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**"High Supracostal" PNL Access: Safety of Dilated Percutaneous Renal Access Above the 11<sup>th</sup> Rib**

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**Introduction:** Percutaneous Nephrolithotomy (PNL) is a minimally invasive surgical option for the treatment of large renal calculi. Traditionally supracostal renal access is avoided due to the increased risk of pleural complication. In this retrospective study, we coined the term "high supracostal (HS) renal access" to identify patients that underwent supracostal renal access through or above the 10<sup>th</sup> intercostal space (above the 11<sup>th</sup> rib) and compared this data to patients that underwent the well accepted subcostal access.

**Materials & Methods:** A retrospective analysis of all consecutive PNL procedures performed in a single academic institution by a single experienced urological surgeon over a 30 month period was performed. 142 patients underwent HS access and 113 patients underwent subcostal access. Computed tomography imaging was used extensively in planning renal access in all cases. Comparison of complication rates between the two groups was analyzed.

**Results:** Complications:

	High supracostal access (N=142)	Subcostal access (N=113)	p value
Blood transfusion	5 (3.52%)	6 (5.31%)	0.5449
UTI	12 (8.45%)	7 (6.19%)	0.4956
Pneumonia	2 (1.41%)	2 (1.77%)	> 0.999
Clinically significant pleural effusion	6 (4.23%)	0	0.0354*
Pleural effusion req VATS	2 (1.41%)	0	0.5045
Pleural effusion req thoracotomy tube	1 (0.70%)	0	> 0.999
Bacteremia/sepsis	3 (2.11%)	6 (5.31%)	0.1905
Collecting system tear	11 (7.75%)	18 (15.93%)	0.0409*
Hematoma	3 (2.11%)	5 (4.42%)	0.4723
Fever	12 (8.45%)	7 (6.19%)	0.4956

Results are summarized in Table 1. Overall complication rates are similar between the two groups. Specific pleural complication risk was increased in the HS group, as expected.

**Conclusions:** In our experience, supracostal or high supracostal access often allows for a more direct route in kidney access opening the angle into the pelvis allowing ease of work, improved ability of rigid nephroscopy, less torque and manipulation on the kidney, improving technical ability of the PNL procedure despite a subtle (and acceptable) increase in pleural complication rates.

3

**Patients with Urolithiasis Receiving Excessive Numbers of Computed Tomography Scans**

Nicholas J. Toepfer, Joseph Leader, Jonathon Darer  
Geisinger Medical Center, Danville, PA

**Introduction:** Computed tomography is an increasing source of radiation exposure as the number performed in the United States each year is increasing rapidly. An estimated 70 million CT scans are performed annually in the US resulting in 14,500 deaths secondary to radiation-induced carcinogenesis. The International Commission on Radiological Protection recommends limiting radiation from CT scans, yet it has been demonstrated that patients with urolithiasis often exceed these limits.

**Materials & Methods:** A retrospective review was performed looking at patients who had twenty or more CT scans of the abdomen or pelvis at our institution from January 2001 to December 2011.

**Results:** 97,446 patients had a CT scan of the abdomen or pelvis over the 11 year span. 1086 individuals had at least twenty CT scans of which 911 had a known diagnosis of malignancy which may have contributed to the high number of studies. Of the 175 patients with no history of cancer, 56 had a diagnosis of urolithiasis. These 56 patients had a total of 1495 scans and 84.4% of these scans were ordered after the patient was a known kidney stone former.

**Conclusions:** 5.1% of patients with at least twenty CT scans of the abdomen or pelvis over an 11 year span had a history of kidney stones without any malignancy. To decrease the risk of death associated with radiation-induced carcinogenesis, alternative diagnostic approaches such as ultrasound or low-dose CT should be implemented in patients presenting with renal colic, particularly in those with a previous history of urolithiasis.

2

**Male Sling Placement Impacts Recovery in Urinary Quality of Life Following Radical Prostatectomy**

Brooke B. Edwards<sup>1</sup>, Jack M. Zuckerman<sup>1</sup>, Kurt A. McCammon<sup>2</sup>  
<sup>1</sup>Eastern Virginia Medical School, Norfolk, VA; <sup>2</sup>Urology of Virginia, Virginia Beach, VA

**Introduction:** Quality of life (QoL) outcomes are an essential concern among patients undergoing prostate cancer treatment. A longitudinal comparison using validated QoL instruments is valuable in evaluating outcomes. We assess the impact that the AdVance® sling had on urinary QoL in patients with post-prostatectomy incontinence (PPI) after radical prostatectomy (RP) using a validated QoL instrument.

**Materials & Methods:** We retrospectively reviewed the charts of 38 patients who received both RP and subsequent AdVance® sling placement for PPI. QoL data was collected prospectively within our institution's QoL database. Each patient completed the University of California Los Angeles, Prostate Cancer Index before RP and at intervals for 60 months after RP. Scoring ranged from 0 (worst) to 100 (best). Clinically significant changes were defined as a minimum difference of 10 points between the baseline and follow-up score.

**Results:** Thirty-eight patients met inclusion criteria. Mean follow-up was 26.6 months post-sling placement. Significant declines from baseline in urinary function and bother were found in post-RP patients with a decrease in 65 and 57 points, respectively. These patients did receive significant increases in QoL scores after treatment with AdVance® sling placement, with increases of 46 and 53 points, respectively. Patients also demonstrated decreases in pad counts after sling placement, from 3.1 to 1.4 pads per day.

**Conclusions:** Men undergoing RP have a significant depreciation in urinary QoL. Although they do not regain their baseline QoL scores, they do improve significantly after AdVance® sling placement. Patient-reported pad counts may also act as a surrogate for urinary function QoL scores.

4

**Long-term Outcome and Surgical Interventions After Sacral Neuromodulation for Lower Urinary Tract Symptoms: A 7 Year, Single Center Experience**

Chad P. Hubsher, Robert Jansen, Dale Riggs, Barbara Jackson, Stanley Zaslau  
West Virginia University, Morgantown, WV

**Introduction:** Few reports address the reoperation rate after sacral neuromodulation implants for lower urinary tract symptoms. We report our long-term results and reoperations in patients who were initially implanted between 2004-05.

**Materials & Methods:** We retrospectively reviewed the first 50 patients who underwent InterStim® sacral neuromodulation implantation for lower urinary tract dysfunction at our institution to assess the long-term outcome, incidence, and cause of surgical re-intervention over the past 7 years.

**Results:** At our institution, sacral neuromodulation devices were implanted in 50 patients between 2004-05. Indications for implantation were urinary urgency, frequency, and/or urge incontinence in 72% of patients, and idiopathic urinary retention in 28%. The explantation and re-implantation rates were 18% and 22%, respectively, with reasons detailed in Table 1. 82% of patients continue to benefit from sacral neuromodulation and 64% have their original InterStim® device after 7 years.

**Conclusions:** Sacral neuromodulation is a minimally invasive procedure with a durable long-term outcome. Based on our single center experience, patients are more likely to experience surgical site problems within the first 2 years. Additionally, an appropriate response after 24 months was noted to be indicative of continued patient benefit.

**TABLE 1.**

	Explantation		Reimplantation	
	# Pts.	Avg. Time (mts.)	# Pts.	Avg. Time (mts.)
Battery Failure	1	79	4	69
Poor Patient Response	1	24	4	21
Infection/Erosion/Site Pain	4*	21	3*	11
Personal Reasons	3	43	0	-
Total	9	55	11	36

\* 2 Patients underwent reimplantation, only to eventually be explanted

# Moderated Poster Session I

2:00 p.m.-3:00 p.m.

5

## Private Practice, Fellowship, and Academic Medicine: A Survey of Current Urology Residents

**Amy Burns**<sup>1</sup>, Christopher Kintner<sup>2</sup>, Chad Tracy<sup>3</sup>, Craig Peters<sup>1</sup>, Noah Schenkman<sup>4</sup>  
<sup>1</sup>Children's National, Washington, DC; <sup>2</sup>Unaffiliated, Arlington, VA; <sup>3</sup>University of Iowa, Iowa City, IA; <sup>4</sup>University of Virginia, Charlottesville, VA

**Introduction:** A resident's decision to pursue fellowship (F), academic medicine (AM), or private practice (PP) involves many factors and subspecialty interest varies.

**Materials & Methods:** During the 2010 and 2011 AUA Basic Sciences, urology residents completed a 90-item survey that queried factors influencing career choice.

**Results:** 364 residents attended and 240 participated. Mean age was 30.3 years, 172 were male, 68 were female, and most were in year 2 (40%) or 3 (40%) of training. 121 (50%) residents indicated they "were more likely than not" to pursue PP while 67 (28%) selected AM/F, 35 (15%) indicated both, and 17 (7%) neither. 54% of women and 38% of men intended to enter AM/F. Of 128 listing a 5-year residency, 23% planned on AM/F, 57% PP, 15% both, and 5% neither. Of 94 in 6-year programs, 33% planned on AM/F, 47% PP, 10% both, and 10% neither.

On a scale of 0-no interest to 3-very interested, AM/F residents were most interested in Endourology/Laparoscopy (mean=1.88) followed by Oncology (1.71), Reconstruction/Trauma (1.31), Pediatrics (1.14), Infertility (0.89), and Female (0.73). For PP only respondents, lack of interest in research and F training length were the highest rated factors making F less likely.

**Conclusions:** The decision to pursue F, PP, or AM involves many factors. Intellectual stimulation and lifestyle were most influential among AM/F and PP groups, respectively.

MP1

## Outcomes Following Buccal Mucosal Graft Staged Urethroplasty

**Mary H. James**<sup>1</sup>, Ramon Virasoro<sup>1</sup>, Matthew D. Lyons<sup>1</sup>, Ajaydeep S. Sidhu<sup>1</sup>, Gerald H. Jordan<sup>2</sup>, Kurt A. McCammon<sup>2</sup>  
<sup>1</sup>Eastern Virginia Medical School, Norfolk, VA; <sup>2</sup>Urology of Virginia, Virginia Beach, VA

**Introduction:** Complex anterior urethral strictures provide a surgical challenge for the reconstructive urologist. Tissue substitution is often required for successful repair. Buccal mucosal graft (BMG) has become the tissue of choice given its excellent graft characteristics and low associated morbidity. We present our outcomes following a staged BMG urethroplasty.

**Materials & Methods:** Patients who underwent staged BMG urethroplasty between January 1, 1999 and August 8, 2011 were identified. A retrospective chart review was performed to collect clinical data. Outcomes were assessed including durability of results, recurrence rates, and additional procedures required.

**Results:** Fifty-seven patients underwent a staged BMG urethroplasty during the designated time period. The most common stricture etiologies were hypospadias (46%) followed by lichen sclerosus (28%). The average stricture length was 7.5 centimeters. Following the first stage procedure 11 (20%) patients elected not to undergo a second stage procedure. Complete follow-up was available in 42 patients (74%). There were 7 major complications (12%) including fistula development (4), penoscrotal tethering (1) and meatal stenosis (1). Three other patients required additional procedures including conversion to a perineal urethrostomy, a suprapubic tube and urethral dilation. The overall success rate was 76% defined as patients who required no further procedure at an average follow-up of 25 months.

**Conclusion:** Substitution urethroplasty is often necessary to treat complex anterior urethral strictures such as those seen in complex hypospadias patients and in patients with lichen sclerosus. The staged BMG is an effective treatment for these patients with acceptable complication rates.

6

## Influence of Preoperative Pelvic Floor Muscle Activity on Post-Prostatectomy Incontinence

**Mary H. James**<sup>1</sup>, Bethany B. Gibbs<sup>2</sup>, Erin Glace<sup>3</sup>, Robert W. Given<sup>3</sup>  
<sup>1</sup>Eastern Virginia Medical School, Norfolk, VA; <sup>2</sup>Department of Health and Physical Activity, University of Pittsburgh, Pittsburgh, PA; <sup>3</sup>Urology of Virginia, Virginia Beach, VA

**Introduction:** Urinary incontinence following radical prostatectomy is a significant clinical problem that compromises patient quality of life. Pelvic floor muscle training has been shown to reduce continence recovery time. The objective of this study was to determine whether preoperative pelvic floor strength influences the degree and duration of post-prostatectomy incontinence.

**Materials & Methods:** All patients scheduled for robotic assisted laparoscopic radical prostatectomy were referred to a pelvic floor physical therapist. Pelvic floor strength was assessed using EMG evaluation. Chart review was performed to obtain post-operative continence data measured by reported pad per day (PPD) usage. Pelvic floor strength was compared in men who were continent versus not at each visit.

**Results:** There were 181 patients with 6 weeks follow-up and 170 patients with 6 weeks and 3 month follow-up. When defining continence as PPD=0 a higher resting tone was associated with return to continence at 6 week follow up (p=0.043) and using continence definition of PPD≤1 a higher resting tone was associated with return to continence at the 3 month mark. (p=0.023). In this group the mean preoperative resting tone for continent patients was 4.5 microvolts compared to 3.4 microvolts in those patients with persistent incontinence.

**Conclusions:** In this small study a higher pelvic floor muscle resting tone was associated achievement of continence at 6 weeks when defining continence as PPD=0 and at 3 months when defining continence as PPD≤1. This information could be useful for preoperative counseling regarding continence outcomes following prostatectomy.

MP2

## Urology Providers Satisfaction Rates with EpicCare Ambulatory

**Jessica Hammett**, George Bailey, Tracey Krupski  
University of Virginia, Charlottesville, VA

**Introduction:** Electronic medical records (EMR) are increasingly being adopted in the name of patient safety, improved documentation for charge capture, and adherence to pay for performance metrics. We sought to evaluate provider satisfaction with EPIC, the nationwide leader in hospital EMR.

**Materials & Methods:** We developed a 14-item instrument called EPIC Satisfaction based on face validity for the Department of Urology. The domains we captured were office work flow (3 items), documentation (3 items), encounter interaction (4 items), medical legal (1 item), personal efficiency (2 items) and 1 global item.

**Results:** Twenty-one of twenty-three providers returned the anonymous Epic Satisfaction survey for a response rate of 91%. Most found pharmacy documentation (90% agreement), ability to insert images into office note (90% agreement), and the ability to build on prior encounters (85% agreement) to be advantages within EPIC. However, over 78% felt patient interaction was impaired by EPIC. Additionally, 100% agreed Epic provides better medical legal documentation, while 85% felt personal efficiency were impaired due to amount of time spent on documentation outside of the normal work day. When asked if they would agree to change to EPIC again, 44%, 87% and 40% of the faculty, residents and nurse practitioners answered in the affirmative.

**Conclusions:** There is clear ambivalence to EPIC EMR technology among this group of urology providers. While they acknowledge that the documentation is improved, the satisfaction "cost" is high as evidenced by the negative impact on patient interaction and the increased demand on personal time.

MP3

**Clinical Outcomes of Cryoablation of Renal Lesions of All Sizes**

Sarah Chan, Michael Phelan  
University of Maryland, Baltimore, MD

**Introduction:** To evaluate the efficacy and outcomes of cryoablation on renal lesions of all sizes, including patients with solitary kidneys.

**Materials & Methods:** We retrospectively analyzed the outcome of a single surgeon's experience of percutaneous and laparoscopic renal cryoablation of renal lesions at a tertiary care center from May 2006 to January 2010. Cryolesions were evaluated with radiographic imaging by determining its size and presence of enhancement. Renal function was analyzed with serum creatinine concentration and estimated glomerular filtration rate preoperatively, at 3 months, and at most recent follow-up. Re-treatment was defined as requiring a subsequent unplanned ablation.

**Results:** 130 patients who underwent cryoablation from May 2006 to January 2010, with a 136 total renal lesions treated. 101 patients included in the study, 14 patients had renal lesions measuring 4cm or greater and 7 patients had solitary kidneys. Average follow-up period was 37 months. Average tumor size of 3.2 cm. 67 lesions were treated percutaneously and 39 lesions were treated laparoscopically. 59 out of 130 patients had ASA score 3 or greater. Overall, 15 patients required a 2<sup>nd</sup> cryoablation and only 1 patient required a 3<sup>rd</sup> cryoablation. Thus retreatment rate was 14.2%. There was minimal change in creatinine and GFR. There was progression of the disease in 11 patients despite intervention with renal cryoablation.

**Conclusions:** Cryoablation is an effective alternative to treatment of renal masses in patients where preservation of renal function is crucial and patients with significant medical comorbidities, given they will comply with the rigorous imaging follow-up.

MP5

**In-Office Urine pH Measurement in Kidney Stone Patients**

Andrew Harbin, Shawn Marhamati, John Pahlira  
Georgetown University Hospital, Washington, DC

**Introduction:** Urinary stone disease is a significant problem in the United States, with an estimated prevalence of 5%. Many patients may benefit from urinary alkalization with oral potassium citrate therapy, including both patients with aciduria as well as patients with hypocitraturia. However, current methods of monitoring response to oral therapy, including repeat office visits and 24-hour urine collections, are cumbersome and costly. The aim of this study was to evaluate two potential methods of home urine pH monitoring, dipstick and litmus paper, and compare them to pH meter.

**Materials & Methods:** Seventy-seven patients were recruited after institutional review board approval was obtained, and urine was collected. The urine was analyzed using the three methods of pH measurement, and these results were repeated twice. Statistical analysis, including intraclass and interclass reliability, was performed using SPSS.

**Results:** The mean pH as measured by dipstick, litmus paper and pH meter were 6.23, 6.21, and 6.03, respectively. There was no significant difference in mean pH between dipstick and litmus (p = 0.438), litmus and pH meter (0.057) or dipstick and pH meter (p = 0.094). The intraclass correlation coefficients (ICC), which is a statistical estimate of the reliability between two or more tests, was found to be 0.96161 between all three methods.

**Conclusions:** The three methods of pH measurement did not differ significantly. This indicates that litmus paper and dipstick may be potentially useful methods of monitoring response to urinary alkalization, and repeat office visits and 24 hour urine measurements may be reduced.

MP4

**Using Pre-operative Albumin Levels as a Surrogate Marker for Nutritional Status and Outcomes after Radical Cystectomy for Bladder Cancer**

Jack W. Lambert, III, Matthew Ingham, Bethany Barone Gibbs, Raymond Lance, Robert Given, Stephen Riggs  
EVMS, Norfolk, VA

**Introduction:** There has been sparse literature assessing pre-operative nutrition and surgical outcomes after urologic surgery. We sought to evaluate pre-operative albumin levels as a marker to compare survival outcomes after radical cystectomy.

**Materials & Methods:** We performed a retrospective chart review using our bladder cancer database from 2004-2011 and included 188 patients with sufficient data for analysis. Serum albumin levels were routinely checked the day prior to cystectomy. We compared overall survival (OS), cancer-specific survival (CSS), and complication rates by albumin levels.

**Results:** 31 patients (16.5%) were in the low albumin cohort (defined as albumin 3.5 grams or less) and 157 patients had normal albumin levels. At 3 years, overall survival (OS) was 40% and 56% (adjusted HR 1.91, p=0.026) and cancer specific survival (CSS) was 55% and 71% (HR 2.15, p=0.043) in the low and normal albumin groups, respectively. The overall complication rates were significantly higher in low albumin cohort at 87% versus 66% in the normal albumin group (p=0.02).

**Conclusions:** Our single institution, retrospective study demonstrates that patients with a low pre-operative albumin levels had approximately a two-fold risk of overall mortality and cancer-specific mortality compared to those with normal albumin levels. Therefore, albumin may be a reflection of disease state as well as nutritional status.

Table 1: Patient Demographic and baseline information and complications

	Low albumin	Normal albumin	p value
# of patients	31	157	
Mean pt age	66.1 (12)	67.5 (10)	0.32
Gender (%)			
M	26 (84)	128 (82)	
F	5 (16)	29 (18)	0.79
Race (%)			
White	24 (77)	7 (23)	130 (83)
Nonwhite	27 (17)	0.42	
Smoking status (%)	21 (68)	123 (78)	
Mean ASA score	2.84 (0.6)	2.75 (0.5)	0.45
Mean albumin	3.02 (0.4)	4.20 (0.3)	<0.001
Time to surgery (days)	71 (74)	90 (84)	0.36
Follow up (mos)	21.7 (20.9)	26.0 (20.7)	0.30
Diversion type			
Ileal conduit/continent	28 (90)	3 (10)	147 (94)
Neobladder	10 (6)	0.41	
Neoadjuvant chemo (%)	6 (19)	29 (18)	0.90
Complications (%)			
Immediate post-op	19 (61)	87 (56)	0.69
Overall	27 (87)	103 (66)	0.02
Minor complications (Clavien 1-2)	15 (48)	59 (38)	0.28
Major complications (Clavien 3-5)	11 (36)	43 (28)	0.39
Mean overall Clavien score	2.48 (1.05)	2.49 (0.96)	0.96

Data presented as mean +/- standard or n (%)

MP6

**Evaluation of Radiation Safety Training and Knowledge Amongst Urologists in the United States - A Nationwide Survey**

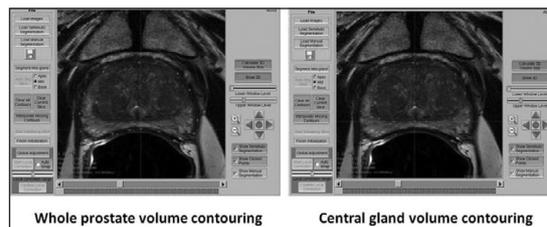
Christopher T. Yingling, Kelly Loftus, Haveesh Sharma, Gaurav Bandi  
Georgetown University Hospital Department of Urology, Washington, DC

**Introduction:** Objective: to determine the current training and knowledge about radiation safety amongst all the urologists in United States.

**Materials & Methods:** An email survey was distributed to all AUA members with an email address in the AUA directory. The survey consisted of 5 demographic questions and 10 knowledge questions. Responses were tabulated and statistically analyzed to evaluate current trends.

**Results:** The overall response rate was 2.4% (257 responses). 41.5% of respondents reported previous radiation safety training. This group had a better performance (50.4% correct responses) compared to those who had no training (46%, p=0.047). Dedicated endourologists (>75% of practice is endourology) and fellowship trained endourologists (49.3%) did not perform better than their non-fellowship trained and lower volume (<75% endourology) counterparts (47.5%, p=.304). Residents (54.5%) and urologists with <5yr experience (50%) were significantly more likely to have received radiation safety training than their more experienced counterparts (5-15yr experience= 43.8%, >15yr experience=34.8%, p=0.001). Based on experience in practice, only urologists with <5yr experience performed significantly better (51.6%, p=0.042) than the whole group.

**Conclusions:** Our survey noted better performance on the knowledge questionnaire only in urologists with previous radiation safety education, but not with experience or specific fellowship training in endourology. Current residents and younger urologists (<5yr experience) were significantly more likely to have received previous radiation safety training.



# Moderated Poster Session I

2:00 p.m.-3:00 p.m.

## MP7

### Empiric Antibiotics for an Elevated PSA: Randomized, Prospective, Controlled Multi-institutional Trial

Jay D. Raman<sup>1</sup>, Joseph Pettus<sup>2</sup>, Ofer Yossefovich<sup>3</sup>, Shilajit Kundu<sup>4</sup>, Scott Eggener<sup>5</sup>  
<sup>1</sup>Penn State Milton S. Hershey Medical Center, Hershey, PA; <sup>2</sup>Wake Forest University, Winston Salem, NC; <sup>3</sup>Tel Aviv University, Tel Aviv, Israel; <sup>4</sup>Northwestern University, Chicago, IL; <sup>5</sup>University of Chicago, Chicago, IL

**Introduction:** The impact of an empiric course of antibiotics for a newly elevated PSA in an asymptomatic male is poorly understood.

**Materials & Methods:** Men of any age with a PSA  $\geq 2.5$  ng/ml and normal digital rectal examination undergoing their first prostate biopsy were recruited from five medical centers. Patients with previous biopsy, prostate cancer, urinary tract infection (UTI) or prostatitis within the prior year, antibiotic use within one month, 5- $\alpha$  reductase inhibitor use, allergy to fluoroquinolones or clinical suspicion of UTI were excluded. Men were randomized to two weeks of ciprofloxacin 500 mg twice daily or no antibiotic. A PSA was obtained 21-45 days following randomization immediately prior to prostate biopsy. All patients received institution-specific prophylactic antibiotics. Primary endpoint was change in PSA between baseline and immediately prior to biopsy. The trial was stopped early following an interim analysis and decision rule for futility.

**Results:** Complete data were available on 77 men with a mean age of 60.6 (IQR: 53.8 - 66.7). In the control group (no antibiotic; n=39), mean baseline and pre-biopsy PSA were 6.5 and 6.9 ng/ml, respectively (p=0.8). In men receiving antibiotic (n=38), mean baseline and pre-biopsy (post-antibiotic) PSA were 7.6 and 8.5 ng/mL, respectively (p=0.7). Prostate cancer was detected in 36 (47%) men. Detection rates did not significantly differ between individuals with an increasing PSA versus decreasing PSA.

**Conclusions:** Empiric use of antibiotics for asymptomatic men with an elevated PSA is not of clinical benefit.

## MP9

### Survey of the Use of Bacille Calmette-Guerin (BCG) in the Management of High-Risk Non-Muscle Invasive Bladder Cancer (NMIBC)

Jayram Krishnan, Ali Husain, Mihir Thaker, Louis L. Keeler, III, Gordon Brown  
 University of Medicine and Dentistry of New Jersey, Stratford, NJ

**Introduction:** To survey the use of bacille Calmette-Guerin (BCG) in the management of high-risk non-muscle invasive bladder cancer (NMIBC).

**Materials & Methods:** Five hundred and fifty-nine urologists received a survey to assess their location, type of practice, fellowship background, and years in practice. Frequency and practice patterns for the use of BCG were assessed.

**Results:** One hundred and forty nine (26%) of 559 urologists submitted responses. One hundred and thirteen (76%) are in private practice, 74 (50%) are located in a suburban setting, 59 (35%) in an urban setting and 22 (15%) in a rural environment. Twenty-eight (19%) are fellowship trained in urologic oncology and 83 (56%) have been in practice more than 10 years. One hundred and six (71%) treat five or more bladder cancer patients every month. All urologists reported the use of BCG instillations as part of their routine practice. One hundred and ten (74%) urologists reported using BCG induction plus maintenance therapy for high-grade Ta, T1 and Tis patients while 32 (21%) urologists perform only induction course BCG therapy for these patients. 26 out of 83 (31%) urologists in practice greater than 10 years and 16 out of 66 (24%) urologists in practice less than 10 years regardless of practice location or fellowship background are using only BCG induction therapy for high-risk NMIBC patients.

**Conclusions:** Our survey reports that BCG is underutilized in the management of high risk NMIBC. Older practitioners are utilizing induction BCG alone for high-risk NMIBC patients in contrast to their younger counterparts.

## MP8

### Impact of Comorbidity on Hospitalization Cost in Patients Undergoing Radical Prostatectomy

Augustine C. Obirieze<sup>1</sup>, Adil H. Haider<sup>2</sup>, Adepeju Adekoya<sup>1</sup>, Edward E. Cornwell, III<sup>1</sup>, Chiledum Ahaghotu<sup>1</sup>  
<sup>1</sup>Howard University College of Medicine, Washington, DC; <sup>2</sup>Johns Hopkins School of Medicine, Baltimore, MD

**Introduction:** Patients undergoing radical prostatectomy often have concurrent comorbid conditions. We sought to use a nationally representative database to investigate the impact of comorbidity on hospitalization costs for these patients.

**Materials & Methods:** A retrospective analysis was conducted using the Nationwide Inpatient Sample database 2005-2009. Patients aged 40 years or older who underwent radical prostatectomy as primary procedure were identified using appropriate ICD-9-CM codes. Study cohort was divided into four categories according to Charlson Comorbidity Indices (CCI): 0, 1, 2, and  $\geq 3$ . Generalized linear models were used to estimate the adjusted mean cost of hospitalization for each of the categories, with CCI of 2 as the reference, adjusting for patient characteristics, case-mix, hospital factors, geographical pricing differences, state variations, and yearly trends. Relative costs (RCs) were estimated comparing the categories to the reference.

**Results:** A total of 65,470 patients met our inclusion criteria. Majority of the patients had CCI of 2 (76%), while only 0.18% of patients had CCI of 0. Across all categories, patients were predominantly White and most had insurance. The adjusted mean costs were \$9,266, \$9,458, \$10,625, and \$10,960 for CCI of 0, 1, 2, and  $\geq 3$  respectively. Crude mortality rate was higher with more comorbidity.

**Conclusions:** Most patients undergoing radical prostatectomy have one or more comorbidities. Comorbidities significantly impact hospitalization cost in these patients even after controlling for factors known to influence cost.

**Table 1. Added Cost of Comorbidity in Patients Undergoing Radical Prostatectomy**

Charlson Comorbidity Index	n (%)	Adjusted mean cost, \$	95% CI of relative mean cost	Mortality, %
0	117 (0.18)	9,266	0.77-0.98	0
1	52 (0.08)	9,458	0.81-0.97	0
2	50,058 (76.48)	10,625	Reference	0.03
3 or more	15,243 (23.28)	10,960	1.02-1.04	0.13

## MP10

### 24-hour Urine Collection in the Metabolic Evaluation of Stone Formers: Is One Study Adequate?

Kelly A. Healy, Scott G. Hubosky, Demetrius H. Bagley  
 Thomas Jefferson University, Philadelphia, PA

**Introduction:** To determine whether 1 versus 2, 24-hour urine collections is optimal in the metabolic evaluation of nephrolithiasis.

**Materials & Methods:** We retrospectively reviewed all 24-hour urine collections performed at our tertiary stone clinic from July 1997 to February 2012. We identified patients with 2, 24-hour urine collections performed  $\leq 10$  days apart. Samples were analyzed by an outside laboratory for the standard urinary parameters. For each parameter, pairwise t-tests were performed and Pearson's correlation coefficients were calculated to compare samples 1 and 2. Additionally, the number of cases that changed from normal to abnormal or vice versa was also evaluated for each parameter.

**Results:** 813 subjects submitted 2, 24-hour urine collections  $\leq 10$  days apart. Mean age was 53.2 years and mean BMI was 28.8 kg/m<sup>2</sup>. Based on Cr 24/kg, subset analysis was performed for all properly collected samples (n=236). Using pairwise t-test, 24-hour urine volume (p=0.0365) and phosphorus (p=0.0387) showed a statistically significant difference between samples 1 and 2. None of the other urinary parameters demonstrated a statistically significant difference when means were compared (pairwise t-test, p>0.05). Pearson's correlation demonstrated a high degree of correlation between 2, 24-hour urines for all variables (r = 0.66-0.95, each p < 0.0001). Depending on the urinary parameter assessed, 5.5% to 44.9% of patients changed from normalcy to abnormality, or vice versa.

**Conclusions:** A single 24-hour urine collection may have changed clinical decision making in nearly 45% of patients. Therefore, we recommend 2 collections to optimize the diagnostic yield and appropriately target stone prevention strategies.

MP11

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**Equal Data - Less Radiation: Low Dose and Standard CT Scans Yield Equivalent Stone Measurements**

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**Introduction:** Low dose computed tomography has recently been introduced as a means to evaluate patients with nephrolithiasis. Since stone size, density, and skin-to-stone distance are critical in determining the proper treatment modality, a comparison between the two scans is sought.

**Materials & Methods:** Ten patients seen in the emergency room over a mean of 23 days (range 0 to 51 days) had both a conventional scan and a low-dose scan for the same stone. Radiation dose reduction was calculated based on the patient's BMI. CT scans were performed with 2 mm section cuts, and coronal views were reconstructed. These images were then randomized and reviewed by a urology resident and staff radiologist. Sizes of the stones were measured and Hounsfield units and skin-to-stone distance were calculated.

**Results:** There was no difference in stone size between the two dosage levels, as measured in height, width, length, or volume of the stone (p values 0.9, 0.7, 0.8, and 0.8 respectively). In addition, no difference in Hounsfield units was appreciated between the two scans (p = 0.6), nor was there any significant difference in skin-to-stone distance (p=0.5). Between the two scans, there was an average effective dose reduction of 73% from 23 mSv to 6 mSv (p = 0.002).

**Conclusions:** There was no significant difference in the measurement of stone size, Hounsfield units, or skin-to-stone distance between a low dose and conventional dose CT scan. However, the low dose scan resulted in a marked reduction in radiation dose to the patient.

**Factors Associated with Improved Ureteroscopic Biopsy Yield of Upper Tract Urothelial Carcinoma Tumors**

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**Introduction:** Ureteroscopic (URS) biopsy has become a mainstay in the diagnosis of upper tract urothelial carcinoma (UTUC) tumors. There is a lack of consensus regarding the ability for URS biopsy to accurately determine the grade and stage of UTUC lesions.

**Methods:** Data from 138 patients who underwent URS biopsy prior to RNU were reviewed. Variables analyzed included: tumor size (cm), location (renal pelvis/ureter), type of ureteroscope (rigid/flexible), biopsy instrument (cup biopsy/basket), and number of biopsies obtained.

**Results:** On final RNU pathology, 51 patients (37%) had muscle invasive ( $\geq$ pT2) and 87 (63%) had high grade UTUC. Over 70% of biopsies were performed via a flexible ureteroscope with 68% of cases using cup biopsy and 32% basket. The median number of URS biopsies was 3. Overall concordance of URS biopsy with final pathologic grade (high vs. low) was 84% and with final pathologic stage ( $<$ pT2 vs.  $\geq$ pT2) was 59%. On univariate analysis, increasing tumor size (p=0.02) and a greater number of biopsies (p=0.001) were associated with improvements in biopsy-final pathology concordance. In a multivariate model, obtaining 4 or more URS biopsies was associated with  $>$ 5-fold greater likelihood of accurately grading and staging UTUC lesions (OR 5.2, p=0.01). Specifically, patients with  $\geq$ 4 URS biopsies had a biopsy-final pathology concordance of 94% for grade and 79% for stage.

**Conclusion:** URS biopsy had a concordance of 84% and 59% with final grade and stage of UTUC tumors. Obtaining 4 or more biopsies at URS significantly increased the likelihood of pathologic concordance with the final specimen.

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**Tubeless Percutaneous Renal Surgery: The New Standard**

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**Introduction:** Percutaneous nephrolithotomy (PNL) is a mainstream urologic approach for management of large renal stones. Today, standard PNL includes nephrostomy tube placement designed to drain the kidney and operative tract. Modern techniques of PNL, tubeless PNL and totally-tubeless PNL, are performed without standard nephrostomy drainage. The objective of this study is to demonstrate that PNL can be safely performed using a tubeless technique generating a trend towards a cost-effective outpatient procedure with improved pain profiles.

**Materials & Methods:** Retrospective analysis of 165 patients with previous PNL treatment was performed. Of this group, 127 patients underwent traditional nephrostomy drainage following PNL. A tubeless procedure was performed in the remaining 38 patients. Patient's post-operative stone size and burden as well as complication profiles were analyzed.

**Results:** Complication rates between the groups were compared and no statistical difference was noted. A total of 23 patients had at least one post-operative complication. Largest stone size and total stone burden was similar between the groups. Patient characteristics and demographic information were compared and no significant statistical difference was identified between the groups.

**Conclusions:** Tubeless and totally-tubeless PNL demonstrates equivalent outcomes in the properly selected patient group when compared to PNL performed with a nephrostomy tube. Thus, tubeless and totally-tubeless PNL can be performed safely and effectively leading to significantly improved cost-effectiveness, patient pain profiles and length of hospitalization.

Complications	Nephrostomy tube and stent (N=56)	Nephrostomy tube (N=72)	Tubeless (N=26)	Totally tubeless (N=12)
% of patients with any Complication	9 (16.67%)	10 (13.70%)	2 (7.69%)	2 (16.67%)
Blood Transfusion	0	0	0	1 (8.33%)
Urinary tract infection	2 (3.70%)	3 (4.17%)	2 (7.69%)	0
Pneumonia	1 (1.85%)	1 (1.37%)	0	1 (8.33%)
Clinically Relevant Pleural Effusion	1 (1.85%)	1 (1.37%)	0	0
Hematoma	0	0	0	1 (8.33%)
Fever	6 (11.11%)	6 (8.22%)	0	1 (8.33%)
Readmission rate	1 (1.85%)	1 (1.37%)	0	0
ER Visit for pain	1 (1.85%)	2 (2.74%)	2 (7.69%)	1 (8.33%)

**Efficacy of Combined VEGF and EGFR Inhibition in Metastatic Papillary Renal Cell Carcinoma Associated with Hereditary Leiomyomatosis and Renal Cell Cancer**

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**Introduction:** Hereditary leiomyomatosis and renal cell cancer (HLRCC) is a familial condition resulting from germline alterations in the gene for the Krebs cycle enzyme fumarate hydratase (FH) and is characterized by an aggressive form of papillary RCC. FH -/- kidney cancer cell lines rely on aerobic glycolysis for energy production (Warburg effect) and exhibit increased glucose dependence. We hypothesized that combined VEGF/EGFR-pathway blockade would constrain glucose delivery to tumors and inhibit critical downstream targets.

**Materials & Methods:** We queried a prospectively maintained kidney cancer database to identify patients with advanced HLRCC-associated RCC treated at our institution on IRB-approved protocols. Demographic, clinical, pathologic, and treatment data were collected by chart review. Response to VEGF/EGFR blockade was determined by RECIST.

**Results:** Eighteen patients with metastatic papillary RCC received systemic therapy from 1998-2008; 7/18 pts received combined VEGF/EGFR blockade (bevacizumab 10mg/Kg IV every two weeks plus either erlotinib [N=6] or gefitinib [N=1] PO daily). The remaining patients received a variety of agents. Patients receiving VEGF/EGFR blockade had an overall response rate of 71% (5/7), including one patient with a complete response (14%) and 4 patients with a partial response (57%). Responses were durable, with one patient remaining disease free 74 months after treatment initiation. Combined VEGF/EGFR blockade resulted in significantly improved overall survival compared to other treatment regimens (median 51 months vs. 14 months; P=0.0012).

**Conclusions:** Combined VEGF/EGFR blockade has significant activity in metastatic papillary RCC associated with HLRCC. A phase II trial combining bevacizumab plus erlotinib (NCT01130519) is ongoing at our institution.

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**Laparoscopic Cryoablation of Small Renal Masses: A Single Center Experience**  
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**Introduction:** Laparoscopic renal cryoablation (LRC) is a minimally invasive, nephron-sparing option for treating small renal lesions. We present a retrospective review and report intermediate oncological outcomes of a large cohort of patients who underwent LRC at our institution.

**Materials & Methods:** Patients with peripheral renal masses <5.0 cm were offered LRC as an alternative to partial nephrectomy. All lesions were characterized by intraoperative ultrasound and treated with two freeze-thaw cycles.

**Results:** From February 2003 to December 2010, 109 consecutive patients underwent 112 procedures. Average patient age was 65 (range, 30-82), mean tumor size was 2.3cm (range, 1.0-4.3) and mean follow-up was 32 months (range, 1-89). Intraoperative needle biopsy of targeted lesions yielded a 67% malignancy rate. Mean estimated blood loss was <50ml (68%) (range, <50ml-500ml), with 5 patients requiring a blood transfusion. There was one open conversion. Most patients were discharged home on postoperative day one (51%) (range, 1-22). Complications occurred in 13 patients (12%), with most complications (85%) classified as Grade II or less. At last follow up, there were 3 recurrences (3%). Two of these patients underwent salvage percutaneous cryoablation and the third underwent salvage partial nephrectomy. All patients are currently NED.

**Conclusions:** LRC is a good option for nephron sparing surgery in select patients with small peripheral renal masses. The procedure is well tolerated, with low morbidity and has shown excellent intermediate oncological treatment results. Post treatment surveillance with periodic imaging is essential to identify radiological recurrences which may be salvaged with repeat cryoablation or partial nephrectomy.

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**Pathological Characteristics of Cystic Renal Lesions**

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**Introduction:** The pathological findings of cystic renal lesions removed due to concern for malignancy are poorly characterized. We describe the histology and grade of cystic renal lesions following extirpation.

**Materials & Methods:** We analyzed our institutional database of renal surgeries, including patients who underwent radical or partial nephrectomy between 2004 and 2010 for cystic renal lesions. The Bosniak score of these lesions and pathological outcomes following nephrectomy were analyzed.

**Results:** We identified 126 patients who met the inclusion criteria. Of these, the Bosniak classification was as follows: 23 Bosniak II lesions (18%), 33 Bosniak III lesions (26%), 45 Bosniak IV lesions (36%), and 25 cystic lesions in which data was insufficient to assign a Bosniak score (20%). On pathological analysis, 90 (71%) of these lesions were malignant. Malignancy was identified 30%, 64%, and 89% of Bosniak II, III, and IV lesions, respectively. The histology and pathological characteristics of the malignant lesions are shown in the Table. Tumor size, pathological stage, and Fuhrman grade did not significantly differ by tumor histology. Surgical margins were negative in all but 1 (1%) of the malignant lesions.

**Conclusions:** Papillary histology is slightly more common in cystic RCCs than in solid lesions. Furthermore, the majority of cystic RCCs are low stage, low grade tumors, suggesting that these lesions may behave in a more indolent fashion than solid renal tumors.

	Clear Cell RCC	Papillary RCC	Mixed Clear Cell/Papillary RCC	Chromophobe RCC	Total	p-value
Number of patients (%)	48 (53%)	23 (26%)	5 (6%)	4 (4%)	80	-----
Mean Tumor Size (cm)	4.0	5.6	3.2	4.0		0.37
Pathological Stage T1	41 (86%)	16 (69%)	5 (100%)	4 (100%)	66 (83%)	0.35
Pathological Stage T2	1 (2%)	5 (22%)	0	0	6 (8%)	
Pathological Stage T3	6 (12%)	2 (9%)	0	0	8 (10%)	
Fuhrman Grade 1	5 (11%)	1 (5%)	0	NA	6 (8%)	0.25
Fuhrman Grade 2	35 (74%)	14 (67%)	2 (40%)	NA	51 (70%)	
Fuhrman Grade 3	6 (13%)	6 (28%)	3 (60%)	NA	15 (21%)	
Fuhrman Grade 4	1 (2%)	0	0	NA	1 (1%)	

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**Retrospective Effectiveness and Safety of Valrubicin in Non-Muscle-Invasive Bladder Cancer Following Reintroduction**

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**Introduction:** Valrubicin was approved in the United States in 1998, voluntarily removed in 2002, and reintroduced in 2009. This multicenter study in adults with non-muscle-invasive bladder cancer (NMIBC) is the first since reintroduction.

**Materials & Methods:** Event-free survival (EFS) was analyzed using Kaplan-Meier methods; an event was defined as recurrence, progression, or death. Local adverse reactions (LARs) were "probably" or "possibly" valrubicin-related, or had unknown causality.

**Results:** 113 patients (median age, 75 y [range, 42-95]) received intravesical (IVe) valrubicin (median, 6 instillations [range, 2-18]). Prior therapy included IVE immunotherapy (mean [SD], 3.5 [4.3] courses), IVE chemotherapy (0.7 [1.8] courses), transurethral bladder resections (2.5 [2.4]), and fulgurations (1.1 [2.0]). Median (95% CI) EFS time was 3.5 (2.5-4.0) months; EFS rate was 52% at 3 months and 30% at 6 months. 15 patients (13%) underwent radical cystectomy. LARs occurred in 56 patients (50%) and serious adverse events in 7 (6%); 5 patients (4%) discontinued as a result of adverse events.

**Conclusions:** Valrubicin was effective and well-tolerated in heavily pretreated patients with NMIBC.

Funding: Endo Pharmaceuticals Inc.

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**Outcome of Penile Revascularization for Arteriogenic Erectile Dysfunction after Pelvic Fracture Urethral Injuries**

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**Introduction:** Patients undergoing repair for pelvic fracture urethral injuries (PFUIs) with inadequate penile arterial inflow appear to be at significant risk of failure due to ischemic stenosis and arteriogenic erectile dysfunction (ED). We review our experience with penile revascularization for patients with occlusion of the deep internal pudendal arteries after PFUIs.

**Materials & Methods:** We identified 17 patients that underwent penile revascularization with end to side anastomosis of the deep inferior epigastric artery to the dorsal penile artery from 1991 to 2010. Retrospective chart review was performed. Success was defined as achieving erections sufficient for intercourse with or without pharmacologic assistance.

**Results:** All patients had PFUI injuries causing arterial insufficiency and ED unresponsive to pharmacologic interventions. Four patients (24%) were revascularized prior to PFUI repair to prevent ischemic stenosis, with secondary intent to improve ED. Thirteen patients (76%) were revascularized for refractory ED after PFUI repair. Mean patient age was 33 years. At average follow up of 3.1 years, the surgery was successful in 14 of 17 patients (82%), including one without any pharmacologic assistance, five using PDE-5 inhibitors, three with intracavernosal injections (ICI), and five using both PDE-5 inhibitors and ICI. Mean right/left peak systolic velocity of the dorsal penile artery duplex ultrasound went from 26.7/28.0 preoperatively to 44.6/47.3 postoperatively; equivalent values for the cavernosal arteries were 20.5/25.7 and 35.8/35.5 cm/sec.

**Conclusions:** Penile arterial revascularization in carefully selected patients can allow for successful treatment of PFUI and refractory ED caused by PFUI.

MP13

**Impact of Robotic Technique and Surgical Volume on the Cost of Radical Prostatectomy**

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**Introduction:** Our present understanding of the effect of robotic surgery and surgical volume on the cost of radical prostatectomy (RP) is limited. Given the increasing pressures placed on healthcare resource utilization, such determinations of healthcare value are becoming increasingly important. Therefore we performed a study to define the effect of robotic technology and surgical volume on the cost of RP.

**Materials & Methods:** The state of Maryland mandates that all acute-care hospitals report encounter-level and hospital discharge data to the Health Service Cost Review Commission (HSCRC). The HSCRC was queried for men undergoing RP between 2008-2011. High volume hospitals were defined as >60 cases per year, and high volume surgeons defined as >40 cases per year. Multivariate regression analysis was performed to evaluate whether robotic technique and high surgical volume impacted the cost of RP.

**Results:** 1499 patients underwent RALRP and 2565 underwent radical retropubic prostatectomy (RRP) during the study period. The total cost for RALRP was higher than for RRP (\$14,000 vs. 10,100; p<0.001) based primarily on operating room charges and supply charges. Multivariate regression demonstrated that RALRP was associated with a significantly higher cost (β coeff 4.1; p<0.001), even within high volume hospitals (β coeff 3.3; p<0.001). However, high volume surgeons and high volume hospitals were associated with a significantly lower cost for RP overall.

**Conclusions:** High surgical volume was associated with lower cost of RP. However, even at high surgical volume, the cost of RALRP still exceeded that of RRP.

MP15

**Positioning Injuries in Robotic Urologic Surgery**

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**Introduction:** Neuropraxia associated with patient positioning during surgery is well documented, with the incidence of neuromuscular injury during laparoscopic urologic procedures cited as 2.7%. Robotic surgery has changed surgical positioning, necessitating increased attention to ensure safety. However, no published reports address neuropathic injury during robotic surgery. We sought to determine the incidence and risk factors associated with positioning injuries during robotic surgery.

**Materials & Methods:** Under an IRB approved protocol, we performed chart abstraction on all urologic cases utilizing the da Vinci Si and da Vinci standard surgical system from January 1-December 31, 2010. We characterized risk factors into four overarching headings: positioning, patient specific, operative, and anesthesia related. Within these four categories, we analyzed 18 specific aspects of patient care.

**Results:** Out of 188 operations, nine positioning injuries (4.8%) such as shoulder pain, hand and thigh paresthesia, and upper extremity weakness were documented. Of these nine injuries, five (56%) resolved within one month, one (11%) resolved between one and six months, and three (33%) persisted beyond six months despite neurology and occupational therapy consultation. Of the 18 factors analyzed, we found operative time (p=.003), ASA score (p=0.0003), and use of bean bag support (p= 0.02) were significantly associated with injury. Body mass index, intravenous fluid infused, and pre-existing neurologic conditions were not associated.

**Conclusions:** Neuropathic injuries are under-recognized in robotic-assisted urologic surgery and may persist beyond six months. Greater median operative time, use of bean bag support, and high ASA score were significantly associated with injury.

MP14

**Degree of Nerve-Sparing after Robot-Assisted Laparoscopic Radical Prostatectomy (RALP): Correlation with Sexual Recovery**

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**Introduction:** Traditionally nerve sparing (NS) has been "all or nothing", but it is apparent that degrees of NS can be achieved. We assessed the impact of NS during RALP on sexual recovery, measured by patient reported results of the erectile function domain (EF-5) of IIEF at ≥12 months after surgery.

**Materials & Methods:** We retrospectively reviewed our institutional IRB-approved RALP database from 2006 to 2010. Preoperatively potent men who had ≥12 months follow-up were included. An EF-5 score of ≥16 +/- PDE-5i therapy were considered potent. NS was scored by the surgeon for each side using a 1 to 4 scale, [1= complete nerve preservation, 4= complete nerve resection]. Scores were assigned bilaterally, and combined to yield a Total Nerve Sparing Sum (TNSS). TNSS and postoperative erectile function was compared. Postoperative penile rehabilitation was offered to each patient, including maintenance PDE-5i therapy +/- vacuum device.

**Results:** A total of 204 men were included, including 68 with TNSS of 2, 79 with TNSS of 3-4, and 57 with TNSS of 5-8. The potency rates were 85%, 70%, and 26% for TNSS of 2, 3-4 and 5-8, respectively (p<0.05) at ≥12 months. Postoperative EF-5 scores were inversely correlated with TNSS, with TNSS of 2, 3-4, and 5-8 having a mean EF-5 of 19.7, 17.0 and 7.4, respectively (p <0.05).

**Conclusions:** There is a significant correlation between the degree of NS and post-operative erectile function. This categorization of TNSS may guide earlier use of more aggressive ED interventions such as intracorporeal injection therapy.

MP16

**Effect of Denosumab on Prolonging Bone Metastasis Free Survival (BMFS) in Men with Non-Metastatic Castration-Resistant Prostate Cancer (CRPC) Presenting with Aggressive PSA Kinetics**

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**Introduction:** Denosumab, an anti-RANK Ligand monoclonal antibody, has been shown to prolong BMFS by a median 4.2 months with a 15% risk reduction vs placebo in men with non-metastatic CRPC and baseline prostate specific antigen (PSA) value ≥8.0 ng/mL and/or PSA doubling time (DT) ≤10.0 months. To determine the efficacy of denosumab in men at even greater risk for bone metastases, we evaluated BMFS in a subset of men with PSADT ≤6 months, a cutoff based on a previous report (Smith MR, et al: J Clin Oncol. 23:2918-2925, 2005).

**Materials & Methods:** 1432 men with nonmetastatic CRPC (baseline medians - PSA: 12.3 ng/mL, PSADT: 5.1 mo, ADT duration: 47.1 mo) were randomized 1:1 to receive monthly subcutaneous denosumab 120 mg or placebo. The primary endpoint was BMFS, reported previously, with a 4.2 mo treatment difference in favor of denosumab.

**Results:** Median BMFS in the placebo group with PSADT ≤6 mo was 6.5 mo shorter than for the placebo group in the overall population (18.7 mo vs 25.2 mo). In patients with PSADT ≤6 mo, denosumab prolonged BMFS by a median 7.2 mo and with a 23% reduction in risk compared with placebo (Table).

Table

Population	Sample Size	BMFS Median (Months)	BMFS Treatment Difference (Months)	Hazard Ratio	95% Confidence Interval	P-value
All Patients	D: 716 P: 716	D: 29.5 P: 25.2	4.2	0.85	0.73 - 0.98	0.028
PSADT ≤ 6 months	D: 419 P: 427	D: 25.9 P: 18.7	7.2	0.77	0.64 - 0.93	0.0064

D = Denosumab; P = Placebo

**Conclusions:** Patients with shortened PSADT are at higher risk of developing bone metastasis and denosumab is markedly effective in prolonging BMFS in this subset of patients.



MP21

**The Effect of PSA Derivatives on the Likelihood of Disease Progression: Treatment Options May be Limited for Patients Who Progress on Active Surveillance**

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**Introduction:** Active surveillance (AS) is an accepted management option in an effort to reduce the over-treatment of prostate cancer. As there are no standard entry criteria for AS, PSA velocity and density are often not considered when offering patients this treatment option. The purpose of this study is to evaluate the effect of PSA derivatives on the likelihood of disease progression and if progression precluded these patients from specific treatment options.

**Materials & Methods:** A retrospective review identified 67 men who were diagnosed with prostate cancer and met criteria for AS at a tertiary Veterans Affairs Medical Center. Criteria for AS included a Gleason score of  $\leq 3+4$  in 4 or less cores with less than 50% disease in each core.

**Results:** 67 patients met criteria for AS with 55 having repeat biopsy at a mean time of 14.3 months. Nine patients had disease progression after repeat biopsy with eight of these patients having a primary Gleason score of four. The PSA density was 0.21 for patients with disease progression compared to 0.13 ( $p < 0.05$ ). PSA velocity was also greater for patients with disease progression at 5.1 compared to 0.21 ( $p = 0.06$ ). Based on standard brachytherapy inclusion criteria, 8 of 9 patients who progressed and 8 of all 55 patients (15%) were no longer candidates for this therapy.

**Conclusions:** PSA density and velocity may be useful in predicting disease progression for patients on AS. Patients should be counseled that brachytherapy may not be a treatment option if disease progression warrants definitive treatment.

MP23

**Revisiting the Clinical Significance of "Close but Negative" Surgical Margins in Radical Prostatectomy**

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**Introduction:** A positive surgical margin (PSM) is an independent predictor of biochemical recurrence (BCR) after Radical Prostatectomy (RP). However, tumor distance from the surgical margin does not appear to predict BCR. Despite this, genitourinary pathologists may occasionally report a surgical margin as being "close but negative" to communicate concern. To date, no study has looked at the rate of BCR in patients who are reported as having "close but negative" margins.

**Materials & Methods:** We retrospectively reviewed our RP database from 1991 to 2001 when the pathology-reporting sheet allowed for free text. 1,189 patients were stratified by margin status into PSM, negative margin, and "close but negative" margin, according to their pathology report. Clinical and pathological characteristics were compared for BCR at 5, 10, and 15-years. Kaplan-Meier curves and cox proportional hazard ratios were also calculated.

**Results:** 79.8% of patients had negative surgical margins, 18.8% had PSM, and only 1.4% were reported as "close but negative". PSM patients had greater risk of BCR compared to negative margin [HR=2.95; 95%CI=2.19-3.96]. No statistical difference was seen between negative margins and "close but negative" margins (HR=1.03; 95%CI=0.58-1.82). No statistically significant difference was achieved between PSM and "close but negative", likely from the small number of patients in the "close but negative" group (HR=0.39, 95%CI=0.12-1.22).

**Conclusions:** Reporting a negative surgical margin as "close but negative" offers no additional prognostic information, but can result in unwarranted anxiety and fear over prostate cancer recurrence for patients. It also potentially puts patients at risk for unnecessary adjuvant therapies.

MP22

**The Effect of Fatigue on Simulated Robotic Surgical Skills Performed by Urology Residents**

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**Introduction:** Urology trainee work hours are restricted by the ACGME, yet no studies have been conducted on the effect of fatigue on residents in our specialty. This study reports on the effect of fatigue on Urology residents using the daVinci surgical skills simulator (dVSS).

**Materials & Methods:** Seven Urology residents performed selected exercises on the dVSS while pre and post call. Prior to each session, Epworth Sleepiness Scale (ESS) was used to measure fatigue. The performance of each resident was evaluated using the metrics available in the dVSS software. Non-parametric statistical analysis was performed to compare overall score, number of critical errors, and individual metric scores provided by the trainer.

**Results:** Residents slept a median of 4 hrs (min 2.5, max 6) while on call and a median of 5 hrs while not on call (min 3, max 7,  $p = 0.1459$ ). On call residents were significantly more likely to be identified as fatigued by the Epworth Sleepiness Score than off call residents ( $p = 0.0479$ ). Significant differences were observed in overall score for fatigued residents performing the exercises Tubes and Match Board. More critical errors were made by fatigued residents (table 1).

**Conclusions:** Fatigue in on call Urology residents negatively effects robotic surgical skills. The dVSS may become a useful instrument in the education of fatigued residents and a tool to identify fatigue in trainees.

Table 1. Differences in Overall Score and Critical Errors for Selected Exercises

	Not Fatigued	Fatigued	p-value
	median (min, max)	median (min, max)	
Tubes Overall	93 (55, 98)	70 (31, 86)	0.0342
Tubes Critical Errors	0 (0, 3)	2 (1, 6)	0.0301
Match Board 2 Overall	89 (73, 95)	77 (46, 86)	0.0433
Match Board 2 Critical Errors	0 (0, 2)	2 (1, 5)	0.0775
Total Critical Errors	2 (1, 11)	6 (3, 17)	0.0289

MP24

**MR-guided Trans-urethral Prostate HIFU in a Preclinical Model**

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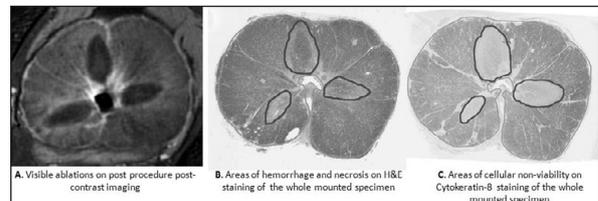
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**Introduction:** There has been a paradigm shift in the treatment of prostate cancer toward minimally invasive options that may achieve good oncological efficacy with minimal morbidity. We present our results using a novel trans-urethral high intensity focused ultrasound (HIFU) device in canine prostates.

**Materials & Methods:** A MR-compatible HIFU prototype was developed in collaboration with Philips Medical Systems. Approved by the Animal Care and Use committee, two canines were treated with 3-4 ablations each. A perineal urethrostomy was performed to allow for direct advancement of the device to the level of the prostate. In-gantry MRI provided images for planning, target selection, and real-time assessment of temperature elevations during therapy. Real-time thermal dose volume estimates based on MR-thermometry were provided by the software. Subsequently, the animals were euthanized for specimen procurement which was stained with Cytokeratin-8 and H&E.

**Results:** Thermal dose volume estimates positively correlated with those determined by histopathological analysis (0.935 cm<sup>3</sup> vs. 0.639 cm<sup>3</sup>, respectively,  $r^2 = 0.89$ ,  $p = 0.004$ ). Post-procedural contrast-enhanced MRI demonstrated an improved correlation with histology (0.60 cm<sup>3</sup> vs. 0.639 cm<sup>3</sup>,  $r^2 = 0.94$ ,  $p = 0.001$ ). Additionally, a positive correlation between ablated volumes determined by MRI thermal dose and MRI contrast-enhancement was found ( $r^2 = 0.88$ ,  $p = 0.057$ ).

**Conclusions:** This novel prototype allows for precise, targeted treatment of preselected lesions in canine models. Further, preclinical data is required prior to human trials to demonstrate its safety, oncological control, and functional outcomes.



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### Disease Specific Survival in Patients Managed with Nephroureterectomy Versus Nephron Preserving Procedures

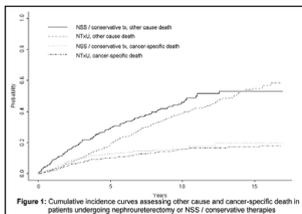
Jay Simhan, Marc C. Smaldone, Daniel Canter, Brian L. Egleston, Steven N. Sterious, Anthony T. Corcoran, Serge Ginzburg, Robert G. Uzzo, Alexander Kutikov  
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**Introduction:** We compared overall and cancer-specific outcomes between patients with upper tract urothelial carcinomas (UTUC) managed with nephroureterectomy (NTxU) and those managed through nephron-sparing measures (NSM).

**Materials & Methods:** Using the Surveillance, Epidemiology, and End Results (SEER) registries, patients with a diagnosis of low grade Ta/T1N0M0 UTUC were stratified into two groups: NTxU versus NSM (observation, endoscopic ablation, or segmental ureterectomy). Cancer and non-cancer specific mortality rates were determined using cumulative incidence estimators. We used Cox regressions for overall survival and Fine and Gray regressions for cause-specific mortality analyses.

**Results:** Of 1,227 patients (mean age 70.2±11.0yrs, 63.2% male), 907 (62.3% male) and 320 (65.6% male) patients underwent NTxU or NSM of low grade, low stage UTUC from 1992-2008. NSM patients were older (mean age 71.6 vs. 69.7yrs, p<0.01) with a greater proportion of well differentiated (G1) tumors (26.3% vs. 18.0%, p=0.001). There were no demographic differences between groups. While there were differences in other-cause mortality between the two groups (p<0.01), cancer-specific mortality trends were similar (Figure). Controlling for grade, demographics, and diagnosis year, patients treated with NTxU had longer non-cancer cause survival (HR=0.78, p=0.009), without a cancer-specific mortality benefit.

**Conclusions:** Patients with low grade, low stage UTUC managed through NSM have similar cancer-specific survival rates to those managed with NTxU. These data may be useful when counseling UTUC patients with baseline chronic kidney disease or other significant competing comorbidities.



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### Evaluation of Murine Dendritic Cell Function and Murine Specific Prostate Cancer Cell P1-A Expression after Exposure to 5-Azacytosine and Lenalidomide

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**Introduction:** Immunomodulatory drugs are being used with increasing frequency to treat various cancers. Although some of the greatest advancements have been achieved in the treatment of hematologic malignancies, a growing body of evidence exists to suggest a benefit in the treatment of solid organ tumors, including prostate cancer. Though the benefits of therapy have been shown in clinical trials, the underlying immune mechanisms responsible for the outcomes have not been completely elucidated.

**Materials & Methods:** Murine derived dendritic cells (DCs) and Murine specific prostate cancer cells (RM-1) were exposed to variable concentrations of Lenalidomide (a thalidomide analogue) and 5-AzaC (a DNA methylation inhibitor). Cell proliferation assays were performed on both. RT-PCR and q-PCR was performed on DCs exposed to 5-AzaC for endothelin expression, and RM-1 cells were exposed to both drugs for P1-A expression. Flow cytometry was performed on DCs exposed to Lenalidomide, and ELISA was performed on DCs exposed to 5-AzaC for IL-15 and IL-12 expression.

**Results:** Although both Lenalidomide and 5-AzaC appeared to be cytotoxic to RM-1 cells and dendritic cells, our results suggest that both upregulate different elements of the immune system and that 5-AzaC increases tumor exposure to the immune system through upregulation of cancer testis antigens.

**Conclusions:** We are developing a murine model to investigate the role of immunomodulatory drugs in the treatment of prostate cancer and ultimately other GU malignancies by analyzing their effect on tumor cells and on the host immune system so that treatment regimens might be optimized with synergistic intent.

### Determining Resident Physician Radiation Exposure during Urologic Surgery Training in a Program with High Volume Endourology Case Load

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**Introduction:** Objective to determine an estimate of radiation exposure to urology residents during training.

**Materials & Methods:** For 220 consecutive cases over a 60 day collection period radiation utilization and exposure data were collected. Cumulative air kerma (CAK), as determined by the fluoroscopy table kerma area product (KAP) sensor, was used as a surrogate of emitted radiation dose. Extrapolating CAK to radiation incident upon the operator was accomplished through a series of distance measurements and utilization of established scatter and decay equations. Luxel + optically stimulated luminescent (OSL) dosimeters (Landauer Inc.) at the collar were used throughout the collection period for verification purposes. Resident ACGME case logs were reviewed to estimate annual case load.

**Results:** CAK for the 3 most common procedures: ureteral stent exchange 16.595mGy (range 2.0-94.0), primary ureteral stent placement 53.554mGy (range 4.2-176.45), and ureteroscopy (URS) 47.437mGy (range 1.3-152.91). Average annual resident case loads: stent exchange N=52.5, primary stent placement N=37, URS N=113.5. Total CAK for annual case load =8235.895mGy. Source to skin distance (fixed)=38cm. Average patient to operator distance =60cm. Mathematical estimate of annual exposure = 2.29Rem/year. Estimated OSL exposure = 3.24Rem/year. Average age at the start of urologic training =28.1years.

**Conclusions:** Collected data suggest radiation exposure during urologic surgery training may approach 50% of recommended NCRP91 maximums. Despite being within accepted limits, exposure should be minimized as it occurs at a vulnerable age in a population likely to have considerable continued lifetime dose accumulation.

### Intraoperative Frozen Section Analysis at the Time of Partial Nephrectomy: is it Necessary? A Review of 370 Patients

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**Introduction:** Intraoperative frozen section analysis (FSA) of tumor margins is common during partial nephrectomy (PN). However, this practice is of questionable benefit as the impact of a positive surgical margin (PSM) on oncologic outcome has been questioned. Our aim was to determine the necessity of intraoperative FSA and its relationship with surgical and pathologic outcome.

**Materials & Methods:** We reviewed the data of 406 patients who underwent PN between July 1996 and September 2010. Clinical and pathologic data was reviewed for each case. Lesions were identified visually in all cases and confirmed by intraoperative ultrasonography in select cases. Lesions were sharply excised completely and visually inspected for appearance of normal parenchymal tissue. Cold cup biopsies from the resection bed were sent for FSA. Biopsy patterns were performed based on tumor gross morphology and location as well as surgeon preference. Clinical and pathologic outcomes for patients with positive and negative FSA were compared.

**Results:** 370 patients (91.1%) underwent intraoperative FSA. Mean age of patient population was 59 (range 23-82). 307 (82.9%), 51 (13.8%), 8 (2.2%) patients had a renal mass of <4 cm, 4-7 cm and >7 cm, respectively. Mean follow-up for PSM and NSM was 30.1 and 26.6 months, respectively. A total of 21 patients (5.7%) had a positive FSA. There was a statistically significant correlation between overall risk of recurrence and PSM (HR 3.7; 1.05-13.2, p=0.042).

**Conclusions:** Our data suggests that PSM on FSA correlates with a higher risk of recurrence, contrary to recent literature supporting otherwise.

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**Stromal Microenvironment in Renal Cell Carcinoma**

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**Introduction:** Advanced renal cell carcinoma (RCC) is in need of novel diagnostic and treatment tools. Although renal tumor cells are intercalated within a mesenchymal stromal microenvironment during RCC tumorigenesis and it is well accepted that tumor-stroma plays an important role in tumorigenesis, research in stromal RCC is not profuse. Objective: To study the clinical importance of RCC's stroma and uncover stromal fibroblast-derived extracellular matrix (ECM) effects in renal tumorigenesis.

**Materials & Methods:** Using fibroblasts harvested from patient matched normal and tumoral renal tissues obtained from fresh surgical samples, we developed an in vivo-like 3D culturing system.

**Results:** Using a well annotated tumor micro-array, we observed that stromal palladin expression levels are indicative of poor outcomes in early non-metastatic RCCs and thus propose that palladin may constitute a novel risk marker. Furthermore, using the 3D system we uncovered that tumor, but not normal, ECMs are tumorigenic permissive inducing growth, survival, inhibition of apoptosis and invasion. Results from an unbiased gene expression array, not only confirmed the ECM induction of known RCC pathways, but also uncovered the involvement of specific integrin pathways and assorted connective tissue disorder components in the observed tumor-ECM induced responses. Moreover, preliminary results suggests that the tumor-ECM induced tumorigenic behaviors could be inhibited (i.e., cell growth) or altered (i.e., cell invasion) by integrin blockage.

**Conclusions:** High expression levels of stromal palladin predict poor clinical outcome in non metastatic RCC patients, while specific integrin activities are responsible for the observed normal ECM restrictive and tumor-activated ECM promoting neoplastic behaviors.

**The Effect of Prostate Volume on the Detection of Clinically Insignificant Cancer on Repeat Prostate Biopsies**

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**Introduction:** Concern about the over-diagnosis of prostate cancer (PCa) secondary to PSA screening has emphasized the need for reliable preoperative predictors of clinically insignificant PCa.

**Materials & Methods:** We retrospectively reviewed our radical prostatectomy database from 1991 to 2008 to assess the effect of prostate volume on clinical and pathological characteristics in patients with PCa detected on first prostate needle biopsy, compared to patients who required  $\geq 3$  biopsies before PCa was detected. Patients were further stratified into prostate volume  $< 50$  cc or  $\geq 50$  cc.

**Results:** The percent of patients with prostates  $\geq 50$  cc increased from 16.5% (266/1,608) on first biopsy to 41.3% (62/150) in the  $\geq 3$  biopsies group. For patients with  $\geq 50$  cc prostates in the  $\geq 3$  biopsies group, 72.6% had Gleason scores of  $\leq 6$  and 81.6% had an estimated tumor volume of  $< 10\%$  on final pathology, which was statistically significant compared to the other groups ( $p < 0.01$ ). There was no significant difference in the rate of upgrading between any of the groups ( $p = 0.98$ ).

**Conclusion:** Patients with prostates  $\geq 50$  cc are more likely to require multiple biopsies before PCa is detected. Tumors in  $\geq 50$  cc glands that required  $\geq 3$  biopsies for detection are more likely to be low grade and low volume at final pathology. Men with large prostates who have already had two negative biopsies should be counseled on the risk of detecting clinically insignificant PCa with additional biopsies. Similarly, men with large prostates diagnosed with PCa after  $\geq 3$  biopsies should be counseled about active surveillance.

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**Predictors of Gleason Score Upgrading in a Large Urban Population**

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**Introduction:** Gleason score is important for prostate cancer risk stratification and influences treatment decisions. Gleason score upgrading (GSU) between biopsy and surgical pathology specimens has been reported as high as 50% and presents a challenge in counseling low-risk patients. While recent studies have investigated predictors of GSU, populations in these studies have been largely Caucasian. We report our analysis of predictors of GSU in a large urban African-American population.

**Materials & Methods:** 786 patients with D'Amico low risk prostate cancer underwent radical prostatectomy between January 2007 and December 2011 at our institution. Race, age, PSA, BMI and TRUS biopsy characteristics were analyzed with both univariate and multivariate analysis to identify significant predictors of GSU.

**Results:** Of the 786 cases, 212 (26.9%) were upgraded on final pathologic specimen. Age, total positive biopsy cores and percent of core involved with cancer were significant on univariate analysis. In a multivariate stepwise logistic regression, age ( $P = 0.07$ ), total cores positive ( $P = 0.01$ ) and % cores positive ( $P = < 0.001$ ) were significantly correlated to clinical GSU (Table 1)

**Conclusions:** More than a quarter of low-risk prostate cancer patients were upgraded on final pathology in our series. Advanced age, total number of cores and percent of cores involved were independent predictors of GSU. Individuals with those clinical parameters may harbor occult high-grade disease and should be carefully counseled on treatment decisions.

Table 1. Univariate Analysis of Variables (** Significant on multivariate analysis)			
Variable	No GSU (n=574)	+ GSU (n=212)	p-value
Mean Age (stdev) **	62.6 (7.1)	63.8 (6.8)	0.043
% African American	34.7% (199/574)	39.2% (83/212)	0.246
Mean BMI (stdev)	27.6 (4.7)	28.3 (4.9)	0.067
Mean PSA (stdev)	6.30 (3.72)	6.61 (3.98)	0.700
Mean Total Cores Positive (stdev) **	3.70 (2.55)	4.30 (3.26)	0.023
Mean % of Positive Core (stdev) **	35.2 (28.3)	40.6 (30.8)	0.037
Mean Final Pathologic Grade	6.00	7.18	

**A New Method for Objective Analyses of Detrusor Rhythmic Contraction**

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**Introduction:** Ambulatory urodynamics indicates that the bladder undergoes spontaneous rhythmic contraction (SRC) during the filling phase, and that SRC is increased in patients with overactive bladder. Strips of detrusor smooth muscle (DSM) isolated from patients with overactive bladder exhibit greater SRC than controls. We propose a new mathematical approach to analyze SRC focusing on concepts drawn from signal analysis.

**Materials & Methods:** Strips of DSM dissected from rabbits were placed between two clips in a muscle bath; one clip was attached to a micrometer for length adjustments, the other to an isometric tension transducer for DSM tone analyses. Tissues were stretched from 0.8-fold a reference muscle length ( $L_{ref}$ ) to 1.2-fold  $L_{ref}$  in 0.1-fold  $L_{ref}$  increments and allowed to rhythm spontaneously for 20 min. SRC were analyzed using Fourier transforms allowing the data to be represented on a frequency rather than a time spectrum.

**Results:** Based on Fourier transform plots represented by signal peaks within specific frequency ranges, rabbit SRC are divided into 3 component waveforms defined as  $A_0 + A_1B_1 + A_2B_2$ .  $A_0$  = length-dependent baseline tone that increases exponentially.  $A_1B_1$  = a fast wave with a length-dependent specific amplitude ( $A_1$ ) and length-independent constant frequency ( $B_1$ ) of  $\sim 0.2$  Hz, and  $A_2B_2$  = a slow wave with a length-dependent amplitude ( $A_2$ ) and frequency ( $B_2$ ).

**Conclusions:** Use of Fourier transform revealed, that rabbit SRC consists of 2 frequencies, one that is, and one that is not, length dependent. This method has potential clinical utility in the study of therapies designed to treat urgency occurring during the filling phase.

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**ERG Negative Index Tumor Type in African American Prostate Cancer Patients Identifies a High Risk Subset**

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**Introduction:** Recent studies show higher frequency of ERG rearrangements in of Caucasian American prostate cancer patients compared to other ethnic groups. The objective of our study was to establish the frequency and prognostic associations of the ERG oncoprotein expression in prostate tumors of matched Caucasian American (CA) and African American (AA) patients.

**Materials & Methods:** Ninety-one AA patients were matched for age, Gleason sum and pathologic stage to 91 CA patients. Whole mount prostate specimens from radical prostatectomies were used for immunohistochemical detection of the ERG oncoprotein. Individual foci of tumors were typed for ERG expression as either positive or negative. ERG genomic rearrangement was assessed by FISH assay in representative sets of CA and AA whole-mount prostate specimens. Correlation of ERG staining with clinico-pathologic data was performed.

**Results:** The frequency of ERG positive tumor type was significantly greater among CA vs. AA patients when assessed in index tumors (63.3% vs. 28.6%,  $p < 0.0001$ ) or in all tumor foci (41.9% vs. 23.9%,  $p < 0.0001$ ). ERG negative index tumor type associated with higher pathology grade in AA patients ( $p = 0.0394$ ).

**Conclusions:** Index tumors are frequently ERG positive in CA patients. High frequency of ERG negative index tumor type associated with higher grade in AA patients, suggesting different biological properties of the ERG negative tumors in disease progression. Assessment of ERG tumor types in prostate cancer in part has a potential to explain reported differences in the disease spectrum between African American and Caucasian American patients.

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**Targeted Prostate Biopsy with Contrast-Enhanced Transrectal Ultrasound Detects Clinically Significant Disease: A Potential Tool to Monitor Patients on Active Surveillance**

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**Introduction:** Prostate cancer screening is controversial, with concerns of overdiagnosis of indolent tumors and the unreliability of prostate biopsy to detect clinically significant, potentially lethal cancer (CSPC). We investigated the ability of contrast-enhanced transrectal ultrasound (CE-TRUS) with targeted prostate biopsy to detect CSPC.

**Materials & Methods:** Fifty eight patients participating in CE-TRUS studies who underwent radical prostatectomy were included. This included 52 patients with CSPC (defined as  $>0.5cc$  tumor volume or Gleason score  $\geq 7$ ). CE-TRUS with targeted and systematic prostate biopsy were utilized. A retrospective analysis of targeted biopsies taken at sites of suspicious enhancement was performed to calculate the detection rate of CSPC if all sextants rated as suspicious by CE-TRUS could be detected.

**Results:** Targeted biopsy of abnormal CE-TRUS findings identified 42/58 (72%) of patients with cancer on whole mount pathologic analysis. Targeted biopsies detected 40/52 (77%) of CSPC. Of the 12 patients with CSPC not detected by targeted biopsy, 9 had CEUS findings suspicious for malignancy in the site of cancer demonstrated on whole mount. Thus, 49/52 of patients with CSPC were associated with abnormalities on CEUS (sensitivity=94%).

**Conclusions:** CE-TRUS demonstrates abnormal enhancement in the majority of patients with CSPC. Targeted biopsy may be negative in some patients because the biopsy site is not perfectly aligned with the CE-TRUS abnormality. Nonetheless, a normal CE-TRUS study will have high negative predictive value for the absence of CSPC, and may be useful to monitor patients on active surveillance for progression to clinically significant disease.

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**Residual Fragments Following Ureteroscopic Lithotripsy: Incidence and Predictors in 248 Patients with Post-operative Computed Tomography (CT) Imaging**

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**Introduction:** Residual fragments (RFs) following ureteroscopy (URS) for calculi may contribute to stone growth, symptoms or additional interventions. We reviewed our experience with URS to define the incidence and establish factors predictive of RFs.

**Materials and Methods:** Records associated with 667 consecutive ureteroscopic procedures for upper tract calculi between April 2007 and May 2009 were reviewed. 265 procedures (40%) had a CT scan between 30 and 90 days following surgery and comprised the study group. RFs were defined as any residual ipsilateral stone  $> 2mm$ .

**Results:** 121 men and 127 women with a mean age of 47 years were included. Mean target stone diameter was 7.6 mm with stone location being 29% kidney, 50% ureter, and 20% in both. RFs were detected on CT following 101 of 265 procedures (38%). On univariate analysis, stone location in the kidney (vs. ureter) ( $p < 0.001$ ), location in both kidney and ureter (vs. either location alone) ( $p < 0.001$ ), multiple calculi ( $p = 0.003$ ), increasing stone diameter ( $p < 0.001$ ), longer operative duration ( $p = 0.088$ ), and use of only flexible ureteroscope ( $p = 0.029$ ) were associated with RFs. In a multivariate model, only pre-treatment stone diameter  $> 5mm$  (OR 2.03,  $p = 0.03$  for 6-10mm, and OR 3.74,  $p = 0.003$  for  $> 10mm$ ) predicted RFs.

**Conclusions:** 38% of patients undergoing URS for calculi will have RFs by CT criteria. Pre-treatment stone size is associated with RFs with rates of 24%, 40%, and 58% for stones  $\leq 5mm$ , 6-10 mm, and  $> 10 mm$  respectively. Such data may guide expectations regarding the success of URS in attaining stone-free status.

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**Contemporary Evaluation of the National Comprehensive Cancer Center Prostate Cancer Risk Classification**

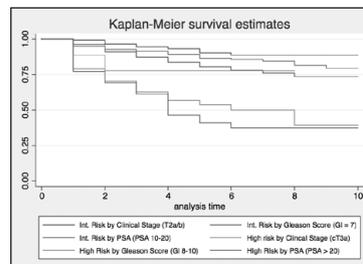
**Adam C. Reese, Phillip M. Pierorazio, Misop Han, Alan W. Partin**  
Johns Hopkins Brady Urological Institute, Baltimore, MD

**Introduction:** The National Comprehensive Cancer Network (NCCN) prostate cancer guidelines define risk groups based on PSA, Gleason score, and clinical stage. We analyzed these risk groups in a contemporary series of patients treated with radical prostatectomy (RP).

**Materials & Methods:** We analyzed our institutional RP database, including all patients with localized disease treated between 2000 and 2010. Per NCCN guidelines, patients were classified as low, intermediate, or high risk. Biochemical recurrence (BCR) free survival rates were compared using the logrank test.

**Results:** 12821 men met the inclusion criteria. 10-year BCR-free survival rates differed significantly by risk group (low-risk 92.1%, intermediate-risk 71.0%, high-risk 38.8%,  $p < 0.01$ ). 80.5% of intermediate risk men met only one intermediate-risk criterion, and 91.2% of high-risk men met only one high-risk criterion. Kaplan-Meier BCR-free survival curves for men meeting a single intermediate or high-risk criterion are shown in the Figure. In both intermediate and high-risk men, BCR-free survival was superior in men with advanced clinical stage, compared to men assigned to the same risk group based on Gleason score or PSA data.

**Conclusions:** We observed heterogeneous outcomes among patients within the NCCN intermediate and high-risk groups. BCR-free survival rates were superior in men with advanced clinical stage compared to those with advanced Gleason score or elevated PSA. These findings question the use of clinical stage data in assigning NCCN risk group.



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**Dutasteride Pretreatment with Contrast-Enhanced Transrectal Ultrasound for Prostate Cancer Detection: A Randomized, Double-Blinded Trial**

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**Introduction:** PSA based prostate cancer screening is controversial because the risks of cancer therapy may outweigh the benefits of treatment among men with indolent cancer. Identification of clinically significant disease is crucial for cost-effective screening. Contrast-enhanced ultrasound (CEUS) detection of increased microvessel density is associated with prostate cancer. Preliminary studies suggest that 5 $\alpha$ -reductase inhibitor pretreatment may improve CEUS targeted biopsy efficiency. This study evaluated prostate cancer detection with CEUS  $\pm$  short-term pretreatment with dutasteride.

**Materials & Methods:** We enrolled 311 pts in a randomized double blinded placebo controlled trial of oral dutasteride pretreatment followed by CEUS and biopsy. The microbubble agent Definity™ (Lantheus Medical Imaging) was used. CEUS findings were graded and directed targeted biopsy (up to 6 cores/prostate). A blinded twelve core systematic biopsy was then performed on every subject.

**Results:** Two hundred seventy two of 311 randomized subjects completed the study. Prostate cancer was detected in 276/3264 (8.5%) of systematic cores and 203/1237 (16.4%) of targeted cores (odds ratio = 2.1; p<0.001). ROC analysis for cancer detection demonstrated improved accuracy of CEUS vs. precontrast imaging (Az of 0.64 vs. 0.60, p=0.005). Precontrast and CEUS demonstrated excellent accuracy for high grade cancer (Gleason score  $\geq$ 7), [Az=0.74 and 0.80 respectively, p=0.0005] and high grade cancer with greater than 50% biopsy core involvement, [Az =0.83 and 0.90 respectively, p=0.001]. Dutasteride pretreatment had no significant impact on detection of prostate cancer (p=0.97).

**Conclusions:** CEUS targeted biopsy provides a significant benefit for the detection of high grade/high volume prostate cancer.

**Multiparametric Magnetic Resonance Imaging (mpMRI) and mpMRI/US Fusion Biopsy Accurately Detect and Localize Recurrent Prostate Cancer**

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**Introduction:** The difficulty in accurately detecting and locating prostate cancer (CaP) local recurrence after definitive treatment still exists today. Correct staging has significant clinical implications in the determination of whether patients should undergo salvage treatment. We present our initial experience using mpMRI and mpMRI/US fusion biopsy to detect and localize local recurrent CaP.

**Materials & Methods:** Between 2010-2011, 22 patients who had undergone definitive treatment for CaP underwent screening with mpMRI (T2-weighted, diffusion-weighted, MR-spectroscopy, and dynamic contrast-enhanced sequences) for suspicion of recurrences. Patients with suspicious lesions identified on mpMRI subsequently underwent mpMRI/US targeted fusion biopsy. Data was retrospectively analyzed.

**Results:** Eleven patients underwent radical prostatectomy, while the remaining patients underwent either HIFU (4), cryotherapy (3), radiotherapy (3), or brachytherapy (1). Six patients received multiple prior therapies. DRE failed to reveal abnormalities in any of these patients. MpMRI detected local suspicious lesions in 73% (16/22) of patients. Thirteen of these patients underwent fusion biopsies, confirming local recurrence in 8 patients (62%). MpMRI failed to detect cancer in two patients, among 6 with negative mpMRI; as they ultimately underwent salvage prostatectomy based on prior outside biopsies. MpMRI also detected incidental bladder cancer in two patients.

**Conclusions:** MpMRI accurately detects the majority of the local recurrences. The utilization of mpMRI and mpMRI/US fusion platform should be considered for patients with biochemical recurrence.

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**Multi-parametric MRI and Subsequent MR/Ultrasound Fusion Biopsy Increases the Detection of Anteriorly Located Prostate Cancers**

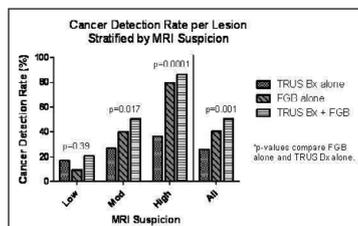
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**Introduction:** Anteriorly located prostate cancer is traditionally under-diagnosed using transrectal ultrasound (TRUS) biopsy. We describe the detection rate of these tumors with the addition of MRI/US fusion guided biopsy (FGB) to standard TRUS biopsy.

**Materials & Methods:** Patients with a clinical suspicion of prostate cancer underwent 3T multiparametric MRI and suspicious lesions in the anterior prostate were identified. Patients then received a FGB of all suspicious lesions and a standard TRUS biopsy. We conducted a lesion based analysis comparing detection of anterior targets using FGB versus TRUS cores taken from the same anatomic location in the prostate. Patients with only anterior targets were analyzed separately.

**Results:** Of 499 patients undergoing FGB, 162 patients had a total of 241 anterior lesions. Mean age, PSA, and prostate volume in this group was 62 years, 12.7ng/dl, and 57mL, respectively. Results of the lesions based analysis are shown in Figure 1. Twenty-four of 42 patients (57.1%) having only anterior lesions on mpMRI had cancer on our platform. Six patients were positive on FGB only. Thirteen were positive on both modalities. However, 7 of 13 were upgraded to a higher Gleason score by FGB. All 5 patients positive on TRUS biopsy only were active surveillance candidates.

**Conclusion:** FGB detects significantly more anterior cancers than TRUS biopsy alone and may be an effective tool for this subset of patients.



**Pelvic MRI with Surface Body Coils to Assess Local Extent of Disease for Patients with Localized Prostate Cancer Undergoing Radical Prostatectomy**

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**Introduction:** The role of magnetic resonance imaging (MRI) to characterize the extent of disease for localized prostate cancer remains unclear. Surface body coil imaging obviates patient discomfort attributable to endorectal coils. We evaluated the ability to assess extent of disease prior to surgery.

**Materials & Methods:** Patients with localized prostate cancer underwent a surface body coil 1.5-T pelvic MRI with gadolinium prior to prostatectomy. Patients were stratified into 3 groups based on the D'Amico criteria. All studies were reviewed by a single radiologist. MRI findings were correlated with final pathology.

**Results:** 110 men with a pre-treatment PSA of 7.7ng/mL were included. Stage distribution was cT1a-1, cT1c-70 and cT2-39, and Gleason sum scores ranged from 6-10. Risk stratification was low-35, intermediate-49, and high-26. On final pathology, 32 men had EPE and 7 had SVI. Overall sensitivity, specificity, PPV, and NPV for preoperative MRI to predict EPE was 41%, 83%, 50%, and 77%, respectively. Regarding SVI, the results were 53%, 95%, 64%, and 92%, respectively. In high risk patients, we observed improved sensitivity and PPV of MRI for both EPE and SVI while maintaining specificity and NPV.

**Conclusions:** Surface body coil MRI may be a useful imaging modality to characterize extent of disease prior to prostatectomy. This appears particularly true for high risk patients whereby MRI had a sensitivity of 58% and PPV of 78% for EPE.

	Extraprostatic Extension (EPE)			
	Sensitivity	Specificity	PPV	NPV
All patients (n=110)	41%	83%	50%	77%
High risk (n=26)	58%	86%	78%	71%
Low/Intermediate risk (n=84)	30%	83%	35%	79%
	Seminal Vesicle Invasion (SVI)			
	Sensitivity	Specificity	PPV	NPV
All patients (n=110)	53%	95%	64%	92%
High risk (n=26)	67%	88%	75%	83%
Low/Intermediate risk (n=84)	38%	96%	50%	94%

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### Treatment of Adolescent Interstitial Cystitis

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**Introduction:** Interstitial cystitis (IC) is a syndrome characterized by urinary urgency and frequency, dysuria, nocturia, and suprapubic pain. Patients are often difficult to treat due to the phenotypic heterogeneity of the disease and the limited efficacy of the treatment options. Treatment regimens must be individualized and tailored through a process of trial and error. We sought to determine if adolescent symptoms respond to adult treatment regimens.

**Materials & Methods:** A systemic chart review of adolescent patients diagnosed with IC was performed to analyze successful treatment regimens. Patients were included if they presented with pelvic pain symptoms prior to the age of 18 and diagnostic workup discerned no discrete etiology.

**Results:** Four patients met criteria and were analyzed based on their treatment regimens. All four patients were initially treated with behavioral modifications, stress management, amitriptyline, and an anticholinergic with failure to control symptoms in all. Two patients required the addition of bladder instillations of heparin, bicarbonate, and lidocaine in order to alleviate their symptoms. One patient responded to the addition of diazepam vaginal suppositories, while the patient with the most severe symptoms and cystoscopic evidence of Hunner's ulcers required the addition of pentosan polysulfate sodium, prednisone, and a topical anticholinergic gel.

**Conclusions:** IC remains a challenging syndrome to diagnosis and manage in adolescents. This chart review demonstrates that one management strategy is unlikely to suffice. Practitioners must have the knowledge to diagnosis IC in an adolescent, and the perseverance to continue trying different treatment options until a successful option is found.

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### Factors Influencing the Decision to Pursue a Pediatric Urology Fellowship: A Survey of Urology Residents

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**Introduction:** Among urology residents who were likely to pursue a fellowship (F), we sought to elucidate factors that make pediatric urology (PU) less appealing.

**Materials & Methods:** During the 2010 and 2011 AUA Basic Sciences, residents completed a 90-item survey querying subspecialty interest and private practice versus academic medicine (AM) or F.

**Results:** 364 urology residents attended, and 240 participated. 102 (43%) indicated they "were more likely than not to pursue AM or F", 66 (65%) were male, 36 (35%) were female, and most were in year 3 (46%) or 2 (36%) of training. When rating interest in 6 subspecialties, respondents ranked PU 4th. Of those who rated their subspecialty interest, 20 (19%) were "very" and 20 (19%) were "moderately" interested in PU. For those with "no", "minimal" or "moderate" interest in PU, the 3 highest rated factors of 13 making PU less likely were preference for adult urology, disinterest in interacting with parents, and lack of desire to do a dedicated research year. AM/F bound residents rated 11 factors influencing F pursuit from 0-no to 3-strong influence. For those with no/minimal interest in PU (n=62), intellectual stimulation (mean=2.13), lifestyle (1.77), and mentor encouragement (1.60) were most influential. For moderate/strong interest in PU, intellectual stimulation (2.21) and mentor encouragement (2.15) were most influential.

**Conclusions:** Among respondents, PU is a less appealing subspecialty. Preference for adult urology and disinterest in working with parents were the highest rated reasons making PU less attractive. Mentor encouragement may be an important factor in increasing PU interest.

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### Ureteroureterostomy in Children with Duplicated Systems Using the Robotic-Assisted Laparoscopic Approach

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**Introduction:** We report on the safety, efficacy and outcomes of robotic-assisted laparoscopic ureteroureterostomy (RUU) in children.

**Materials & Methods:** A retrospective chart review was employed for all patients with duplicated systems undergoing RUU performed by a single surgeon from June 2006-March 2009 for treatment of ureterocele (1) or ectopic ureter (9).

**Results:** Ten female children underwent RUU. Surgery was performed on 11 renal units (5 right; 4 left; 1 simultaneous bilateral). Patients presented with urinary tract infection (UTI) (2), incontinence (3), UTI and incontinence (3), ureterocele (1), and prenatally detected hydronephrosis (1). Mean age at surgery was 4.4 years (range 7.6 months-16.6 years). Mean weight was 20.7 kg (7.6-70.2 kg). All patients underwent a three-port, transperitoneal, upper-to-lower pole RUU using a spatulated, watertight, end-to-side anastomosis. The anastomosis was proximal in 9 patients and distal in 1 patient who underwent bilateral procedures. Mean operative time was 153 minutes (109-196 minutes) from incision to port closure. No patient required open conversion. There were no intraoperative complications. Double J stents were placed antegrade in 1 patient and retrograde in 9 patients. Mean length of stay was 1.9 days (1.4-3.5 days). Mean length of follow-up was 22.8 months (range 1.0-51.7 months). In 6 patients with preoperative hydroureteronephrosis, 5 had complete resolution and 1 improved. All patients had complete resolution of their incontinence and recurrent UTI.

**Conclusions:** RUU is safe and effective and no patient has required further operative intervention. Excellent results were achieved in all children in terms of symptom resolution and improved imaging results.

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### Modified Sleeve Technique for Second Stage Hypospadias Repair

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**Introduction:** Second stage hypospadias repair has historically been done using the Thiersch Duplay technique. Issues with high complication rates and proper placement of the neourethra into the distal most glans have prompted us to develop a novel procedure incorporating the principle of the sleeve technique.

**Materials & Methods:** Ten boys with proximal hypospadias ages 9 months to 22 months (mean 15.9 months) underwent a second stage modified sleeve procedure as an outpatient. All patients received preoperative depot testosterone intramuscularly and were stented postoperatively for 7 days. Instead of tubularizing the glans as is done with the Thiersch Duplay, the ventral shaft skin was found to be sufficient to develop the neourethra above the level of the distal glans. The neourethra was mobilized proximally for enough distance to easily allow for proper length. The glans was split in the midline and spongiosum tissue core out to allow placement of the neourethral meatus deep within the glans at the orthotopic location. A secondary vascularized layer was placed over the neourethra in each instance.

**Results:** Follow-up ranged from 2 weeks to 68 months (mean 28.5 months). One patient was lost to follow-up after 6 months and one patient did not return after the two week visit but the primary care giver saw no complications at 6 years. Complications included 1 fistula and 1 urethral diverticulum, both of which were repaired successfully.

**Conclusions:** Preliminary data shows the modified sleeve procedure as a promising adjunct to second stage hypospadias repair with an acceptable complication rate.

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**Pediatric Renal Injuries in All-terrain Vehicle Trauma: A Mechanistic Relationship**

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**Introduction:** The riding of all-terrain vehicles (ATV) is a popular recreational activity. Pediatric ATV related trauma continues to rise at alarming rates. The pediatric population has the highest rates of overall injury among ATV riders. The purpose of this study is to identify and discuss the mechanistic risk factors associated with genitourinary (GU) trauma in pediatric all-terrain vehicle (ATV) accidents.

**Materials & Methods:** A retrospective analysis of all pediatric trauma admissions in a single institution between 2005 and August 2011 was performed. We identified all pediatric patients who presented with GU trauma related to ATV accidents. Demographics, injury data including mechanism, and treatment records were investigated.

**Results:** A total of 304 pediatric patients were admitted with ATV related injuries during the study period. Ten patients experienced GU injuries (3.2%). Analysis of the mechanism revealed that 9 out of 10 were thrown from the ATV and one was described as a rollover accident. All 10 patients sustained renal trauma: nine renal lacerations of various grades and one renal pedicle injury. Spleen and liver lacerations were commonly associated injuries (40% and 30% respectively).

**Conclusions:** Pediatric ATV related GU injuries remain an uncommon yet serious problem. Renal trauma is most commonly encountered GU injury. Analysis of the mechanism of injury suggests that ejection off the ATV places pediatric patients at the greatest risk of renal injury. Previous studies have suggested that crush during ATV rollovers or striking the handlebars place these patients at highest risk for renal injury.

**Genomic Study of Prostate Cancer Disparities between African American and Caucasian American Populations**

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**Introduction:** Research demonstrates Prostate Cancer (PCa) health disparities in which the African American (AA) population exhibits higher incidence and mortality rates compared to Caucasian Americans (CA). Evidence suggests that widespread microRNA deregulation may play crucial role in cancer development, yet the relationship between population-specific microRNAs and PCa disparities remains largely unknown.

**Materials & Methods:** We applied a systems biology approach by combining mRNA expression profiling, microRNA profiling and microRNA target searches to characterize the genetic portraits of PCa in AA and CA populations. Affymetrix human exon ST1.0 arrays and Agilent human miRNA V2 arrays were used to analyze the global mRNA and microRNA expression profiles in AA and CA prostate tissue samples.

**Results:** A 4-way statistical analysis (t-test with 10% FDR; AA normal vs. CA normal, AA cancer vs. CA cancer, AA cancer vs. AA normal, and CA cancer vs. CA normal) has identified 275 to 987 genes with differential expression. Pathway analysis revealed that the mis-regulated testosterone metabolic pathway, activated inflammatory response and up-regulated oncogenic pathways are associated with the biological differences when comparing AA normal to CA normal, AA cancer to CA cancer and AA cancer to AA normal. A microRNA / mRNA-regulated network, generated by integrating microRNA-targeted mRNAs and mRNA profiling data, suggested that the population-specific microRNAs may contribute to differential cell-cycle control, protein synthesis and cell apoptosis in AA and CA prostate cancers.

**Conclusions:** Our study demonstrates that differential gene-network regulation, driven by the population-specific mRNA and microRNA expression, may explain some biological differences between AA and CA prostate cancers.

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**Length-dependent Regulation of Detrusor Smooth Muscle Myosin Light Chain Phosphorylation and Tone During Bladder Filling**

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**Introduction:** Strips of mammalian bladder display low amplitude, rhythmic contractions, independent of nervous input, and those isolated from patients with OAB display enhanced rhythmic contraction. Most stretch-sensitive afferent nerves within the bladder behave as tension receptors in-series with detrusor smooth muscle (DSM), and afferents display burst activity associated with rhythmic contraction. Smooth muscle contraction is dependent on crossbridge activation as assessed by myosin light chain (MLC) phosphorylation (MLCp). We tested the hypothesis that in rabbit bladder, MLCp and DSM tone are length-dependent.

**Materials & Methods:** Strips of DSM from rabbit bladders were placed between two clips in a muscle bath; one clip was attached to a micrometer for length adjustments, the other to an isometric tension transducer for DSM tone analyses.

**Results:** Stretching strips from 0.8-fold of an optimum length for muscle contraction ( $L_{ref}$ ) to 1.2-fold  $L_{ref}$  caused an ~2.5-fold increase in the area under the tone curve. Ibuprofen abolished this increase. In the presence of ibuprofen, addition of PGE<sub>2</sub> increased tone, and stretch from 0.8-fold  $L_{ref}$  to 1.2-fold  $L_{ref}$  increased PGE<sub>2</sub>-induced tone by ~2.5-fold. The level of MLCp at 1.2-fold  $L_{ref}$  was ~5-fold that at 0.8-fold  $L_{ref}$ , but when stretched further to 1.3-fold  $L_{ref}$  then released back to 1.2-fold  $L_{ref}$ , MLCp was only ~3-fold that at 0.8-fold  $L_{ref}$ .

**Conclusions:** These data indicate that length regulates the biochemical activation of DSM, and the degree of tone during bladder filling. Pathological increases in the sensitivity of this mechanism may accentuate bladder tone during filling, suggesting a relationship to OAB.

**Metformin Induces Cytotoxicity via Inhibition of Respiratory Chain Complex 1 in Prostate Cancer Cells**

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**Introduction:** Currently, there are two main mechanisms proposed in the literature for metformin's antineoplastic effects: activation of AMP-activated protein kinase (AMPK) and inhibition of complex 1 of oxidative phosphorylation in mitochondria. In this study, we attempt to determine the dominant mechanism of Metformin's action in prostate cancer cell lines.

**Materials & Methods:** We used androgen-sensitive LNCaP as well as androgen-insensitive PC3 prostatic tumor cells to test the effects of metformin. The cells were treated with three different concentrations (1mM, 10mM and 20mM) of metformin to evaluate cytotoxicity and change in pH of the culture media. The effects of various drugs, including AICAR (AMPK activator), Compound C (AMPK inhibitor) and 2-DG (glycolysis inhibitor) were evaluated on cell growth and culture media pH.

**Results:** The treatment of LNCaP and PC3 cells with metformin had a significant dose-dependent cytotoxic effect. Furthermore, treatment with metformin substantially lowered the pH of the culture media. Treatment with the glycolytic inhibitor 2-DG alone did not cause significant cell death; however, a combination of 2-DG with metformin resulted in synergistic cell death. Importantly, AMPK activation as well as inhibition had no significant effect on cell proliferation, a notable difference from previous studies.

**Conclusions:** We conclude the cytotoxic effect of metformin in LNCaP and PC3 prostatic tumor cells likely results from inhibition of respiratory chain complex 1, however, the specific cell signaling pathway has yet to be defined.

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**Genome-wide Effect of Prostate Cancer on Dendritic Cells in the Murine Model**  
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**Introduction:** The apoptotic and suppressive effects of prostate cancer on immune-competent cells are well known. Gene arrays were performed to evaluate genome-wide effects on dendritic cells (DC) in a murine prostate cancer model.

**Materials & Methods:** Dendritic cells were compared to DC incubated with RM-1 murine prostate cancer cells. Affymetrix Mouse 430 v2 Array was used for analysis containing 45000 probes. Quantitative polymerase chain reaction (qPCR) was performed to validate some results. RNAs from murine prostate cancer and normal murine prostate were also compared.

**Results:** There was a significant increase in cell death inducing genes in DC incubated with prostate cancer cells and decreased expression of genes encoding for several interleukins and interferons. Change in the expression of endothelin receptors was seen as well. Considering the role of the endothelin axis in DC functioning, we used qPCR to further evaluate the condition of the endothelin axis in DC under prostate cancer influence. There was a significant decrease in the expression of ET-1 (4.50±1.33 fold) and ETA receptor (2.67±0.13), which are involved in DC survival and pro-inflammatory function. There was also an increase in the expression of ETB receptor (3.42±0.14) involved in DC apoptosis. Comparison of RNAs derived from murine prostate cancer and murine prostate demonstrated decreased expression of apoptotic genes by prostate tumor.

**Conclusions:** Prostate cancer induces a wide variety of changes in DC including decreased expression of genes responsible for pro-inflammatory function and survival. Alterations of the endothelin axis may be one reason why tumor escapes immune monitoring.

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**Geometric Evaluation of Systematic Transrectal Ultrasound-Guided Prostate Biopsy**

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**Introduction:** Transrectal ultrasound (TRUS)-guided prostate biopsy results rely on the physician's ability to target the gland according to the biopsy schema. However, it is unknown how accurately the freehand, TRUS-guided biopsy cores are placed within the prostate and how the geometric distribution of biopsy cores may affect the prostate cancer (PCa) detection rate.

**Materials & Methods:** To determine the geometric distribution of cores, we developed a biopsy simulation system with pelvic mockups and an optical tracking system. Mockups were biopsied in a freehand manner by five urologists and by our TRUS Robot that can support and move the TRUS probe. We compared their 1) biopsy targeting error; 2) accuracy and precision of repeat biopsies; and 3) estimated "significant" PCa (≥0.5cm<sup>3</sup>) detection rate using a probability-based model.

**Results:** The urologists biopsied cores in clustered patterns and under-sampled a significant portion of the prostate. The robot closely followed the predefined biopsy schema. The mean targeting error of the urologists and the robot was 9.0 mm and 1.0 mm, respectively. Robot assistance reduced repeat biopsy errors significantly with improved accuracy and precision. The mean "significant" PCa detection rates by the urologists and the robot were 36% and 43%, respectively (p<0.0001).

**Conclusions:** Systematic biopsy with freehand TRUS guidance does not closely follow the sextant schema and may result in suboptimal sampling and cancer detection. Repeat freehand biopsy of the same target is challenging. Robot-assistance can potentially improve targeting, precision and accuracy. Optimized biopsy schemas are needed to further improve PCa detection rates.

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**Contrast Enhanced Transrectal Ultrasound (CE-TRUS) Prostate Cancer Detection: Comparison to Whole Mount Prostatectomy Specimens**

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**Introduction:** To determine the accuracy of prostate cancer (CaP) detection using CE-TRUS targeted biopsies.

**Materials & Methods:** Fifty eight patients with CaP detected on CE-TRUS undergoing radical prostatectomy were identified. A 5 point scale was used to rate areas suspicious for CaP for each prostate sextant in 3 baseline modes (grayscale, color, power Doppler) and in 5 contrast-enhanced modes (continuous & intermittent harmonic, flash replenishment, color, power Doppler). Digitized prostate maps were used to measure tumor volumes. Baseline TRUS and CE-TRUS findings were compared to pathology. A clustered logistic regression model was computed to compare the area under the curve (A<sub>z</sub>) for detection of CaP by imaging modality.

**Results:** Twenty nine patients had Gleason 6 disease; Gleason 7 was present in 24 and Gleason 8 in 5. Percent tumor involvement was <2% (less than 1cc) in 8 subjects and ≥2% in 50. Baseline TRUS had A<sub>z</sub> of 0.55 for grayscale, 0.61 for color Doppler and 0.59 for power Doppler. CE-TRUS was significantly improved, with highest A<sub>z</sub> for CE-power Doppler (0.66) and flash replenishment imaging (0.64) (p=0.04 comparison to baseline). When limited to subjects with >2% gland involvement, CE-TRUS modalities had higher A<sub>z</sub>, with CE-power Doppler (A<sub>z</sub> =0.69) and flash replenishment imaging (A<sub>z</sub> =0.65) the highest. The combination those two resulted in an improved A<sub>z</sub> compared to baseline imaging (0.70 vs. 0.59, p=0.006).

**Conclusions:** CE-TRUS demonstrates greater diagnostic accuracy than baseline imaging. Diagnostic accuracy is further improved for tumor volumes >1cc. CE-TRUS can improve the detection of clinically significant prostate cancers.

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**Very Distal Apical Prostate Cancer: Identification on Multiparametric MRI at 3 Tesla**

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**Introduction:** Apical prostate cancer (CaP) can be difficult to detect in TRUS biopsy. Therefore it may be missed before treatments such as HIFU or surgery. We describe an undescribed "very distal" apical CaP at multiparametric MRI (mpMRI).

**Materials & Methods:** From January 2011 to December 2012, 210 patients underwent 3Tesla (mpMRI) with endorectal coil and previously described MRI/ultrasound image-fused, directed TRUS biopsies. Patients also underwent standard TRUS biopsies. Inclusion criteria required at least one distal apical prostate lesion on mpMRI and targeted for biopsy as seen in Figure 1.

**Results:** Thirty-eight men (median age & PSA 62, 7.68ng/dl) were identified having distal apical CaP on mpMRI. Thirteen patients (34%) had prior diagnosis of cancer and on active surveillance protocols, 25 (66%) did not. Of those patients 21 (55%) had undergone a median of 2 prior negative biopsies. Twenty-two patients (58%) were positive on biopsy for CaP. For positive patients, 17 (77%) were positive on TRUS biopsies and 21 (95%) were positive on MRI targeted biopsies, majority of patients having multifocal disease. At the distal apical lesions of interest, 80% were positive on MRI targeted biopsy. In addition 33% of patients were upgraded on MRI targeted biopsy at the distal lesion.

**Conclusions:** Very distal apical CaP can be accurately detected and sampled with mpMRI and subsequent MRI/US fusion biopsy. This may aid decision making for therapeutic modalities.

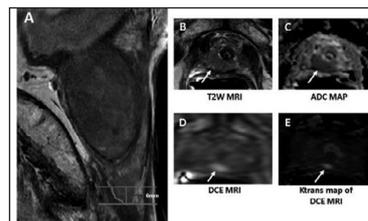


Figure 1. Sagittal T2W MRI image shows the distal 8mm apical portion of the prostate (A) in a 72-year-old man with a serum PSA of 13.9ng/dL, no presence of previous negative prostate biopsies. Axial T2W MRI (A), ADC map of T2W MRI (B), raw DCE MRI (C) and Ktrans map derived from DCE MRI (D) demonstrate a right distal apical lesion (arrows). This lesion was sampled with the MRI/US fusion biopsy platform and found to include Gleason 4+4 tumor, 100% of core involvement.

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**Outcomes and Significance of Positive Periprostatic Lymph Nodes at the Time of Radical Prostatectomy**

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**Introduction:** Some literature suggests that a positive periprostatic (PP) lymph node should be considered equivalent to a positive pelvic lymph node (PLN) and treated with adjuvant therapy. Other studies have shown inconclusive evidence that these nodes harbor any adverse clinical effects. Our study aims to assess the clinical significance of positive PP lymph nodes at the time of radical prostatectomy.

**Materials & Methods:** We performed a retrospective chart review of 1125 patients who underwent radical prostatectomy since 2007, all of which had periprostatic nodes sent as a separate pathologic specimen. Of these 965 had sufficient data for inclusion.

**Results:** Of the 965 patients, 6 (0.6%) had isolated periprostatic lymph node metastasis and 5 had biochemical recurrence (BCR) requiring adjuvant therapy. 5 (0.5%) patients had positive pelvic lymph node metastasis. Overall, 59 (6.1%) patients had a lymph node found within the anterior fat pad. Of the patients with a positive periprostatic node, 67% had pT3 disease (p < 0.001) and 67% had a positive surgical margin (p = 0.005). Log-rank testing across groups comparing BCR-free survival showed a statistically significant difference for patients with a positive PP node (X<sup>2</sup>=11.79, p = 0.009) compared to those without positive nodes. BCR-free survival was similar amongst those patients with positive PP and PLNs.

**Conclusions:** Our data suggests similar BCR-free survival amongst patients who have positive periprostatic lymph nodes when compared to those with positive PLNs. Thus, we should consider positive PP nodes as a pN1 stage and these patients would likely benefit from adjuvant therapy.

**Population-Based Imaging Utilization Following Treatment of Small Renal Masses**

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**Introduction:** The incidence of small renal masses (SRM) has increased with greater use of cross-sectional imaging. While ablative and nephron-sparing approaches are gaining popularity, subjects undergoing these approaches may experience more post-treatment surveillance imaging.

**Materials & Methods:** Using SEER-Medicare linked data during 2005-2008, we identified 1682 subjects with SRM treated with open (OPN, n=330) and minimally invasive partial nephrectomy (MIPN, n=160), open (ORN, n=404) and minimally invasive radical nephrectomy (MIRN, n=535), ablation (n=212), and surveillance (n=42). Multivariable regression models were constructed to identify factors associated with imaging utilization within 24 months of diagnosis/treatment.

**Results:** In unadjusted analyses, ablation, MIPN and OPN were associated with greater surveillance imaging. Computed tomography (CT) was used for 83.5% of ablation, 73.9% of OPN, and 73.8% of MIPN within 12 months diagnosis, although this decreased to 37.3%, 49.7% and 56.3% at 24 months, respectively. In adjusted analyses, ablation was associated with almost ten-fold greater odds for imaging compared with ORN (OR = 9.6; 95% CI; 1.19-77.6), while other treatment types, demographic (age, sex, marital status, race, education, income, geographic region) and tumor (grade, stage) were not associated with significant variation in surveillance imaging utilization (Table 1).

**Conclusions:** Ablation is associated with greater utilization of imaging compared to other SRM treatments. Additional studies are needed to quantify long-term costs and risks of secondary malignancy due to greater radiation exposure.

**Multivariate Analysis of Post Treatment Surveillance Imaging by Treatment**

Variable	OR (95% CI)	P Value
Procedure Type (vs. ORN)		
Ablation	9.62 (1.19-77.6)	0.034
MIPN	2.74 (0.60-12.5)	0.194
OPN	1.81 (0.66-4.97)	0.247
MIRN	1.31 (0.59-2.92)	0.51

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**Shear-wave Elastography Detection of Prostate Cancer as Compared to Conventional Transrectal Ultrasound**

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**Introduction:** To compare shear-wave elastography with conventional biopsy for prostate cancer detection.

**Materials & Methods:** Twenty three patients referred for prostate biopsy were evaluated with conventional grayscale, color and power Doppler as well as shear-wave elastography using an end-fire probe. Quantitative measurements of tissue elasticity were recorded in each sextant of the prostate. Six or less targeted core biopsy specimens were taken from areas of abnormal gray scale, Doppler or elastography, as well as 12 systematic biopsy cores from each patient. Gray scale and Doppler findings were graded on a 1-5 scale representing normal-abnormal. Clustered receiver operating characteristic (ROC) analysis was performed to compare the accuracy of elastography to conventional gray scale and Doppler imaging for identification of cancer.

**Results:** Prostate cancer was detected in 8/23 patients (35%) and 16/138 sextants (12%). The AUC (Az) for prostate cancer was 0.56 for grayscale, 0.57 for color Doppler, 0.50 for power Doppler and 0.64 for elastography (test for inequality - not significant, p=0.2). Using a threshold of 25kPa, elastography detected 13/16 (81%) cancerous sextants (specificity = 60/122 (49%)). With a higher threshold (30kPa), sensitivity drops to 12/16 (75%) (specificity = 73/122 (60%)). On a per-patient basis, a threshold of 25kPa detected 7/8 (88%) prostate cancers, while a threshold of 30kPa detected 6/8 (75%).

**Conclusions:** Shear-wave elastography is a promising technology for detection of prostate cancer. The diagnostic accuracy of elastography was greater than that of conventional grayscale and Doppler imaging, but the sample size was insufficient to demonstrate a significant difference.

**Current Trends in the Use of Perioperative Intravesical Therapy in the Management of Non-Muscle Invasive Bladder Cancer**

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**Introduction:** To analyze current practice patterns with the use of perioperative intravesical agents for non-muscle invasive bladder cancer (NMIBC).

**Materials & Methods:** Five hundred and fifty-nine urologists received a survey to assess their location, type of practice, fellowship background, years in practice, and frequency of perioperative intravesical agent use. Current practices patterns were assessed.

**Results:** One hundred and forty nine (26%) of 559 urologists submitted responses. One hundred and thirteen (76%) are in private practice, 74 (50%) are located in a suburban setting, 59 (35%) in an urban setting and 22 (15%) in a rural environment. Twenty-eight (19%) are fellowship trained in urologic oncology and 83 (56%) have been in practice more than 10 years. One hundred and six (71%) treat five or more bladder cancer patients every month. One hundred and thirty six (91%) urologists have used perioperative intravesical chemotherapy at least once and of those, 105 (70%) routinely use perioperative intravesical therapy. Reasons for not using perioperative intravesical therapy were the following; unavailable at institution (30%), staff not available (13%), poor outcomes/side effects (30%) and cost (15%).

**Conclusions:** The use of perioperative intravesical agents has increased over time in comparison to historic controls. Sixty-six (44%) urologists reported a change in their practice patterns over the last five years with 32 (21%) additional urologists now routinely instilling intravesical agents perioperatively.

## P3

### Robotic Assisted Laparoscopic Simple Prostatectomy in Men with Bladder Outlet Obstruction: Improving Perioperative Outcomes.

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**Introduction:** Robotic assisted laparoscopic simple prostatectomy (RALSP) is a feasible option in men with markedly enlarged prostates and urinary obstruction. Since January 2011, we have modified our surgical method in hope of further enhancing perioperative outcomes related to RALSP. Herein, we report our initial experience utilizing a novel urinary reconstruction technique.

**Materials & Methods:** 9 patients underwent modified suprapubic RALSP for symptomatic BPH in 2011. All but one patient were in urinary retention preoperatively. Upon removal of the obstructing prostate adenomas, a circumferential anastomosis was completed by advancing and approximating the bladder neck to the prostate urethral stump with 8 to 10 interrupted 2-0 vicryl sutures, similar to that of the urethral-vesical anastomosis during radical prostatectomy. 6 patients who underwent a standard RALSP with bladder trigonization only between August 2009 and December 2010 served as our control.

**Results:** The two groups were similar in regard to age, BMI, preoperative prostate size on ultrasound and comorbidities. None of the patients required transfusion, suprapubic catheter insertion or continuous bladder irrigation peri-operatively. Mean operative time, pathologic specimen weight and catheterization time were comparable between the 2 groups but the average blood loss (100cc vs 330cc, p<0.05) and hospital stay (1.4 days vs 3.6 days, p<0.05) were significantly shorter in men who underwent modified RALSP.

**Conclusions:** Our early experience with the modified RALSP technique (a circumferential anastomosis between the bladder neck and prostate urethra) has been associated with less intra-operative blood loss and shorter hospital stay due to early resolution of gross hematuria.

## P4

### Incidence of Postembolization Syndrome after Renal AngioInfarction: A Single Institution Experience over 4 years

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**Introduction:** Renal angioinfarction (RAI) has been used for various indications in the management of renal tumors including palliation, controlling renal hemorrhage/trauma, and facilitating radical nephrectomy. A common impediment to embolization is the development of postembolization syndrome (PES) which has a reported incidence of 30-90%. We report our experience with RAI as a safe palliative and adjunctive procedure over 4 years.

**Materials & Methods:** From 2008 to 2011, 113 patients underwent RAI at our institution for palliative or adjunctive therapy by an interventional radiologists. Embolization of renal artery was performed by subsegmental injection of polyvinyl alcohol particles with support of gelfoam.

**Results:** All 113 patients underwent successful renal embolization. 48 patients underwent embolization for preoperative adjunctive therapy, 24 patients for palliation of renal mass, 36 patients for trauma/hemorrhage, and 5 patients for renal artery aneurysms. (Table 1) Incidence of PES only occurred in 13 (11.5%) patients. No major complications (Clavien Grade III or above) occurred.

**Conclusions:** In our experience, renal angioinfarction is a safe and reliable procedure for palliation of renal masses, adjunctive procedure for radical nephrectomy, and for management of trauma/renal hemorrhage. Postembolization syndrome occurred in a relatively few amount of patients with no major complications and should not impede clinical consideration of this procedure.

Table 1. Patient Characteristics (n=113)

Mean Age (stdev)	56.9 (18.1)	Patient Insurance Profile	Left Renal Embolization	41.6% (47/113)	Radical Nephrectomy Characteristics	Postembolization Syndrome and Complication Incidence	
% Male	53.1% (60/113)	Medicare	30.9% (35/113)	Right Renal Embolization	53.1% (60/113)	Overall Postembolization Syndrome Rate	10.6% (12/113)
Mean BMI (stdev)	30.1 (8.4)	Medicaid	7.1% (8/113)	Bilateral Renal Embolization	5.3% (6/113)	Operative Time (in minutes) (stdev)	259.7 (157.3)
% Smokers	23.9 (27/113)	No Insurance	6.2% (7/113)	Mean Contrast used in cc (stdev)	100.8 (66.4)	Estimated Blood Loss in cc (stdev)	500.7 (716.9)
Mean Ejection Fraction (stdev)	57.1 (12.9)	Private Insurance	58.8% (65/113)	Mean Packed RBC Transfusion in Units (stdev)	1.89 (2.45)	Mean Fickel RBC Transfusion in Units (stdev)	1.89 (2.45)
Incidence of Hypertension	73.5% (83/113)	Indications for Renal Embolization	Mean Postembolization Creatinine (stdev)	3.82 (3.49)	% Chromophobe RCC	4.2% (2/48)	77.1% (37/48)
Incidence of Hyperlipidemia	25.7% (29/113)	Renal Mass (Palliative)	Mean Postembolization Creatinine at 12 months (stdev)	3.86 (3.28)	% Angiomyolipoma	14.5% (7/48)	77.1% (37/48)
Incidence of COPD	6.2% (7/113)	Renal Mass (Adjunctive)	Mean Postembolization Hemoglobin (stdev)	10.1 (2.28)	% Oncocytoma	2.1% (1/48)	77.1% (37/48)
Incidence of Coronary Artery Disease	15.9% (18/113)	Trauma/Hemorrhage	Mean Postembolization Hemoglobin (stdev)	9.5 (1.55)	% Transitional Cell Carcinoma	2.1% (1/48)	77.1% (37/48)
Incidence of Diabetes Mellitus	34.5 (39/113)	Renal Artery Aneurysm	Mean Postembolization Hemoglobin at 12 months (stdev)	10.1 (2.20)			77.1% (37/48)

## P5

### Contrast Enhanced Ultrasound for the Detection of Prostate Cancer: A Secondary Analysis Based on Directed Biopsy Results and Prior Biopsy Status

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**Introduction:** Contrast enhanced ultrasound (CEUS) using Doppler detection and microbubble contrast helps identify hypervascular prostate cancers. One of the roles best suited for CEUS targeted biopsies is in the setting of patients with persistent indications for biopsy despite previous negative biopsy, however targeted biopsies may also be useful in more accurate clinical staging by direct biopsy of the index tumor.

**Materials & Methods:** We reviewed biopsy results of 272 consecutive patients enrolled in prior randomized, blinded study. CEUS was used to guide up to 6 directed biopsies followed by standard 12 core. Biopsy results were analyzed to determine if directed biopsies resulted in an increased NCCN risk classification for each patient diagnosed with prostate cancer.

**Results:** Of the 272 patients enrolled in the study, 262 patient charts were available for review. Of the 262 patients included in our analysis 111 were diagnosed with prostate cancer. Of the 111 prostate cancers 25 (22%) of the cancers were upgraded with directed biopsies. 112 patients had no previous biopsy, 61 patients had a previous negative biopsy, 54 patients had a previous positive biopsy, and 35 patients had a previous biopsy positive for ASAP or PIN. Cancer was diagnosed in 55 (49%), 13 (21%), 33 (61%) and 10 (29%) patients in each group respectively and of these cancers 10 (18%), 5 (38%), 8 (24%) and 2 (20%) were upgraded respectively.

**Conclusions:** CEUS may help determine which patients diagnosed with prostate cancer need more aggressive treatment.

## P6

### MRI Assessment of Whole Prostate and Zonal Specific Prostate Volumes: Clinical Correlation with Urinary and Sexual Function

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**Introduction:** Technical advancements in prostate MRI have allowed accurate assessment of whole prostate (WP) and zonal specific volumes (central zone (CZ), peripheral zone (PZ)). We examined associations between volumes and urinary and sexual outcomes.

**Materials & Methods:** This IRB approved study included 503 men (mean age 60.5y, mean PSA 8.2ng/dl) who had prostate MRI. WP and CZ were contoured on axial T2W images using a semi-automated segmentation tool (see figure). WP, CZ, and PZ volumes were calculated using voxel analysis. Volumes were correlated with patient age, PSA, IPSS and SHIM.

**Results:** Age was positively correlated with WP and CZ (p<0.05), but not PZ. PSA was positively correlated with WP, CZ, and PZ (p<0.05). IPSS was correlated with WP and CZ (p<0.05), but not PZ. SHIM was correlated with WP and CZ (p<0.05), but not PZ. A multivariable model including age, PSA, race, WP and CZ was used to predict IPSS and SHIM. Only age and CZ remained significant predictors of IPSS (p<0.05). Only age remained a significant predictor of SHIM (p<0.05). Those with age-adjusted CZ volumes in the tenth decile had significantly worse IPSS outcomes than those in the first decile (IPSS 12.9118 vs 6.5625; p<0.05).

**Conclusions:** MRI has allowed quantitative assessment of zonal prostate anatomy. As expected, urinary function was principally affected by the central gland volume. Sexual function was not related to whole prostate or zonal volumes.

P7

**Readmission after Radical Cystectomy Associated with Lower Overall Survival**  
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**Introduction:** Radical cystectomy (RC) and urinary diversion is a complex procedure with a significant complication and perioperative mortality rate. It is a common and costly event. The objective of this study was to evaluate the readmission rate in a large university hospital series and assess the relationship of readmission to patient and pathologic characteristics as well as the impact of readmission on long term outcome.

**Materials & Methods:** A prospectively maintained database of RC patients was evaluated from 1996 to 2007 for complications and readmissions over a 90 day perioperative period. Log rank test and multivariate regression analysis was employed to evaluate the nature of complications and readmission s and patient survival.

**Results:** 368 patients were evaluated. There were 83 (22%) patient readmissions due to multiple issues but principally dehydration/failure to thrive and urosepsis (34%). There was no association between age, gender, race, or final pathology with readmission. There was no relationship between readmission and cancer specific survival. A readmission within 30 days was associated with all cause mortality OR = 0.28 95% CI [0.023-0.98]. Readmission between 31 and 60 days was associated with all-cause mortality R= 4.8 95%CI 1.02-22.5].

**Conclusions:** Readmission after radical cystectomy is a relatively frequent event occurring across many patient parameters. It is also associated with all cause mortality. Strategies to decrease readmissions for common causes may aid in decreasing patient discomfort and costs. The impact of readmission on all cause mortality requires further investigation but may be related to innate frailty.

P9

**Significant Variability in 10-year Cumulative Radiation Exposure Incurred on Different Surveillance Regimens Following Surgery For pT1 Renal Cancers - Yet Another Reason to Standardize Protocols?**  
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**Introduction:** One-quarter of patients presenting with renal tumors will be younger than 55 years of age. Radiation exposure incurred on surveillance protocols following surgery may be significant in such patients. We evaluated the 10-year cumulative radiation exposure from different imaging regimens following surgery for pT1 renal cell carcinoma (RCC).

**Materials & Methods:** The PubMed database was queried for surveillance protocols following surgery for RCC. Two index lesions were selected: 1) pT1a 3cm, Fuhrman 2, clear cell and 2) pT1b 5cm, Fuhrman 3, clear cell. Exposure for a single phase chest CT, abdominal CT, and CXR were 7mSv, 8mSv, 0.1mSv, respectively. Calculations assumed biphasic CT scans, negative surgical margins, and ECOG status of <1.

**Results:** 12 published surveillance regimens were identified. For the first lesion (pT1a, clear cell, Fuhrman 2), we observed significant variability in proposed regimens ranging from no imaging to several CT scans of both chest and abdomen. Cumulative incurred radiation exposure for this index patient ranged between 0mSv and 102mSv (mean, 34mSv). When considering the second tumor (pT1b, clear cell, Fuhrman 3), all studies recommended some form of follow-up imaging although regimens once again varied from annual CXR to multiple CT scans of chest and abdomen. Cumulative incurred radiation exposure in this scenario ranged from 0.5mSv to 450mSv (mean, 89mSv).

**Conclusions:** Surveillance protocols following surgery for early stage RCC result in widely divergent levels of radiation exposure. Such considerations are increasingly paramount given concerns of radiation induced secondary malignancies and present another reason to standardize follow-up protocols.

P8

**Outcomes of Minimally Invasive Radical Prostatectomy in Patients with Prior Abdominal or Pelvic Surgery**  
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**Introduction:** Patients with prior abdominal or pelvic surgery may be discouraged from undergoing minimally-invasive radical prostatectomy (MIRP) due to concern for intra-operative technical difficulties. We compared outcomes following MIRP in patients with prior surgery versus those without.

**Materials & Methods:** We analyzed one surgeon's MIRP database. Patients with history of prior abdomino-pelvic surgery were included in the "prior surgery" group; all others were included in the "no surgery" group. Disease characteristics and outcomes were compared between groups using t-test and chi-squared analysis.

**Results:** Of 1023 men, 279 (27%) had "prior surgery" compared to 744 (73%) with no surgical history. Extraperitoneal MIRP was performed less frequently in patients with prior surgery compared to those without (86% vs. 79%, p = 0.02). Only 61% of patients with prior bilateral inguinal hernia repair underwent an extraperitoneal approach, compared to 82% of men with other surgeries (p = 0.02). The Table compares pre- and post-operative characteristics between the "prior surgery" and "no surgery" groups. In all outcomes, no significant differences were observed.

**Conclusions:** Our data demonstrate the feasibility and safety of MIRP in men with a history of prior abdomino-pelvic surgery. While extraperitoneal MIRP may be more difficult in such patients, particularly in those with prior inguinal surgery, the ability to offer both extraperitoneal and transperitoneal MIRP allows for a safe approach in men with prior abdomino-pelvic operations.

Comparison of	No Prior Surgery	Prior Surgery	p-value
Mean PSA (ng/ml)	5.94	6.02	0.76
Biopsy Gleason Score ≥ 7	218 (28%)	77 (32%)	0.38
Clinical Stage ≥ T2	215 (28%)	67 (28%)	0.78
Mean OR Time (hours)	3.63	3.18	0.54
Mean EBL (ml)	311	296	0.47
Lymph Node Dissection Performed	498 (64%)	162 (68%)	0.45
Intra-Op Complication	10 (1.3%)	3 (1.3%)	0.98
Positive Margin	139 (18%)	43 (18.0%)	0.94
Post-op Complication	54 (6.9%)	14 (5.9%)	0.58

P10

**Contemporary Management of Small Renal Masses: Does Practice Environment Matter?**  
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**Introduction:** Population based studies imply underutilization of renal preservation strategies for managing small renal masses (SRMs). We evaluated contemporary practice patterns for treating SRMs in the context of practice environment.

**Materials & Methods:** A survey querying practice type (private vs. academic/academic affiliation) was distributed to urologists of the Mid-Atlantic section of the American Urological Association. The survey queried management strategies for three case scenarios (exophytic 2.5cm SRM in a healthy 55 year old, healthy 75 year old, and comorbid 75 year old patient).

**Results:** Of the 287 responding urologists who managed kidney cancer, 92 (33%) practiced in an academic environment, and 189 (67%) were private practitioners. For SRMs in a healthy 55 year old, private practitioners were more likely to perform a radical nephrectomy (6% vs. 0%, p=0.03) and less likely perform a partial nephrectomy (79% vs. 91%, p=0.01) than academic practitioners. Increased use of thermal ablation and observational strategies was noted in older patients with SRMs. When specifically considering management of a SRM in our 75-year old patients (healthy or comorbid), private practitioners were more likely to offer thermal ablation when compared to academic urologists (41% vs. 32%, p=0.05).

**Conclusions:** Over 95% of urologists espouse renal preservation, although private practitioners are still more likely to offer radical nephrectomy (and less likely partial nephrectomy) in younger patients. While surveillance is an increasingly utilized treatment option for SRMs in the elderly patient, private practice urologists are more likely to recommend active treatment via thermal ablation when compared to academic counterparts.

## P11

**Sacral Neuromodulation Implantable Pulse Generator Failures: Impact of Symptomatology and Programming Settings on Battery Life**  
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**Introduction:** Sacral neuromodulation is an FDA-approved treatment for refractory urinary frequency/urgency, urge urinary incontinence, nonobstructive urinary retention and fecal incontinence. At our institution, 289 patients have undergone InterStim® placement with 22 requiring battery replacement due to failure. According to the manufacturer (Medtronic, Inc), the InterStim® implantable pulse generator (IPG) should function for 2-4 years. To our knowledge, no data exists regarding IPG life as it pertains to indication for implantation, program settings and the type of stimulation.

**Materials & Methods:** We retrospectively reviewed the 22 battery failures to determine the length of time between implantation and revision due to battery failure, as well as the indication of implantation and polarity settings used.

**Results:** 22/289 patients underwent IPG replacement due to battery failure. 20 of the patients were female (average age 49.5yrs) and 2 were male (average age 41.5yrs). 18 patients had urinary frequency-urgency and/or urge incontinence, while 4 patients had nonobstructive urinary retention. Voltage requirements and time to reimplantation based on symptomatology and settings are listed in Table 1.

**Conclusions:** Sacral neuromodulation patients should expect to undergo IPG battery replacement in 4-5 years. Nonobstructive retention patients may last longer due to a lower voltage requirement to achieve benefit. Bipolar settings, despite high voltage in our group, may provide longer time to reimplantation as well.

Table 1

	VOLTAGE (v)	TIME TO REIMPLANTATION (mts.)
Frequency-urgency/urge incontinence	2.66	53.16
Nonobstructive urinary retention	2.26	59.75
Unipolar setting	1.81	54.70
Bipolar setting	2.54	62.00

## P13

**Zero-ischemia: Better Preservation of Kidney Function with Equivalent Oncologic Outcome?**  
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**Introduction:** The type of ischemia and duration applied are considered the primary determinants of renal function following partial nephrectomy. Data from solitary kidney partial nephrectomies suggest preexisting function and volume of tissue excised may be equally important. Widespread adoption of this no-clamp technique has not occurred due to concerns over field visualization with resultant margin status. We sought to define the utility of no clamp partial nephrectomy in preserving GFR while maintaining negative margins.

**Materials & Methods:** An IRB approved retrospective chart review was performed from 2004-2011 for all patients undergoing partial nephrectomy. Kruskal-wallis tests were performed to evaluate changes in creatinine and eGFR by clamp usage. Regression analysis was used to compare surgical margins and eGFR change adjusting for patient and tumor characteristics.

**Results:** Partial nephrectomies were performed on 116 patients with 19 (17%) being no clamp and 92 (83%) clamped. The negative margin rate for the no-clamp technique was 89% compared to 79% for the clamped. There was no association between margin status and clamp technique when adjusted for operative time, pre-operative eGFR, and maximal tumor diameter. (p=0.67) The median percent decline of GFR for the no-clamp technique was 8.8% and 18.2% for the clamped technique. When adjusted for preoperative creatinine, age, gender and operative duration, the association between clamp technique and post operative eGFR was significant (p=0.03).

**Conclusions:** Our experience with no-clamp partial nephrectomy suggests equivalent oncologic outcomes with better preservation of renal function. Further definition of the role of no-clamp partial nephrectomy is needed.

## P12

**Relationship Between Objective and Subjective Measures of Bladder Emptying in Multiple Sclerosis**  
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**Introduction:** Lower urinary tract dysfunction is common among patients with multiple sclerosis (MS) contributing to decrease in health related quality of life, and need for care assistance.

**Materials & Methods:** Retrospective analysis of validated questionnaire and urodynamic (UDS) data for women with MS was performed. Elevated post void residual urine volume (PVR) was defined as 125 ml or greater and >30% urodynamic bladder capacity. Subjective and objective findings were compared using Spearman's rank correlation coefficients (r<sub>s</sub>).

**Results:** 36 women with MS underwent UDS for chief complaints ranging from incontinence to urinary retention to recurrent urinary infections over the last 2 years. 20 (56%) subjects had evidence of detrusor overactivity, 10 (28%) had evidence of detrusor sphincter dyssynergia (DSD) and 12 (33%) had elevated PVR. Seven subjects reported no subjective difficulty with bladder emptying, 1/7 had DSD and 3/7 (43%) had elevated PVR and started intermittent self catheterization (ISC). Of 20 patients who reported difficulty with emptying "almost always", only 7 (35%) had elevated PVR, including 1 with DSD; all 7 started ISC. 60% (6/10) of patients with DSD did not have elevated PVR. (8/10) with DSD reported at least some bother from incomplete emptying. Subjective symptoms of incomplete bladder emptying showed poor correlation with catheterized PVR (r<sub>s</sub>=0.17) and presence of DSD (r<sub>s</sub>=0.36). Subjective bother from incomplete bladder emptying also showed poor correlation with catheterized PVR (r<sub>s</sub>=0.08) and presence of DSD (r<sub>s</sub>=0.38).

**Conclusions:** Our study suggests poor correlations between symptoms of incomplete bladder emptying, catheterized PVR, and urodynamic DSD in women with MS.

## P14

**Outpatient Percutaneous Nephrolithotomy: A Comparative Analysis with Laparoscopic Cholecystectomy**  
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**Introduction:** The purpose of this study is to demonstrate the safety and efficacy of percutaneous nephrolithotomy (PNL) in an outpatient setting when treating individual stones of less than 20 mm in a select patient cohort. The evolution of laparoscopic cholecystectomy (LC) to an outpatient setting is used as a comparison to demonstrate that PNL is a viable outpatient procedure.

**Materials & Methods:** A 30 month retrospective review of patients who underwent PNL in a single institution by the same surgeon was performed. Using specific criteria it was determined that a total of 61 patients were candidates for outpatient PNL. Comparisons were made on outcomes between our select group of patients and previously published outpatient LC data using Clavien-Dindo grading.

**Results:** Results are summarized in Table 1. Similar complication and admission rates are noted as compared to LC. Additionally cost analysis demonstrates an average savings of approximately 30% when hospitalization was not required. Outpatient PNL procedure was successfully performed on 100% of patients who met specific criteria.

**Conclusions:** When specific criteria are met, outpatient PNL is safe, effective, and can produce significant savings to the health care industry when treating stones <20mm in size. As the advance of LC has pioneered the way for outpatient surgical procedures, prospective outpatient PNL studies will solidify the era of "same day PNL".

	Lap Chole	PNL
Clavien-Dindo		
I	10.5%	11.8%
II	3.5%	3.28%
III/IV	1.8%	0.0%
Unexpected Admission	14.2%	15.29%

P15

**Results of Non-contrast Computerized Tomography in Patients Presenting with Flank Pain in a Community Urology Practice**

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**Introduction:** Patients commonly present to urologists for evaluation of non-acute flank pain. The purpose of this study is to determine the non-contrast CT scan (NCT) findings in these patients.

**Materials & Methods:** Electronic medical records of 859 patients with NCT were abstracted finding 613 patients presenting with flank pain. Records of these 613 patients were reviewed by an investigator not involved in patient care. Associated symptoms (hematuria, nausea and vomiting, and stone history) plus age, race and sex were recorded. NCT findings were correlated with patient symptoms.

**Results:** NCT findings in the flank pain group showed 175 (28.5%) had no stones and 438 (71.5%) had renal or ureteral stones. Only 33 patients had flank pain as their sole symptoms and 6% (2) of these patients had ureteral calculi on NCT. Flank pain, nausea or vomiting and previous stone history were the most common group of symptoms in 27% (164) of patients and 86% (141) of these patients had a stone on NCT. Thirty patients (5%) with flank pain had non-stone findings on NCT. No patients with non-stone findings on NCT required emergent medical management.

**Conclusions:** Diagnosis of urinary calculi on NCT in patients presenting to a community urologist with non-emergent flank pain is influenced by the presence of associated findings (hematuria, nausea or vomiting or a history of stones). NCT finding of non-calculi disease is small and did not require emergent treatment. The urologist needs to consider multiple factors before ordering a NCT for an office patient with flank pain.

P17

**Overall Survival Benefit with Sipuleucel-T by Baseline PSA: Exploratory Analysis from the IMPACT Trial**

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**Introduction:** In the IMPACT trial, sipuleucel-T reduced risk of death by 22.5% (P=0.032). A pre-specified subgroup analysis for baseline prognostic variables showed homogeneous treatment effects consistently favoring sipuleucel-T. In patients with baseline PSA below vs above the median, there was a trend toward greater treatment effect (HR=0.685 vs. 0.865). In this exploratory analysis, we further sub-divided baseline PSA into quartiles to evaluate potential treatment effect patterns.

**Materials & Methods:** All randomized IMPACT patients (n=512) were categorized by baseline PSA quartile, ECOG, and other prognostic variables (LDH, PAP, ALP in bone-only disease, Hgb). Median overall survival (OS) and hazard ratio (HR) were estimated using Kaplan-Meier and Cox models, respectively.

**Results:** Increasing baseline PSA quartile was associated with markers of advanced disease. Although there was inadequate power to demonstrate inter-quartile significance, data suggest a consistent treatment effect in all subsets and a trend toward an increased effect with lower baseline PSA. A similar benefit was suggested for other prognostic variables, with the exception of baseline Hgb.

**Conclusions:** This analysis supports a consistent OS benefit with sipuleucel-T across PSA quartiles, and suggests that patients with less advanced disease may benefit more from treatment with sipuleucel-T.

	Baseline PSA (ng/mL)			
	≤ 22.1 (n=128)	>22.1-50.1 (n=128)	>50.1-134.1 (n=128)	>134.1 (n=128)
Median OS, mos				
Sipuleucel-T	41.3	27.1	20.4	18.4
Control	28.3	20.1	15.0	15.6
Difference	13.0	7.1	5.4	2.8
HR (95% CI)	0.51 (0.31, 0.85)	0.74 (0.47, 1.17)	0.81 (0.52, 1.24)	0.84 (0.55, 1.29)

P16

**An Alternative Technique for Bulbar Urethral Stricture Repair: Buccal Mucosal Graft in a Bed of Bulbospongiosus Muscle**

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**Introduction:** The use of a buccal mucosal graft (BMG) for bulbar urethral strictures requiring urethral augmentation is well accepted. Controversy exists over whether dorsal or ventral graft positioning is superior. Most experts agree that skeletal muscle provides an ideal bed for graft placement. We sought to combine the relative ease of ventral BMG placement with the expectation of excellent graft survival in muscle by affixing the BMG to the bulbospongiosus muscle (BSM).

**Materials & Methods:** 8 patients undergoing bulbar stricture repair had a BMG quilted into the bed of BSM as an element of their repair. The BMGs were ventrally positioned in 7 patients and in 1 patient 2 BMGs were placed. The ventral BMG was employed as a simple onlay in 1 patient in the others, the ventral onlay was combined with stricture excision and dorsal urethral wall approximation. The average age of the patients was 28.5 yr and the average stricture length was 5.5 cm. Mean postoperative follow up is 33.5 months.

**Results:** All patients experienced symptomatic improvement. Flow rates have a normal contour in patients who had stricture excision combined with BMG placement. There has been no adverse effect on ejaculatory function and post void dribbling has not been problematic. No patient required reoperation.

**Conclusions:** Bulbar stricture repair using BMG in a bed of the BSM provides excellent initial efficacy with no significant early complications. Further follow up will be required to see if the results are durable.

P18

**Early Outcomes of MRI-Guided Prostate Biopsies in a Community-Based Setting for Detection of Prostate Cancer**

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**Introduction:** Localization of suspicious areas of the prostate by MRI with targeted biopsies yielded prostate cancer detection rates of 50-60% in clinical trials and tertiary care centers; no data from community-based facilities is published.

**Materials & Methods:** A retrospective review of the initial experience of MRI-guided prostate biopsies (MGPB) performed by a single interventional radiologist at a community radiology suite from September 2011-February 2012 was completed. Men with a PSA ≥4.0 ng/mL (≥2.0 on 5-ARI therapy) or a suspicious DRE with at least one negative TRUS biopsy were included. Dynamic contrast enhancement (DCE), diffusion weighted imaging (DWI), and T2 weighted imaging of the prostate were obtained. Post-processing analysis of enhancement kinetics was performed; suspicious areas were graded 1-5, and a cumulative score of 3-15 was assigned. A prostate map and template for biopsy was constructed.

**Results:** Sixteen men with an average age of 63 underwent a MGPB from 9/2011-2/2012. Mean PSA was 5.1±3.2ng/mL (3.3±1.7ng/mL on 5-ARI); the average number of previous biopsies was 2.25. Average gland size was 52.4 cc; mean suspicious lesion size was 1.2±0.4cm, with an average cumulative score of 10.3±3.5. Three men had prostate cancer diagnosed on MGPB, with an average score of 12.7±2.5.

**Conclusions:** Unlike published data from large centers, early outcomes of MGPB in a community setting do not support the use of this method to predict a positive biopsy following a negative TRUS-guided biopsy. Whether this discrepancy represents an artifact of sample size, population selection, or imaging variation for biopsy is to be determined.

## P19

### Overutilization of Staging Examinations for Prostate Cancer is Associated with Delays in Radical Prostatectomy but Does Not have a Negative Impact on Pathologic Staging

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**Introduction:** The McGuire VAMC serves as the principal referral hub for patients with prostate cancer in Virginia and West Virginia. Our goal was to determine what factors are associated with treatment delays and whether these delays had any impact on pathologic outcomes.

**Materials & Methods:** A retrospective chart review was performed on 71 patients who underwent a radical prostatectomy at the McGuire VAMC between 2010 and 2011. Of these patients, 33 were local while the remaining 38 were referred. The pre-biopsy PSA, Gleason score at biopsy, pathologic stage, interval to surgery, and presence of a metastatic workup were all documented.

**Results:** The average pre-biopsy PSAs were 6.5 locally and 6.48 in those referred (p = 0.97). The average Gleason score was 7.24 locally and 7.16 in those referred (p = 0.92). Referred patients experienced on average a 78 day delay in their care (134.4 vs. 211.9 days, p <0.0006). There were 5/33 patients with pT3 disease in the local group and 8/38 in the referred (p = 0.26). A greater proportion of referral cases (79%) vs. local cases (24%) had undergone a metastatic workup (p <0.0001).

**Conclusions:** There is a significant time difference to radical prostatectomy between the two groups. This appears in part due to overutilization of staging tests. However, final tumor characteristics were analogous between the groups. We hope to reduce the delay by decreasing triage time, increasing operating days, and educating our referral bases about the appropriate criteria which merits a metastatic workup.

## P21

### Urologic Physician Assistants Can Perform TRUS-biopsies with Equivalent Safety and Cancer Detection Rates as Urologic Residents

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**Introduction:** Transrectal ultrasound-guided (TRUS) prostate biopsy is associated with only rare serious morbidity, including hemorrhage and sepsis. TRUS-biopsy has traditionally been performed by the urologist, but expected shortages in the urologic workforce may alter the roles of the surgeon and non-physician provider. This study compared the cancer detection rate and safety of TRUS-biopsies performed by a urologic physician assistant (PA) to those performed by urologic residents, to determine if biopsies can be safely and effectively performed by non-physician providers.

**Materials & Methods:** A retrospective chart review was performed, evaluating at least the first eighty biopsies performed by two PGY2-residents and one PA. Patients with prior atypia, known prostate cancer, or evidence of advanced or metastatic disease were excluded. All biopsies were performed under direct or indirect supervision of an attending physician at a single institution. Patient demographics, histologic findings, and associated major infectious or bleeding complications were compared.

**Results:** There was no significant difference in the rate of cancer detection (49.1 vs. 43.6%) or major complications (3.7 vs. 1.1%) on biopsies performed by the residents and PA, respectively. Overall, the complication rates are similar to those reported in the literature. The groups did not differ significantly in baseline characteristics of age (64.4 vs. 62.6yrs), PSA (7.6 vs. 7.0) or race between resident and PA groups, respectively.

**Conclusions:** TRUS-prostate biopsy can be safely and effectively performed by well-trained physician assistants with appropriate supervision. In the setting of workforce shortages, this may allow the surgeon to focus on more complex patient care.

## P20

### Clinical Outcomes of Renal Cryoablation for Lesions 4 cm or Greater

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**Introduction:** To evaluate the efficacy and outcomes of cryoablation on renal lesions 4 cm or greater.

**Materials & Methods:** We retrospectively analyzed the outcome of percutaneous and laparoscopic renal cryoablation of renal lesions equal to or greater than 4cm from May '06 to Jan '10. Cryolesions were evaluated with radiographic imaging by determining its size and presence of enhancement. Renal function was analyzed with serum creatinine concentration and estimated glomerular filtration rate preoperatively, at 3months, and at most recent follow-up. Re-treatment was defined as requiring a subsequent unplanned ablation.

**Results:** A total of 15 lesions in 14 patients with renal lesions 4cm or larger were treated with either percutaneous or laparoscopic cryoablation. The mean tumor size was 5.6cm (4-10cm). Mean follow-up was 25months (8-49). Eleven of 15 lesions (73.3%) demonstrated good ablation of renal lesion following one intervention, and one lesion was staged as 2 procedures given the large preprocedural size of 8cm and was successfully ablated following the 2nd procedure. Three of 15 (20%) lesions demonstrated persistent enhancement concerning for residual tumor requiring a 2nd cryoablation. Three of 15 lesions demonstrated progression of disease. Mean change in GFR was -1.5 (-14 to +7).

**Conclusions:** Our findings demonstrate that cryoablation can be used to treat larger renal lesions for patients who are poor surgical candidates and short-term outcome is encouraging, including comparable retreatment rates compared to smaller lesions and minimal effect on renal function; however the re-treatment rate is higher than other treatment modalities, especially with larger renal lesions.

## P22

### Incidence and Risk Factors for Corneal Abrasions during Minimally Invasive Pelvic Surgery

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**Introduction:** Corneal abrasions have been reported as the most frequent ocular event during surgery under general anesthesia occurring in up to 44% of patients without the use of adequate protective measures. In this study, we have evaluated the incidence of corneal abrasions with minimally invasive urologic and gynecologic pelvic procedures.

**Materials & Methods:** This retrospective cohort study included all patients undergoing robotic or laparoscopic sacral colpopexy (LSC) between 1/06-3/11, and patients undergoing robotic assisted laparoscopic prostatectomy (RALP) in 2010. All of these patients were placed in the Trendelenburg position during surgery. All women undergoing vaginal apical suspensions (VAS) in the supine position between 1/09-3/11 served as the control group. The incidence of corneal abrasions was compared between the groups. Statistical analysis was performed using the Fisher's exact test, Student's t-tests, and logistic regression.

**Results:** During the study period 216 women underwent LSC, 103 men underwent RALP, and 197 women underwent VAS. Seven (2.19%) patients developed corneal abrasions in the LSC and RALP group compared to 0% in the VAS group (p=0.0475). Patients undergoing LSC and RALP had longer operating time than VAS (264 min vs. 174 min, p<0.001). There were no significant differences in age, body mass index, preoperative hemoglobin, or IV fluids. All patients had intraoperative eye protection per protocol.

**Conclusions:** There is a strong trend toward more corneal abrasions with minimally invasive pelvic surgery compared to vaginal apical suspension procedures. Possible risk factors for further investigation include the steep Trendelenburg position during minimally invasive pelvic surgery and the prolonged operative time.

P23

**Size Does Matter: Prostatic Urethra Size Correlates with Increased Risk of Post Operative Urinary Incontinence Following Robot-Assisted Laparoscopic Prostatectomy**

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**Introduction:** Identify preoperative anatomic factors or surgical techniques which predispose patients to postoperative urinary complications including incontinence following a Robot-Assisted Laparoscopic Radical Prostatectomy (RALP).

**Materials & Methods:** Using our prospectively collected database we identified 402 patients treated for prostate cancer with a RALP between 2007 and 2012. The influence of surgical technique, as well as patient anatomic characteristics, was compared retrospectively with intent to correlate specific preoperative and surgical parameters to postoperative urinary incontinence. Factors we examined included; use of nerve sparing techniques, extent of lymph node dissection, age, Body Mass Index (BMI), and prostate weight, length, width and diameter. Patients with complaints of urinary incontinence prior to surgery were excluded from the study. Patients were followed for a mean post operative duration of 30.5 months.

**Results:** The number and percent of patients reporting postoperative complications of urinary incontinence was 168 (45%) and 66 (26%) at 1 and 2 years respectively. Factors resulting in increased risk of urinary incontinence following RALP were lack of nerve sparing surgical technique (p=0.001) and prostatic urethra length (p=0.04). Prostatic Urethral length was further broken down into 1-2.9cm, 3-3.9cm, 4-4.9cm and >5cm in length displaying a risk of 32%, 40%, 52% and 58% for postoperative urinary incontinence after year 1, respectively.

**Conclusions:** We identified that prostatic urethral length has an association with increased urinary incontinence following RALP. Measurement of prostatic urethral length prior to surgery could be a new tool in an urologist's armamentarium to inform a patient of their relative risk for post RALP urinary incontinence

P24

**Body Mass Index is Not a Reliable Measure for Planning Percutaneous Nephrolithotomy in Patients with Myelomeningocele**

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**Introduction:** Patients with neurogenic bladder (NGB) can develop large renal stones requiring percutaneous nephrolithotomy (PNL). Patients with myelomeningocele (MMC) have NGB and typically abnormal body habitus which can make percutaneous access and surgical positioning difficult. Measures such as body mass index (BMI) may not be reliable for planning percutaneous renal procedures in these patients.

**Materials & Methods:** We reviewed the medical records of all patients with NGB who underwent PNL at our institution from 2001 to 2010, excluding those without preoperative cross-sectional imaging. Patients with non-MMC forms of NGB were used as a control group with normal body habitus. Shortest skin-stone distance (SSD) at 0, 45 or 90 degrees was analyzed.

**Results:** 20 patients with NGB underwent PNL with cross-sectional imaging preoperatively. SSD increased with larger BMI in both groups. This was only statistically significant in the non-MMC group. Patients with MMC had wider variability in SSD, presumably due to abnormal body habitus.

**Conclusions:** SSD may affect surgical difficulty and required equipment. Our experience confirmed that BMI is a valid predictor of SSD in NGB patients with typical body habitus. BMI is not necessarily a useful measure in predicting SSD in patients with MMC, likely due to abnormal body habitus.

**Skin-to-stone distance and BMI**

	Patients [#]	Mean SSD (Std dev) [cm]	Mean SSD for BMI < 25 [cm]	Mean SSD for BMI >= 25 [cm]	p value (high vs low BMI)
MMC	10	8.42 (3.75)	6.42	9.76	0.24
non-MMC	10	8.14 (2.42)	6.15	9.47	0.02