sup>, Douglas Robertson RDN, LD<sup>4,2</sup>, Mary Brooks RN,, MSN, CPHQ<sup>5,2</sup>, Bridget Drapeaux MA, RDN, LD<sup>4,2</sup>, Larry Newman DNP, BSN, AGPCNP–C<sup>1,2</sup> and Kenneth Nepple, MD<sup>1,2</sup>

<sup>1</sup>University of Iowa Department of Urology; <sup>2</sup>Iowa City, IA; <sup>3</sup>University of Iowa Carver College of Medicine; <sup>4</sup>University of Iowa Department of Food and Nutrition Services; <sup>5</sup>University of Iowa Office of Clinical Quality, Safety, and Performance Improvement

(Presented by: Lewis Thomas)

Introduction: Cystectomy is associated with potential complications and costly hospital stays. In the current environment of cost containment, insufficient hospital reimbursement for cystectomy may decrease support and harm patient care. Hospital total base payment is based on the presence of no comorbidity/complication (CC), CC, or major CC and can range from approximately $19,000 to $55,000. Billing is based on documentation, so inadequate documentation of preexisting comorbidity or postoperative sequelae can impact reimbursement. We postulated that our current evaluation and documentation of malnutrition (MN) may not be reflecting the complexity of cystectomy care.

Methods: MN was assessed because of the prevalence of poor nutrition in the cystectomy population and the direct impact on hospital reimbursement (mild/not–otherwise specified (NOS) MN is a CC while severe MN is a major CC). We obtained our administrative billing data from UHC (University HealthSystem Consortium) for 253 patients with cystectomy from 08/2010 to 01/2014. We assessed each record for the ICD–9 codes related to MN and evaluated the outcomes of length of stay (LOS) and hospital charges.

Results: Documented MN was present in only 8.3% of patients (21/253) after cystectomy, of which 6 patients had pre–existing MN while 15 had new–onset MN during the hospital stay. MN severity was mild/NOS in 15 and severe in 6. LOS and hospital charges were higher in those with MN compared to those without (avg: 20 days vs 10 days, p<.0001; $167,243 vs $84,455, p<0.0001). Patients with MN were more likely to be older and female than those without, but not significantly so (67.2 vs 65.2 years, p=0.21; 52% female vs 33% female, p=0.23). There was no statistically significant difference in coded diagnosis of ileus in MN versus non–MN patients (38% vs 27%, p=0.31).

Conclusion: The diagnosis of MN after cystectomy appears to be inadequately documented as it was infrequent and not notably higher in patients with a nutritional risk factor (ileus). Improved assessment and documentation could result in both better patient care and increased reimbursement. We are piloting a multidisciplinary approach to improve nutrition assessment for RC patients by shifting the evaluation to preoperatively when intervention can occur prior to therapy. This work was supported by Grant IRG–77–004–34 from the American Cancer Society, via the Holden Comprehensive Cancer Center at The University of Iowa.
Poster #124

RECURRENT PATTERNS AND RISK OF LOCAL AND DISTANT RECURRENCE AFTER OPEN AND ROBOT-ASSISTED RADICAL CYSTECTOMY FOR BLADDER CANCER: A COMPARATIVE ANALYSIS

Daniel P. Nguyen, MD, Bashir Al Hussein Al Awamlh, MD, Igor M. Inoyatov BA, Abimbola Ayangbesan BA, Padraic O’Malley, MD, Douglas S. Scherr, MD
Cornell University, New York, New York
(Presented by: Daniel P. Nguyen)

Introduction: Concerns remain whether robot-assisted radical cystectomy (RARC) compromises survival because of inadequate oncologic resection or alteration of recurrence patterns. The aim of this study was to compare recurrence patterns and evaluate factors predicting local and distant failure following open radical cystectomy (ORC) and RARC.

Methods: 383 patients with non-metastatic bladder cancer underwent radical cystectomy (120 ORCs, 263 RARCs) from July 2001 to February 2014. Descriptive statistics were used to compare baseline variables and patterns of cancer recurrence (local vs distant and anatomic locations). Recurrence-free survival estimates were generated using the Kaplan-Meier method. Multivariable Cox regression models were built to evaluate the effects of clinicopathological factors with an univariable significance level of <10% and the operative technique on the risk of recurrence.

Results: Median follow-up times were 15.5 months and 18 months for ORC and RARC, respectively (p=0.84). ORC patients were more likely to have higher pathologic stage and positive surgical margins (both p=0.03). Other baseline variables between the 2 groups were similar. At 2 and 3 years, the actuarial recurrence-free survival rates were 64±5% and 62±5%, respectively, for ORC, and 71±3% and 70±3%, respectively, for RARC (log rank p=0.13). Isolated local recurrence was detected in 7 (6%) of 120 ORC patients and 15 (6%) of 263 RARC patients (p=0.94). Distant recurrence without evidence of local recurrence was detected in 19 (16%) of 120 ORC patients and 37 (14%) of 263 RARC patients (p=0.65). Concomitant local and distant recurrence was detected in 10 (8%) of 120 ORC patients and 10 (4%) of 263 RARC patients (p=0.14). Sites of first recurrence were distributed similarly between ORC and RARC patients. Particularly, peritoneal carcinomatosis was diagnosed in 10 (16%) of 61 recurrent RARC patients, and in 2 (6%) of 35 recurrent ORC patients (p=0.14). In multivariable analysis adjusting for tumor and nodal stage, presence of lymphovascular invasion and surgical margin status, RARC was not found to be predictive of distant and/or local cancer recurrence.

Conclusion: In this single-center study, recurrence patterns were similar after ORC and RARC. Moreover, in multivariable analysis RARC provided no additional risk of cancer recurrence compared to ORC.
Poster #125
MEASURING SUCCESS AFTER RADICAL CYSTECTOMY: FEASIBILITY OF A NOVEL COMPOSITE ENDPOINT ("POOR RECOVERY") TO QUANTIFY OUTCOMES AFTER SURGERY
Erika L. Wood MPH1, Janet E. Baack Kukreja, MD2, Sima Porten, MD3, Wei Qiao1, Raphael Ezeagu1, Neema Navai, MD1, Ashish M. Kamat, MD1, Colin P. Dinney, MD1 and Jay B. Shah, MD1
1MD Anderson Cancer Center (Houston, TX); 2University of Rochester Medical Center (Rochester, NY); 3University of California at San Francisco (San Francisco, CA)
(Presented by: Erika L. Wood)

Introduction: Given the predilection of invasive bladder cancer toward older sicker patients and the complexity of the radical cystectomy (RC) operation, it is not surprising that many patients experience prolonged, difficult recoveries after surgery. There is growing interest in identifying ways to improve recovery after RC. To date, studies on this topic have focused on inpatient length of stay (LOS) as the primary measure of recovery improvement efforts. Given that many patients suffer complications after discharge and require readmission to the hospital, inpatient LOS may not be the most useful measure of determine efficacy of recovery improvement efforts. We propose a novel composite endpoint – “Poor Recovery” – as a more encompassing measure of outcomes after RC.

Methods: A comprehensive perioperative multidisciplinary algorithm known as the Optimized Surgical Journey (OSJ) has been in development at our institution over the last 18 months. We selected 50 patients that underwent RC with the OSJ algorithm and 50 patients that underwent RC with usual care during the same time period. Poor Recovery was defined by inpatient LOS > 7 days or hospital readmission for any reason within 30 days. Statistical analyses included the Wilcoxon rank-sum test for continuous variables and Fisher’s exact test for categorical variables.

Results: Patients in the OSJ group had significantly shorter times to flatus, first bowel movement, first ambulation and resumption of regular diet as compared to the non–OSJ group (Figure). There were no differences between the groups in operative time, blood loss, opioid use, epidural use, or rate of ICU admission. Mean LOS was significantly shorter in the OSJ group (5.6 and 8.5 days, p < 0.01). Poor Recovery was experienced by 20% of the patients in the OSJ group and 60% of the patients in the non–OSJ group (p < 0.01).

Conclusion: We define a novel composite endpoint – Poor Recovery – that can help measure outcomes after RC. For future prospective studies of accelerated recovery pathways, the poor recovery endpoint may be a useful metric by which to determine the efficacy of various interventions.
Introduction: Clinical management of patients with non–muscle invasive urothelial bladder cancer (NMIBC) relies upon an accurate determination of pathological grade. Inter–observer differences between pathologists assigning grade is well described and has prompted repeat modifications to the WHO grading system. Recently genomic classification signatures have been published that can group muscle invasive UBC based on expression profiles. Here we studied the whole transcriptome (protein coding and non–coding genes) of bladder cancers by RNAseq. We investigated whether the application of next generation sequencing can complement modern pathological grade assessment of UBC tumours by providing an objective “molecular grading”.

Objectives: To determine inter–observer reliability between uro–pathologists’ assessment of grade (WHO 1973 & 2004) in a cohort of 49 UBC archival trans–urethral bladder tumour resection specimens and to evaluate if the grading discrepancy could have had clinical importance.

Methods: Three experienced uro–pathologists  (from two international Academic centres) graded forty nine (49) bladder cancer specimens according to the 1973 and 2004 WHO grading (blinded to clinical outcome). The same tumour samples underwent RNASeq (Illumina 2000) and hierarchal clustering.

Results: A high level of agreement was observed between the three uro–pathologists using the WHO 2004 classification (Fleiss Kappa 0.788 p<0.0001). For WHO 1973 the agreement was only moderate (Fleiss Kappa 0.49 p<0.0001). There were 7 (14%) cases (using the 2004 system) where non–agreement occurred between the uro–pathologists, all were staged as pTa where grade assignment would influence the choice of adjuvant therapy. RNAseq and analysis of the tumours’ transcriptome allowed molecular grading to be assigned.

Conclusion: Although the rate of concordance was high using the 2004 classification, even expert uro–pathologists do not always agree upon the assignment of grade and this may directly impact patient management. Next generation sequencing (RNAseq) allows analysis of thousands of coding and non–coding genes, key grade classifier genes can be used to improve tumour characterization.
Poster #127
AROMATASE EXPRESSION IN UROTHELIAL CARCINOMA, FURTHER EVIDENCE OF A HORMONAL EFFECT ON ONCOLOGICAL FACTORS AND OUTCOMES IN BLADDER CANCER
Padraic O’Malley, MD1, Nicholas Hauser, MD1, Daniel P Nguyen, MD1, Bashir Al Hussein Al Awamlh, MD1, Nigel P Mongan, PhD2, Brian D Robinson, MD3, Gerald Wang, MD1 and Douglas S Scherr, MD1
1Urology, Weill–Cornell Medical College, New York, NY; 2Pharmacology, Weill–Cornell Medical College, New York, NY; 3Pathology and Laboratory Medicine, Weill–Cornell Medical College, New York, NY
(Presented by: Padraic O’Malley)

Introduction: Bladder cancer (UC) is the fourth most common malignancy among men in the United States and is two to four times more common in men than women. Previously, we demonstrated the inverse relation of androgen receptor (AR) expression with tumor stage. We have demonstrated estrogen receptor beta (ERβ) up-regulation in UC compared to benign urothelium. The enzyme aromatase (ARO) meanwhile is responsible for estrogen synthesis from adrenal and testicular androgen precursors. ARO expression has not been previously reported in UC.

Methods: Immunohistochemistry was performed and semi-quantitatively recorded to evaluate ARO (n=36) and ERβ (n=41) expression in urothelium of patients with UC. This was correlated with clinical features including stage, disease recurrence and progression, and disease-free survival. DNA microarray analysis of 22,239 genes was performed on tumor and adjacent benign urothelium from seven patients.

Results: ARO expression is associated with increasing tumor stage (p=0.0023), as well as disease recurrence and progression (OR 5.5, 95% CI 1.2 to 26.1, p=0.026). ARO(+) patients had a 29% 12-month disease-free survival compared to 75% in patients whose tumors did not express ARO (log-rank p=0.0063). Consistent with our previously published work, microarray analysis demonstrated a 4-fold up-regulation of ERβ expression in tumor compared to benign urothelium.

Conclusion: This is the first study to evaluate ARO expression in UC and its correlation to poorer clinical features and outcomes. This further supports a putative role of hormonal involvement in disease outcomes.

Supported by The Frederick J. & Theresa Dow Wallace Fund of the New York Community Trust, and the Ferdinand C Valentine Fellowship from the New York Academy of Medicine (POM).
Poster #128
PATIENTS FOUND TO BE LYMPH NODE POSITIVE FOLLOWING NEOADJUVANT CHEMOTHERAPY AND RADICAL CYSTECTOMY HAVE A VERY POOR PROGNOSIS
Eugene Cha, MD1, John Sfakianos, MD2, Ranjit Sukhu BA1, Alyssa Yee, MD1, Daniel Sjoberg BA1 and Bernard Bochner, MD1
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(Presented by: Eugene Cha)

Introduction: Patients with lymph node (LN)–positive bladder cancer following radical cystectomy (RC) and pelvic lymph node dissection (PLND) have a poor prognosis. While utilization of neoadjuvant chemotherapy (NAC) is increasing, outcomes for NAC pre−treated patients found to be LN−positive are not well described. We sought to evaluate outcomes of bladder cancer patients with LN−positive disease following neoadjuvant chemotherapy (NAC).

Methods: Of 1484 consecutive patients treated with RC/PLND for urothelial carcinoma of the bladder (UCB) between 2000 and 2010, 306 (20.6%) had LN−positive disease. We analyzed 198 patients treated with RC/PLND for clinically non−metastatic (cN0M0) muscle−invasive UCB who were found to be LN−positive. As patients not receiving perioperative chemotherapy were significantly older and comorbid, we compared LN−positive patients previously treated with NAC (n=32) to LN−positive patients treated with adjuvant chemotherapy (AC, n=49). Univariate and multivariable Cox proportional hazards models addressed time to disease recurrence and cancer−specific mortality. A sensitivity analysis was designed to account for the additional time to RC in NAC patients.

Results: The three−year recurrence−free survival estimate for LN−positive NAC patients was 26% compared with 60% for LN−positive AC patients. LN−positive patients treated with NAC had significantly higher risks of disease recurrence and CSM (HR=2.86, 95%CI 1.58−5.19, p=0.001 and HR=2.50, 95%CI 1.34−4.65, p=0.004, respectively). This remained statistically significant in multivariable analyses adjusting for pathologic stage and LN density (HR=3.11, 95%CI 1.59−6.07, p=0.001 and HR=3.05, 95%CI 1.46−6.35, p=0.003, respectively). Sensitivity analyses similarly demonstrated worse outcomes for LN−positive patients treated with NAC.

Conclusion: LN−positive patients previously treated with NAC have a poor prognosis, significantly worse than LN−positive patients subsequently treated with AC, and should be considered for clinical trials using sandwich chemotherapy approaches or novel agents. These results should be considered in the interpretation of and stratification for clinical trials.

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<td>Cancer-Specific Mortality (n=77)</td>
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</table>

*Models adjusted for pathological stage (pT12) and lymph node density.
† Logistic regression modeling for outcomes ≤2 years after RC
Poster #129
LATE RECURRENT FOLLOWING RADICAL CYSTECTOMY FOR UROTHELIAL CARCINOMA OF THE BLADDER
Eugene Cha, MD1, Alyssa Yee, MD1, John Sfakianos, MD2, Philip Kim, MD1 and Bernard Bochner, MD1
1Memorial Sloan Kettering Cancer Center, New York, NY; 2Mt. Sinai School of Medicine
(Presented by: Eugene Cha)

Introduction: Patients who experience disease recurrence after radical cystectomy (RC) for urothelial carcinoma of the bladder (UCB) have a very poor prognosis. Most recurrences occur during the first two years following RC. The incidence, patterns, and prognosis of late recurrences (LRs) following RC have not been well described.

Methods: We queried our prospectively maintained institutional database and identified 1953 consecutive patients who underwent RC for UCB from 1995−2010. We identified patients who experienced disease recurrence following RC and analyzed both non−urinary tract disease recurrence and urinary tract recurrence. Late recurrence was defined as a non−urinary tract recurrence occurring three or more years following RC.

Results: Of 638 UCB patients who experienced non−urinary tract disease recurrence following RC, 108 (17%) occurred greater than 3 years following RC, and 49 (8%) occurred after 5 years (range 3.01 – 13.74 years). Of these 108 LRs, 25 (23%) were local, 58 (54%) were distant, and 24 (22%) were both local and distant. Sites of metastasis in patients with LRs included 44 pelvis (41%), 44 retroperitoneum (41%), 24 lung (22%), 25 liver (23%), 21 bone (19%), and 8 other (7%). Urinary tract recurrences were identified in 53 of 108 patients with LR, 35 upper tract and 18 urethral. The stage distribution at RC for LR patients was pT0 (4%), pTa (6%), pTis (21%), pT1 (17%), pT2 (23%), pT3 (18%), and pT4 (11%). Thirteen LR patients (12%) had LN−positive disease. Fourteen LR patients had received pre−operative cisplatin−based chemotherapy and 11 received adjuvant chemotherapy. LR patients were more likely to have organ−confined disease at RC (68% vs. 21%, p < 0.001) and concomitant CIS (77% vs. 63%, p = 0.02) than patients experiencing recurrence within 3 years. However, the prognosis following recurrence was similarly poor for patients experiencing LR as it was for early recurrence, although LR patients had a slightly longer time from recurrence to death (p < 0.001).

Conclusion: Bladder cancer patients treated with RC remain at risk for disease recurrence for many years, although the majority of patients who will recur do so within the first two years. Patients who experience late recurrence have different disease characteristics than those who experience early recurrence. Continued surveillance for detection of local, distant, and urinary tract recurrences following RC may be beneficial.
Poster #130  
BRANCHED EVOLUTION AND INTRATUMOR HETEROGENEITY OF UROTHELIAL CARCINOMA OF THE BLADDER  
Eugene Cha, MD, John Sfakianos, MD, Hikmat Al-Ahmadie, MD, Sasinya Scott BA, Philip Kim, MD, Gopa Iyer, MD, Dean Bajorin, MD, Jonathan Rosenberg, MD, Michael Berger, PhD, Bernard Bochner, MD and David Solit, MD  
1Memorial Sloan Kettering Cancer Center, New York, NY; 2Mt. Sinai School of Medicine, New York, NY  
(Presented by: Eugene Cha)

Introduction: Genomic characterization of urothelial carcinoma of the bladder (UCB) has begun to reveal significant intertumor heterogeneity when comparing samples from different subjects. As in other malignancies, intratumor heterogeneity, which may allow for tumor evolution and adaptation, poses a significant challenge to personalized-medicine strategies.

Methods: To examine UCB tumor evolution and heterogeneity, we performed next-generation targeted sequencing on multiple temporally and spatially separated bladder tumors obtained at time of transurethral resection (TUR) and radical cystectomy (RC). Specimens were analyzed using a next-generation, targeted sequencing assay designed to identify point mutations, indels, and copy number alterations in 300 cancer-associated genes.

Results: Phylogenetic reconstruction revealed evidence of branched evolutionary growth. Evaluation of multiple tumors from individual subjects identified both shared and unique potential driver mutations. Evidence of convergent phenotypic evolution was detected through analysis of multiple distinct tumors from several subjects. For example, three separate tumors in one subject shared a common PIK3CA mutation (E453K) and had unique second mutations in PIK3CA (E542V, E545K, and E545Q, respectively). In another subject, distinct inactivating mutations of EP300 were identified in two temporally separated tumor samples. Microdissection of single tumors into non-invasive and invasive components revealed significant intratumor heterogeneity; one case illustrates how analysis of a muscle-invasive TUR specimen could result in undersampling and thereby miss the tumor clone that persisted at time of RC.

Conclusion: We demonstrate branched evolution of UCB through genomic analyses of multiple temporally and spatially distinct bladder tumors from individual subjects. Microdissection of individual tumor samples identified significant intratumor heterogeneity. These concepts may present major challenges to personalized-medicine approaches that rely on sampling of a single tumor at a specific timepoint in the evolution of a patient's UCB.
Poster #131
ASSESSING THE CLINICAL UTILITY OF TWIST1 AND NID2 DNA METHYLATION MARKERS IN BLADDER CANCER
Matthew Ingham, MD, Robert Given, MD, Raymond Lance, MD, Michael Williams, MD
Eastern Virginia Medical School, Norfolk, VA
(Presented by: Matthew Ingham)

Introduction: Cystoscopy and biopsy remain the gold standard in both the diagnosis and surveillance of urothelial cell carcinoma (UCC) of the bladder. We sought to investigate the clinical utility of TWIST1 and NID2, previously described urine−based DNA methylation products, in augmenting the more invasive gold standard methods.

Methods: Patients were prospectively accrued to investigate the usefulness of TWIST1 and NID2. Group 1 consisted of patients with new hematuria diagnoses without prior NMIBC. Group 2 consisted of patients with a history of NMIBC being surveilled for cancer recurrence. A 50cc voided urine sample was evaluated to obtain TWIST1 and NID2 gene copy values, with β−actin gene copies serving as an internal control. Positivity thresholds of 8 and 30 copies for TWIST1 and NID2, respectively, were used as previously described. These results were then compared against biopsy proven cancer occurrence.

Results: Groups 1 and 2 accrued 26 and 58 patients, respectively. In Group 1, patients who were positive for both markers demonstrated a sensitivity and specificity of 40% and 90%, respectively, along with positive and negative predictive values (PPV and NPV) of 50% and 86%, respectively. In Group 2, sensitivity and specificity were found to be 44% and 92%, respectively. PPV and NPV were 50% and 90%, respectively.

Conclusion: Though further studies are needed, TWIST1 and NID2 appear to be reasonable urine−based, non−invasive markers for the presence of UCC of the bladder. Both the high specificity and NPV appear quite useful in helping reassure the clinician of the absence of new or recurrent cancer.
Poster Session II—Full Abstracts

Poster #132
EFFECT OF NEOADJUVANT CHEMOTHERAPY ON ELEVATED PRECYSTECTOMY SERUM LEVELS OF EPITHELIAL TUMOR MARKERS IN UROTHELIAL CANCER OF THE BLADDER
Soroush T. Bazargani, MD, Swar Shah, MD, Hooman Djaladat, MD, Anne Schuckman, MD, David Quinn, MD, Tanya Dorff, MD, Sarmad Sadeghi, MD, Siamak Daneshmand, MD
USC Institute of Urology, Los Angeles, CA
(Presented by: Siamak Daneshmand)

**Introduction:** Elevated pre-cystectomy serum levels of epithelial tumor markers have been shown to predict worse oncological outcome in patients with invasive urothelial cancer of the bladder (UCB). We evaluated the effect of neoadjuvant chemotherapy (NACt) on elevated tumor marker levels before and after treatment.

**Methods:** Under IRB approval, serum levels of Carbohydrate Antigen 125 (CA−125), Carbohydrate Antigen 19−9 (CA 19−9) and Carcinoembryonic Antigen (CEA) were prospectively measured in patients with invasive UCB undergoing neoadjuvant chemotherapy from August 2011 through July 2014. Markers were measured prior to the first and after the last cycle of chemotherapy (before cystectomy).

**Results:** A total of 26 patients had a complete tumor marker profile before and after neoadjuvant chemotherapy. Of these, 12 had one or more elevated tumor markers. The mean age was 63 years (range: 34−78), with 8 (67%) males and 4 (33%) females. The pathological stage was organ−confined disease (≤T2) in 3 (25%) and locally advanced disease (pT3−T4 or positive lymph node or both) in 9 (75%). After complete course of chemotherapy, 7 (58%) patients had completely normal tumor markers. Of the 5 (42%) patients who still had elevated levels, 4 (80%) died, 3 of them cancer−related. One patient had unresectable tumor at the time of surgery, and is alive with disease following palliative chemo−radiation. This is comparable to only 1 death in the group with normalized markers following NACt.

**Conclusion:** The results of this series suggest that patients with elevated markers following NACt do extremely poorly following cystectomy. This might imply a promising role for tumor markers in predicting prognosis of advanced urothelial bladder cancers receiving neoadjuvant chemotherapy. To our knowledge, this is the first pilot study of its type. A large, controlled study with longer follow up is needed to determine their role in predicting survival.

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**Table 1. Descriptive data of each patient with complete tumor marker profiles.**

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<tr>
<th>Pathological Stage</th>
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<th>Post Neoadjuvant</th>
<th>Outcome</th>
<th>Follow up (months)</th>
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<tbody>
<tr>
<td>CA 125 CA 19−9 CEA</td>
<td>CA 125 CA 19−9 CEA</td>
<td>CA 125 CA 19−9 CEA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 T2aN0 M0</td>
<td>334 257 6</td>
<td>103 19 3</td>
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<tr>
<td>2 T4aN0 M0</td>
<td>27 208 6</td>
<td>15 16 1</td>
<td>Died</td>
<td>5</td>
</tr>
<tr>
<td>3 T0 N0 M0</td>
<td>82 196 3</td>
<td>10 10 1</td>
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</tr>
<tr>
<td>4 T4bN2 M0</td>
<td>745 4235 31</td>
<td>4523 29410 958</td>
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<td>5</td>
</tr>
<tr>
<td>5 T3bN2 M1</td>
<td>18 51 3</td>
<td>35 35 3</td>
<td>Alive, relapsed</td>
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</tr>
<tr>
<td>6 T4bN1 M1</td>
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<td>18 28 1</td>
<td>Died</td>
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<td>7 T4aN0 M0</td>
<td>11 137 2</td>
<td>18 47 3</td>
<td>Alive, NED</td>
<td>20</td>
</tr>
<tr>
<td>8 T4bN2 M1</td>
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<td>12 T2aN2 M0</td>
<td>12 369 2</td>
<td>10 33 2</td>
<td>Alive, NED</td>
<td>31</td>
</tr>
</tbody>
</table>

*Normal values are as follows: CEA <3.8u/ml, CA 125 <35u/ml, CEA >3.8u/ml.

†DOD: Dead of Disease; NED: No Evidence of Disease.
Poster #133
IMPACT OF EXTENDED VERSUS STANDARD LYMPH NODE DISSECTION ON POST–CYSTECTOMY SURVIVAL AMONG PATIENTS WITH LYMPH NODE–NEGATIVE UROTHELIAL CANCINOMA OF THE BLADDER
Cesar E. Ercole, MD1, Ranko Miocinovic, MD2, Andrew Stephenson, MD1, Steven Campbell, MD1, Amr Fergany, MD1 and Michael C. Gong, MD1
1Cleveland Clinic Foundation, Cleveland, OH; 2Detroit Medical Center, Detroit, MI
(Presented by: Cesar E. Ercole)

Introduction: Current literature suggests that a more extensive lymph node dissection (LND) carries an association for improved survival in patients who undergo a radical cystectomy (RC). We sought to compare the outcomes of pathological LN–negative (pN0) urothelial carcinoma (UC) patients who either underwent a standard LND (sLND) versus an extended LND (eLND) and the impact on post–cystectomy survival (PCS) and recurrence free survival (RFS).

Methods: Between 2004 and 2010, we identified 316 patients at our institution who underwent a RC with LND and were classified as pN0. Patients were divided according to the extent of LND, where sLND was defined as distal to and eLND as proximal to the bifurcation of the common iliac artery. 121 (38.3%) patients underwent sLND and 195 (61.7%) patients underwent eLND. Cox proportional hazards models were used to compare the association of extent of LND with PCS and disease recurrence after adjusting for age at RC, pathologic stage, positive surgical margins, and lymphovascular invasion.

Results: The median follow–up after cystectomy was 42.4 months (IQR 12.67, 65.3). Patients with sLND and eLND had a median of 14 and 27 LN removed, respectively. At 5 years, overall PCS and RFS were 82.3% (95%CI, 77.4–87.2) and 80% (95%CI, 72–88), respectively. After multivariate analyses, higher stage and positive surgical margins were associated with worse PCS and RFS. However, the extent of LND (extended vs. standard) was not associated with either improved PCS or RFS.

Conclusion: While an eLND may define with greater sensitivity the presence of regional LN metastases compared to sPLND and thus improve staging, the therapeautic benefit associated with ePLND in patients with LN–negative disease does not translate to an improvement in post–cystectomy survival or cancer recurrence in this select population.
Poster #134
SEQUENTIAL INTRAVESICAL GEMCITABINE/DOCETAXEL FOR THE TREATMENT OF BCG FAILURES WITH NON-MUSCLE INVASIVE BLADDER CANCER

Ryan L. Steinberg, MD, Lewis J. Thomas, MD, Michael A. O'Donnell, MD, Kenneth G. Nepple, MD
Department of Urology, University of Iowa, Iowa City, IA
(Presented by: Ryan L. Steinberg)

Introduction: In patients with non–muscle invasive bladder cancer and failed intravesical Bacillus Calmette–Guerin (BCG), cystectomy has traditionally been the standard of care. However, many patients refuse cystectomy or are poor surgical candidates. We hypothesize that sequential use of Gemcitabine and Docetaxel may be an effective intravesical treatment for such patients with prior BCG failures.

Methods: A single institution retrospective review was performed from 2009–2014. After undergoing transurethral resection or bladder biopsy, patients were treated with weekly sequential intravesical Gemcitabine (1 g in 50 mL sterile water) and Docetaxel (40 mg in 50 mL saline) for 6 weeks. In most cases, a restaging procedure was performed 6 weeks after treatment completion. A few patients underwent simple cystoscopy with cytology alone. If no recurrence was pathologically identified, patients began monthly maintenance instillations. Failure was defined as bladder cancer recurrence or cystectomy.

Results: 45 patients were analyzed, 82.2% of which were male, with a median age of 72 years old (range 50–91). Median follow up was 5.9 months (range 0–36.2). Patients with 1 prior BCG failure comprised 37.8% of patients, while 53.3% had 2 or more prior BCG failures. At initiation of treatment, 44.4% of patients had CIS alone, 26.7% Ta, 8.9% T1, and 20% CIS/Ta or T1. 5 patients (11.1%) were unable to tolerate a full induction course. Using intention to treat analysis, success at 4 months, 1 year and 2 year after beginning induction was achieved in 66%, 54%, and 34% of patients respectively. Of the 30 potential cystectomy candidates, 10 patients underwent cystectomy at a median of 5.6 months (range 2.4–22.7). Cystectomy pathology revealed T0 in 30% and Tis in 50% of cases. No patients progressed to muscle invasive disease or had positive lymph nodes.

Conclusion: In this challenging cohort with intermediate follow up, intravesical treatment with sequential Gemcitabine and Docetaxel appears to be an option for patients with BCG failures. Failures did occur but there was no evidence of progression to muscle–invasive or node positive disease. Further study assessing the durability of the response is needed.
REDUCED EGFR (<60 ML/MIN) AT FIRST TRANSURETHRAL RESECTION OF BLADDER TUMOR IS A SIGNIFICANT PREDICTOR OF SUBSEQUENT RECURRENCE AND PROGRESSION

Timothy J. Rushmer, MD, Michael L. Blute, Jr., MD, Fangfang Shi, MS, Benjamin Fuller, E. Jason Abel, MD, David Jarrard, MD, and Tracy Downs, MD

1University of Wisconsin School of Medicine and Public Health (Madison, Wisconsin); 2University of Wisconsin Department of Urology; 3University of Wisconsin School of Medicine and Public Health

(Presented by: Timothy J. Rushmer)

Introduction: Reduced eGFR is known to be associated with higher risk of cancer. It is also associated with increased cancer-specific mortality (CSM).

Objectives: Using our dataset, we sought to validate if eGFR <60 ml/min was a significant predictor of tumor recurrence or progression.

Methods: An institutional bladder cancer database identified 422 patients treated with transurethral resection (TUR) for NMIBC. 310 patients were retrospectively found to have serum creatinine values listed in their chart prior to first TUR. eGFR was calculated using the CKD–epidemiology collaboration formula. Progression was defined as any increase in T stage. Cox proportional hazards models were used to evaluate associations with recurrence-free (RFS) and progression-free survival (PFS).

Results: Median follow-up was 3.1 years. Median patient age was 69.4. A total of 169 (54.5%) patients had a recurrence. A total of 68 (21.9%) patients had worsening of grade or stage progression. A total of 11 (3.5%) patients had progression to muscle invasive disease (pT2). The number of patients with an eGFR <60 ml/min was 96. Multivariate analysis demonstrated tumor diameter >3 cm (HR 1.44, 95% CI 1.05–1.98; p=0.024) and eGFR <60 ml/min (HR 1.53, 95% CI 1.10–2.13; p=0.011) are associated with reduced RFS. The 5-year RFS rate was 37.7% for patients with an eGFR >=60 ml/min and 18.7% for patients with an eGFR <60 ml/min (p=0.033). Multivariate analysis also demonstrated that eGFR <60 ml/min (HR 4.91, 95% CI 1.28–18.9; p=0.021) was associated with progression to muscle–invasive disease. The 5-year PFS rate was 77.1% for patients with an eGFR >=60 ml/min and 57.4% for patients with an eGFR <60 ml/min (p=0.009).

Conclusion: An eGFR<60ml/min at first TUR is associated with reduced RFS and PFS and therefore warrants further investigation.

Figure 1. Patient progression free survival rates according to eGFR (<60 ml/min or >=60 ml/min).
Introduction: Frailty is an often-subjective assessment of a patient’s gradual loss of physical and mental capacity with or without clinical disease. The Canadian Study of Health and Aging Frailty Index (CSHA−FI) is an objective measure of frailty, which can be used to assess a patient’s fitness for surgical intervention. Although any postoperative complication is undesirable, particular in-hospital conditions have been designated by the Centers for Medicare & Medicaid Services as “Never Events,” which will not be reimbursed as they are considered preventable. We propose that a modified version of the CSHA−FI (mFI) can predict the development of certain “Never Events” in patients undergoing nephrectomy.

Methods: We accessed the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database for all nephrectomy cases in years 2005–2012 and matched eleven CSHA−FI variables to the NSQIP database: 1. Diabetes mellitus; 2. Dependent functional status; 3. History of severe COPD or current pneumonia; 4. CHF in 30 days before surgery; 5. History of MI 6 months prior to surgery; 6. Previous PCI, cardiac surgery, or history of angina in 1 month before surgery; 7. Hypertension requiring medication; 8. Peripheral vascular disease or rest pain; 9. Impaired sensorium; 10. History of either TIA or CVA; 11. History of CVA with neurologic deficit. The mFI of each patient was calculated as the ratio of the number of positive CSHA−FI risk factors to the number assessed. The primary outcome was the development of at least one of the three “Never Events” documented in NSQIP: surgical site infection (SSI), DVT/PE, and/or UTI. Chi-square analysis was performed, with Fisher’s exact test when appropriate.

Results: A total of 8,542 nephrectomy patients were identified. There were 162 instances of SSI, 100 DVT/PEs, and 145 UTIs (not mutually exclusive), amounting to 379 patients with at least one “Never Event.” Higher mFI was associated with the development of at least one “Never Event” and of UTI in specific (p<0.05). There was no association between mFI and the development of DVT/PE or SSI.

Conclusion: Increased mFI was associated with higher rates of at least one “Never Event” and of UTI in specific. This supports the utility of mFI as a predictor of the development of a “Never Event” in patients undergoing nephrectomy and potentially urologic surgery in general.
**Poster #137**

**THE IMPACT OF ISCHEMIA ON LONG-TERM RENAL FUNCTION FOLLOWING PARTIAL NEPHRECTOMY IN THE TWO KIDNEY MODEL**

Michael Patton¹, Daniel Salevitz¹, Mark Tyson, MD, Rafael Nateras, MD² and Erik Castle, MD³

¹Phoenix, AZ; ²Mayo Hospital Phoenix, AZ; ³Mayo Hospital, Phoenix AZ

(Presented by: Mark Tyson)

**Introduction:** To determine whether on-clamp partial nephrectomy (ON-PN) has any significant impact on long-term renal function in a two kidney model.

**Methods:** From November 1999 to July 2013, 607 patients underwent partial nephrectomy at our institution. After excluding patients with solitary kidneys, multiple renal masses, and follow-up less than 90 days, 331 remained. Patient demographics were assessed, as was renal function based on pre- and postoperative renal scans and change in estimated glomerular filtration rate (eGFR) using the preoperative and most recent recorded creatinine levels.

**Results:** There were a total of 236 patients who underwent ON-PN and 95 who underwent off-clamp partial nephrectomy (OFF-PN) during the study period. The longest follow-up was 12.6 years with mean follow-up of 3 years. Mean ischemia time of patients undergoing ON-PN was 25 minutes (ranging from 8 to 63 minutes). No differences were noted between the ON-PN and OFF-PN cohorts with respect to estimated change in eGFR (ON-PN: −6.07 mL/min/1.73 m² vs OFF-PN: −6.00 mL/min/1.73 m², p=0.69). No differences were likewise noted in the % change in the renal scan (ON-PN: −0.77% vs OFF-PN: −1.1%, p=0.94). A post-hoc sensitivity analysis of the same two variables stratified by age likewise revealed no differences in change in estimated GFR or % change in differential function on renal scan.

**Conclusion:** In the two kidney model, warm ischemia does not appear to affect long-term renal function outcomes after partial nephrectomy. These data provide evidence that ON-PN is perfectly acceptable in the appropriately selected patient with two kidneys and heroic off-clamp techniques may not provide clinical benefit.

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**Poster #138**

**PRECLINICAL DEVELOPMENT OF A NOVEL METHOD FOR DETECTING RENAL CELL CARCINOMA CIRCULATING TUMOR CELLS USING THE NEPHRIC-LINEAGE MARKER PAX8**

Michael Gorin, MD¹, Mark Ball, MD¹, Hans Hammers, MD, PhD², Phillip Pierorazio, MD¹, Kenneth Pienta, MD¹ and Mohamad Allaf, MD¹

¹The James Buchanan Brady Urological Institute and Department of Urology, The Johns Hopkins University School of Medicine, Baltimore, MD; ²Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Baltimore, MD

(Presented by: Michael Gorin)

**Introduction:** To date, attempts at isolating circulating tumor cells (CTCs) from patients with renal cell carcinoma (RCC) have been met with limited success. This is due to the fact that most available CTC isolation technologies rely on the positive selection of cells using EpCAM, a cell surface marker which is expressed in a minority of RCCs. Furthermore, non-EpCAM based selection methods have also been unsuccessful, as these rely on the detection of CTCs with cytokeratins, proteins which are variably expressed in metastatic RCC specimens. To overcome the limitations of existing CTC platforms, we have developed a novel method for detecting RCC CTCs using size-exclusion and immunofluorescence for the nephric-lineage marker PAX8.

**Methods:** A protocol for performing immunofluorescence using a mouse monoclonal antibody against PAX8 (BC12, Biocare Medical, Concord, CA) was optimized with positive (786-O & ACHN) and negative (DU-145 & PC3) cell line controls. Once optimized, the protocol was tested in mock CTC recovery experiments using the positive control lines spiked in whole blood from healthy donors. For this work, CTCs were isolated from 7.5 mL of donor blood using a microfilter-based isolation method (Creatv MicroTech, Potomac, MD). CTCs were enumerated on the basis of nuclear PAX8 staining and CD45 negativity.

**Results:** In initial testing, the mouse monoclonal BC12 clone against PAX8 was highly specific for the 786-O and ACHN RCC cell lines as compared to the DU-145 and PC3 prostate cancer lines. In mock CTC recovery experiments, >90% of isolated RCC cells showed strong nuclear signal for PAX8. No CD45 positive cells were falsely positive for this nuclear marker.

**Conclusion:** CTC isolation with size exclusion and subsequent immunofluorescence for the nephric-lineage marker PAX8 appears to be a sensitive and specific method for detecting RCC CTCs apart from peripheral blood cells. Future work aims to validate this method of CTC detection in patients with metastatic RCC.
Poster #139
INCREASED NEPHRON-SPARING SURGERY USE MAY UNDERTREAT LOCALLY ADVANCED DISEASE
Matthew Maurice, MD¹, Robert Abouassaly, MD, MS¹ and Hui Zhu, MD, ScD²
¹Urology Institute, University Hospitals Case Medical Center, Cleveland, OH; ²Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH
(Presented by: Matthew Maurice)

Introduction: Recently the survival and functional benefits of nephron-sparing surgery (NSS) in comparison to radical nephrectomy have been called into question in the European Organization for Research and Treatment of Cancer (EORTC) randomized trial 30904. Given these surprising results, we sought to re-examine practice patterns in NSS utilization.

Methods: Using the National Cancer Database, we identified patients treated with NSS for renal cell carcinoma (RCC) from 1998–2011. We plotted the time trend of NSS utilization by pathologic T stage and tumor size. Based on evidence of increased NSS use for all stages and sizes, multivariate logistic regression was performed to assess predictors of NSS usage overall and, in particular, for T3 disease.

Results: Of 387,057 patients with RCC, 72,252 (18.7%) received NSS. NSS use rose significantly with time (range, 8.4–38.7%) so that RCC diagnosed in 2011 had 3.6 times greater odds of being managed with NSS than in 2003 (OR 3.6, CI 3.4–3.7, P<0.01). The rise in utilization was greatest for pT1 disease and for tumors ≤7 cm but also was seen for pT3 disease and for tumors >7 cm. Importantly, tumors of larger size and higher T stage were all significantly less likely to be treated with NSS (P<0.01). However, for pT3 disease, a significant increase (2.7–10.3%) in NSS use occurred over the study period (OR 2.4, CI 1.9–3.2, P<0.01). Interestingly, patients treated at academic hospitals had 2.6 and 2.4 times the odds of undergoing NSS overall and for pT3 disease, respectively (OR 2.6, CI 2.5–2.8, p<0.01 and OR 2.4, CI 1.9–3.0, p<0.01).

Conclusion: NSS utilization increased rapidly for localized RCC since its introduction, especially at academic hospitals. Unexpectedly, academic hospitals also utilized NSS increasingly for locally advanced disease, possibly as an unintended consequence of increased NSS usage overall. NSS, especially for larger or more complex tumors, should be utilized cautiously until there is clear evidence of its superiority over radical nephrectomy.

Financial funding: None

NSS Utilization by pT Stage and Tumor Size

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<th>pT Stage</th>
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<td>pT1</td>
<td>13.4%</td>
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NSS Utilization by Year

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<td>% NSS</td>
<td>52.6%</td>
<td>45.0%</td>
<td>10.1%</td>
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IDENTIFYING PATIENTS AT HIGH RISK OF PERI–OPERATIVE DEATH FROM SIMULTANEOUS UROLOGICAL AND CARDIAC SURGERY FOR TUMOURS INVOLVING THE INFERIOR VENA CAVA (IVC)

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(Presented by: Archie Fernando)

Introduction: Propagation of tumour in the IVC to and beyond the level of the diaphragm has profound circulatory and oncological consequences. Despite advances in surgery and peri–operative care, interventions in these situations remain very high–risk and that risk demands continuous re–assessment. Of particular interest would be the identification of pre–operative prognostic factors that could guide decision–making.

Methods: Retrospective review of all patients with tumour in the IVC or right atrium undergoing simultaneous urological and cardiac surgery since this service was established at our centre in December 2007.

Results: 35 patients were evaluated by a multi–disciplinary team. 17 female; 18 male. 3 were deemed unsuitable for surgery. 32 underwent surgery – intent was curative in 29 and cytoreductive in 3.

Median age 68 years (range 31 – 95).
Neves–Zincke classification level IV = 22; level III = 9; level II = 1. All patients underwent surgery via median sternotomy and “Mercedes Benz” incision.
21 patients had both bypass and cooling with circulatory arrest; 3 bypass only; 8 neither bypass nor arrest.
Histology revealed 27 clear cell cancers, 1 adrenal carcinoma, 2 papillary, 1 neuroectodermal, and 1 leiomyosarcoma.
5/32 (15%) patients had a pre–operative raised INR>2; 3/5 (60%) died in the peri–operative period (<30 days) despite correction of INR prior to surgery. All 3 patients who died were aged >70 years.
The 2 patients with INR >2 who survived were both < 70 years but both had Clavien IV complications and prolonged lengths of stay.
There were no deaths in the 27 patients who had normal pre–operative INR.
3/7 (43%) patients >70 years who underwent surgery died. All 3 had a deranged pre–operative INR.
Across the whole cohort 7/32(22%) operations were free from complication; 4/32 (12%) Clavien IIIa; 3/32(9%) IIIb; 2/32(6%) IVa; 2/32(6%) IVb; 3/32(9%) V. Median hospital stay 15 days (range 7 – 97).

Conclusion: Pre–operative deranged INR identifies those at very high risk of death from surgery for intra–cardiac renal tumours. Deranged INR presumably indicates physiological decompensation and in the elderly this physiological decompensation is lethal.

Based on this study
1) we no longer recommend this type of surgery to patients with an INR > 2 who are aged >70 years
2) surgery can be offered with confidence to patients with a normal INR, even if elderly
Poster #141
CLINICOPATHOLOGIC OUTCOMES OF CLINICALLY LOCALIZED TYPE 1 AND TYPE 2 PAPILLARY RENAL CELL CARCINOMA
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(Presented by: Rodrigo Ledezma)

Introduction: Type 2 PRCC has been associated with less favorable outcomes compared to Type 1 PRCC. We aimed to determine incidence, pathologic findings, prognostic factors, and clinical outcomes for patients with clinically localized papillary RCC.

Methods: Demographic, clinical, and pathologic findings were collected on all patients with PRCC undergoing radical or partial nephrectomy. Two dedicated uropathologists re-reviewed each case. The primary endpoint was overall survival (OS), secondary endpoint was recurrence-free survival (RFS) and Kaplan-Meier estimates were used. Cox proportional hazard regression models were used to assess predictors of mortality and recurrence.

Results: Among 2,238 patients identified 189 (8%) were PRCC, 98 (52%) were type 1, 84 (44%) were type 2, and 7 (4%) were mixed Type 1 and 2. Compared to patients with type 2 PRCC, those with type 1 PRCC were younger (mean: 59 vs 64; p=0.001) and had smaller mean tumor size (4.3 vs 4.7 cm; p=0.9). Eighty percent were pT1. With a median follow-up of 41 months (IQR: 20–66), 25 (14%) patients experienced recurrence and 18 died (10%). The 5-year RFS was 83% (95% CI=76–89) and OS 87% (95% CI=79–92). PRCC subtype was not a predictor of OS or RFS on univariate or multivariate analyses. Older age and nodal involvement were predictors of OS.

Conclusion: Patients with clinically localized PRCC have a low risk of recurrence and mortality after surgery. No differences in clinical outcome were observed between PRCC type 1 and type 2.
Poster #142
THE NATURAL SURGICAL HISTORY OF PATIENTS WITH GERMLINE VON–HIPPEL LINDAU GENE MUTATIONS
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(Presented by: Alice Semerjian)

Introduction: Germline mutations of the Von Hippel Lindau (VHL) gene cause multiple pathologic manifestations including renal and adrenal tumors, hemangioblastomas of the brain and spinal cord, pancreatic neuroendocrine tumors, and cystadenomas of the epididymis and broad ligament. As a result, affected patients undergo numerous surgical interventions over the course of their lives. The purpose of this paper is to better characterize the natural surgical history of this condition.

Methods: We queried the National Institute of Health (NIH) database for all deceased patients with a history of VHL. These charts were reviewed and detailed surgical history for treatment of VHL–related manifestations was collected. Surgical procedures performed both at outside institutions and at NIH were included.

Results: 123 patients were identified of which 4 did not require any surgical procedures. Mean patient age at the time of first surgical procedure was 33 years (range 6−67) and mean age at death 51.5 years (18−95). The mean time that each patient was followed from first procedure to death was 18 years (0−51). The population of patients studied underwent procedures dating from 1970 to 2014. The mean number of kidney related procedures per patient who required at least one kidney procedure were 2.69. Patients underwent a mean of 5.7 (0−31) surgical procedures for treatment of VHL manifestations during their lifetime. Figure 1 presents number of procedures by organ system in our population. 72 out of 123 (58.5%) patients had at least one renal surgery for treatment of a renal tumor and 40 (32.5%) had an adrenal surgery. Only 10% (12/123) ultimately required bilateral nephrectomy and subsequent dialysis.

Conclusion: Patients with germline VHL mutations require many surgical interventions throughout a lifetime. Only a small minority of patients will eventually require bilateral nephrectomy and transplant. Brain and spinal cord tumors are the most common cause for surgical intervention followed by genitourinary tumors. These data may be useful in counseling newly diagnosed patients.
**Poster Session II – Full Abstracts**

**Poster #143**

THE EFFECT OF RURAL RESIDENCE AND ACCESS TO UROLOGIC SPECIALISTS: AN INVESTIGATION ON THE MORTALITY OF KIDNEY CANCER IN MINORITIES

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(Presented by: Adamantios Mellis)

**Introduction:** Previous studies have found differing kidney cancer mortality rates among minority groups. Several factors may contribute to these findings including rural residence and presence of specialty care. In this study, we used a state administered cancer registry to investigate kidney cancer mortality in minority groups based on urban/rural residence and presence of urologists.

**Methods:** Using the Oklahoma State Department of Health’s web-based public health query system, OK2SHARE, the incidence and mortality of kidney cancer was evaluated in the state of Oklahoma from 2000 to 2010 across counties of residence. Mortality rates were evaluated among Caucasians, Hispanics, African-Americans, and American Indians. Within these groups, rates were compared across gender. Urban/rural residence and presence of urologist were evaluated at a county wide level. Urologists were identified from the Oklahoma State Urology Association membership directory. Rural counties were identified using U.S. Department of Agriculture data.

**Results:** Of the 77 counties in Oklahoma, 17 were classified urban (22%). Of these, 6 had a practicing urologist. 11 rural counties had a practicing urologist. Between 2000 and 2010, 6,587 cases of kidney cancer and 2,185 deaths were observed in Oklahoma. Counties with a urologist reported 1,269 (58%) kidney cancer mortalities. Overall, the mortality rate in men (7.21) was higher than women (4.06), consistent with national trends. Analyzing mortality rates stratified by race, American Indians had a higher mortality rate (5.32) compared to all other minority races (2.93). African American and American Indian populations living in rural areas of the state had higher mortality rates (8.37 and 6.10) than their urban counterparts (3.14 and 4.49). Furthermore, increased mortality rates in African Americans was seen in counties where there were no urologic specialists (9.38 vs. 3.17).

**Conclusion:** In this preliminary study we found that kidney cancer mortality rates in Oklahoma were highest among American Indians in minority races. Further, we found that rural residence and lack of urologist to be associated with increased mortality rates, particularly among African Americans and American Indians. Additional factors not evaluated may contribute to these findings. Further studies are warranted to evaluate the differences in kidney cancer mortality among these minority populations.
Poster #144

CHANGE IN PLATELET COUNT AS A PROGNOSTIC INDICATOR FOR RESPONSE TO NEO-ADJUVANT TYROSINE KINASE INHIBITOR THERAPY IN METASTATIC RENAL CELL CARCINOMA

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1UC San Diego Health System, La Jolla, CA; 2Cleveland Clinic, Cleveland, OH; 3Spectrum Health, Grand Rapids, MI
(Presented by: Hak Lee)

Introduction: Biomarkers may be useful prognostic indicators prior to and during systemic therapy. We evaluated change in platelet count (ΔPlt) as an indicator of response to primary tyrosine kinase inhibitor (TKI) therapy for metastatic renal cell carcinoma (mRCC).

Methods: Multi-center retrospective study of mRCC patients undergoing neo-adjuvant TKI from 5/2005–8/2014. ΔPlt was defined as post-treatment Plt after first cycle minus pre-treatment Plt. Primary outcome was response of disease to TKI defined by RECIST criteria: partial response (PR), stable disease (SD), and progressive disease (PD). Demographic and clinical characteristics were analyzed between subgroups with stable/increased (+ΔPlt) and decreased (−ΔPlt) counts. Multivariable analysis (MVA) was completed to evaluate for factors associated with tumor response. Kaplan-Meier analysis (KMA) survival analysis compared Plt groups with log-rank test. Sensitivity, specificity, negative predictive value (NPV), and positive predictive value (PPV) were calculated for ΔPlt and disease response.

Results: 115 patients treated with neo-adjuvant TKI were analyzed; 19 (16.5%) had +ΔPlt and 96 (83%) had −ΔPlt after neo-adjuvant TKI. There were no other differences in clinical or demographic variables between the two groups (ECOG, tumor size/grade, number metastases, number of TKI cycles). Patients with −ΔPlt had higher TKI toxicity compared to the +ΔPlt group. (87.9% vs. 57.9%, p=0.005). PD was more common among +ΔPlt (89.4%) vs. −ΔPlt (19.1%), (p<0.001), and SD/PR was more common in −ΔPlt (80.9%) vs. +ΔPlt (10.6%), (p<0.001). On MVA, +ΔPlt above baseline was independently associated with PD (OR=15.4, p=0.001). KMA (Figure) demonstrated lower overall and cancer-specific survival in +ΔPlt vs. −ΔPlt with 5-year survival probability of 23% vs 53% (p<0.0003). ΔPlt had sensitivity of 48.6%, specificity of 97.4%, PPV of 89.5% and NPV of 80.9% for PD.

Conclusion: Patients with −ΔPlt were more likely to respond to TKI therapy and had longer median overall survival. +ΔPlt above baseline had high specificity for predicting PD after primary TKI. Further investigation is requisite to determine the utility of ΔPlt as a biomarker for response to TKI.
**Introduction**: Long-term outcomes of radiofrequency ablation (RFA) in patients with multifocal renal cell carcinoma are not well characterized. We present an analysis of RFA outcomes based upon RENAL score from the longest single-institution follow-up of RFA in patients with multifocal renal carcinoma.

**Methods**: Between 1999–2004, 63 patients with multifocal renal cell carcinoma (RCC) were enrolled in a clinical trial and 113 lesions were treated with RFA. 24 lesions were treated with a 50-watt system, and 89 lesions with a 200-watt system. Eligible lesions were between 0.5 and 4.0 cm in size and exhibited growth on CT. Serial imaging (CT/MRI) continued after treatment and lesion size re-measured and enhancement recorded in Hounsfield units (HU). RENAL score was calculated for each treated tumor.

**Results**: Mean age of the patients at treatment was 42 years (20–74). Median total follow-up was 123 months; mean follow up to last CT scan was 91 months. 34 patients had a single lesion and 20 patients had ≥2 lesions treated during a single RFA session. The median and mean RENAL score for all treated tumors was 7 and the mode was 8. 25.7% had RENAL score ≥9. 27 patients with 49 lesions required no subsequent ipsilateral treatment and were followed for a mean of 101 months. 36 patients with 64 lesions required ipsilateral surgery and were followed for a mean of 117 months. Mean tumor size for lesions with RENAL Score >7 was 2.65 cm while those with RENAL score ≤7 was 2.35 cm (p=0.0012). The mean enhancement of ablated lesions at 1 year was 14.7 HU and 4.7 HU for those groups respectively (p=0.048). At last follow up the mean enhancement was 16.3 HU vs 4.3 HU respectively (p=0.01). For tumors with RENAL >7, 24.5% had enhancement >10 HU whereas only 16.7% of lesions with RENAL ≤7 demonstrated enhancement >10 HU. The cause of multifocal RCC was von Hippel–Lindau (45.1%), Hereditary Papillary Renal Carcinoma (3.5%), sporadic or unknown hereditary kidney lesions (8).

**Conclusion**: With the longest follow-up in the literature, we demonstrate that increasing RENAL score correlates with increasing post-ablation enhancement in renal tumors after RFA in a unique cohort of hereditary and multifocal renal cancer patients.
Poster #146
MULTICENTER ANALYSIS OF ONCOLOGICAL OUTCOMES AFTER PERCUTANEOUS RENAL TUMOR CRYOTHERAPY IN RENAL CELL CANCER
Hak Lee, MD1, Song Wang, MS1, Omer Raheem, MD1, Kyle Gillis, BS1, Amy Alagh, BS1, Michael Liss, MD1, Gerant Rivera, MD1, Robert Wake, MD2, Anthony Patterson, MD2 and Ithaar Derweesh, MD1
1 UC San Diego Health System, La Jolla, CA; 2 University of Tennessee Health Science Center, Memphis, TN
(Presented by: Hak Lee)

Introduction: Percutaneous renal cryotherapy (PRC) is an option for management of small renal mass (SRM). We analyzed oncological outcomes in patients who underwent PRC in patients with documented renal cell carcinoma (RCC) by perioperative biopsy.

Methods: Multicenter retrospective analysis of 153 patients [median follow-up 48 months] who underwent PRC from 09/2005–08/2014. We divided the cohort into patients who developed recurrence vs. no recurrence. Demographics, clinical characteristics, and outcomes were analyzed. Primary outcome was tumor recurrence, whether by primary treatment failure, or progressive disease by metastasis. Multivariate analysis (MVA) was performed to identify risk factors associated with tumor recurrence. Kaplan–Meier analysis (KMA) estimated the disease free survival by comparing the grades 1 vs. 2/3 with log–rank test.

Results: 18 patients (11.8%) developed recurrence and 135 (88.2%) patients were without evidence of tumor recurrence after PRC. There were no differences between the groups with respect to demographic variables. There was greater proportion of non–Caucasian patients in recurrence group (83.3% vs. 54.8%; p=0.021). Greater proportion of patients with recurrence died (27.8% vs. 4.4%; p=0.004). Recurrence group had larger tumor size (3.1 vs. 2.4 cm; p=0.011), upper pole tumor location (p=0.016), and proportions of high grade tumor (33% vs. 0.7%; p<0.001) and clear cell histology (77.8% vs. 45.9%; p=0.011). MVA demonstrated non–white ethnicity (OR=5.25; p<0.024), upper pole tumor location (OR=3.83; p=0.007), increasing tumor size (OR=3.08; p=0.003), clear cell histology (OR=5.68; p=0.012) and increasing tumor grade (OR=14; p<0.001) as independent risk factors associated with tumor recurrence. KMA for DFS revealed that Grade I/II tumors had median DFS of 68 months, but grades 1 and unknown histology were disease free at last follow–up (p<0.001).

Conclusion: Association of higher grade and Clear Cell histology with recurrence and progression suggests need for increased emphasis on preoperative risk stratification by biopsy, with non–Clear Cell histologies and grade I Clear Cell RCC being associated with better outcomes than higher grade Clear Cell RCC.
Poster #147
CYSTIC RENAL CELL CARCINOMA – SIZE OR T−STAGE OF THE CYSTIC TUMOUR MAKES NO DIFFERENCE TO SURVIVAL
Jaimin Bhatt, Sarah Kawaguchi, Shabbir Alibhai, Patrick Richard, Narhari Timilshina, Michael Jewett, Antonio Finelli
University Health Network, Toronto, ON
(Presented by: Jaimin Bhatt)

Introduction: Renal cell carcinoma (RCC) makes up 3–5% of all cancers. Of these, cystic RCCs constitute between 3–14%, and are often picked up as complex enhancing renal cysts on imaging. Since 2004, there has been a pathological reclassification of cystic clear RCC leading to description of multilocular cystic RCC (mcRCC) as a subtype of clear cell RCC. Other types include tubulocystic RCC. We aimed to study the histologic patterns and survival outcomes of all recorded cystic RCCs using a province-wide cancer registry database.

Methods: A retrospective review of all histologically−proven cases of cystic RCC treated by partial or radical nephrectomy (PN or RN) between 1995 and 2008 identified from the Ontario Cancer Registry was performed. Patient demographics, type of surgery, histologic features and survival outcomes were evaluated.

Results: A total of 168 cases of cystic RCCs were identified. Mean age was 54.5 years, with a male preponderance of 58%. RN was performed in 58% with adrenalectomy in 25%. Mean lesion size at histology was 4.1cm (1–18cm). Vast majority were cystic clear−cell or multilocular cystic RCC (mcRCC) with one case of tubulocystic RCC. Ninety−eight % were low grade (Fuhrman grade 1–2). There were only 2 cases of vascular invasion and none of lymphatic invasion. None of the cases involved the renal pelvis or adrenal gland where removed. There were 2 small renal vein thrombi, and 3 cases of perinephric fat invasion. All cases were margin−negative. Patients had a median post−operative follow up of 9.75 years. Thirty deaths occurred but only 3 out of 168 were reported to be due to cancer, hence cancer−specific survival of 98%. There was no difference in survival outcome based on T−stage or tumour size.

Conclusion: In this largest series of cystic RCCs to date, we confirm a favourable histology and an excellent prognosis of mcRCC, making a strong case for nephron−sparing, adrenal−saving approach for cystic renal masses suspicious of being RCCs. The magnitude is underrepresented as we only report on proven cancerous cysts, whereas many excised complex cystic masses are benign. We also confirm that size of the cystic renal cancer makes no difference to outcomes. We opine that labelling a 10cm cystic RCC as T2 is erroneous as the tumour burden is much less than a solid RCC of the same size. We therefore propose that cystic RCCs should not be T−staged.
FACTORS RELATED TO RENAL FUNCTIONAL DECLINE AFTER PERCUTANEOUS RENAL CRYOABLATION: A MULTICENTER ANALYSIS

Hak Lee, MD\(^1\), Song Wang, MS\(^1\), Omer Raheem, MD\(^1\), Kyle Gillis, BS\(^1\), Amy Alagh, BS\(^1\), Michael Liss, MD\(^1\), Gerant Rivera, MD\(^1\), Robert Wake, MD\(^2\), Anthony Patterson, MD\(^2\) and Ithaar Derweesh, MD\(^1\)

\(^1\)UC San Diego Health System, La Jolla, CA; \(^2\)University of Tennessee Health Science Center, Memphis, TN

(Presented by: Hak Lee)

**Introduction:** Percutaneous renal cryoablation (PRC) is an option for management of small renal mass (SRM) in select patients with significant medical co–morbidities. We investigated renal functional outcomes in PRC focusing on percent parenchyma spared and RENAL nephrometry score as a measure of tumor complexity.

**Methods:** Multicenter retrospective analysis of patients who underwent PRC for SRM from 09/2005–08/2014. A cut off of 25% decrease in estimated glomerular filtration rate (GFR, MDRD) was utilized as a surrogate for significant renal functional decline. We then divided the cohort into patients who had >25% and ≤25% decline in eGFR post PRC. RENAL score was assigned to all tumors. Percent volume preservation was calculated with 3–dimensional imaging. Demographic, perioperative factors, RENAL score, and percent parenchyma spared were analyzed between the two groups. Multi–variable analysis (MVA) was performed to identify risk factors associated with renal functional decline.

**Results:** 153 patients [median follow up 48 months] were analyzed. 36 patients (23.5 %) had >25% decline in GFR, compared to 117 (26.5%) who did not. More female (63.9% vs. 28.2%; p=0.0001) and diabetic (41.7% vs. 26.2%; p=0.021) patients had a decrease of eGFR>25%. Median tumor size was significantly higher in the >25% eGFR decrease group (2.8 vs. 2.4 cm; p=0.005) as was median RENAL score (7 vs. 5, p<0.001), and transfusion rates (11.1% vs. 1.7%; p=0.011), though complication rates were not significantly different (p=0.079). Significantly less percent parenchyma spared (70% vs. 85%, p<0.0001) and higher median number of probes (3 vs. 2, p<0.001) were noticed in the >25% eGFR decline group. MVA demonstrated decreasing % parenchyma spared (OR 1.4; p<0.0001), increasing RENAL score (OR 2.41; p=0.004) and female patients (OR 7.18; p=0.013) were independent risk factors associated with decrease in eGFR >25%.

**Conclusion:** Absence of global renal ischemic insult does not protect the kidney from renal functional decline and a significant proportion of patients may yet go on to suffer significant decreases in GFR. Increasing tumor complexity and decreasing percentage parenchyma spared and female sex were independently associated with significant renal functional decline. Development of predictive computer modeling to aid in optimal patient selection and procedure planning may aid in optimizing renal functional outcomes.
Poster #149
MULTICENTER ANALYSIS OF PERIOPERATIVE AND RENAL FUNCTIONAL OUTCOMES OF PARTIAL NEPHRECTOMY FOR COMPLEX RENAL SCORE WITH OR WITHOUT PRE–SURGICAL SUNITINIB

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1UC San Diego Health System, La Jolla, CA; 2Cleveland Clinic, Cleveland, OH; 3Spectrum Health, Grand Rapids, MI
(Presented by: Hak Lee)

Introduction: Partial nephrectomy (PN) in setting of large or complex renal masses is a challenging surgical procedure. We compared perioperative and renal functional outcomes of patients who underwent primary sunitinib therapy prior to PN (pre TKI–PN) for complex renal masses compared to patients who underwent PN and did not undergo primary sunitinib (no preTKI–PN).

Methods: Multi–center retrospective study of Renal Cell Cancer (RCC) patients with complex RENAL Score (>10) who underwent PN from 07/2005–07/2014. Analysis was conducted between pre−TKI PN and no preTKI−PN groups. Demographics, clinical and pathological and perioperative/renal functional data were collected. Primary outcome was post–operative complication rate (Clavien). Secondary outcomes included transfusion rate (%) and change in estimated glomerular filtration rate (eGFR, MDRD). Response to sunitinib was defined by RECIST criteria. Multivariate analysis (MVA) was performed to identify risk factors associated with complications.

Results: 125 patients have complex RENAL scores and underwent PN [47 pre−TKI PN and 78 no pre TKI−PN] with median follow–up 31 months. For preTKI−PN 15 (32.6%) had PR, 29 (63%) had SD, and 2 (4.4%) had PD by RECIST. PreTKI−PN had median tumor size change of −1.4 cm and median RENAL score change from 11 to 9 after TKI. Pre−TKI PN had greater tumor size compared to no pre−TKI PN (7.2 vs 6 cm, p=0.045). There were no differences between groups with respect demographic variables and transfusion rates (p=0.34). Pre−TKI PN had greater overall complication rate (48.9 vs. 26.9%, p=0.0126) and complications by Clavien grade (p<0.001). There were no differences between the two groups for ΔeGFR (preTKI−PN −8.3 vs. no preTKI−PN −11.0, p=0.321) MVA revealed that neoadjuvant TKI was the only independent factor associated with postoperative complications (OR 2.26, p=0.042).

Conclusion: Patients who underwent pre–surgical TKI demonstrated downsizing of primary tumor. Nonetheless, neoadjuvant therapy was associated with increased risk of surgical complications without significant improvement in renal function. While pre–surgical TKI may have a role in facilitating surgery in select patients, our findings do not support widespread utilization of pre–surgical sunitinib in the setting of PN for complex RENAL score.
Poster #150
GRADE HETEROGENEITY IN SMALL RENAL MASSES: POTENTIAL IMPLICATIONS FOR RENAL MASS BIOPSY.
Mark Ball, MD, Stephania Bezerra, MD, Michael Gorin, MD, Morgan Cowan, MD, Christian Pavlovich, MD, Phillip Pierorazio, MD, George Netto, MD, Mohamad Allaf, MD
James Buchanan Brady Urological Institute and Department of Urology, Johns Hopkins University School of Medicine, Baltimore, MD
(Presented by: Mark Ball)

Introduction: Renal cell carcinoma is a heterogeneous disease both at the molecular and histologic level. Understanding the degree of phenotypic heterogeneity within a small renal mass (SRM) may have implications for interpreting renal mass biopsy (RMB) data. In this study we sought to quantify the nuclear grade heterogeneity within SRMs.

Methods: Our institutional renal mass database was queried for patients with T1a (<4cm) renal masses, stratified by the following criteria: imaging diameter <2 cm or > 2 cm, clear cell or papillary histology, low-grade (LG; Fuhrman 1−2) or high-grade (HG; Fuhrman 3−4) with tissue available for review. Four consecutive specimens were chosen from each of the 8 strata for a total of 32. All specimens were reanalyzed and the highest Fuhrman grade present in each 10x−powered field was recorded. A case was classified as heterogeneous if multiple grades were present and classified as discordant if the highest Fuhrman grade was present in less than 50% of the specimen.

Results: A median of 5 slides (IQR 3.5−7.5) and 59 10x powered fields (IQR 34−109) were examined per patient. Overall, 26 samples (81.3%) were heterogeneous, including 15 of 16 (93.8%) HG specimens. Among all cases, 10 (31.3%) were discordant, and among HG specimens, 4 (25%) were discordant. The median fraction of LG tissue in HG specimens was 38.9% (IQR 12.2 − 57.2).

Conclusion: The majority of SRMs demonstrated considerable nuclear grade heterogeneity. The greatest degree of heterogeneity and discordance was observed in HG tumors. One should consider these findings when interpreting RMB data as the risk of under sampling HG tumors may not be insignificant.
Introduction: American Urological Association has recommendations on surveillance strategies following nephron-sparing surgery (NSS). However, the capacity for early detection of recurrences must be balanced against the cost of additional investigations. Furthermore, some debate the ability of current guidelines to effectively detect recurrences following surgery. Methods: To assess the pattern of RCC recurrences in NSS patients, and to determine whether current guidelines for surveillance could be modified based on such patterns. A secondary aim includes estimating the cost implications related to the implementation of changes in surveillance strategies based on recurrence patterns. Method: Retrospective review of single institution NSS database. Pattern of RCC recurrences and factors associated with recurrence were analyzed using the univariate and multivariable (MVA) competing risk regression. Cost of surveillance was estimated based on Medicare charges. Results: From 1999–2012, 505 patients had elective NSS. Primary T-stage included: pT1a (394), pT1b (79) and pT2 or greater (32). Median follow-up was 38.3 (6–88) months, with 68% and 38% of patients followed for more than 24 and 48 months, respectively. Recurrence was detected in 26 patients (5.1%) at a median of 18.9 months and within the following tumor stages; 2.7% of pT1a, 12.7% of pT1b and 15.6% of pT2 or greater tumors. On MVA stage higher than pT1a (HR=6.0, CI=2.8–13.1), the presence of multifocal or bilateral tumors (HR=2.9, CI=1.2–7.0) and left sided lesions (HR=2.4, CI=1.1–5.7) were likely to have recurrence. Only 10 patients recurred beyond 24 months (delayed recurrence), including seven asymptomatic patients diagnosed on surveillance imaging, one patient during workup for elective surgery and 2 patients based on symptoms (dyspnea and limb weakness). The latter 2 patients with symptoms were the only pT1a cases (0.5%) that relapsed beyond 2 years (at 50 and 74 months). Beyond 24 months, routine surveillance did not detect any recurrence in patients with pT1a tumors. Using current AUA guidelines, we estimate the cost savings from omitting routine surveillance beyond 2 years in our cohort of pT1a patients at $1M. Conclusion: Current guidelines adequately capture most clinically significant recurrences and with longer follow up, it may be possible to confirm that routine surveillance beyond 2 years may have little clinical significance for asymptomatic unifocal pT1a patients.
Poster #152
NEOADJUVANT SUNITINIB IS ASSOCIATED WITH IMPROVED ONCOLOGIC OUTCOMES FOR PATIENTS WITH TUMOR THROMBUS IN RENAL CELL CARCINOMA
Hak Lee, MD1, Juan Himenez, MD2, Song Wang, MS1, Omer Raheem, MD1, Kyle Gillis, BS1, Amy Alagh, BS1, Michael Liss, MD1, Frederick Millard, MD1, Christopher Kane, MD1, Brian Lane, MD, PHD3, Steven Campbell, MD, PHD2 and Ithaar Derweesh, MD1
1UC San Diego Health System, La Jolla, CA; 2Cleveland Clinic, Cleveland, OH; 3Spectrum Health, Grand Rapids, MI
(Presented by: Hak Lee)

Introduction: Primary tyrosine kinase inhibitor therapy is increasingly utilized in settings of metastatic and locally advanced renal cell carcinoma (RCC). We analyzed outcomes of neoadjuvant sunitinib in patients with venous thrombus, and compared outcomes to patients who did not undergo neoadjuvant therapy prior to surgery.

Methods: Multicenter retrospective comparison of RCC patients with tumor thrombus who were treated or not treated with neoadjuvant sunitinib prior to surgery. Primary outcome was overall survival (OS) and secondary outcomes were cancer specific survival (CSS) and progression free survival (PFS). Response of disease to sunitinib was defined by RECIST criteria. Kaplan–Meier analysis (KMA) calculated OS, CSS and PFS by comparing neoadjuvant and no neoadjuvant groups with log–rank test. Multivariate analysis (MVA) was performed to identify risk factors associated with our primary and secondary outcomes.

Results: 53 patients with RCC and venous thrombus were analyzed (median follow-up 58 months); 19 (35.8%) patients underwent neoadjuvant sunitinib and 34 (64.2%) did not; 18 patients (9 neoadjuvant; 9 no neoadjuvant) had metastatic RCC. There was no statistical difference in distribution of level of thrombus between the two groups. (p=0.76). In the neo-adjuvant group median primary tumor size decreased from 8.1 cm to 6.8 cm after sunitinib. There was a median thrombus size decrease of 1.3 cm and 10/19 (52.6%) patients post sunitinib maintained and 8/19 (42.1%) had a decrease in their level of thrombus. There were no differences in demographic or clinical/operative variables between the two groups. KMA demonstrated no difference in OS (72 vs. 37, p=0.08), and PFS (23 vs. 5 months, p=0.36), but revealed significant difference in median CSS (72 vs. 38 months, p=0.023) in favor of neoadjuvant sunitinib (Figure). MVA showed that neoadjuvant sunitinib was independently associated with improved OS (OR 12.5; p<0.019).

Conclusion: In RCC patients with tumor thrombus, neoadjuvant sunitinib was associated with reduction in primary tumor and thrombus size and improved CSS. Further investigation is requisite to determine utility of neoadjuvant sunitinib in patients with tumor thrombus.
**Poster Session II – Full Abstracts**

**Poster #153**  
**EXTENDED FOLLOW-UP OF CHRONIC KIDNEY DISEASE DUE TO SURGICAL REMOVAL OF NEPHRONS: IMPACT ON SURVIVAL AND FUNCTIONAL STABILITY**

Sevag Demirjian, MD\(^1\), Brian Lane, MD\(^2\), Ithaar Derweesh, MD\(^3\), Toshio Takagi, MD\(^1\), Zhiling Zhang, MD\(^1\), Lilya Velet, MD\(^1\), Cesar E Ercole, MD\(^1\), Amr Fergany, MD\(^1\) and Steven Campbell, MD\(^1\)

\(^1\)Cleveland Clinic Foundation, Cleveland, OH; \(^2\)Spectrum Health, Michigan State University School of Medicine, Grand Rapids, MI; \(^3\)University of California, San Diego, CA

(Presented by: Sevag Demirjian)

**Introduction:** Chronic kidney disease (CKD) can be associated with increased risk of progression to end-stage renal disease and higher mortality rates. However, etiology of nephron loss may modify these risks. Previous studies noted CKD due to surgical removal of nephrons (CKD-S) may be more stable and associated with better survival than CKD due to medical causes (CKD-M); however, some limitations prevented definitive conclusions. Here we address key limitations with longer follow-up, differentiation of cause of death, and control for potential confounding factors.

**Methods:** From 1999–2008, 4299 patients underwent surgery for renal cancer (RC) at one institution were divided into 3 groups: no CKD (n=1949) for whom new baseline GFR (ml/min/1.73m\(^2\)) after surgery remained >60; CKD-S (n=1113) for whom new baseline GFR was <60 after surgery but preoperative GFR was above this level; and CKD-M/S (n=1237) for whom new baseline GFR and preoperative GFR were both <60. New baseline GFR was defined as the highest GFR within 42 days postop. We evaluated for stability of renal function, overall survival, and non-RCC related survival. Median follow-up was 9.4 years.

**Results:** The CKD-M/S group had higher incidence of DM, HTN, and cardiac disease, and new baseline GFR was lower (38 for CKD-M/S, 49 for CKD-S, and 79 for no CKD). On multivariable analysis (controlling for age, gender, race, DM, HTN, and cardiac disease) the CKD-M/S group demonstrated higher relative rates of progressive decline of renal function (50% decline or need for dialysis), all-cause mortality, and non-RCC related mortality when referenced to the CKD-S and no CKD groups (all HR=1.69–2.33, all p<0.05). In contrast the relative rates of these outcomes were similar for the CKD-S group when referenced to the no CKD group (HR=1.10, 1.19, and 1.07, respectively). New baseline GFR also proved to be a significant predictor of renal functional decline and mortality, particularly if <40–45.

**Conclusion:** CKD-S is more stable than CKD-M/S and exhibits better survival that approximates that of patients with no CKD. However, if new baseline GFR is <40–45 the risk of renal functional decline appears to rise. These findings, which are more robust with almost 10 years of median follow-up and more stringent control of confounding factors, may influence counseling for patients with localized RC with increased oncologic potential and a normal contralateral kidney.
**A CRITICAL ANALYSIS AND VALIDATION OF THE RENAL CELL CARCINOMA BIOMARKER LITERATURE USING THE CANCER GENOME ATLAS (TCGA)**

Samuel D. Kaffenberger, MD, Andrew G. Winer, MD, Victor Reuter, MD, Jonathan Coleman, MD, Paul Russo, MD, James J. Hsieh, MD, A. Ari Hakimi, MD

Memorial Sloan-Kettering Cancer Center

(Presented by: Samuel D. Kaffenberger)

**Introduction:** A tremendous number of biomarker studies have been published for prognostication in clear cell renal cell carcinoma (ccRCC). Unfortunately, the majority have not been validated in independent patient cohorts and even fewer have supporting biological studies for mechanistic corroboration. We therefore sought to systematically appraise the recent ccRCC biomarker literature and to validate putative biomarkers in a large cohort with clinical and comprehensive molecular information—the Cancer Genome Atlas (TCGA).

**Methods:** mRNA and protein-based biomarker prognostication studies in ccRCC were identified in PubMed and selected for analysis. Clinical data and mRNA expression and reverse phase protein array (RPPA) data from TCGA were collected and biomarkers from the literature were matched to the cohort. Univariable and multivariable survival analyses for overall (OS) and disease-specific (DSS) survival were performed using Cox proportional hazards models. The stage, size, grade, and necrosis (SSIGN) score, a validated ccRCC instrument, was utilized to account for pathologic data.

**Results:** 19 studies evaluating tumor mRNA and 83 studies evaluating protein-based biomarkers met inclusion criteria of which only 20% presented any sort of validation. mRNA expression levels for 13 genes were analyzed in the TCGA cohort which consisted of 397 patients with a follow-up of 39 months. The univariable and multivariable analyses for OS and DSS are shown in Tables 1a and 1b, respectively. Only mRNA expression of ARID1a and AXL were independently associated with OS after accounting for SSIGN score and only mRNA expression of AXL and MAP1LC3 were independently associated with DSS. Of the 85 protein biomarkers assessed, RPPA data in TCGA contained information on 20 and most were not differentially expressed. In univariable survival analyses, only AMPK, AKT, and pAKT were significantly associated with OS and DSS and none were independently associated.

**Conclusion:** Very few of the ccRCC biomarkers encountered in the literature showed robust, independent prognostic information in our cohort. It is important to cautiously interpret candidate biomarkers in the absence of biological and clinical confirmatory studies.

**Table 1a: Univariable and multivariable Cox proportional hazards regression for overall survival**

<table>
<thead>
<tr>
<th>HR</th>
<th>CI</th>
<th>p</th>
<th>HR</th>
<th>CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADM</td>
<td>1.17</td>
<td>0.94-1.44</td>
<td>0.246</td>
<td>1.27</td>
<td>0.80-1.92</td>
</tr>
<tr>
<td>ARID1a</td>
<td>0.75</td>
<td>0.53-1.06</td>
<td>0.096</td>
<td>0.61</td>
<td>0.41-0.92</td>
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<tr>
<td>AXL</td>
<td>1.74</td>
<td>1.24-2.36</td>
<td>0.001</td>
<td>1.55</td>
<td>1.03-2.32</td>
</tr>
<tr>
<td>Becn1</td>
<td>0.96</td>
<td>0.69-1.34</td>
<td>0.818</td>
<td>0.92</td>
<td>0.62-1.36</td>
</tr>
<tr>
<td>EKR1</td>
<td>0.53</td>
<td>0.38-0.75</td>
<td>&lt;0.001</td>
<td>0.85</td>
<td>0.48-1.51</td>
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<tr>
<td>EFA1</td>
<td>0.56</td>
<td>0.40-0.80</td>
<td>0.001</td>
<td>1.00</td>
<td>0.59-1.68</td>
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<tr>
<td>GAS6</td>
<td>1.18</td>
<td>0.85-1.66</td>
<td>0.321</td>
<td>1.37</td>
<td>0.93-2.03</td>
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<td>H1OR</td>
<td>1.49</td>
<td>1.03-2.13</td>
<td>0.032</td>
<td>1.08</td>
<td>0.72-1.62</td>
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<tr>
<td>MAP1L3</td>
<td>1.73</td>
<td>1.22-2.44</td>
<td>0.002</td>
<td>1.23</td>
<td>0.81-1.85</td>
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<tr>
<td>PEGAM1</td>
<td>0.71</td>
<td>0.51-0.99</td>
<td>0.046</td>
<td>0.69</td>
<td>0.44-1.07</td>
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<tr>
<td>SLC7A5</td>
<td>2.34</td>
<td>1.64-3.33</td>
<td>&lt;0.001</td>
<td>1.39</td>
<td>0.90-2.14</td>
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<tr>
<td>TSPAN7</td>
<td>0.61</td>
<td>0.44-0.86</td>
<td>0.005</td>
<td>1.50</td>
<td>0.92-2.17</td>
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<tr>
<td>SSIGN Score</td>
<td>1.26</td>
<td>1.21-1.32</td>
<td>&lt;0.001</td>
<td>1.26</td>
<td>1.20-1.32</td>
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**Table 1b: Univariable and multivariable Cox proportional hazards regression for disease-specific survival**

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<tr>
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<th>CI</th>
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<tr>
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<td>ARID1a</td>
<td>0.84</td>
<td>0.57-1.26</td>
<td>0.399</td>
<td>0.66</td>
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<td>AXL</td>
<td>2.08</td>
<td>1.38-3.15</td>
<td>0.001</td>
<td>1.92</td>
<td>1.16-3.17</td>
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<tr>
<td>Becn1</td>
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<td>0.70-1.55</td>
<td>0.047</td>
<td>0.95</td>
<td>0.59-1.53</td>
</tr>
<tr>
<td>EKR1</td>
<td>0.44</td>
<td>0.29-0.67</td>
<td>&lt;0.001</td>
<td>0.84</td>
<td>0.40-1.73</td>
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<td>EFA1</td>
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<td>0.30-0.69</td>
<td>&lt;0.001</td>
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<td>0.51-1.82</td>
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<td>GAS6</td>
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<td>0.314</td>
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<td>0.84-2.12</td>
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<tr>
<td>H1OR</td>
<td>1.55</td>
<td>1.04-2.33</td>
<td>0.032</td>
<td>0.95</td>
<td>0.57-1.67</td>
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<tr>
<td>MAP1LC3</td>
<td>2.13</td>
<td>1.40-3.16</td>
<td>&lt;0.001</td>
<td>1.7</td>
<td>1.01-2.88</td>
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<td>PEGAM1</td>
<td>0.70</td>
<td>0.47-1.04</td>
<td>0.077</td>
<td>0.92</td>
<td>0.54-1.57</td>
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<tr>
<td>SLC7A5</td>
<td>2.61</td>
<td>1.62-4.03</td>
<td>&lt;0.001</td>
<td>1.15</td>
<td>0.68-1.95</td>
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<tr>
<td>TSPAN7</td>
<td>0.45</td>
<td>0.29-0.68</td>
<td>&lt;0.001</td>
<td>1.14</td>
<td>0.58-2.26</td>
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<tr>
<td>SSIGN Score</td>
<td>1.41</td>
<td>1.33-1.49</td>
<td>&lt;0.001</td>
<td>1.41</td>
<td>1.32-1.51</td>
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Poster #155
RISING SERUM URIC ACID LEVEL IS NEGATIVELY ASSOCIATED WITH SURVIVAL IN RENAL CELL CARCINOMA
Omer Raheem, MD1, Hak Lee, MD1, Song Wang, MS1, Reza Mehrzian, MD2, Ryan Kopp, MD1, Jason Woo, MD1, Michael Liss, MD1, Nishant Patel, MD1, Anthony Patterson, MD2, Jim Wan PHD2 and Ithaar Derweesh, MD1
1UC San Diego Health System, La Jolla, CA; 2University of Tennessee Health Science Center, Memphis, TN
(Presented by: Omer Raheem)

Introduction: Hyperuricemia, defined as Uric acid (UA) elevation, has been associated with an increased risk of chronic kidney disease (CKD). Statin medications have been recently associated with improved outcomes in renal cell carcinoma (RCC), and may affect UA levels. We sought to investigate UA levels and statins in a cohort of RCC patients.

Methods: Multi-institutional retrospective study of patients for RCC and had preoperative and postoperative uric acid levels were included. Hyperuricemia was defined as >7mg/dL for males and >5.7 mg/dL for females. Analysis was carried out between two groups: patients with increase in postoperative UA vs. patients with stable/decreased UA postoperative UA. Demographics and clinical characteristics, renal function and oncological outcomes were analyzed and compared. Kaplan–Meier analysis (KMA) calculated OS, CSS and PFS by comparing increased and stable/decreased UA groups with log–rank test. Multivariable analysis (MVA) was performed to identify factors associated with decreased UA.

Results: 905 patients were identified with appropriate UA data between 8/2005–8/2014. Decreased/same UA levels were noted in 675 (74.6%) and increased UA levels were noted in 230 (25.4%); 230/905 (25%) of patients took statins. More patients in group increased UA level were male, non-Caucasian, obese, hypertensive and smokers (p <0.05). Higher proportion of patients with decreased/same UA levels were on statins (28% vs 18%, p=0.004), whereas significantly higher proportion of radical nephrectomy was seen in increased UA level group (77% vs 64%, p<0.001). Comparing rising UA to stable/decreased UA groups, there were significant differences in rates of de novo CKD (38.7% vs. 18.4%, p<0.001), proteinuria (30.9% vs. 20.7%, p=0.002) and anemia (47% vs. 25%, p<0.001). KMA demonstrated improved CSS (168 vs. 81 months, p<0.001) and OS (168 months vs. 67 months, p<0.001) in patients with stable/decreased UA levels. MVA revealed that factors independently associated with decreased UA levels postoperatively included statin utilization (OR 7.8, p<0.001), lower clinical stage (OR 5.1, p=0.004), no CKD (OR 4.2, p<0.001) and no anemia (OR 1.6, p=0.003).

Conclusion: Increasing UA was associated with worsened outcomes in patients with RCC. Decreased UA levels were associated with statin intake and lower stage disease as well as lack of CKD and anemia. Future studies are requisite to clarify the etiology of these interactions.
ASSOCIATION OF OBESITY AND OTHER COMORBIDITIES WITH THE AGGRESSIVENESS OF RENAL CELL CARCINOMA

Kevin Cwach, BS\textsuperscript{1,2,3}, Lewis Thomas, MD\textsuperscript{4,2,3}, Laura Bertrand, MD\textsuperscript{4,2,3}, Lyse Norian, PhD\textsuperscript{5,1,4,2,3} and Kenneth Nepple, MD\textsuperscript{4,2,3}
\textsuperscript{1}Carver College of Medicine; \textsuperscript{2}University of Iowa; \textsuperscript{3}Iowa City, IA; \textsuperscript{4}Department of Urology; \textsuperscript{5}Interdisciplinary Graduate Program in Immunology
(Presented by: Kevin Cwach)

Introduction: Obesity is a risk factor for the development of renal cell carcinoma (RCC). One theory for this is that excess adipose tissue creates a chronic pro-inflammatory state that is tumorigenic. In addition to obesity, hypertension is a RCC risk factor and other medical diseases such as atherosclerosis and diabetes have an element of increased systemic inflammation. We hypothesized that the cumulative inflammatory impact of comorbidity (CMB) may result in differences in tumor characteristics compared to a healthy cohort. We performed a detailed comorbidity evaluation in a RCC cohort, and examined the impact of obesity and CMB on tumor characteristics.

Methods: We performed a detailed retrospective comorbidity evaluation in an RCC cohort (n=83) who underwent surgical excision of their tumors. Obesity was defined as BMI >30 (48/83, 57%). Comorbidity was evaluated with two validated measures, the Charlson Comorbidity Index (CCI) and the Adult Comorbidity Evaluation-27 (ACE-27), which includes obesity (BMI >38) as a comorbidity. The groups were stratified into CMB vs. Non-CMB. CMB was defined as CCI >2 or ACE-27 of moderate/severe (CCI CMB n= 42, non-CMB n=41; ACE-27 CMB n=51, non-CMB n=32) Univariate analysis was used to look for associations between tumor pathology, CMB and obesity.

Results: Obese patients had lower Fuhrman grades vs non-obese patients (2.4 vs 2.8, p=0.012), despite similar tumor sizes, with no significant difference in LVI rates (Table). Comparing CMB vs non-CMB, using both ACE-27 and CCI there were no statistically significant associations between CMB and tumor size, Fuhrman grade, or LVI (Table). A cohort of patients with just T1 tumors was analyzed, with similar results. Obesity was associated with increased CMB by ACE-27 (p=0.002) but not by CCI (p=0.44 respectively).

Conclusion: In our cohort of RCC, obese individuals had less aggressive RCC by Furhman grade despite near identical tumor sizes. Comorbidity seemed to have an insignificant effect on the tumor pathology. We are actively expanding this cohort and evaluating immune parameters to further evaluate the interplay between obesity, CMB, and RCC. This study was funded by NIH grant #1R01CA181088-01 (LAN).

<table>
<thead>
<tr>
<th></th>
<th>Tumor size (cm)</th>
<th>Fuhrman Grade</th>
<th>LVI %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obese (n=48) vs Non-Obese (n=35)</td>
<td>5.1 vs 5.1, (p=0.50)</td>
<td>2.4 vs 2.8 (p=0.012)</td>
<td>17% vs 31%, (p=0.12)</td>
</tr>
<tr>
<td>ACE-27 CMB (n=51) vs non-CMB (n=32)</td>
<td>5.3 vs 4.9 (p=0.85)</td>
<td>2.6 vs 2.7 (p=0.56)</td>
<td>25% vs 19% (p=0.59)</td>
</tr>
<tr>
<td>CCI CMB (n=42) vs non-CMB (n=41)</td>
<td>5.2 vs 5.1 (p=0.85)</td>
<td>2.6 vs 2.6 (p=0.65)</td>
<td>28% vs 15% (p=0.18)</td>
</tr>
</tbody>
</table>
 LOW−RISK SHOULD NOT BE DISMISSED: RETHINKING SURVEILLANCE FOR LOW−RISK RENAL CELL CARCINOMA AFTER PARTIAL NEPHRECTOMY

Paras Shah, MD\textsuperscript{1}, Michael Siev\textsuperscript{1}, Arvin George, MD\textsuperscript{2}, Simpa Salami, MD\textsuperscript{1}, Manaf Alom, MD\textsuperscript{1}, Jessica Kreshover, MD\textsuperscript{1}, Lee Richstone, MD\textsuperscript{1}, Manish Vira, MD\textsuperscript{1} and Louis Kavoussi, MD\textsuperscript{1}
\textsuperscript{1}Arthur Smith Institute for Urology, North Shore–Long Island Jewish Health System, New Hyde Park, NY, USA; \textsuperscript{2}Urologic Oncology Branch, National Cancer Institute, National Institutes of Health, Bethesda, Maryland

(Presented by: Michael Siev)

Introduction: Although low in incidence, recurrence after partial nephrectomy (PN) for small renal masses remains a clinically significant event that warrants appropriate postoperative surveillance. Heterogeneity in current surveillance guidelines introduces potential for delayed or missed detection. This study characterizes patterns of recurrence after PN for clinically localized tumors and assesses the ability of established societal guidelines to reliably detect recurrence, in order to facilitate the development of a more evidence−based, standardized approach to surveillance.

Methods: We performed a retrospective review of 700 patients who underwent laparoscopic PN for a localized renal mass found to be malignant on histology. Among identified cases of recurrences, tumor pathology, site and time to recurrence were assessed. 2014 surveillance guidelines from the AUA, EUA, and NCCN were compared for their ability to reliably detect recurrence among our cohort of patients.

Results: 30 total cases of recurrence were identified (incidence=4.3%). Overall years to recurrence (mean±SD) was 2.58±1.55; by pathologic tumor stage (pT) was 3.23±1.69, 2.10±1.41, 2.71±1.59, and 2.05±1.22 for T1a, T1b, T2a, and T3a tumors respectively. No significant difference in time to recurrence was appreciated between low risk (pT1,N0,MX) and higher risk (pT2a, pT3a) lesions. 60% of recurrences among low risk tumors were in the ipsilateral kidney, followed by lungs (15%) or bone (15%). Consequently, only 60% of recurrences were detectable on ultrasound; 15% required dedicated chest imaging. Among the 20 low risk tumors that recurred, 10 (50%) recurred more than 3 years after PN and may have had delayed detection by AUA and NCCN guidelines; only 3 (15%) low risk lesions recurred 5 years after PN, with potentially delayed detection by EAU guidelines. Substratification of low risk tumors by pT demonstrates that 54% of pT1a recurrences may have had delayed detection by AUA and NCCN guidelines, as opposed to 23% by EAU guidelines.

Conclusion: Low risk renal cell carcinomas are not immune to recurrence after laparoscopic PN and require appropriate surveillance. We demonstrate that a significant number of low risk tumors recur after the 3−year recommendation of several societal guidelines, and are metastatic in nature. As such, more aggressive surveillance protocols that include systemic imaging are warranted to potentially optimize oncologic outcomes.
Poster #158
TRENDS IN THE USE OF HIGH DOSE INTERLEUKIN−2 FOR METASTATIC RENAL CELL CARCINOMA
Christopher Allard, MD1, Francisco Gelpi–Hammerschmidt, MD2, Benjamin I Chung, MD3 and Steven L. Chang, MD2
1Massachusetts General Hospital, Brigham and Women’s Hospital, Boston, MA; 2Division of Urologic Surgery, Brigham and Women’s Hospital, Harvard School of Medicine, Boston, MA; 3Department of Urology, Stanford School of Medicine, Palo Alto, California
(Presented by: Christopher Allard)

Introduction: Metastatic renal cell carcinoma (mRCC) is responsible for approximately 13,000 annual deaths in the United States. High dose interleukin−2 (IL−2) offers a cure in a small percentage of patients but is associated with significant cost and toxicity. Newer targeted therapies have improved progression−free survival, are easier to administer, and have manageable side effect profiles, but durable complete responses are exceedingly rare. We evaluated contemporary utilization trends in IL−2 for mRCC in the era of targeted systemic therapies.

Methods: Using the Premier Hospital Database (Premier, Inc., Charlotte, NC), a nationally representative discharge database with data from over 600 non−federal hospitals in the US, we identified patients receiving IL−2 for mRCC in the United States from 2004–2012. We characterized frequency of use, type of hospital administering treatment, and patient characteristics (age, race, comorbidities, and history of cytoreductive nephrectomy).

Results: The weighted cohort included 5481 patients; an average of 609 patients received IL−2 per year. Most patients (77.4%) had minimal co−morbidities (Charlson comorbidity index <2). Total IL−2 use decreased by 69% from 2004 to 2008 with a subsequent increase through 2012 (Figure 1). Only 4% of IL−2 patients underwent cytoreductive nephrectomy. We observed a trend towards greater centralization of IL−2 use in academic hospitals during the study period.

Conclusion: High dose IL−2 utilization for mRCC in the U.S. decreased following the introduction of targeted systemic therapies but has subsequently increased. Most patients who receive IL−2 have minimal comorbidities. The shift of IL−2 towards high−volume centers may pose a novel barrier to treatment access among eligible mRCC patients. We plan future studies to evaluate the clinical and financial implications of these trends.
Poster #159

CLINICALLY NON−METASTATIC RENAL CELL CARCINOMA WITH SARCOMATOID DEDIFFERENTIATION: NATURAL HISTORY AND OUTCOMES AFTER SURGICAL RESECTION WITH CURATIVE INTENT

Megan Merrill DO 1, Christopher Wood, MD 2, Nizar Tannir, MD 3, Rebecca Slack, MS 4, Kara Babaian, MD 2, Eric Jonasch, MD 3, Lance Pagliaro, MD 3, Zachary Compton, MD 2, Pheroze Tamboli, MD 5, Kanishka Sircar, MD 5, Louis Pisters, MD 2, Surena Matin, MD 2 and Jose Karam, MD 2

1Department of Urology– The Ohio State University; 2Department of Urology–The University of Texas, MD Anderson Cancer Center, Houston, TX; 3Department of Genitourinary Medical Oncology, The University of Texas, MD Anderson Cancer Center, Houston, TX; 4Department of Biostatistics, The University of Texas, MD Anderson Cancer Center, Houston, TX; 5Department of Pathology, The University of Texas, MD Anderson Cancer Center, Houston, TX

(Presented by: Megan Merrill)

Introduction: Renal cell carcinoma with sarcomatoid dedifferentiation (sRCC) is an aggressive malignancy associated with a poor prognosis. While existing literature focuses on patients presenting with metastatic disease, characteristics and outcomes for patients with localized disease are not well described. We aimed to evaluate post−nephrectomy characteristics, outcomes, and predictors of survival in patients with sRCC who presented with clinically localized disease.

Methods: An IRB−approved review from 1986−2011 identified 77 patients who presented with clinically localized disease, underwent nephrectomy and had sRCC in their primary kidney tumor. Clinical and pathologic variables were captured for each patient. Overall survival (OS) and recurrence−free survival (RFS) were calculated for all patients and those who had no evidence of disease (NED) following nephrectomy, respectively. Comparisons were made with categorical groupings in proportional hazards regression models for univariable and multivariable analyses.

Results: OS for the entire cohort (N=77) at 2 years was 50%. A total of 56 (77%) patients of the 73 who were NED following nephrectomy patients experienced a recurrence, with a median time to recurrence of 26.2 months. On multivariable analysis, tumor stage, pathologically positive lymph nodes, and year of nephrectomy were significant predictors of both OS and RFS. Limitations include the retrospective nature of this study and relatively small sample size.

Conclusion: Long−term survival for patients with sRCC, even in clinically localized disease is poor. Aggressive surveillance of those who are NED following nephrectomy is essential and further prospective studies evaluating the benefit of adjuvant systemic therapies in this cohort are warranted.
VARIANT HISTOLOGY DOES NOT PREDICT SURVIVAL OUTCOMES AFTER RADICAL NEPHROURETERECTOMY FOR UPPER TRACT UROTHELIAL CARCINOMA: Results: FROM THE CANADIAN UPPER TRACT COLLABORATION

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1University of Alberta, Edmonton, AB; 2McGill University, Montreal, QC; 3Dalhousie University, Halifax, NS; 4University of Western Ontario, London, ON; 5McMaster University, Hamilton, ON; 6University of British Columbia, Vancouver, BC; 7University of Montreal, Montreal, QC; 8University of Winnipeg, Winnipeg, MN; 9University of Ottawa, Ottawa, ON; 10Laval University, Quebec City, QC

(Presented by: Lucas Dean)

Introduction: Predictors of survival after radical nephroureterectomy (RNU) for upper tract urothelial carcinoma (UTUC) include age, pathologic TNM stage, lymphovascular invasion (LVI), histologic grade, and tumor architecture. Little data are available on the role of variant histology as a prognostic factor for survival. The objective of this study was to investigate the association between variant histology and survival outcomes in patients who underwent RNU for UTUC.

Methods: Institutional RNU databases containing information on UTUC patients treated between 1994 and 2009 were obtained from 10 academic centers in Canada. Data were collected on 1029 patients and combined into a relational database formatted with patient characteristics, pathologic characteristics, and survival status. Histologic type was categorized as pure urothelial carcinoma (UC; N=972) or UC + variant histology (N=40). Kaplan–Meier analysis and Cox proportional regression models were used to analyze overall survival (OS), disease–specific survival (CSS), and recurrence–free survival (RFS).

Results: Median follow–up duration was 2.5 years (IQR: 0.6–6.2 years). Baseline characteristics were similar between groups except that the UC + variant histology group had a higher proportion of patients with concomitant carcinoma in–situ (7.5% vs. 3.6%, p=0.016) and LVI (25% vs 16%; p=0.01). Overall survival (65% vs 69%; p=0.58), DSS (77% vs 79%; p=0.84), and RFS (42% vs 47%; p=0.60) did not differ between groups. On multivariate analysis, UC + variant histology was not independently associated with OS (HR 0.89; 95% CI 0.46–1.71; p=0.74), DSS (HR 0.66; 95% CI 0.27–1.62; p=0.37), or RFS (HR 0.87; 95% CI 0.53–1.42; p=0.56).

Conclusion: Despite being associated with concomitant CIS and LVI, the presence of UC + variant histology was not predictive of survival outcomes following RNU for UTUC.
THE PROSTATE GENETIC SCORE (PGS) STRATIFIES BASELINE RISK OF PROSTATE CANCER AND IMPROVES PSA PERFORMANCE IN THE PLCO TRIAL

Michael A. Liss, MD, MAS1, Jianfeng Xu, PhD2, Haitao Chen, PhD3 and A. Karim Kader, MD, PhD4
1UTHSCSA, San Antonio, TX; 2Wake Forest, Winston-Salem, NC; 3Fudan University, Shanghai, China; 4UCSD, San Diego, CA
(Presented by: Michael A. Liss)

Introduction: Prostate specific antigen (PSA) based prostate cancer (PCa) screening has limited survival benefit that can be improved by screening men at high-risk. We investigate the ability of the prostate genetic risk score (PGS), a germline biomarker of PCa risk, to categorize men participating in the prostate, lung, colorectal, and ovarian (PLCO) cancer screening trial and determine its effects on PSA performance.

Methods: We obtained the genetic data from the Cancer Genetic Markers of Susceptibility (CGEMS), a nested case control study examining germline DNA markers of the screened arm of the PLCO trial. Other demographics collected at trial entry were linked with the genomic data. A PGS was calculated based on their genotype at 33 PCa associated single nucleotide polymorphisms (SNPs) genotype and weighted by odds ratio (OR) and allele frequency of SNPs as previously described. A PGS of 1.0 indicates an average risk in the general population. The primary outcome was the diagnosis of PCa and primary predictor was PGS score.

Results: obtained: We identified 2,244 patients in the CGEMS database corresponding to controls (no cancer, N=1017) and cases: non–aggressive PCa (N=550) and aggressive PCa (N=677). The PGS (p<0.001), prostate specific antigen (PSA; p<0.001), family history of PCa (<0.001), abnormal digital rectal exam (DRE, p<0.001), and history of ever smoking (p=0.037) were associated with PCa diagnosis. In multivariable analysis, the log (PGS) was associated with PCa diagnosis with an odds ratio of 1.68 (95% CI 1.36−2.08, p<0.001), log (PSA) (OR 8.2; 95% CI 6.75−10.04, p<0.001), and family history of PCa (OR 2.01; 95% CI 1.26−3.20, p=0.003). The PGS was divided into quartiles noting an increasing the rate of prostate cancer detection in addition to PSA: 43.2% (Q1), 47.8% (Q2), 58.8% (Q3), and 69.4 (Q4) (P<0.001) and improvement in PSA performance (p<0.001). (Figure 1)

Conclusion: Germ–line DNA in the form of the PGS is able to risk stratify men regarding their risk of PCa. The PGS may have implications regarding who may benefit most from PCa screening and possibly add to PSA performance.
WHEN IS THE BEST TIME TO GIVE AKT INHIBITOR THERAPY IN ADVANCED PROSTATE CANCER?

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Vancouver Prostate Centre, Department of Urologic Sciences, Vancouver, Canada
(Presented by: Paul Toren)

Introduction: Several preclinical studies support the use of combined blockade of the PI3K/Akt/mTOR and AR pathways in prostate cancer. However, the optimal timing of using PI3K/Akt/mTOR pathway inhibitors remains to be fully understood. Using the well characterized LNCaP xenograft model and the enzalutamide-resistant MR49F model, we evaluate the use of combination AKT and AR blockade at different time points to model different prostate cancer disease states.

Methods: LNCaP cells were inoculated into the flanks of 6 week old nude mice. Mice were castrated when PSA reached 50ng/mL. AZD5363 37.5mg/kg twice daily was given to inhibit the Akt pathway and enzalutamide (ENZ) 10mg/kg once daily was given to inhibit the AR pathway. Treatments were administered 5 days per week. Tumour growth and PSA responses were assessed when the combination was given at time of castration and when the PSA recurred to pre-castration levels (CRPC). Comparator arms at time of CRPC included AZD5363 and ENZ monotherapy. To model ENZ-resistance, AZD5363 was given with or without ENZ to LNCaP-derived ENZ-resistant MR49F cells inoculated into castrate mice.

Results: In the LNCaP xenograft model, combination AZD5363 + ENZ resulted in a dramatic regression of tumours and suppression of PSA when given both at castration and at time of CRPC. No significant regression of tumour size was seen with castration alone or with AZD5363 monotherapy at time of CRPC. The mean PSA nadir was lowered to a greater extent with combination therapy given at castration relative to vehicle (51-fold difference, p=0.064) compared to AZD5363 + ENZ given at time of CPRC relative to ENZ treatment (12-fold difference, P=0.065). On discontinuation of combination therapy after near complete regression of tumours treated at time of castration, a similar rising PSA velocity compared to control mice suggests there is no selection or adaption toward a more aggressive phenotype. In the MR49F model, ENZ induced an agonist effect in vivo, complicating evaluation of the combination approach. Studies in this model using AZD5363 indicated a dose-dependent response, but even without ENZ progressive tumour growth did eventually occur on treatment in all cases. Tumour progression during AZD5363 + ENZ treatment was not observed in the LNCaP model.

Conclusion: These preclinical results suggest that Akt inhibitor therapy in combination with ENZ may be more effective when given earlier in the course of disease.
ABIRATERONE ACETATE (AA) IMPROVES OVERALL SURVIVAL (OS) IN CHEMOTHERAPY–NAÏVE METASTATIC CASTRATION–RESISTANT PROSTATE CANCER (MCRPC) PATIENTS: FINAL ANALYSIS OF COU–AA–302, A RANDOMIZED PHASE 3 STUDY

Fred Saad, MD, FRCS1, Charles J. Ryan, MD2, Matthew R. Smith, MD, PhD3, Karim Fizazi, MD, PhD4, Kurt Miller, MD, PhD5, Peter F.A. Mulders, MD, PhD6, Cora N. Sternberg, MD, FACP7, Thomas W. Griffin, MD8, Peter De Porre, MD9, Youn C. Park, PhD10, Jinhui Li, PhD10, Thian Kheoh, PhD8, Vahid Naini PharmD8, Arturo Molina, MD, MS, FACP11 and Dana E. Rathkopf, MD8

1University of Montréal, Montréal, QC, Canada; 2Helen Diller Family Comprehensive Cancer Center, University of California, San Francisco, CA; 3Harvard Medical School and Massachusetts General Hospital, Boston, MA; 4Institut Gustave Roussy, University of Paris Sud, Villejuif, France; 5Department of Urology, Charité Berlin, Berlin, Germany; 6Radboud University Medical Centre, Nijmegen, The Netherlands; 7San Camillo and Forlanini Hospitals, Rome, Italy; 8Janssen Research & Development, Los Angeles, CA; 9Janssen Research & Development, Beerse, Belgium; 10Janssen Research & Development, Raritan, NJ; 11Janssen Research & Development, Menlo Park, CA

(Presented by: Fred Saad)

Introduction: AA is the prodrug of abiraterone, a specific CYP17 inhibitor that blocks androgen biosynthesis. It is approved with prednisone (P) for the treatment of pts with progressive mCRPC. Planned COU–AA–302 interim analyses at 43% (Ryan, NEJM 2013) and 56% (Rathkopf, Eur Urol 2014) of expected deaths in mCRPC chemotherapy naïve pts showed that AA + P significantly delayed disease progression and improved OS vs P alone, and was well tolerated. We report the prespecified final analysis (96% of expected deaths) of OS, time to opiate use for cancer–related pain and safety outcomes.

Methods: 1088 pts were randomized 1:1 to receive AA (1 g) + P (5 mg orally twice daily) vs P. Coprimary endpoints were radiographic progression–free survival and OS. Median time to events with 95% CI was estimated by the Kaplan–Meier method. Cox model was used to estimate the HR. Stratified log–rank test was used to test the treatment effect difference. The O’Brien–Fleming boundary using the Lan–DeMets α-spending function was implemented to control the overall α at 0.04 for OS. The final analysis nominal significance level for efficacy was 0.0384.

Results: With median follow–up of 49.2 months, OS final analysis was performed after 741 deaths. 44% of pts in the P arm subsequently received AA + P. AA + P significantly prolonged OS vs P (median OS, 34.7 vs 30.3 mos; HR=0.81 [95% CI 0.70–0.93]; p=0.0033). AA + P significantly decreased the risk of time to opiate use for cancer–related pain vs P (median 33.4 vs 23.4 mos; HR=0.72 [95% CI 0.61–0.85]; p<0.0001) Adverse events (AEs) of special interest were more common with AA + P vs P; grade 3/4 AEs: hypertension, 4.6% vs 3.1%; hypokalemia, 2.6% vs 1.9%; alanine aminotransferase increased, 5.9% vs 0.7%; aspartate aminotransferase increased, 3.3% vs 0.9%; fluid retention/edema, 1.1% vs 1.7%. However, a direct treatment arm safety comparison is limited as most P arm pts had already discontinued or crossed over since the second interim analysis.

Conclusion: With a median follow–up of >4 years, the COU–AA–302 prespecified, final analysis demonstrates a statistically significant OS benefit with AA + P despite many pts in the P arm having received AA + P and other subsequent therapy. AA also delayed the onset of symptoms and the need for opiate analgesics. With nearly an additional 2 years of follow–up since last reported, AA + P maintained a favorable safety profile and was well tolerated.

Funding Janssen Research & Development.
Poster #164
REGIONAL COST VARIATIONS OF RADICAL PROSTATECTOMY IN THE UNITED STATES: ROBOTIC VERSUS OPEN SURGERY
Neal Patel, MD, Viktor Y. Dombrovskiy, MD, PhD, MPH, Izak Faiena, MD, Rutveej Patel, MD, Parth K. Modi, MD, Amirali H. Salmasi, MD, Eric A. Singer, MD, MA, Isaac Y. Kim, MD, PhD
Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey
(Presented by: Neal Patel)

Introduction: A common criticism of robot-assisted radical prostatectomy (RARP) is its higher cost compared to open radical prostatectomy (ORP). Previous population-based studies have identified regional variations in radical prostatectomy cost in the United States. We aim to evaluate cost differences between RARP and ORP in various census regions of the USA.

Methods: ICD-9-CM diagnosis and procedure codes were used to identify in the Nationwide Inpatient Sample (NIS) 2009–2011 patients with prostate cancer who underwent RARP or ORP. Hospital cost was calculated from total hospital charges in the NIS with adjustment to cost in 2011. Because of skewness, cost was presented as median with interquartile range (IQR) and was compared with Wilcoxon rank sum test and multivariate linear regression analysis with adjustment by age, gender, race, comorbidities, and hospital characteristics.

Results: 24,636 RARP and 13,590 ORP were evaluated. As shown in Table 1, the smallest cost for both procedures was in the South; the greatest cost overall and for RARP was found in the West, for ORP – in the Northeast. In the multivariate analysis of the overall cost of the radical prostatectomy, costs in the Northeast, Midwest and West were, respectively, 12.1%, 19.6% and 40.3% (P<0.0001 for all) greater compared to the South. For RARP, this increase in these regions compared to the South was equal, respectively, 3.4%, 23.1% and 40.4% (P<0.0001 for all); for ORP it was equal to 33.8%, 13.0% and 37.6% (P<0.0001 for all). In all regions except Northeast cost for RARP was greater than for ORP. Adjusted by patient and hospital characteristics, it was 43.3% greater in the Midwest, 37.2% greater in the South, and 39.1% greater in the West (P<0.0001 for all). At the same time, cost for RARP in the Northeast was 12.1% less than for ORP (P<0.0001).

Conclusion: Cost for radical prostatectomy significantly varied in the Nation and in the majority of regions it is significantly greater for RARP compared to ORP. In contrast, RARP in the Northeast is less expensive than ORP. The further research is needed to find the reason of these differences in order to optimize cost of radical prostatectomy as a whole and robot-assisted in particular.

Table 1.

<table>
<thead>
<tr>
<th>US Regions</th>
<th>Cost $, median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall RARP ORP</td>
</tr>
<tr>
<td>Northeast</td>
<td>10,473 (5,839) 10,126 (5,288) 11,423 (7,400)</td>
</tr>
<tr>
<td>Midwest</td>
<td>11,162 (6,261) 12,662 (6,927) 9,452 (5,027)</td>
</tr>
<tr>
<td>South</td>
<td>9,220 (4,544) 9,720 (4,744) 8,132 (4,325)</td>
</tr>
<tr>
<td>West</td>
<td>13,125 (6,825) 13,913 (6,570) 10,934 (6,750)</td>
</tr>
</tbody>
</table>
Poster #165
ONCOLOGICAL OUTCOMES IN HIGH−RISK PROSTATE CANCER AFTER RADICAL PROSTATECTOMY BASED ON GLEASON SCORE: USC EXPERIENCE WITH 3755 CASES
Weichen Xu BA¹, Jie Cai, MS², Gary Lieskovsky, MD², Siamak Daneshmand, MD² and Hooman Djaladat, MD³
¹Keck School of Medicine of USC; ²USC Institute of Urology; ³USC Institute of Urology, Los Angeles, CA
(Presented by: Hooman Djaladat)

Introduction: Gleason score is an important predictor of oncological outcomes after radical prostatectomy. However, it remains unclear whether there is a difference in outcomes between a Gleason score (GS) 8 and a GS 9−10 tumor. We compare oncological outcomes after open radical prostatectomy for prostate cancer patients with GS of 8 versus 9−10.

Methods: Of 3755 radical prostatectomy patients (1987−2008), 360 patients who had final cancer pathology of GS 8, 9 or 10 and lymph node negative were included in this study. Age, race, and surgical margins were compared between the two groups without any significant differences. Impact of Gleason scores on outcomes was controlled for preoperative PSA, pathological stage, use of adjuvant radiation therapy and use of neoadjuvant/adjuvant hormone deprivation therapy in multivariable analyses. Outcomes of interest were biochemical recurrence free survival (BCRFS), clinical recurrence free survival (CRFS) and overall survival (OS). Kaplan Meier plots, log rank tests and multivariable Cox regression model were used to analyze the data.

Results: Median age for both groups was 66 years. Median follow−up for GS 8 and GS 9−10 were 10.0 years and 8.6 years, respectively (p=0.43). Demographic data and multivariable analysis are presented in Table 1 and 2, respectively. Outcomes were not significantly different between different tumor patterns within GS 8. Results in following tables.

Conclusion: Long term follow up after radical prostatectomy reveals significant differences in BCRFS and CRFS but not OS between patients with GS 8 vs. 9−10 prostate cancers. Further studies may examine sub−stratification of GS 8 tumors into a lower risk category than GS 9−10 tumors.

Table 1.

<table>
<thead>
<tr>
<th>Total patients</th>
<th>GS 8</th>
<th>GS 9,10</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Gleason score (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>112 (49.4)</td>
<td>133</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>60 (26.4)</td>
<td>101 (75.9)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>55 (24.2)</td>
<td>32 (32.1)</td>
<td></td>
</tr>
<tr>
<td>PSA &lt;10 (%)</td>
<td>135 (59.5)</td>
<td>66 (45.6)</td>
<td></td>
</tr>
<tr>
<td>PSA 10−20 (%)</td>
<td>58 (25.5)</td>
<td>33 (24.8)</td>
<td></td>
</tr>
<tr>
<td>PSA &gt;20 (%)</td>
<td>34 (15)</td>
<td>34 (25.6)</td>
<td>0.042</td>
</tr>
<tr>
<td>Non−organ confined disease (%)</td>
<td>125 (55.1)</td>
<td>95 (71.4)</td>
<td>0.003</td>
</tr>
<tr>
<td>Radiation therapy (%)</td>
<td>97 (42.7)</td>
<td>67 (50.4)</td>
<td>0.188</td>
</tr>
<tr>
<td>Any hormone deprivation therapy (%)</td>
<td>59 (26)</td>
<td>62 (46.6)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 2.

<table>
<thead>
<tr>
<th>Prognostic factors</th>
<th>BCRFS</th>
<th></th>
<th>CRFS</th>
<th></th>
<th>OS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>p−value</td>
<td></td>
<td>HR</td>
<td>p−value</td>
<td></td>
<td>HR</td>
</tr>
<tr>
<td>Gleason 9/10 vs. 8</td>
<td>1.598</td>
<td>0.017</td>
<td>1.902</td>
<td>0.026</td>
<td>1.304</td>
<td>0.219</td>
</tr>
<tr>
<td>PSA &gt;20 vs. not</td>
<td>1.557</td>
<td>0.069</td>
<td>1.147</td>
<td>0.688</td>
<td>1.142</td>
<td>0.614</td>
</tr>
<tr>
<td>non organ confined vs. organ confined cancer</td>
<td>1.448</td>
<td>0.111</td>
<td>0.967</td>
<td>0.923</td>
<td>1.872</td>
<td>0.018</td>
</tr>
<tr>
<td>Radiation therapy vs. not</td>
<td>1.120</td>
<td>0.595</td>
<td>2.477</td>
<td>0.008</td>
<td>1.392</td>
<td>0.188</td>
</tr>
<tr>
<td>Any hormone deprivation therapy vs. not</td>
<td>1.085</td>
<td>0.688</td>
<td>1.152</td>
<td>0.634</td>
<td>1.243</td>
<td>0.320</td>
</tr>
</tbody>
</table>
Poster Session II – Full Abstracts

Poster #166
VALIDATION OF AN ACTIVE SURVEILLANCE THRESHOLD FOR THE CCP SCORE IN CONSERVATIVELY MANAGED MEN WITH LOCALIZED PROSTATE CANCER

Steven Stone1, Jack Cuzick, PhD2, Gabrielle Fisher, PhD2, Zi Hua Yang, PhD2, Bernard V. North, PhD2, Daniel M. Berney FRCPPath3, Luis Beltran3, David C. Greenberg, PhD4, Henrik Moller, MD5, Julia E. Reid, MStat1, Alexander S. Gutin, PhD1, Jerry S. Lanchbury, PhD1, Michael K. Brawer, MD1 and Peter T. Scardino, MD6
1 Myriad Genetics, Inc., Salt Lake City, UT; 2 Wolfson Institute of Preventive Medicine, Queen Mary University of London, London, UK; 3 Barts Cancer Institute, Queen Mary University of London, London, UK; 4 National Cancer Registration Service (Eastern Office), Public Health England, Cambridge, UK; 5 Cancer Epidemiology and Population Health, King’s College London, London, UK; 6 Department of Urology, Memorial Sloan–Kettering, New York, NY
(Presented by: Steven Stone)

Introduction: Active surveillance (AS) is an increasingly popular treatment modality for men with localized prostate cancer. However, better risk stratification is needed to appropriately select men for AS. The cell cycle progression (CCP) score (based on measuring the expression levels of CCP genes) has proven to be a robust predictor of prostate cancer outcomes in various clinical settings, including in conservatively managed cohorts. Here, we present a validation of an AS threshold for a predefined score that combines CCP with CAPRA (combined clinical CCP risk (CCR) score) for predicting prostate cancer mortality (PCM) in conservatively managed patients.

Methods: We determined the CCR score distribution in 505 men who were tested in our clinical laboratory and, based on their clinical characteristics only, might typically be considered for AS. Specifically, the training cohort consisted of men who had Gleason score ≤ 3+4; PSA < 10 ng/ml; < 25% cores positive; and clinical stage ≤ T2a. A threshold CCR score of 0.80 was selected such that 90% of the men in the training cohort had scores below the threshold. The performance characteristics of the threshold were then evaluated in two independent cohorts of conservatively managed men (TAPG1 [N= 180] and TAPG2 [N=585]). As reported previously, the CCP score was a strong prognostic indicator in both cohorts. Survival data were censored at 10 years.

Results: The primary pre–planned analysis called for evaluating the CCR threshold on TAPG2. There were 60 men (of 585) below the threshold in the validation cohort and the threshold validated, dichotomizing the cohort into high and low risk groups (log rank P–value = 0.0008). There were no deaths in patients below the threshold and the Cox proportional hazard estimate of 10–year PCM associated with the CCR threshold was 3.3%. The 10–year risk of PCM associated with the threshold in the combined cohort (TAPG1 and TAPG2) was 3.2%, and as before, there were no observed prostate cancer deaths in patients below the threshold.

Conclusion: For patients considering deferred treatment, the CCR score provides significant prognostic information at disease diagnosis. The threshold presented here was derived from the ‘typical’ risk of PSM for AS patients, and it can be used to guide patient selection for AS based on an integrated view of risk assessment.
Poster #167
PATHOLOGIC GLEASON 8–10: DO ALL MEN DO POORLY? Results: FROM THE SEARCH DATABASE
Sean Fischer1, Ross Simon, MD1,2, Lauren Howard, MS1,3, William Aronson, MD4,5, Martha Terris, MD6,7, Christopher Kane, MD8, Christopher Amling, MD9, Matt Cooperberg, MD10,11,12, Stephen Freedland, MD1,2 and Adriana Vidal, PhD1
1Division of Urology, Department of Surgery and Pathology, Duke University School of Medicine, Durham, NC; 2Urology Section, Veterans Affairs Medical Center, Durham, NC; 3Department of Biostatistics and Bioinformatics, Duke University School of Medicine, Durham, NC; 4Urology Section, Department of Surgery, Veterans Affairs Medical Center of Greater Los Angeles, Los Angeles, California; 5Department of Urology, University of California at Los Angeles Medical Center, Los Angeles, California; 6Urology Section, Division of Surgery, Veterans Affairs Medical Center, Augusta, Georgia; 7Division of Urologic Surgery, Department of Surgery, Medical College of Georgia, Augusta, Georgia; 8Division of Urology, Department of Surgery, University of California at San Diego Medical Center, San Diego, California; 9Department of Urology, Oregon Health and Science University, Portland, Oregon; 10Department of Urology, University of California at San Francisco, San Francisco, California; 11Department of Epidemiology and Biostatistics, University of California at San Francisco, San Francisco, California; 12Urology Section, Department of Surgery, Veterans Affairs Medical Center, San Francisco, California
(Presented by: Sean Fischer)

Introduction: Pathologic Gleason 8–10 is associated with high risk of biochemical recurrence (BCR). However, whether there are subsets of men with Gleason 8–10 who have particularly high or low BCR risk is unknown. We examined predictors for early BCR (2–years) after radical prostatectomy (RP), among patients with pathological Gleason 8–10.

Methods: We identified 459 patients treated with RP with pathologic Gleason 8–10 in the SEARCH database. Patients were stratified into 5 groups based on pathological characteristics – Group 1: men with negative surgical margins and no extracapsular extension (−SM/−ECE), Group 2 (+SM/−ECE), Group 3 (−SM/+ECE), Group 4 (+SM/+ECE), and Group 5: men with seminal vesicle invasion (+SVI). BCR was defined as a single PSA greater than 0.2 ng/ml, 2 values of 0.2 ng/ml, or secondary treatment for an elevated postoperative PSA. Cox proportional hazard models were used to compare early BCR (2–years post–RP) among groups and a log–rank test was used to assess the difference between survival curves by group.

Results: At 2–years post–RP, patients in Group 5 (+SVI) had the highest BCR risk (66%) whereas men in Group 1 (−SM/ECE) had the lowest risk (1%, p<0.001). No significant difference in recurrence among groups 2 to 4 (~50% recurrence, log–rank, p=0.28) was found. On multivariable analysis after adjusting for PSA, age, pathological Gleason sum, and clinical stage; Group 5 had the highest recurrence risk, Groups 2–4 were at intermediate–risk with no differences among the groups, and Group 1 had the lowest risk of recurrence.

Conclusion: In patients with high grade (Gleason 8–10) prostate cancer after RP, the presence of surgical margins, extracapsular extension, both surgical margins and extracapsular extension, and seminal vesicle invasion are all associated with an increased risk of early BCR. While patients with seminal vesicle invasion are at the highest risk of recurrence, the presence of any of these pathological features among patients with Gleason 8–10 may warrant adjuvant radiation. On the contrary, men with organ–confined margin negative disease have a very low risk of early BCR despite Gleason 8–10 disease.
A MULTI-INSTITUTIONAL PROSPECTIVE TRIAL IN THE UNITED STATES CONFIRMS THE 4KSCORE ACCURATELY IDENTIFIES MEN WITH HIGH−GRADE PROSTATE CANCER

Sanoj Punnen, MD, Dan Sjoberg1, Steve Zappala, MD2 and Dipen Parekh, MD3
1Memorial Sloan Kettering, New York, NY; 2Andover Urology, Andover, MI; 3University of Miami, Miami, FL
(Presented by: Sanoj Punnen)

Introduction: Prostate cancer screening is associated with improved cancer−specific mortality, but comes at a high cost, with large numbers of men needing to be screened, biopsied, and treated to save one life. The 4Kscore is a blood test combining four kallikrein assays with clinical information in an algorithm that reports the probability of high−grade prostate cancer on biopsy of the prostate. It has been well validated in multiple retrospective European cohorts, but has never been tested in a US population. This study is the first prospective evaluation of the 4Kscore for detecting high−grade prostate cancer among men referred for prostate biopsy in the United States.

Methods: Prospective enrollment of 1,012 men scheduled for prostate biopsy, regardless of PSA level or clinical findings, was completed at 26 US centers between Oct. 2013 and April 2014. The AUC, risk calibration, and decision curve analysis (DCA) were performed, along with comparisons of probability cut offs for achieving biopsy reduction and their impact on delaying diagnosis.

Results: High−grade prostate cancer was found in 231 (23%) of the 1,012 patients. The 4Kscore showed excellent calibration with the predicted probability of high−grade cancer being similar to the observed. The 4Kscore demonstrated higher discrimination than the popular Prostate Cancer Prevention Trial Risk Calculator (PCPTRC) (AUC 0.82 versus 0.74, p−value <0.0001). In addition, the 4Kscore displayed a higher net benefit by DCA than the PCPTRC and standard of care at all threshold probabilities used in common clinical practice. For example, if a 9% probability of high−grade cancer was used as a threshold for biopsy of the prostate, 434 (43%) unnecessary biopsies could have been avoided, while delaying diagnosis of only 24 (2.4%) high−grade cancers.

Conclusion: The 4Kscore demonstrated excellent accuracy in detecting high−grade prostate cancer. It is a useful tool in selecting men who are likely to have high−grade disease and most likely to benefit from a prostate biopsy versus those men with no cancer or indolent cancer.

Funding: OPKO Diagnostics, LLC
Poster #169
MRI/US FUSION−GUIDED BIOPSY DETECTS CLINICALLY SIGNIFICANT PROSTATE CANCER IN THE CENTRAL GLAND CORRELATING WITH INDEX LESION
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1Urologic Oncology Branch, National Cancer Institute, National Institutes of Health, Bethesda, Maryland; 2Molecular Imaging Program, National Cancer Institute, National Institutes of Health, Bethesda, Maryland; 3Center for Interventional Oncology, National Cancer Institute & Clinical Center, National Institutes of Health, Bethesda, Maryland; 4Laboratory of Pathology, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
(Presented by: Michele Fascelli)

Introduction: Central gland (CG) prostatic adenocarcinomas (CaP) are historically reported with lesser incidence, smaller tumor volume, and higher Gleason scores when compared to the peripheral zone (PZ). Additionally, index tumor lesions as defined by highest grade may be missed when residing in the CG. MRI/US fusion-guided biopsy allows targeting of lesions seen on MRI, potentially better identifying cancer outside the traditional TRUS biopsy template.

Methods: Retrospective review was performed of 1003 patients who underwent MR/US fusion-guided biopsy of 2119 suspicious lesions. Targets were stratified by zonal distribution of the lesion on multiparametric MRI (mpMRI) in the CG or PZ. Detection rates for Gleason ≥4+3 cancers were tabulated by location and correlated with PSA, Gleason score, prostate volume and MRI suspicion.

Results: MR/US fusion-guided biopsy targeted lesions in the central (n=711, 34%) or peripheral (n=1408, 66%) prostatic zones. Cancer detection rate was similar between zonal distributions, 35.2% in the CG compared to 33.6% in the PZ (p=0.497) (Table 1). Cancer detection of clinically significant disease (Gleason >4+3) was found to be similar in the CG and PZ (11.4% vs 11%, p=0.128) despite a higher prostate volume in those with CG lesions (p= 0.004). In contrast to random 12-core TRUS biopsy, upgrading occurred in 18.5% of patients with CG lesions versus 13.3% for PZ targets (p=0.024). When MRI detected suspicious lesions in the CG, 36.6% (77/210) of these represented the highest risk lesion. These CG index lesions translated to 13% (77/592) of the entire cohort of men with biopsy-proven CaP.

Conclusion: Prostate cancer of the central gland occurs at a similar frequency than in the peripheral zone. Targeted lesions of the CG were more likely to be upgraded from 12-core biopsy, frequently representing the index lesion as determined by Gleason grade. In all CG patients with upgrading, CG target lesions constituted the highest Gleason grade index lesion in a third of all males with prostate cancer. Multiparametric MRI and fusion-guided biopsy aids in identifying clinically significant disease of the CG not captured on traditional TRUS biopsy.
**Poster #170**

**SIMPLIFIED FRAILTY INDEX PREDICTS ADVERSE SURGICAL OUTCOMES AND INCREASED LENGTH OF STAY IN RADICAL PROSTATECTOMY PATIENTS**

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Columbia University, College of Physicians and Surgeons, NY, NY

(Presented by: Danny Lascano)

**Introduction:** Frailty is usually assessed by the “eyeball” test with remarks in medical notes such as “older than stated age”. No good measure exists to quantify this despite its large impact on surgical outcomes.

**Objectives:** We analyzed and applied a simplified frailty index to the American College of Surgeons National Surgical Quality Improvement Program (ACS−NSQIP) data to assess whether it predicts adverse post−surgical outcomes.

**Methods:** The ACS−NSQIP Participant Utilization File was queried for the years 2005−2012 for inpatient radical prostatectomy patients (16848 total). Using the Canadian Study of Health and Aging Frailty Index (FI), eleven variables were matched to NSQIP to create a modified frailty index (mFI): diabetes mellitus, functional status, CHF, MI, prior cardiac surgery, hypertension, peripheral vascular disease, impaired sensorium, TIA or CVA with neurological sequela. Four variables specific to cancer were also included: chemotherapy or radiation, weight loss, renal failure, and metastasis. Outcomes assessed included 30−day mortality, surgical site infection (SSI), MI, DVT/PE, Clavian IV complications, never events (surgical site infections, DVT/PE), length of stay (LOS), and all combined adverse events. Chi−square was used for comparing categorical variables, Kruskal−Wallis for non−parametric continuous variables, and logistic regression for comparing different clinical tests.

**Results:** Increasing mFI was associated with adverse outcomes of any type, Clavian IV complications, and number of SSI (p<0.05 for all). A Kruskal−Wallis H test showed that there was a statistically significant difference in length of stay between those with different mFI (X²= 88.02, p<0.01) with a mean rank of 3, 4, 6, 5, 2 and 1 day(s) for mFI of 1, 2, 3, 4, 5 and 6 respectively. Multivariate analysis indicated that mFI was significant for Clavian IV complications, MI, and never−events (OR 1.368, p < 0.01, OR 2.745, p < 0.01, OR 1.368, p <0.01) performing as well or better than the Charlson Comorbidity Index Score, American Society of Anesthesiologist score, or work relative value unit.

**Conclusion:** Using a large national database, a modified frailty index was shown to correlate with after radical prostatectomy with 30−day morbidity and length of stay but not mortality. This simple tool may be useful for surgical planning and risk assessment for the high−risk elderly.
IMPROVED RECOVERY OF ERECTILE FUNCTION IN YOUNGER MEN AFTER RADICAL PROSTATECTOMY: DOES IT JUSTIFY IMMEDIATE INTERVENTION IN LOW−RISK PATIENTS?

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1Memorial Sloan Kettering Cancer Center, New York, NY; 2Memorial Sloan Kettering Cancer Center, New York, (Presented by: Mariam Imnadze)

Introduction: To investigate whether improved post–operative recovery of erectile function in younger men justifies immediate intervention for low−risk prostate cancer.

Methods: Patient−reported outcome data, including International Index of Erectile Function−6 questionnaires (IIEF−6), for 1806 patients who underwent radical prostatectomy (RP) between 2008 and 2013 was reviewed. IIEF−6 surveys were obtained at baseline and at 3−months intervals following surgery, up to 24 months post−operatively. Patients with clinical features of high−risk prostate cancer (PSA ≥ 10, biopsy Gleason grades ≥ 4+3, > cT2b) were excluded from analysis (n=603). The final cohort consisted of 1,203 patients.

We wished to illustrate the recovery of EF under two differing strategies: immediate RP at diagnosis and delayed RP following a period of surveillance, and identify which strategy led to better overall EF over a 10 year period. Baseline EF was estimated using data collected pre−operatively and plotted against patient age. Post−operative EF recovery was estimated in a similar fashion using interval patient−reported IIEF−6 questionnaires collected following surgery, and plotted against patient age.

Results: Figure 1 illustrates the predicted difference in EF recovery for a 55−year−old patient with a baseline IIEF−6 score of 26. The 10−year−average score for this patient undergoing immediate prostatectomy was predicted at 19.3 compared to 21.2 with a delay of 5 years between diagnosis and intervention, with a calculated difference of 2.0 points (95% CI: 0.4 −3.9). If the same patient were to delay surgery by 8 years, his average IIEF−6 score over a fifteen year period would be estimated at 20.4 compared to 18.8 if he were to undergo immediate RP, with a calculated difference of 1.6 points (95% CI 0.2− 3.8).

Conclusion: We found no evidence to support the claim that immediate radical prostatectomy in younger men results in better overall post−operative erectile function. Therefore, age−related ability to better recover erectile function following radical prostatectomy should not be used to justify immediate intervention for younger men with low−risk prostate cancer.

Figure 1. Predicted EF recovery for a 55 M with baseline IIEF-6 score of 26 undergoing immediate RP (dashed line) vs RP after 5 years of observation (solid line).
Poster #172
IMPACT OF ROUTINE STAGING MULTIPARAMETRIC 3T–MRI SCANS FOR MEN WITH GLEASON’S SCORE 6 PROSTATE CANCER
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1Hunter Holmes McGuire Veterans Affairs Medical Center, Richmond, VA; 2Virginia Commonwealth University, Richmond, VA; 3Hunter Holmes McGuire Veterans Affairs Medical Center
(Presented by: Drew Moghanaki)

Introduction: Multiparametric MRI (mpMRI) is used at our institution to improve risk–stratification of men with newly diagnosed Gleason’s score (GS) 6 prostate cancer. Targeted biopsies are performed on lesions suspicious for higher GS disease. Recommendations for management often rely on the final GS, as opposed to volume of GS 6 disease. The influence of this pathway on rates of active surveillance (AS) was explored.

Methods: Scans were performed on a 3T–MRI with body coil (General Electric). Image processing recorded minimum ADC values for areas of concern (Dynacad). Three radiologists dedicated to MRI reviewed these images. Routine multi–disciplinary conferences were held with radiation oncologists and urologists to review suspicious findings. All suspicious lesions underwent a trans–perineal targeted biopsy using MRI–Ultrasound image fusion software (MIM).

Results: During the initial 12–month period, 99 men with GS 6 prostate cancer were staged with a 3T–mpMRI. Eighty–eight percent were ordered by radiation oncologists, the rest by urologists. This included 48% with ‘significant cancer’ by Epstein’s criteria. Overall, 22 patients (22%) had a lesion suspicious for GS ≥7 disease. This included 20% (10/51) who met Epstein’s criteria for AS, and 25% (12/48) who did not (p=0.59). Targeted biopsies of suspicious lesions confirmed GS ≥7 in 32% of patients sampled (7/22). The rate of detecting GS ≥7 in men undergoing targeted biopsy was 30% and 33% in men who did, or did not, meet Epstein’s criteria (p=0.67). Pathological findings from targeted biopsies revealed GS 8–10 in 14%, GS 7 in 18%, and no increase in 68%. Two patients without upstaging to GS ≥ 7 preferred definitive treatment, occurring only in the early months of this program. After 1–year, 93% of patients still did not have documentation of pattern 4 disease, and 91% remained on AS.

Conclusion: A clinical pathway that incorporates routine mpMRI staging is associated with a high 1–year rate of AS that exceeds 90% for men with newly diagnosed GS 6 prostate cancer.
Poster #173
SURGEON HUMAN CAPITAL DEPRECIATION: THE IMPACT OF DAYS OFF BETWEEN CASES ON PERIOPERATIVE AND FUNCTIONAL OUTCOMES FOR ROBOTIC–ASSISTED LAPAROSCOPIC PROSTATECTOMY
Shane Pearce, MD, Joseph Pariser, MD, Sanjay Patel, MD, Blake Anderson, MD, Scott Eggener, MD, Gregory Zagaja, MD
University of Chicago, Chicago, IL
(Presented by: Shane Pearce)

Introduction: Case order has variable effects on perioperative outcomes in robotic–assisted laparoscopic prostatectomy (RALP), and increased number of days between cases has been associated with higher mortality rate in cardiac surgery. We hypothesized that increased days between cases is associated with worse perioperative and functional outcomes for RALP.

Methods: We analyzed a single surgeon (GZ), single institution, series of 2,036 RALP cases between 2003 and 2014, excluding salvage prostatectomies, aborted cases, and open conversions. The cohort was stratified by days between cases (DBC): 0–4 DBC and ≥ 5 DBC. Data included age, BMI, race, preoperative PSA, performance of lymph node dissection (LND), nerve sparing (NS), pathologic stage (pT), Gleason score (GS), specimen weight (SpWt), estimated blood loss (EBL), operative time (OT), positive surgical margins (PSM), and case experience (to control for learning curve). Potency (erections adequate for intercourse) and continence (pad free) were evaluated with the UCLA–PCI questionnaire preoperatively and at 12 months postop. Multivariable logistic regression was performed to identify factors associated with perioperative and functional outcomes.

Results: Univariate analysis revealed DBC groups were similar (p>0.05) with respect to age, race, preoperative PSA, pT stage, and NS. Significant increases for ≥5 DBC compared to 0–4 DBC were seen in EBL (271mL [222–320mL] vs 195mL [185–205mL], p<0.01) and OT (242min [224–259min] vs 186min [182–190min], p<0.01), but there was no difference in PSM (20.4% vs 17.9%, p=0.5). The groups also varied with respect to BMI (29.3kg/m2 [28.4–30.2g/m2] vs 28.3kg/m2 [28.1–28.6g/m2, p=0.03], SpWt (54.2g [49.9–58.6g] vs 50.2g [49.2–51.2g, p=0.02], performance of LND (p<0.01), final GS (p<0.01), and case experience (p<0.01). The multivariable logistic regression model demonstrated DBC ≥5 was independently associated with EBL>350mL (OR 3.0 [1.8−4.7], p<0.01) and OT>240min (OR 5.8 [3.6−9.5], p<0.01), but not associated with PSM (OR 1.2 [0.8−2.0], p=0.4), potency (OR 1.1 [0.7–1.8], p=0.7) or continence (OR 1.1 [0.7–1.8], p=0.6). Increased case experience reduced risk of OT>240min and PSM (all p<0.05), but was not significantly associated with EBL>350, potency, or continence.

Conclusion: In a large, single surgeon RALP series, ≥5 DBC was associated with increased EBL and OT, but not associated with PSM, potency, or continence when controlling for surgeon experience.
**Poster #174**

**IMPACT OF PATIENT–SPECIFIC 3D MODEL OF PREOPERATIVE MRI ON NERVE SPARING DURING ROBOT–ASSISTED LAPAROSCOPIC PROSTATECTOMY**

Junichi Tokuda, PhD¹, Tudor Borza, MD², Fiona Fennessy, MD, PhD¹, Kibel Adam, MD² and Clare Tempany, MD¹

¹Department of Radiology, Brigham and Women’s Hospital, Boston, MA; ²Division of Urologic Surgery, Brigham and Women’s Hospital, Boston, MA

(Presented by: Junichi Tokuda)

**Introduction:** The goals of robot–assisted laparoscopic prostatectomy (RALP) is to excise the gland and all cancer with negative surgical margins and to preserve erectile function by minimizing the damage to the neurovascular bundles (NVB). Multi–parametric prostate MRI (mpMRI) provides a 2D visualization of the gland, tumors, and the NVBs. Integration of mpMRI into preoperative planning can be difficult. Post–processing of mpMRI can generate 3D models of image–based features, in particular 3D tumor volumes relationships to the NVBs. The objective is to evaluate the impact of 3D models on decision–making regarding nerve–sparing (NS) for RALP.

**Methods:** Twenty–three subjects underwent both pre–operative 3T mpMRI and RALP under an IRB–approved protocol. The followings structures were segmented manually using the 3D Slicer to generate the individual’s 3D model (Fig): whole gland, NVBs, the external urethral sphincter (EUS), and all tumors. The surgeon provided a decision at 3 different time points (TP): before reviewing MRI, based upon clinical data including DRE and biopsy (TP1), after reviewing MRI (TP2), and after reviewing the 3D model (TP3). The numbers of NVBs selected for NS and non–NS (NNS) were counted at each TP. The number of cases with extracapsular extension (ECE) positive margins in the posterior of the same side was counted for each group based on histopathological documentation.

**Results:** The decisions changed based upon MR and model reviews (Table). Twelve NVB’s were resected, 5 were changed from NNS to NS; among them, ECE was found in 1, and positive margin was found in 2 (pT3b and pT2c). Four NVBs were changed from NS to NNS, and 3 of them had ECE. No positive margin was found after NNS procedures.

**Conclusion:** In this pilot study, 5/13 (38%) of NVBs selected for NS at TP1, underwent a NS procedure on basis of 3D model. There was a positive margin rate of 2/5(40%), and ECE was found in 1. On the other hand, 4/30 (8%) of NVBs selected for NS at TP1, underwent a NNS procedure without positive margin and turned out to have ECE in 3/4 (75%). Management was changed in 9/46 (20%) NVB. Change in management was correct in 6/9 (66%).

Acknowledgement. NIH R01CA111288, P41RR019703, and U01CA151261.

<table>
<thead>
<tr>
<th></th>
<th>NS</th>
<th>N</th>
<th>ECE</th>
<th>PM</th>
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<tbody>
<tr>
<td>TP1. DRE/Bx</td>
<td>30</td>
<td>13</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>TP2. MRI</td>
<td>27</td>
<td>13</td>
<td>3</td>
<td>7</td>
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<tr>
<td>TP3. 3D model</td>
<td>31</td>
<td>14</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>TP4. Surgery</td>
<td>34</td>
<td>12</td>
<td>5</td>
<td>9</td>
</tr>
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NS: nerve-sparing; NNS: non-nerve-sparing; UD: undetermined
N: Total; ECE: extracapsular extension; PM: positive margin.
Poster #175
BASELINE PSA LEVELS IN MEN AGED 40−60 ARE INFLUENCED BY RACE, BODY MASS INDEX (BMI) AND WAIST-CIRCUMFERENCE: A STUDY USING THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES, 2001−2010)
Mark Preston, MD, MPH1, Julie Batista ScD2, Samuel Peisch2, Quoc−Dien Trinh, MD1, Sarah Markt ScD2, Taylor Medwig2, Adam Kibel, MD1, Meir Stampfer, MD, PhD2 and Lorelei Mucci ScD2
1Brigham and Women’s Hospital, Boston, MA; 2Harvard School of Public Health, Boston, MA
(Presented by: Mark Preston)

Introduction: There is increasing evidence that a baseline PSA during mid-life can predict future development of lethal prostate cancer. We determined baseline PSA levels for US men aged 40 to 60 years in a nationally representative cohort and studied the influence of race, BMI, and weight circumference on median PSA levels among men without diagnosed prostate cancer.

Methods: We leveraged data from the National Health and Nutrition Examination Survey (NHANES), a set of studies that gathers lifestyle and nutrition information, and includes in person clinical assessments and biomarker measures. The study was nested among men with PSA measured between 2001−2010. Those with current infection or prostate inflammation, rectal exam in the past week, prostate biopsy or cystoscopy in the past month, or with a history of prostate cancer were excluded from PSA testing. We constructed a multivariable linear regression model to determine associations between age, body mass index (BMI), waist circumference, race, and log-transformed total PSA.

Results: There were 3,972 men aged 40 to 60 with PSA measured, of whom 49% were white, 20% black and 19% Mexican−American. Median total PSA levels by race, BMI and waist circumference are outlined in the table. In multivariable models, older age was positively associated with PSA levels. Moreover, PSA levels were higher among men of African−American and Mexican−American ancestry, compared to non−Hispanic white ancestry. In contrast, men with higher BMI or greater waist circumference had lower total PSA levels, adjusting for age and race.

Conclusion: This study is among the first to report racial differences in PSA levels among men in midlife, and showing higher levels among African−American, and Mexican−American men. Conversely, BMI and waist circumference were inversely associated with PSA levels, and these associations were independent of race or age. We aim to continue examining these relationships with respect to lethal prostate cancer risk in future analyses using the updated NHANES mortality data.

<table>
<thead>
<tr>
<th>Table: Baseline total PSA levels in men aged 40-60 years by race, body mass index and waist circumference.</th>
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<tbody>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>40-44.9</td>
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<td>45-49.9</td>
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<td>50-54.9</td>
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<td>55-60</td>
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</tbody>
</table>

| Age | **BMI<25** | **BMI 25-30** | **BMI≥30** |
| 40-44.9 | 236 | 0.80 (0.60-1.18) | 445 | 0.70 (0.50-1.01) | 355 | 0.70 (0.47-0.92) |
| 45-49.9 | 243 | 0.80 (0.53-1.30) | 416 | 0.78 (0.50-1.15) | 346 | 0.70 (0.46-1.07) |
| 50-54.9 | 233 | 0.86 (0.50-1.40) | 441 | 0.90 (0.55-1.40) | 351 | 0.80 (0.51-1.30) |
| 55-60 | 218 | 0.94 (0.60-1.90) | 355 | 1.01 (0.60-1.70) | 333 | 0.90 (0.50-1.72) |

| Age | Waist Circumference <102 cm | Waist Circumference ≥102 cm |
| 40-44.9 | 626 | 0.71 (0.51-1.10) |
| 45-49.9 | 563 | 0.76 (0.50-1.22) |
| 50-54.9 | 554 | 0.89 (0.52-1.40) |
| 55-66 | 451 | 1.00 (0.60-1.80) |

Abbreviations: PSA = prostate specific antigen.
INTegrative genomics analysis revealed microRNA–mRNA pairings associated with prostate cancer disparities

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¹Department of Pharmacology and Physiology, the George Washington University School of Medicine and Health Sciences, Washington, DC; ²George Washington University Department of Urology, Washington, DC; ³Medical Faculty Associates, the George Washington University School of Medicine and Health Sciences, Washington, DC; ⁴Oral and Pharyngeal Cancer Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, MD; ⁵Cartilage Biology and Orthopaedics Branch, National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health, Bethesda, MD; ⁶Department of Anatomy and Regenerative Biology, the George Washington University School of Medicine and Health Sciences, Washington, DC; ⁷Department of Pathology, the George Washington University School of Medicine and Health Sciences, Washington, DC; ⁸GW Cancer Institute, the George Washington University Medical Center, Washington, DC

(Presented by: Alice Semerjian)

Introduction: African Americans (AA) exhibit higher prostate cancer (PCa) incidence and mortality rates compared to European American (EA) men. In addition to socioeconomic influences affecting access to health care, biological risk factors may also play a critical role in PCa disparities.

Methods: To identify the biological elements involved in the differential biological properties between AA and EA PCa, we applied integrative genomics analysis by combining miRNA and mRNA profiling, miRNA target prediction, pathway analysis and functional validation, to map miRNA–mRNA interactions associated with PCa disparities.

Results: In this study, we have first identified 22 AA–specific and 18 EA–specific miRNAs in PCa versus patient–matched normal prostate, and 10 ‘AA–enriched/–depleted’ miRNAs in AA PCa versus EA PCa comparisons. Further pathway analyses have revealed that many population–specific and –enriched miRNAs–mRNA pairings were over–represented in several oncogenic pathways, including the PI3K/AKT and EGF signaling pathways. Novel miRNA–mRNA pairings were validated by qRT–PCR, western blot and/or IHC analyses in PCa specimens. In–vitro functional evaluations were performed in AA– and EA–specific PCa cell lines and confirmed that miR–133a/MCL, miR–513c/STAT1, miR–96/FOXO3A, miR–145/ITPR2 and miR–34a/PPP2R2A as critical miRNA–mRNA pairings contributing to the PCa disparities.

Conclusion: In summary, our data suggest that miRNA–mRNA interactions may play a critical role in the activation of oncogenic pathways in AA PCa, and the AA–enriched/–specific miRNA pairings (such as miR–133a/MCL1, miR–513c/STAT1 and miR–96/FOXO3A) may serve as potential PCa biomarkers and novel therapeutic targets in the treatment of aggressive PCa.
DECLINING RATE OF PROSTATE BIOPSY IN THE VETERANS HEALTH ADMINISTRATION IN THE PAST DECADE: AN ALTERNATE APPROACH TO LIMITING OVERDIAGNOSIS AND OVERTREATMENT OF PROSTATE CANCER?

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1Department of Urology, Medical University of South Carolina (Charleston, SC); 2J.B. Dorn Veterans Affairs Medical Center (Columbia, SC); 3Department of Epidemiology and Biostatistics, School of Public Health, University of South Carolina (Columbia, SC); 4Department of Urology, Medical University of South Carolina (Charleston, SC), Ralph H. Johnson Veterans Affairs Medical Center (Charleston, SC)
(Presented by: Ryan Levey)

Introduction: With increasing recognition of the overdiagnosis and overtreatment of prostate cancer, much attention has been placed on limiting prostate–specific antigen (PSA) testing for prostate cancer screening. An additional (but underexamined) intervention point to discourage prostate cancer screening is limiting the use of prostate biopsy by urologists. We analyzed the patterns of utilization of both PSA and prostate biopsy across the Veterans Health Administration (VHA) in the past decade.

Methods: Men aged between 40 and 80 years with at least one PSA value between 2003 and 2012 were included for analysis. Once men were biopsied, they were subsequently removed from the eligible study population, creating a dynamic cohort of over 250,000 men per year. More than 24 million patient–years were included in the analysis. An autoregressive, ecological parametric model was created to demonstrate trends for prostate biopsy, focusing on differences by race and age.

Results: The rate of prostate biopsy in the VHA has declined annually over the past decade (p<0.001). Non–African American men and those over age 55 years had the most precipitous decline in the rate of prostate biopsy, while African American men and veterans under 55 years of age have not experienced the same rate of change (p<0.001 for all groups). PSA screening has also declined, but not at a clinically significant pace.

Conclusion: Overall rates of prostate biopsy across the VHA have declined in all cohorts over the past decade. Biopsies in men at perceived higher risk (African American race) or with greater benefit from screening (younger age) have a lower rate of decline than the rest of the veteran population. These findings may be the result of more judicious and selective use of prostate biopsy by urologists, although further research is needed.

Table 1: CDR of CaP detected by SB and FB

<table>
<thead>
<tr>
<th>Biopsy indications</th>
<th>N (%)</th>
<th>Systematic Biopsy CDR n (%)</th>
<th>Fusion Biopsy CDR</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>GS6</td>
<td>GS&lt;6</td>
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<tr>
<td>Overall cohort</td>
<td>615 (100%)</td>
<td>188 (31%)</td>
<td>122 (20%)</td>
</tr>
<tr>
<td>Biopsy Naïve</td>
<td>290 (47%)</td>
<td>101 (35%)</td>
<td>69 (24%)</td>
</tr>
<tr>
<td>Prior Negative</td>
<td>171 (28%)</td>
<td>28 (16%)</td>
<td>20 (12%)</td>
</tr>
<tr>
<td>Active Surveillance</td>
<td>154 (25%)</td>
<td>59 (38%)</td>
<td>33 (21%)</td>
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<table>
<thead>
<tr>
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<td>Overall cohort</td>
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<td>Biopsy Naïve</td>
<td>&lt;0.001</td>
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<tr>
<td>Prior Negative</td>
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<td>Active Surveillance</td>
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Poster #178
VALIDATION OF GEMCAP AS A DNA BASED BIOMARKER TO PREDICT DISEASE RECURRENCE IN PATIENTS WITH INTERMEDIATE TO HIGH RISK DISEASE UNDERGOING PROSTATECTOMY FOR PROSTATE CANCER.
Hao Nguyen, MD, PHD1, Elizabeth Gilbert, BS, MA2, Jaime Tawney, BS2, Vy Ngo, BS, MA2, Janet Cowan, BS, MA2, Cristina Magi-Galluzzi, MD, PHD3, Noel Krzesinski, BS4, Jorge Yao, MD4, Eric A. Klein, MD5, Peter R. Carroll, MD, MPH2 and Pamela L. Paris PHD2
1University of California, San Francisco, CA; 2UCSF dept. of urology San Francisco, Ca; 3Department of Anatomic Pathology, Cleveland Clinic Cleveland, Ohio; 4Department of Pathology, University of Rochester, Rochester, NY.; 5Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, Ohio.
(Presented by: Hao Nguyen)

Introduction: There are currently no validated DNA based biomarkers available for routine clinical use to predict prostate cancer recurrence after prostatectomy. The Genomic Evaluators of Metastatic Cancer of the Prostate (GEMCaP) assay is a tumor genotype using copy number at 36 genomic loci. We aim to validate the GEMCaP assay using an external cohort of intermediate and high risk patients.

Methods: We randomly identified 400 patients with intermediate to high clinical risk features who had undergone radical prostatectomy at the Cleveland Clinic and University of Rochester from 2000–2005 and had tissue available for research. After pathology review (CMG, JY) cancer tissues were macrodissected and DNA extracted and subjected to high resolution array comparative genomic hybridization (aCGH) using Agilent’s oligonucleotide microarray platform. We have previously defined a high GEMCaP score as ≥20% of the genomic loci exhibiting copy number gain or loss in a given tumor. Cox regression was used to evaluate associations between GEMCaP score and risk of biochemical recurrence in univariate and multivariate analysis adjusted for D’Amico clinical risk.

Results: We report the results from the first 60 patients from the Cleveland Clinic cohort. Median follow up was 164 months, 23% of patients had clinically high risk disease, and 28% of the cohort had a high GEMCAP score (≥20%). High GEMCaP score approached significant association with higher risk of biochemical recurrence (HR 1.96 95%CI 0.95–4.01). A continuous GEMCaP score was not associated with risk of recurrence. This preliminary analysis was restricted to a subset of the final cohort and thus lacks statistical power.

Conclusion: As part of an ongoing study, results from the first 60 patients in our validation cohort indicated that a high GEMCaP score may be prognostic of biochemical recurrence after radical prostatectomy in men with intermediate and high clinical risk features. The fraction of genome altered and the outcome of clinical recurrence will be examined in future work. The GEMPCaP biomarker could be an efficient and effective clinical risk assessment tool to identify patients for early adjuvant therapy.
Poster Session II – Full Abstracts

Poster #179
COMPARISON OF MR−TARGETED PROSTATE BIOPSY BY MRI−US FUSION VERSUS SYSTEMATIC PROSTATE BIOPSY IN PATIENTS WITH PRE−BIOPSY 3T MULTI−PARAMETRIC MRI: SINGLE INSTITUTION EXPERIENCE IN 615 PATIENTS.
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1Department of Surgery, New York University Langone Medical Center, New York, NY; 2Department of Radiology, NYU Langone Medical Center, New York, NY; 3School of Medicine, NYU Langone Medical Center, New York, NY; 4Department of Urology, NYU Langone Medical Center, New York, NY; 5Department of Pathology, NYU Langone Medical Center, New York, NY; 6Department of Radiology, NYU Langone Medical Center, New York, NY
(Presented by: Xiaosong Meng)

Introduction: Increasing evidence supports the use of MRI/ultrasound fusion prostate biopsy (FB) to improve the detection of clinically significant cancer while limiting over−detection of indolent disease. This study reports the results of FB and TRUS−guided systematic 12−core PB (SB) for all men presenting to our center with suspicion of prostate cancer (CaP) or history of low risk CaP under consideration for active surveillance (AS) undergoing pre−biopsy 3T multi−parametric MRI (mpMRI) followed by FB and SB since June 2012.

Methods: Biopsy results in all men undergoing a SB and FB, using the Artemis/Pro−fuseTM system, between June 2012 and June 2014 were reviewed. Biopsy indications, highest MRI suspicion scores (mSS) per patient and cancer detection rates (CDR) were summarized.

Results: 615 men (mean age 65±8 years; mean PSA 5.5±5.4 ng/ml) met inclusion criteria. Table 1 displays the CDR for SB and FB for GS6 and GS>6 CaP for overall cohort and by biopsy indications. FB detected fewer Gleason 6 (GS6) CaP, 85(14%) vs 188(31%) (p<0.001), and more Gleason >6 (GS>6) CaP, 152(25%) vs 122(20%) (p=0.002), as compared to SB.

Evaluating the cohort by biopsy indications, in the biopsy naive cohort, FB detected fewer GS6 CaP compared to SB, 32(11%) vs 101(35%) (p<0.001), and was similar in detecting GS>6 CaP, 77(27%) vs 69(24%) (p=0.243). In the prior negative PB cohort, FB and SB were similar in detecting GS6 CaP, 17(10%) vs 28(16%) (p=0.082), but FB detected more GS>6 CaP than SB, 34(20%) vs 20(12%) (p=0.002). In the AS cohort, FB detected fewer GS6 CaP compared to SB, 36(23%) vs 59(38%) (p=0.003), but was similar in detecting GS>6 CaP, 41(27%) vs 33(21%) (p=0.243), except for patients with mSS 5 in whom FB detected more GS>6 CaP compared to SB, 16(89%) vs 6(33%) (p=0.009), identifying 11 GS>6 CaP missed by SB.

Conclusion: Overall, FB detected more GS>6 CaP and fewer GS6 cancer than SB. The performance characteristics of biopsy vary by clinical indication, offering potential to maintain or improve detection of potentially lethal prostate cancers while reducing over−detection of GS6 disease in all.

Table 1: CDR of CaP detected by SB and FB

<table>
<thead>
<tr>
<th>Biopsy indications</th>
<th>Systematic Biopsy CDR %</th>
<th>Fusion Biopsy CDR %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GS6</td>
<td>GS&gt;6</td>
</tr>
<tr>
<td>Overall cohort</td>
<td>615 (100%)</td>
<td>188 (31%)</td>
</tr>
<tr>
<td>Biopsy Naive</td>
<td>290 (47%)</td>
<td>101 (35%)</td>
</tr>
<tr>
<td>Prior Negative</td>
<td>171 (28%)</td>
<td>26 (16%)</td>
</tr>
<tr>
<td>Active Surveillance</td>
<td>154 (25%)</td>
<td>59 (38%)</td>
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</tbody>
</table>

SB vs FB p values

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<thead>
<tr>
<th>Biopsy indications</th>
<th>Overall cohort</th>
<th>Biopsy Naive</th>
<th>Prior Negative</th>
<th>Active Surveillance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GS6</td>
<td>GS&gt;6</td>
<td>All CaP</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Overall cohort</td>
<td>0.002</td>
<td>0.063</td>
<td>0.069</td>
<td></td>
</tr>
<tr>
<td>Biopsy Naive</td>
<td>0.003</td>
<td>0.243</td>
<td>0.069</td>
<td></td>
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<tr>
<td>Prior Negative</td>
<td>0.002</td>
<td>0.002</td>
<td>0.063</td>
<td></td>
</tr>
<tr>
<td>Active Surveillance</td>
<td>0.003</td>
<td>0.243</td>
<td>0.069</td>
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Introduction: MRI suspicion score (mSS) predicts the likelihood of prostate cancer on systematic (SB) and MRI/ultrasound fusion biopsy (FB). Increasing mSS is also predictive of a higher likelihood of high grade cancer. In this study we explore the relationship of mSS and biopsy outcomes among all men undergoing combined SB/FB following pre-biopsy 3T multi-parametric MRI (mpMRI) in our institution.

Methods: Biopsy results in all men undergoing SB and FB, using the Artemis/Pro-fuseTM system, between June 2012 and June 2014 were reviewed. Biopsy indications, highest mSS per patient and cancer detection rates (CDR) were summarized.

Results: 615 men (mean age 65±8 years; mean PSA 5.5±5.4 ng/ml) met inclusion criteria. FB detected fewer GS6 CaP for all mSS compared to SB [mSS 2: 9(8%) vs 20(17%) p=0.006, mSS 3: 30(14%) vs 54 (25%) p<0.001, mSS 4: 37(21%) vs 74(41%) p<0.001, mSS 5: 9(10%) vs 38(40%) p<0.001], respectively. FB detected more GS>6 CaP for mSS 4 and 5 but not for mSS 2 and 3 as compared to SB [mSS 2: 1(1%) vs 2(2%) p=1, mSS 3: 12(6%) vs 21(10%) p<0.066, mSS 4: 60(34%) vs 44(25%) p=0.012, mSS 5: 79(84%) 55(59%) p<0.001], respectively.

When evaluating the cohort by biopsy indications for mSS 5, FB was similar to SB for detection of GS>6 cancer in biopsy naive men (43(80%) vs 38(70%) p=0.228), but detected more GS>6 cancer in men with prior negative SB [20(91%) vs 11(50%) p=0.008] and in men with previous positive biopsy on surveillance (AS) [16(89%) vs 6(33%) p=0.009].

Overall, increasing mSS was associated with step-wise increases in detection of GS>6 cancer. This finding is not reflected in detection of GS6 disease (Table 1). CDR variations exist according to biopsy indication for each mSS. For mSS 5, CDR for SB GS6 [27(50%), 7(32%), 4(22%)] , SB GS>6 [38(70%), 11(50%), 6(33%)], FB GS6 [5(9%), 3(14%), 1(6%)] and FB GS>6 [43(80%), 20(91%), 16(89%)] differ for biopsy naive, prior negative and AS cohorts, respectively.

Conclusion: In men with high mSS, FB detected more GS>6 CaP and fewer GS6 cancer than SB. As mSS increases, CDR for GS>6 cancer increases in a stepwise fashion. These findings suggest that the contribution of systematic biopsy to cancer detection declines with increasing mSS.
Introduction: The role of salvage radical prostatectomy (sRP) for radiation recurrent prostate cancer still remains controversial in the urologic community. However, much of the literature consists of relatively underpowered studies without long-term follow up. Here we analyze surgical safety, functional, and 15-year oncologic end points from a large institutional sRP cohort.

Methods: Patients with prostate cancer undergoing radical prostatectomy between 1987 and 2012 after primary radiotherapy were identified from a prospectively maintained radical prostatectomy registry. Complications, functional outcomes, and 15-year oncologic data were obtained. Univariate and multivariate models were used to predict long-term oncologic outcomes after sRP.

Results: The 173 patients undergoing sRP had a mean age of 65.5 (+/-6.4) years and mean interval from primary radiotherapy to sRP of 4.9 (+/-3.0) years. Preoperatively: mean PSA was 6.8 (+/-10.7), 57.5% had a biopsy Gleason sum of 7 or higher, and 59% were at least cT2. Postoperatively: 72.1% had a pathologic Gleason sum of > 7 or higher, 49.1% were at least pT3, 35.8% had positive margins, and 17.4% had positive lymph nodes. For surgical safety outcomes: no deaths, CV, CNS, or septic shock complications occurred within 30 days of sRP. Other serious complications were also uncommon: wound infection (4.6%), DVT (1.7%), PE (0.6%). Overall complication rate was 55.6%, with the most common complications being bladder neck contracture (28.3%) and anastomotic leak (19.7%). Lymphoceles were uncommon (1.2%). After 1 year, 66.3% were continent using 2 or fewer pads per day and 49.7% were continent using 1 or 0 per day. Biochemical recurrence and systemic progression free survival at 15 years was 38% and 72%, respectively. Prostate-cancer-specific and overall survival at 15 years was 80% and 60%, respectively. A previously validated composite GPSM score (Gleason Score, PSA, pathologic stage, and margin status) was a significant multivariate predictor of biochemical recurrence (p<0.001), systemic progression (p=0.048), prostate cancer mortality (p=0.041), and overall mortality (p=0.030).

Conclusion: sRP remains a valid treatment option for selected patients with radiation recurrent prostate cancer, given that at 15 years about 40% of patients remained free of biochemical recurrence and 70% free of systemic progression.
**Introduction:** We have previously shown that metabolic syndrome (MetS) is associated with an increased risk of prostate cancer (PC) overall and high grade disease on biopsy pathology. In the present study, our objective was to determine if MetS is associated with adverse final pathology and risk of treatment failure in men undergoing radical prostatectomy (RP).

**Methods:** Patients undergoing RP (2004–2013) were identified using our prospectively maintained institutional database. Salvage RPs and men who received neo–adjuvant therapies were excluded. MetS required any 3 of 5 components (obesity, diabetes or impaired fasting glucose, hypertension, low HDL–cholesterol, and high triglycerides). The outcomes were PC grade and stage on final RP pathology, and RP treatment failure, defined by a post–RP serum PSA >=0.2, or use of salvage therapies such as radiation or androgen deprivation therapy (patients were censored if adjuvant radiation was given). Multivariable logistic regression, Kaplan–Meier analyses, and Cox–proportional Hazards models were used.

**Results:** Of final cohort of 1939 men, 439 (22.6%) had MetS. Median follow up was 36 months. On RP pathology, there were 1321 (68.1%) with Gleason 7 disease, 113 (5.8%) with Gleason 8–10 disease, and 663 (34.2%) men with extraprostatic disease (>=pT3). Increasing number of MetS components was associated with a progressively increasing probability of higher grade (p–trend=0.002) and higher stage (p–trend=0.02) disease. In multivariable logistic regression analyses, MetS was associated with an increased risk of Gleason 8–10 disease (>=3 vs. 0 components: OR=2.51, 95%CI=1.33–4.71, p=0.004) and extraprostatic disease (>=3 vs. 0 components: OR=1.36, 95%CI=1.02–1.81, p=0.04). Decreased use of nerve–sparing in men with MetS was noted, suggesting more aggressive resection. Overall probability of RP failure was similar between men with and without MetS (5–yr failure–free survival: 71.4% vs. 75.5%). In adjusted Cox models, MetS was not associated with risk of treatment failure (HR=1.04, 95%CI=0.77–1.42, p=0.78).

**Conclusion:** MetS is associated with an increased risk of harboring extraprostatic and high–grade disease on final RP pathology (with a biological gradient present). However, with more aggressive resection, similar failure–free outcomes can be achieved in well–selected patients.

**Funding:** none
Poster Session II – Full Abstracts

Poster #183
COMPARATIVE EFFECTIVENESS OF TARGETED PROSTATE BIOPSY USING MRI-US FUSION SOFTWARE AND VISUAL COGNITION: PROSPECTIVE, BLINDED STUDY
Behfar Ehdaie, MD MPH1, Dan Sjoberg, PhD1, Pedro Recabal, MD1, Dan Lee, MD2, James Eastham, MD1 and Jonathan Coleman, MD1
1Memorial Sloan Kettering Cancer Center, NY, NY; 2Weill-Cornell Medical College, NY, NY
(Presented by: Behfar Ehdaie)

Introduction: Increasing evidence supports the role of Magnetic Resonance Imaging (MRI) in guiding prostate biopsy. MRI-ultrasound fusion (MR-F) software devices have emerged to replace visual targeting (Vt) and cognitive guidance using MRI data. Our objective was to prospectively compare diagnostic outcomes between MR-F and Vt biopsy.

Methods: 151 consecutive men with 229 MRI lesions underwent prostate biopsy by two surgeons. Using a standardized protocol, each patient underwent Vt followed directly by MR-F biopsy and the number of cores obtained for Vt and MR-F were equivalent for each lesion. Investigators were blinded to the Vt during MR-F biopsy as the target was identified on a separate monitor. To assess whether the MR-F results in a higher rate of cancer detection we investigated the difference in the rate of high-grade cancer detection (Gleason≥7) and any grade cancer between the two techniques. We assessed the difference only utilizing one lesion per patient and using the lesion with the highest radiologist score if a patient had more than one lesion biopsied. McNemar’s method was used to evaluate the difference between groups which accounts for the correlation within patient for each type of biopsy. Next, we repeated the above analysis using a lesion-based approach including all biopsied lesions. The p-value was calculated from a conditional logistic regression model clustered by patient to account for the correlation of outcomes from patients with multiple lesions.

Results: 55% of men had one MRI lesion (55%). Using the patient as the unit of analysis, Vt identified 27 high-grade cancers compared to MR-F which identified 29 high-grade cancers (p=0.6). Results were similar for the detection of any grade cancer (p=0.6). Utilizing a lesion-based analysis among 229 biopsied MRI lesions, the difference between Vt and MR-F was not statistically significant (p=0.3). However, MR-F identified 51 high-grade cancers compared to 44 by Vt and only 31 of the cancers were found by both techniques. MR-F detected 20 high-grade tumors missed by Vt. Finally, Vt identified 13 high-grade cancers missed by MR-F.

Conclusion: We did not identify a significant increased detection rate of high-grade cancer using either MR-F and Vt biopsy techniques. Both MR-F and Vt identified a significant number of cancers missed by the other technique. Based on these preliminary results, both MR-F and Vt techniques are required optimize diagnosis of high-grade prostate cancer.
**Poster Session II – Full Abstracts**

**Poster #184**

**MOLECULAR ALTERATIONS IN PROSTATE CANCER AND ASSOCIATION WITH MRI FEATURES**

Daniel Lee, MD, Jacqueline Fontugne, MD, Naveen Gumpeni, MD, Kyung Park, MD, Theresa MacDonald, MS, Brian Robinson, MD, Andrea Sboner, PHD, Juan Miguel Mosquera, MD, Mark Rubin, MD, Christopher Barbieri, MD, PHD

Weill Cornell Medical Center / New York Presbyterian Hospital

(Presented by: Daniel Lee)

**Introduction:** Magnetic resonance imaging (MRI) has been increasingly used in the diagnosis and management of prostate cancer (PCa) worldwide. Recent sequencing data have identified distinct molecular subclasses of PCa with characteristic recurrent genomic alterations. However, the associations between molecular alterations in PCa and characteristics on MRI are unknown. We therefore investigated recurrent molecular alterations in PCa and their associations with MRI features.

**Methods:** After IRB approval, 57 prostate nodules from 39 radical prostatectomy specimens from a single institution were identified that had a corresponding preoperative multiparametric MRI (mpMRI). Individual nodules in each radical prostatectomy specimen were evaluated for ERG rearrangement, PTEN deletion, SPINK1 overexpression, SPOP mutation, and CHD1 deletion. The nodules were scored by single observer according to the prostate imaging–reporting and data systems (PI–RADS) scale on the T2 and diffusion–weighted sequences (DWI). The PI–RADS scale is a 5-point Likert scale with 5 points indicating the most aggressive appearing lesion.

**Results:** Overall, the median age was 62.7 years (IQR 57.4–69.1), with a median preoperative PSA of 5.2 ng/dL (IQR 3.7–7.4); in the dominant nodules, there were ten (18.5%) Gleason 6 PCa, 37 (68.5%) were Gleason 7, and 7 (13%) were Gleason 8 and above. Twenty nodules (37.7%) were ERG positive by immunohistochemistry, 8 (15.1%) had SPINK1 overexpression, 3 (11.5%) had PTEN deletions, 4 (12.1%) had SPOP mutations, and none had CHD1 deletions. Eighteen nodules (37.5%) had PI–RADS 5 scores on T2 sequences, and 16 (55.2%) had PI–RADS 5 scores on DWI sequences with a median apparent diffusion coefficient (ADC) of 879 (IQR 736–949). There were no significant associations between ERG translocation, PTEN deletions, SPINK1 overexpression, SPOP mutations, or CHD1 deletions with T2 or DWI PI–RADS scores (all p>0.05).

**Conclusion:** Preliminary investigation revealed no significant associations between molecular alterations and characterization of the prostate cancer nodules on mpMRI. Additional analyses are underway to dissect this question in more detail.
Poster #185
GERMLINE VARIANTS WITHIN THE PTEN/PI3K AXIS AND ASSOCIATION WITH CASTRATE RESISTANT PROSTATE CANCER AND PROSTATE CANCER SPECIFIC MORTALITY
Ryan Kopp, MD1, John Sullivan, MD 2, James Hayes1, James Eastham, MD1, Kenneth Offit, MD, MPH1, Joseph Vijai, PhD1 and Robert Klein, PhD3
1Memorial Sloan Kettering Cancer Center, New York, NY; 2Royal College of Surgeons in Ireland, Dublin, Ireland; 3Mount Sinai School of Medicine, New York, NY
(Presented by: Ryan Kopp)

Introduction: Early detection of aggressive prostate cancer (PCa) that will lead to castrate resistant prostate cancer (CRPC) and prostate cancer specific mortality (PCSM) is unreliable with current biomarkers. Somatic mutations in the PTEN/PI3K signaling axis are implicated in CRPC development. We determined if germline single nucleotide polymorphisms (SNPs) within this signaling axis are associated with CRPC and PCSM.

Methods: We genotyped 1354 individuals of European ancestry diagnosed with localized PCa between June 1988 and December 2007. Blood samples were prospectively collected and de-identified before being genotyped and matched to phenotypic data with follow up current as of November 2013. We identified candidate genes involved with PTEN/PI3K signaling previously implicated in CRPC. Using public ENCODE data we identified potentially functional SNPs at DNAse hypersensitivity and histone methylation sites of PCa cell lines, then created tag SNPs with minor allele frequency >0.05 and r2>0.8. We genotyped 74 SNPs among 12 genes using matrix-assisted laser desorption/ionization time-of-flight (Sequenom iPLEX) then excluded 156 samples and 6 SNPs for genotype calls <80%. The 1198 patients with adequate genotyping included 283 with CRPC and 171 with PCSM. We analyzed associations between 68 SNPs and CRPC and PCSM with Cox proportional hazards models using time interval from diagnosis to event. Multivariate models adjusted for age and PSA at diagnosis, biopsy Gleason sum, stage and treatment. We considered p<0.05 significant for this pilot analysis, but also included Bonferroni correction for multiple testing (p<0.00074).

Results: The cohort had median age 66 years (IQR 60, 72), biopsy Gleason sum ≤6/7/8–10 in 37%/41%/22%, clinical stage I/II/II in 45%/40%/16%, and median PSA 7.4 (IQR 5.1, 12.7). On multivariable analysis 1 SNP was associated with CRPC (rs11762213 MET, HR 1.64, p=0.035) and 4 SNPs were associated with PCSM (rs38840 MET, HR 1.43, p=0.015; rs8102171 AKT2, HR 0.72, p=0.025; rs137969027 AKT1, HR 0.74, p=0.033; rs3730089 PIK3R1, HR 1.37 p0.047). After correction for multiple testing (p<0.00074), only rs38840 was associated with PCSM on univariate analysis (p=0.00065).

Conclusion: This pilot analysis identified SNPs associated with CRPC and PCSM within the PTEN/PI3K axis. These findings require further validation prior to assessment of applicability to PCa screening or current treatment paradigms.
PRECISE INTRAOPERATIVE DETECTION OF PROSTATE CANCER AND COMPLETE RESECTION OF MICROSCOPIC RESIDUAL DISEASE WITH NOVEL SERRS NANOSTARS

Massimiliano Spaliviero, MD, Stefan Harmsen, PhD, Ruimin Huang, PhD, Julie R. White DVM, Jason M. Samii, MD, PhD, Hazem Karabeber, MD, Matthew A. Wall, BS, James A. Eastham, MD, Karim A. Touijer, MD, Peter T. Scardino, MD, Moritz F. Kircher, MD, PhD
Memorial Sloan Kettering Cancer Center, New York, NY
(Presented by: Massimiliano Spaliviero)

Introduction: We evaluated the ability of our newly-developed Raman-active nanoparticles [SERRS (Surface-Enhanced Resonance Raman Scattering)-Nanostars] to detect prostate cancer (PCa) and image-guide its complete surgical resection in a preclinical mouse model.

Methods: SERRS-Nanostars consisted of a 70 nm gold core coated with a 30 nm Raman-active IR780 perchlorate dye-embedded silica. SERRS-Nanostars consistently showed a Raman peak intensity of 950 cm⁻¹ in the IR780 spectrum, with a detection threshold of 1.5 fM (11.6 zeptomoles in absolute terms). In-vivo Raman imaging of 10-month old PCa-bearing Hi-Myc transgenic mice (n = 5) and healthy controls (litter mates without transgene, n = 3) was acquired using a Renishaw InVia Raman microscope 16-18 hours after injection of 30 fmol/g SERRS-Nanostars via tail vein. Pathologic examination of prostate specimens included hematoxylin-eosin (H&E) stains and immunohistochemistry (IHC) using anti-PEG, anti-c-myc, and anti-AR (androgen receptor) antibodies.

Results: In Hi-Myc mice, Raman signal was detected in multiple areas of the prostate (Fig. 1). RP was conducted resecting Raman-positive areas in a stepwise fashion under Raman guidance, which delineated the macroscopic extent of PCa. Foci of residual Raman signal in the radical prostatectomy tumor bed were also resected. H&E confirmed the presence of PCa in Raman-positive regions. Anti-PEG immunostaining revealed the accumulation of PEGylated SERRS-Nanostars within all these lesions, but not in the surrounding healthy stroma. SERRS-Nanostars accumulated in PCa at different stages of progression, including pre-malignant high-grade PIN (prostatic intraepithelial neoplasia), and invasive PCa with squamous or mucous cell differentiation (Fig. 1). No Raman activity or accumulation of PEGylated nanostars was found in the prostate of control mice. No cytotoxicity effects were observed.

Conclusion: A single injection of SERRS-Nanostars allowed precise detection and mapping of all intraprostatic neoplastic lesions, from pre-malignant PIN to different subtypes of invasive PCa. Intraoperatively Raman imaging-guided RP allowed resection of residual microscopic tumor foci within the prostatectomy bed.
THE PREVAIL STUDY: PRIMARY AND NONVISCERAL DISEASE SUBGROUP Results: FOR ENZALUTAMIDE IN MEN WITH METASTATIC PROSTATE CANCER THAT HAD PROGRESSED ON ANDROGEN DEPRIVATION THERAPY (ADT)
Gerald Andriole, MD1, Thomas Keane2, Christopher P. Evans3, Peter Iversen4, David Forer5, Hank Mansbach5, Frank Perabo6, Gabriel Haas7, Tomasz M. Beer8 and Bertrand Tombal9
1Washington University School of Medicine; 2Medical University of South Carolina, Charleston, SC; 3UC Davis Comprehensive Cancer Center, Sacramento, CA; 4Rigshospitalet, Copenhagen, Denmark; 5Medivation Inc., San Francisco, CA; 6Chicago, IL, USA
*Dr Perabo was an employee of Astellas Pharma at the time of project initiation; 7Astellas Global Development, Northbrook IL; 8OHSU Knight Cancer Institute, Portland, OR; 9Cliniques Universitaires Saint−Luc, Brussels, Belgium
(Presented by: Gerald Andriole)

Introduction: Enzalutamide (ENZA) is an oral androgen receptor signaling inhibitor. In the PREVAIL trial, ENZA significantly improved overall survival (OS) and radiographic progression−free survival (rPFS) compared to placebo (PBO) in men with chemotherapy−naïve metastatic prostate cancer that had progressed on ADT. ENZA's benefit was demonstrated for all secondary endpoints. Here we present data from a post hoc analysis investigating the effect of ENZA vs PBO in patients (pts) with nonvisceral metastatic disease including those with lymph node metastases only and no evidence of bone metastases.

Methods: PREVAIL was a multinational double−blind phase 3 study in men with minimally symptomatic/asymptomatic metastatic prostate cancer who had not received chemotherapy. OS and rPFS were coprimary endpoints. Pts were randomized 1:1 to ENZA (872 pts) or PBO (845 pts). All pts remained on ADT. Imaging and bone scans were performed at screening and at weeks 9, 17, and 25, and every 12 weeks thereafter. The nonvisceral subgroup included pts with only bone and/or nodal disease at study entry.

Results: In PREVAIL, 89% (774/872) of ENZA pts and 87% (739/845) of PBO pts had nonvisceral disease at entry and baseline characteristics were similar between the 2 study arms. Efficacy (table) and safety outcomes in pts with nonvisceral disease were consistent with those observed in the full population. Within the nonvisceral subgroup, 87 pts in the ENZA group and 108 pts in the PBO group had lymph node only disease. In this subset, ENZA reduced the risk of radiographic progression or death by 91% compared with PBO (hazard ratio [HR] 0.092; P<0.0001); median rPFS was 14.1 months with ENZA and 3.7 months with PBO. Median OS in pts with lymph node only disease was not reached with either treatment.

Conclusion: Consistent with the robust results obtained in the full PREVAIL population, ENZA significantly reduced the risk of progression of metastatic disease, reduced the risk of death, and delayed the initiation of chemotherapy in pts with nonvisceral disease. In the subset of pts with lymph node disease and no radiographic evidence of bony metastases rPFS was longer on enzalutamide than placebo.

Funding source: Medivation and Astellas

<table>
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<tr>
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<th>Pts with nonvisceral disease</th>
<th>All pts</th>
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<tbody>
<tr>
<td></td>
<td>ENZA (N=774)</td>
<td>PBO (N=739)</td>
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<tr>
<td><strong>OS (median, months)</strong></td>
<td></td>
<td></td>
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<tr>
<td>NYR</td>
<td>30.2</td>
<td>32.4</td>
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<tr>
<td>HR 0.69</td>
<td>(95% CI: 0.57, 0.83)</td>
<td>HR 0.71</td>
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<tr>
<td><strong>rPFS (median months)</strong></td>
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<tr>
<td>14.1</td>
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<tr>
<td>HR 0.18</td>
<td>(95% CI: 0.14, 0.22)</td>
<td>HR 0.19</td>
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<tr>
<td><strong>Time to cytotoxic chemotherapy (median, months)</strong></td>
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<td>28.4</td>
<td>11.6</td>
<td>28.0</td>
</tr>
<tr>
<td>HR 0.36</td>
<td>(95% CI: 0.31, 0.42)</td>
<td>HR 0.35</td>
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Cl = confidence interval; NYR = not yet reached
REAL TIME MR IMAGING−GUIDED IN−BORE FOCAL LASER ABLATION FOR LOW−TO−INTERMEDIATE RISK PROSTATE CANCER – Results: OF COMBINED PHASE I/II STUDY

Sangeet Ghai, MD, FRCR¹, Uri Lindner, MD², Masoom Haider, MD³, Walter Kucharczyk, MD², Tristan Barrett, MD² and John Trachtenberg, MD²

¹University Health Network – Toronto, Ontario; ²UHN, Toronto, Ontario; ³Sunnybrook Health Sciences Centre, Toronto, Ontario

(Presented by: Sangeet Ghai)

Introduction: Men with low−intermediate risk prostate cancer (PCa) are offered either active treatment (surgery or irradiation) with almost certain impairment in quality of life (sexual, genitourinary or bowel dysfunction) or active surveillance, with risk of disease progression and long periods of careful observation leading to significant burden to the patient and health care system. Although PCa is often multifocal, the volume of index tumor is the likely source of local and distant spread of the tumor. The index lesion is usually demonstrated on multi−parametric MRI and creates a treatment target. Thus focal ablation of index cancer could provide the best balance between oncologic control and quality of life.

The goal of our study was to assess the safety and feasibility of focal laser ablation therapy in PCa under MR guidance.

Methods: Patients with biopsy−proven low or intermediate risk PCa were prospectively enrolled. Treatment was performed as an outpatient in the MR suite under deep sedation. MR−compatible transperineal template was used for initial treatments. Final 15 treatments were performed with a trajectory alignment device (robot).

Upon confirming optimal catheter placement, 980 nm water cooled laser fiber was placed and the ablation monitored in real−time by MRI thermography. Contrast enhanced imaging confirmed post−procedure coagulation. Follow−up biopsy was performed 4−6 months post ablation in 47/50 patients. All patients filled out IPSS and IIEF−5 questionnaires at baseline, 1 and 4 months after treatment.

Results: None of the patients had any significant sustained side effects from the treatments. At 4−6 month biopsy, 32/47 patients (68%) were treated successfully, while 15 had evidence of residual cancer in the treated region. Of these 15 patients, 6 reduced in risk category to very low. Presence of a definite lesion on diagnostic MRI and complete lesion coverage by thermal ablation zone were significantly associated with no residual disease (P<0.05). Reasons for residual tumor likely include registration error, MR unrecognized sparse tumor at periphery of target, and deformation of the prostate at the 4 month biopsy.

Conclusion: Focal laser ablation is a feasible, safe, and possible effective therapy for low−to−intermediate risk PCa. Enhanced definition of tumor margins and the ability to accurately biopsy the treated area post therapy, will further enhance the science of in−bore focal treatment of PCa.
TALL SCORE FOR PREDICTION OF ONCOLOGICAL OUTCOMES AFTER RADICAL NEPHROURETERECTOMY FOR HIGH GRADE UPPER TRACT UROTHELIAL CARCINOMA

Ramy Youssef, Laura−Maria Krabbe, MD1, Shahrokh F. Shariat, MD2, Yair Lotan, MD3, Arthur I. I. Sagalowsky, MD3, Jay Raman, MD4, Christopher G. Wood, MD5, Alon Weizer, MD6, Marco Roscigno, MD7, Francesco Montorsi, MD8, Christian Boenzl, MD9, Mesut Remzi, MD10, Karim Bensalah, MD11, Wassim Kassouf, MD12 and Vitaly Margulis, MD3

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Presented by: Ramy Youssef

Introduction: We created a multivariable prognostic tool for prediction of oncologic outcomes after radical nephroureterectomy (RNU) for high−grade non−metastatic upper tract urothelial carcinoma (UTUC).

Methods: Data from UTUC collaboration database was utilized to include 586 patients who underwent RNU for non−metastatic (M0), node negative (N0), high−grade UTUC. A score was defined based on the sum of the independent prognostic variables from univariable and multivariable survival analyses. Survival outcomes were compared according to the score.

Results: The study included 382 males (65%) with a median age 70 y (range 28 −97). Pathological tumor stage (T) was ≥ T2 in 418 (71%) patients. Sessile architecture (A) was found in 204 (35%) and lympho−vascular invasion (LVI) in 152 (26%). Lymphadenectomy (L) was performed in 245 (42%). Independent prognostic factors with significance in multivariate analysis included: T, A, LVI and L. The sum of T (≤ T1 = 1, T2 = 2, T3= 3 and T4 = 4), A (papillary = 0 and sessile = 1), LVI (negative = 0 and positive = 1) and L (lymphadenectomy = 0 and no lymphadenectomy = 1) was entered into a TALL score (1−7). Disease free survival (DFS) and cancer specific survival (CSS) was stratified into 4 risk categories according to the TALL score: low (n= 172 [29%], TALL 0−2), intermediate (n= 152 [26%], TALL = 3), high (n= 109 [19%], TALL = 4) and very high risk (n= 153 [26%], TALL ≥ 5) using Kaplan−Meier survival analyses. Five−year DFS and CSS rates were 86 and 90 in low, 71 and 75 in intermediate, 57 and 58 in high and 34 and 38 in very high risk categories. TALL score was externally validated in a single center cohort of 85 UTUC patients. Patients were divided into low risk and high−risk categories in the validation cohort. Five−year DFS and CSS rates were 70 and 75 in low risk; 37 and 52 in high risk TALL score patients (p < 0.001 and p = 0.004; respectively)

Conclusion: We developed a validated multivariable prognostic tool that can be utilized for the prediction of oncological outcomes after RNU for high grade UTUC. This postoperative prediction model can be used for patient counseling, determination of follow up schedule, selection for adjuvant systemic therapies and design of clinical trials.
Introduction: Experience with management of genito–urinary (GU) melanoma is rare. Therefore, in order to better elucidate the disease characteristics of GU melanoma we utilized a large population–based cancer registry to examine the epidemiology, natural history, pathological characteristics, prognostic factors, and treatment outcomes.

Methods: The Surveillance, Epidemiology, and End Results (SEER) database (1973–2010) was used to identify cases by tumor site and histology codes. The association between demographic, clinical, pathological characteristics and long–term disease specific survival (DSS) was examined.

Results: A total of 1586 histologically confirmed cases were identified between 1973 and 2010. The cohort was composed of 77 penile, 35 scrotal, 67 urinary tract, 1059 vulvar, and 348 vaginal melanomas. The annual age–adjusted incidence rate was 0.11 cases per 100,000, and did not change significantly over time. Median age was 69 years (IQR 7–98). Of the patients with a known tumor stage (N = 1224), 40% had regional or distant stage. Of the patients with known Clark’s level (N = 536), 72% had a Clark level IV or higher. The majority of patients (88.8%) received cancer directed surgery. 9.5% of patients received radiation therapy in combination with surgery. Overall, five and ten–year cancer specific survival rates were 51 % and 41%. For males, 5– and 10–year DSS rates for urinary tract melanomas were 63% and 31%, compared to penile (69%, 52%) and scrotal (69%, 69%); (p < 0.38). For females, 5 and 10–year DSS for genial melanomas, urinary tract melanomas were 35% and 29%, compared to vaginal (27%, 18%) and vulvar (58%, 48%); (p < 0.001). On univariate analysis, age, sex, race, marital status, stage, anatomic location, Breslow thickness, presence of ulcerations, and lymph node involvement were all significant predictors of survival. On multivariate analysis, a worse outcome was associated with increasing age, Clark level 4 or higher, distant stage, positive lymph node involvement, urinary tract and vaginal locations, and presence of ulcerations.

Conclusion: This series represents the largest cohort of GU melanomas to date. GU melanomas commonly presented with a high Clark level and advanced stage with a poor prognosis. A worse DSS was associated with increasing age, Clark level 4 or higher, distant stage, positive lymph node involvement, urinary tract and vaginal locations, and presence of ulcerations.
Introduction: Historically, primary radiotherapy has been the preferred treatment modality for stage I seminoma. However, there is emerging consensus that observation or primary chemotherapy may be the preferred management strategies to reduce overtreatment and risk of secondary malignancy. Hypothesizing that the use of radiotherapy has decreased in the modern era, our objective was to assess temporal practice patterns in stage I seminoma using a large national cancer registry.

Methods: The National Cancer Database (NCDB) was queried for all patients diagnosed with stage I seminoma from 1998 to 2011. Temporal trends for receipt of systemic chemotherapy, radiation, and observation (defined as no treatment) were assessed. Following adjustment for patient, demographic, and clinicopathologic characteristics, generalized estimating equations were used to assess for associations between covariates and receipt of primary radiotherapy.

Results: Of the 34,251 patients identified with stage I seminoma in the NCDB, 20,627 were treated with radiation (60.2%), 2,278 were treated with chemotherapy (6.7%), and 11,346 were managed with observation (33.1%). Radiation use significantly declined from 73.5% in 1998 to 29.6% in 2011 (p<0.0001), while utilization of chemotherapy (1.9% to 16.5%, p<0.0001) and observation (24.6% to 53.9%, p<0.0001) markedly increased (FIGURE 1). Following adjustment, age categories 30−39 years (OR 1.06 [CI 1.01−1.13]) and 40−49 years (OR 1.10 [CI 1.03−1.17]), and pathologic stage T2 (OR 1.25 [CI 1.17−1.32]) and T3 (OR 1.21 [CI 1.04−1.41]) were associated with increased utilization of radiotherapy. Uninsured patients (OR 0.78 [CI 0.71−0.86]) and those with Medicaid (OR 0.82 [CI 0.73−0.92]) or Medicare (OR 0.62 [CI 0.55−0.69]) were less likely to undergo primary radiotherapy.

Conclusion: These data demonstrate that utilization of radiation therapy for stage I seminoma is on the decline. Coinciding with shifts in evidence-based guidelines, observation is now the most commonly employed management strategy for patients with Stage I seminoma.
Poster #192

UPTAKE OF INGUINAL LYMPH NODE DISSECTION FOR T2 PENILE CANCER: Results: FROM THE NATIONAL CANCER DATABASE

Mohammed Haseebuddin, MD, Elizabeth Handorf, PhD, Nikhil Waingankar, MD, Yu−Ning Wong, MD, Rosalia Viterbo, MD, Richard Greenberg, MD, Robert Uzzo, MD, Alexander Kutikov, MD, Marc Smaldone, MD, David Chen, MD
Fox Chase Cancer Center, Philadelphia, PA
(Presented by: Nikhil Waingankar)

Introduction: Per the NCCN guidelines, inguinal lymph node dissection (ILND) is recommended for patients with intermediate (T1b) or high (Any T2 or Grade 3) risk disease even in the absence of palpable nodal disease. Our objective was to assess temporal trends in uptake of ILND and to determine factors associated with the receipt of ILND using the National Cancer Database (NCDB).

Methods: The NCDB was queried for all patients diagnosed with T2 penile cancer from 1998–2011. Temporal trends for receipt of ILND were assessed. Adjusting for patient, demographic, and clinicopathologic characteristics, multivariable logistic regression models were used to examine the association between available covariates and receipt of ILND.

Results: Of 2019 patients identified over the study period, 693 (34.3%) underwent ILND. Rates of ILND did not significantly improve from 1998 to 2011 (34.2 to 40.0%; p = 0.09). Significant differences were observed in patients undergoing ILND with respect to age (p<0.001), hispanic ethnicity (p=0.04), insurance status (p<0.001), and facility type (p<0.001), while no changes were seen with respect to race, income, education, urban/rural location, tumor grade, or Charlson co−morbidity score. Following adjustment, patients with high grade disease (OR 1.35 [CI 1.1−1.7]) and those treated at academic centers (OR 3.2 [CI 2.2−4.7]) were more likely to receive ILND, while patients >70 years of age (OR 0.41 [CI 0.28−0.60]) were less likely to receive ILND.

Conclusion: In the NCDB, less then 35% of patients with T2 penile cancer receive ILND and the rates have not significantly changed over the last decade. Referral of patients with this uncommon, highly morbid disease to experienced centers may increase adherence to guideline recommended care.
Poster Session II – Full Abstracts

Poster #193
AUA OFFICE OF RESEARCH: SUPPORT FOR UROLOGIC ONCOLOGY THROUGH FUNDING, EDUCATION, AND ADVOCACY
Carolyn Best, PhD1, Jessica Ames, MS1, Rodney Cotten MBA2 and Johannes Vieweg, MD2
1American Urological Association, Linthicum, MD; 2Department of Urology, Prostate Disease Center, University of Florida College of Medicine, Gainesville, FL
(Presented by: Carolyn Best)

Introduction: The Office of Research is advancing the commitment of the American Urological Association (AUA) to support urological research through funding, education, and advocacy to meet the ever-growing needs of patients with urologic diseases and conditions.

Methods & Results: To best meet the funding needs of urologic research, the AUA Office of Research (AUA OR) administers grant programs, provided through the Urology Care Foundation, for early-career investigators, fellows, residents, and medical students. Funding has increased annually with $678,000 in 2011 to a projection of $1,239,000 in 2015. Over the full 39-year history of these programs, over 600 scholarships totaling over $20 million have been provided. Over 51% of scholarships from 2012–2014 were for urologic cancer research. Awardees have garnered $20 in federal and other grants for every $1 received in scholarship funds, and the 2003–2012 awardees (178) have published over 6,000 peer-reviewed journal articles, including entries in the “Top 100 Cited Articles in Urology.”

The AUA OR also conducts research education conferences. In 2014, the Urologic Oncology Research Symposium and AUA/NCI/SPORE Workshop at the AUA Annual Meeting featured premier scientists presenting innovative advancements in basic, translational, and clinical research in prostate, bladder, and kidney cancers. Sessions on these and other urologic oncology topics will again be offered in 2015. Other opportunities for scientific conferencing and developing collaborations include the annual Summer Research Conference, which has covered bladder cancer and hormones in prostate cancer, among other topics. We also emphasize opportunities for early-career investigators with the Research Forum at the AUA Annual Meeting and the Early-Career Investigators Workshop (ECIW) to foster successful research careers through grant-writing and presentation. Of eight K or R grant applications submitted after the first ECIW in 2012, five (63%) were funded upon their first submission.

The AUA and AUA OR have significantly increased engagement in research advocacy. In 2014, “promotion of urology/cancer research funding” became an AUA legislative priority, and the AUA OR has defined initial advocacy priorities that include prostate cancer and bladder health including bladder cancer.

Conclusion: The AUA OR maintains robust programs for supporting urologic oncology research and is working toward engagement with all urologic oncology researchers.
THE IMPACT OF VARIABLE DEGREES OF SEMINOMATOUS INVOLVEMENT IN MIXED GERM CELL TUMORS ON INTRA−OPERATIVE COMPLEXITY IN POST−CHEMOTHERAPY RETROPERITONEAL LYMPH NODE DISSECTION

Christopher Russell, BS1, Gautam Agarwal, MD2, David D. Buethe, MD2, Patrick Espiritu, MD2, Adam Luchey, MD2, Phillipe E. Spiess, MD2, Julio Powsang, MD2, Michael Poch, MD2 and Wade J. Sexton, MD2

1USF Morsani College of Medicine, Tampa, Fl; 2H. Lee Moffitt Cancer Center, Tampa, Fl
(Presented by: Christopher Russell)

Introduction: Post−chemotherapy retroperitoneal lymph node dissection (PC−RPLND) is an essential component in the management of metastatic testicular cancer (TC). A significant desmoplastic reaction is often encountered in the residual masses of patients with pure seminoma and has previously been reported to increase surgical complexity. The impact of mixed primary tumors with variable percentages of seminoma elements on PC−RPLND operative parameters is undetermined.

Methods: Patients undergoing PC−RPLND for residual TC following the completion of at least 1 induction course of cisplatin−based combination chemotherapy were identified through retrospective review. Primary orchiectomy specimens with pure seminoma (SGCT) and mixed seminoma containing germ cell tumors (SC−GCT) were compared to primary GCTs with no seminoma elements (true NSGCT) to assess for differences in intra− and post−operative outcomes. Linear and logistic regression models were used to assess for differences in parameters between percentages of seminoma elements.

Results: 97 patients met inclusion criteria, consisting of 18 pure SGCT, 22 mixed SC−GCT, and 57 NSGCT. Mixed SC−GCT contained a mean of 31.4% (range 5%−90%) seminoma elements. Pure SGCT demonstrated a significantly increased median EBL (p=0.049) and nephrectomy rate (p=0.006) compared to NSGCT. Patients with SC−GCT had significantly increased median operative time (p=0.008), EBL (p=0.048) and transfusion volume (p=0.004) when compared to NSGCT. In patients with mixed SC−GCT, linear and logistic regression revealed a significant correlation between increasing percentage of seminoma involvement in the primary orchiectomy tumor and median EBL (p=0.048) transfusion rate (p=0.02), and transfusion volume (p=0.0005). Post−operative complications occurred in 31 patients. There was no difference in complication rates according to histology. Although logistic regression failed to demonstrate any association between percentage of seminoma involvement and complication rates (p=0.611), there was an association with increased rates of complications ≥ Clavien grade 3 (p=0.049).

Conclusion: Mixed SC−GCT results in an increased intra−operative complexity similar to that seen in pure seminoma and there is a significant correlation between the percentage of seminoma elements within the primary orchiectomy specimen and increased median EBL transfusion rates, transfusion volume, and high−grade complications following PC−RPLND.
COMMON LANGUAGE AS COMPARED TO USE OF THE BOSNIAK CLASSIFICATION SYSTEM (BCS) ACCOUNTS FOR INTER-OBSERVER VARIABILITY AND UNNECESSARY RADIOGRAPHIC FOLLOW UP

Alex Baumgarten BA1, Jenna Bates, BS1, C. Peter Chang, MD2, James Oliver, MD2, James Symanowski, PhD3 and Stephen Riggs, MD1

1Division of Urology, Department of Surgery, Levine Cancer Institute, Carolinas Healthcare System, Charlotte, NC; 2Department of Radiology, Carolinas Healthcare System, Charlotte, NC; 3Department of Biostatistics, Carolinas HealthCare System, Charlotte, NC

(Presented by: Jenna Bates)

Introduction: Tumor classification from radiographic interpretation is important for diagnosing cystic renal lesions (CRLs). The BCS was created to implement stricter guidelines for stratifying CRLs. Through our longstanding small kidney tumor conference (SKTC) we sought to investigate the “cost” to classifying a lesion as a complex cyst (CC) as well as inter−observer variability of the BCS.

Methods: Patients from 2005−2013 with an initial interpretation of CC, Bosniak 2, or 2F were identified from our prospectively maintained SKTC database. Using the BCS, two radiologists performed independent and blind re−reviews of all initial and final CT or MRI renal images for identified patients. Classifications per SKTC, as well as inter−observer variability were compared using these re−reads.

Results: 91 of 827 patients in our database had initial interpretations of CC (60%), Bosniak 2 (7%), or 2F (33%). Average number of scans was 4.3 (1−10). 30% of lesions initially categorized by conference as CC were reclassified as Bosniak 1 or 2 lesions. Initial BCS utilization would have eliminated 90 follow−up scans. Three−level categorization separating (a) Bosniak 1 & 2, (b) Bosniak 2F, and (c) Bosniak 3 & 4 lesions finds initial scan reader agreement to be 81.5% (Κ =65%). Final reader agreement for the three−category system was 81.8% (Ι̂ = 67%).

Conclusion: The BCS stratifies CRLs; its lack of use results in unwarranted imaging and follow−up visits. The concurrence among inter−reader classification of CRLs using the BCS conferred a substantial strength agreement; thus, with initial utilization of the BCS, unnecessary and costly radiographic scans may be prevented.
**Posters Session II – Full Abstracts**

**Poster #196**
**INCREASING FRAILTY AS MEASURED BY RISK ANALYSIS INDEX PREDICTS POSTOPERATIVE COMPLICATIONS AND MORTALITY IN UROLOGY PATIENTS**
Sudhir Isharwal MBBS, Jason Johanning, MD, Kendra Schmid, PhD, Roy Williams, Chad Lagrange, MD
Omaha, NE
(Presented by: Sudhir Isharwal)

**Introduction:** Our objective was to determine the impact of preoperative frailty, as measured by validated risk analysis index (RAI), on the occurrence of postoperative complications after urologic surgeries in a national database comprised of diverse practice groups and cases.

**Methods:** The National Surgical Quality Improvement Program (NSQIP) database was queried from 2005−2011 for a list of abdominal, vaginal, transurethral and scrotal urological surgeries using current procedural terminology codes (CPT). The study population was subdivided into two groups based on the nature of procedures performed: complex procedures (abdominal or vaginal) and simple procedures (transurethral or scrotal). Risk analysis index was calculated using preoperative NSQIP variables to determine preoperative frailty. Major postoperative morbidities (pulmonary, cardiovascular, renal and infectious), mortality, return to operating room, discharge destination and readmission to hospital were examined.

**Results:** The study identified 42,715 patients who underwent urological procedures – 25,693 complex and 17,022 simple procedures. Mean RAI score (range) was 7.75 (0−53). The majority of patients scored low on the RAI (90.57% with RAI < 10). As the RAI score increased, there was a significant linear increase in postoperative complication and mortality rate (both P<0.0001). Similarly, rate of return to operating room and hospital readmission rate increased as RAI increased (both P<0.0001). Additionally, rate of discharge to home decreased. Interestingly, mortality rate in patients with high RAI did not differ comparing simple to complex procedures (P=0.90) whereas complications were significantly greater in the complex operation (P=0.01).

**Conclusion:** Increase in frailty, as measured by RAI score, is associated with increased postoperative complications and mortality. RAI may allow for rapid identification and counseling of patients who are at high risk for adverse perioperative outcomes.

Financial disclosure: Authors did not receive any financial support for this study.

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The effect of preoperative frailty on the postoperative complications and mortality

![Graph showing the relationship between risk analysis index score and postoperative complications and mortality](image)
Poster #197
UROLOGIC MEDICARE REIMBURSEMENT IN 2012: ANALYSIS OF CLAIMS AND PAYMENTS
Benjamin Davies, MD, Alireza Moinzadeh, MD, David Canes, MD
Lahey Clinic, Burlington, MA
(Presented by: Benjamin Davies)

Introduction: On 4/9/14 the Centers of Medicare and Medicaid Services (CMS) released 10 million billing records of over 880,000 physicians and other healthcare providers. The records accounted for over a billion dollars in Medicare payments distributed in 2012. Herein we present urologic specific data in the context of overall physician payments which to date has not been published or analyzed.

Methods: The zip file (tab delimited, 1.7 GB) was downloaded at CMS.gov from the publically available Medicare provider utilization and payment database containing 2012 claims data. This was used to provide a database using Microsoft Excel, Access, and Tableau. The urology specialty was extracted in full detail, and other specialities were extracted only at summary level. The urology dataset includes 27 database fields, 843 procedures/drugs/services, and 32,491,668 total services. Techniques including pivot tables, visual basic functions and macros, graphs, charts, and other methods were utilized for data analysis.

Results: In 2012 a total of $1,385,385,000 was distributed to 8,784 Urologic Physician Providers for 194,554 Procedure claims. The average urologist was paid $157,700 by CMS in 2012. The top 5 paid claims were: established outpatient visits ($411,878,000), leuprolide injections ($141,465,800), cystoscopy ($126,700,838), new outpatient visits ($99,259,200), and cystoscopy and treatment ($52,857,100). The top 5 highest per procedure payments were: remove bladder/create pouch ($1,848), remove bladder/revise tract ($1,742), prostatic microwave thermotherapy ($1,714), kidney transplant ($1,679), prostatic rf thermotx ($1,678).

Of total medicare payments, 13.4 billion (17%) went to primary care, and 42 billion (55%) to specialty care. Of specialty care, Urology ranks 10th among subspecialties for total Medicare payments, with the top five being Opthalmology, Cardiology, Diagnostic Radiology, Hematology/Oncology, and Dermatology. Radiation oncology ranks 9th. Geographic analysis was performed by ranking states according to total paid, and adjusting for census population over age 65, revealing nonuniform distribution. Highest per capita spending was in FL, DE, DC, NJ.

Conclusion: The release of an enormous amount of provider level claims data by CMS may potentially serve as a new tool to locate potential fraud, pinpoint needs, and assess levels of growth in care. This is the first report that broadly creates a picture of the urologic medicare landscape.

Poster #198
THE ROLE OF 18F−FDG PET/CT IN STAGING PENILE SQUAMOUS CELL CARCINOMA
Sumit Isharwal, MD1, Robert Goldfarb, MD2 and Badrinath Konety, MD, MBA2
1University of Minnesota; 2University of Minnesota, Minneapolis, MN
(Presented by: Sumit Isharwal)

Introduction: The extent of lymph node involvement is the most important prognostic factor in patients with penile cancer. However, inguinal lymph node dissection is associated with significant morbidity. Initial 18F−FDG−PET/CT−scan studies have reported promising results and can be helpful to avoid inguinal lymph node dissection in selected patients.

Objective: To analyze the diagnostic accuracy of 18F−FDG−PET/CT−scan in the assessment of inguinal lymph node involvement in patients with high risk penile squamous cell carcinoma.

Methods: 11 patients with high−risk penile cancer were staged by 18F−FDG−PET/CT−scan at our institution. In total, lymph node involvement was assessed in 17 inguinal regions. Reference standard was either histology or clinical follow−up with a minimum of 13 months (mean: 19.2; range 13−26 months).

Results: 18F−FDG−PET/CT−scan showed a sensitivity, specificity, positive predictive value and negative predictive value of 83.33%, 81.82%, 71.42% and 90.00% respectively.

Conclusion: 18F−FDG−PET/CT−scan is a promising staging modality in assessing inguinal lymph node involvement in high−risk penile cancer patients and can be helpful to avoid inguinal lymph node dissection in selected patients.
Poster #199
THE LANDSCAPE OF WHOLE–GENOME ALTERATIONS AND PATHOLOGIC FEATURES IN GENITOURINARY MALIGNANCIES: AN ANALYSIS OF THE CANCER GENOME ATLAS
Mark Ball, MD, Michael Gorin, MD, Phillip Pierorazio, MD, George Netto, MD, Charles Drake, MD, Hans Hammers, MD, Mohamad Allaf, MD
James Buchanan Brady Urological Institute and Department of Urology, Johns Hopkins University School of Medicine, Baltimore, MD
(Presented by: Mark Ball)

Introduction: The accumulation of somatic genetic alterations drives carcinogenesis; however little is known about how the level of genetic alteration across an entire cancer genome affects tumor grade and stage on histopathologic analysis. We investigated the influence of somatic mutation count (MC) and copy number variance (CNV) in patients with genitourinary malignancies in The Cancer Genome Atlas (TCGA).

Methods: The TCGA datasets for bladder urothelial carcinoma (UC), clear cell renal cell carcinoma (ccRCC), papillary renal cell carcinoma (pRCC), chromophobe renal cell carcinoma (pRCC) and prostate adenocarcinoma (PCa) were accessed via the TCGA data portal. All cases with histopathologic data available as of 8/1/2014 were included in analysis. The median MC/genome and the CNV (calculated as the fraction of the genome with log (2) copy number > 0.2 compared to the reference genome) was compared among each tumor type. For each tumor type, patients were stratified by tumor grade and stage, and differences in MC and CNV were compared. Tumor grade was not available for pRCC or chRCC. Two sided P < 0.05 were considered significant.

Results: Among the tumor types analyzed, UC had the highest median MC (163), followed by pRCC (75), chRCC (54), ccRCC (50), and PCa (30). Median CNV was highest for chRCC (.47), followed by UC (.17), ccRCC (.12), pRCC (.07) and PCa (.02) (Figure 1). MC was not associated with grade or stage for any tumor; however CNV was associated with increasing Fuhrman grade in ccRCC ( P < 0.001), Gleason grade in PCa (p < 0.001), T stage in PCa (P=0.003), and rate of biochemical recurrence in PCa (P < 0.001). CNV was not associated with grade or stage for the remaining tumor types.

Conclusion: Among genitourinary malignancies, MC and CNV varies greatly among tumor types. While MC was not predictive for any malignancy, CNV was most predictive for PCa, which was the tumor type with the lowest levels of MC and CNV, and likely the highest signal:noise ratio. For other malignancies, differences in grade and stage may correspond to alterations in specific genes, as well as epigenetic and expression level changes yet to be elucidated.
Poster #200
A SINGLE INSTITUTION REVIEW OF AMYLOIDOSIS OF THE UROTHELIUM DETECTED ON HEMATURIA EVALUATION
Ariel Schulman, MD1, William Hilton, MD2, Ruben Pinkhasov, MD3 and Jonathan Coleman, MD2
1Maimonides Medical Center, Brooklyn, NY; 2Memorial Sloan Kettering Cancer Center, NY, NY; 3Maimonides Medical Center, Brooklyn, NY
(Presented by: Ariel Schulman)

Introduction: To present clinical findings of six cases of amyloidosis of the urothelium detected on hematuria evaluation at a tertiary Urologic Oncology institution.

Methods: We performed a single institution review of patients with pathologically confirmed amyloidosis of the urothelium from 1998 to 2013.

Results: 6 cases of amyloidosis of the urothelium were identified. One upper tract, four cases in the bladder and one case in the urethra. The median age was 70.5 (29−87 yrs) with equal gender distribution. All patients presented with gross hematuria and five patients had abnormal abdominal imaging findings. Five of the six patients had initial pathology outside with referring diagnoses including amyloidosis, nephrogenic adenoma and low-grade urothelial carcinoma. Four patients were referred for systemic evaluation with one negative work-up, one newly diagnosed MALT lymphoma, one known B−cell lymphoma and one case suggestive of systemic amyloidosis. The urinary tract was safely managed expectantly (without extirpation) in all cases with a median follow-up of 36.5 (5−132 mo.) None of the patients had synchronous or metachronous urothelial carcinoma.

Conclusion: Amyloidosis is an important pathologic entity encountered in the urothelium. It presents with signs and symptoms similar to carcinoma and may be misdiagnosed due to its rare nature. We observed safe, long-term expectant management of the urinary tract in this small series. Patients should be referred to the hematology/oncology service to rule out systemic amyloidosis and occult hematologic malignancy. Long-term surveillance of the urinary tract is reasonable to ensure no progression of disease.

<table>
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<th>Presenting Symptom</th>
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<th>Outside Diagnosis</th>
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Clinical features of six patients with amyloidosis of the urothelium.
Introduction: Nephroureterectomy (NU) is the standard treatment for upper tract urothelial carcinoma (UTUC). Minimally invasive (MI) laparoscopic or robotic-assisted approaches have been introduced in an effort to reduce morbidity. We performed a population-based study to evaluate contemporary utilization trends, morbidity, and costs associated with NUs in the US.

Methods: Using the Premier Hospital Database (Premier, Inc., Charlotte, NC), a nationally representative discharge database with data from over 600 non-federal hospitals in the US, we captured patients who underwent a NU (ICD9 55.51) with diagnoses of renal pelvis (189.1) or ureteral (189.2) neoplasms from 2004 to 2013. We fitted regression models, adjusting for clustering by hospitals and survey weighting to evaluate 90-day postoperative complications, length of stay (LOS), OR time, and direct hospital costs among open, laparoscopic, and robotic NU.

Results: The weighted cohort included 17245 open, 13298 laparoscopic, and 3745 robotic NUs. MI surgeries increased from 36% to 54% from 2004 to 2013 while the number of NUs decreased by nearly 20% during the same period (Figure 1). The overall 90-day mortality, major (Clavien 3-5), and minor (Clavien 1-2) complication rates were 1.89%, 9.4%, and 27.7% respectively with no statistically significant differences between the three approaches based on adjusted logistic regression analyses. The LOS was decreased for laparoscopic (Incidence Risk Ratio [IRR]: 0.87, 95% CI: 0.82-0.92, p <0.001) and robotic (IRR: 0.76, 95% CI: 0.7-0.83, p <0.001) NU compared to open NU. OR time was 10.35 (p<0.05) and 56.35 (p<0.001) minutes longer for laparoscopic and robotic NU. Adjusted 90-day median direct hospital costs were $1354 and $3533 higher for laparoscopic and robotic NU (p<0.001).

Conclusion: During this contemporary 10-year study, the use of MI NUs increased to over half of procedures with a recent surge in robotic NUs, along with a concurrent reduction in total NUs performed in the US. Comparable perioperative outcomes suggest that the morbidity profile may be driven primarily by patient-specific characteristics as opposed to surgical approach. Long-term oncological and functional outcomes of MI NU remain to be seen.
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The following urologic oncology fellowship programs have earned the credentials of the Society of Urologic Oncology:

**Duke University Medical Center**  
Program Director: Thomas J. Polascik, MD  
Professor, Division of Urologic Surgery  
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Email: polas001@mc.duke.edu  
http://urology.surgery.duke.edu/education-and-training/fellowship-programs/urologic-oncology

**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  
http://www.fccc.edu/healthProfessionals/fellowships/urologic.html

**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  
http://my.clevelandclinic.org/urology/fellowships/urologic Oncology_fellowship.aspx

**Indiana University, Urology Department**  
Program Director: Timothy A. Masterson MD  
Indiana University Health, Department of Urology  
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tamaster@iupui.edu

Fellowship Contact: Tina Hedges  
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---

**Johns Hopkins Brady Urological Institute**  
Program Director: Christian Pavlovich, MD  
Associate Professor  
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urology.jhu.edu/professionals/oncology_fellowship.php

**Keck School of Medicine – University of Southern California**  
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Fellowship Coordinator: Adriana Cassani  
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**Mayo Clinic Cancer Center, Mayo School of Graduate Medical Education**  
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Education Coordinator: Joan E. Simon  
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Program Director: Aria F. Olumi, MD
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http://www.massgeneral.org/urology/

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www.mdanderson.org/education-and-research/education-and-
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residency-and-fellowship-programs/urologic-oncology-
fellowship.html

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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.
### 2016 Urologic Oncology Fellowship Matching Program

#### Match Schedule

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<th>Event</th>
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| Nov 12 – May 8, 2015 | Online registration process.  
Please register at: [http://www.auanet.org/eforms/SUO/](http://www.auanet.org/eforms/SUO/) |
| May 8, 2015   | Registration deadline for both applicants and programs. |
| May 11, 2015  | Preference list phase begins.               |
| June 8, 2015  | Deadline for receipt of all online preference lists.  
(You will receive e-mail instructions on how to submit your list.) |
| June 17–24, 2015 | The Match is performed, using all possible safeguards to ensure  
accuracy and confidentiality. |
| June 26, 2015 | Match results sent out via e-mail.          |
In accordance with the ACCME Accreditation Criteria, the American College of Surgeons, as the accredited provider of this activity, must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. Therefore, it is mandatory that both the program planning committee and speakers complete disclosure forms. Members of the program committee were required to disclose all financial relationships and speakers were required to disclose any financial relationship as it pertains to the content of the presentations. The ACCME defines a ‘commercial interest’ as “any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients”. It does not consider providers of clinical service directly to patients to be commercial interests. The ACCME considers “relevant” financial relationships as financial transactions (in any amount) that may create a conflict of interest and occur within the 12 months preceding the time that the individual is being asked to assume a role controlling content of the educational activity.

ACS is also required, through our joint sponsorship partners, to manage any reported conflict and eliminate the potential for bias during the activity. All program committee members and speakers were contacted and the conflicts listed below have been managed to our satisfaction. However, if you perceive a bias during a session, please report the circumstances on the session evaluation form.

Please note we have advised the speakers that it is their responsibility to disclose at the start of their presentation if they will be describing the use of a device, product, or drug that is not FDA approved or the off-label use of an approved device, product, or drug or unapproved usage.

The requirement for disclosure is not intended to imply any impropriety of such relationships, but simply to identify such relationships through full disclosure and to allow the audience to form its own judgments regarding the presentation.

### CME Organizers

**Apolo, MD, Andrea**  
Tel:  

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**Bellmunt, MD, PhD, Joaquim**  
Tel:  

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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**Black, MD, Peter Colin**  
Tel: (604) 875-4301  

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### Bratslavsky, MD, Gennady
Tel: (315) 464-4473

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### Brugarolas, MD, PhD, James
Tel: (214) 648-4059

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### Campbell, MD, PhD, Steven Charles
Tel: (216) 444-5595

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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### Daneshmand, MD, Siamak
Tel: (323) 865-3700

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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### Dinney, MD, Colin P.N.
Tel: (713) 563-7475

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Faculty Speaker Disclosures

Feldman, MD, Darren R.
Tel: (646) 422-4491

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Fossa, MD, Sophie
Tel: (472) 293-4000

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Foster, MD, Richard Scott
Tel: (317) 274-3458

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Holzbeierlein, MD, FACS, Jeffrey
Tel: (913) 588-7564
I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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Hsieh, MD, PhD, James J.
Tel: (646) 888-3263
I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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Jewett, MD, Michael A.S.
Tel: (416) 946-2909

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Kapoor, MD, Anil
Tel: (905) 522-6536

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### Kibel, MD, Adam Stuart
**Tel:** (617) 732-6665  
I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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### Kim, MD, William
**Tel:** (919) 966-4765  
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### Klein, MD, Eric A.
**Tel:** (216) 444-5591  
I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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### Klotz, MD, Laurence H.
**Tel:** (416) 480-4673  
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### Kuban, MD, Deborah Ann
**Tel:** (713) 563-2329  
I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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Lee, MD, Cheryl Taylore
Tel: (734) 615-6662

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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Lerner, MD, Seth Paul
Tel: (713) 798-6841

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Lin, MD, Daniel Wei
Tel: (206) 221-0797

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Linehan, MD, W. Marston
Tel: (301) 496-6353

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Maranchie, MD, Jodi Kathleen
Tel: (412) 605-3019

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Matin, MD, Surena F.
Tel: (713) 792-3250
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McConkey, PhD, David J.
Tel: (713) 667-0280
I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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McDermott, MD, David F.
Tel: (617) 632-9250
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Messing, MD, Edward M.
Tel: (585) 275-3345

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Milowsky, MD, Matthew I.
Tel: (919) 966-3856

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### Pal, MD, Sumanta Kumar
**Tel:** (310) 902-5880

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### Pantuck, MD, Allan Jonathan
**Tel:** (310) 296-2436

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### Pinto, MD, Peter Anthony
**Tel:** (310) 496-6353

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### Rabbani, MD, Farhang
**Tel:** (718) 920-2174

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### Rathmell, MD, PhD, W. Kimryn
**Tel:** (919) 966-8644

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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### Faculty Speaker Disclosures

**Rosenberg, MD, Jonathan**  
Tel: (646) 422-4461  
I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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**Sandler, MD, Howard M.**  
Tel: (310) 423-4204  
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**Sheinfeld, MD, Joel**  
Tel: (646) 422-4311  
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**Wood, MD, FACS, Christopher**  
Tel: (713) 792-3250  
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CME Presenters and/or Authors

Aragon-Ching, MD, FACP, Jeanny
Tel: (202) 741-2478
I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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Bagrodia, MD, Aditya
Tel:

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Bhindi, MD, CM, Bimal
Tel: 164 744-86400

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Chen, MD, MPH, Ronald
Tel: (919) 966-0400

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Chin, MD, PhD, Arnold
Tel: (310) 206-4022

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Choyke, MD, Peter
Tel: (301) 435-4046

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Cost, MD, Nicholas
Tel:

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Daskivich, MD, MSHPM, Timothy J.
Tel: (310) 206-6766

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### Faculty Speaker Disclosures

#### Eggener, MD, Scott E.  
Tel: (773) 702-5195

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#### Epstein, MD, Jonathan I.  
Tel: (410) 955-5043

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#### Evans, MD, FACS, Christopher Paul  
Tel: (916) 734-7520

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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#### Fleshner, MD, Neil  
Tel: (416) 946-2899

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#### Haddad, MBChB, MRCS, Ahmed  
Tel: (214) 645-8765

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#### Hahn, Noah M.  
Tel: (443) 287-0553

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#### Ho, MD PhD, Thai  
Tel: (480) 301-8335

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<td>Hruszkewycz, MD, PhD, Andrew</td>
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<td>Jonasch, MD, Eric</td>
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<td>Jones, PhD, Jeremy</td>
<td>Tel: (626) 256-4673</td>
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<td>Karam, MD, Jose Antonio</td>
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Nayan, MD, Madhur  
Tel: (416) 854-5574

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Nelson, MD, Joel Byron  
Tel: (412) 605-3013

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Nelson, MD, John Daley  
Tel: (817) 287-1986

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Petrylak, MD, Dan P.  
Tel: (212) 305-1731

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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Pinthus, MD, PhD, Jehonathan H.  
Tel: (905) 387-9495

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Psutka, MD, Sarah P.
Tel: (617) 285-3321

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Rubin, MD, Mark A.
Tel: (212) 746-6313

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Scher, MD, Howard I.
Tel: (646) 422-4330

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### Faculty Speaker Disclosures

**Stephenson, MD, Andrew James**  
Tel: (216) 445-1062

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**Taneja, MD, Samir S.**  
Tel: (646) 825-6321

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

<table>
<thead>
<tr>
<th>Who's Involved</th>
<th>Company</th>
<th>Relationship Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>Hitachi Aloka</td>
<td>Consultant</td>
</tr>
</tbody>
</table>

**Taylor, Mario**
Tel: 

<table>
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<tbody>
<tr>
<td>Self</td>
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**Varmus, MD, Harold E.**  
Tel: (301) 496-5615

<table>
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<tr>
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</table>

**Yu, MD, Evan Ya-Wen**  
Tel: (206) 288-6292

I, or my spouse/partner presently (within the past 12 months) have relevant financial relationships with a commercial interest(s) as identified below:

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<th>Who's Involved</th>
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<tr>
<td>Self</td>
<td>Astellas</td>
<td>Honorarium</td>
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<td>Dendreon</td>
<td>Honorarium</td>
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<td>Janssen</td>
<td>Honorarium</td>
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<td>Sanofi</td>
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**Zlotta, MD, Alexandre**  
Tel: (416) 586-4800

<table>
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SUO-SBUR Joint Meeting at the 2015 AUA Annual Meeting
May 2015
New Orleans, LA

SUO at the 2015 AUA Annual Meeting
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16th Annual Meeting of the SUO
December 2015
Washington, D.C.