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RPE-1

Elasticity in an Isolated Working Pig Bladder

A Non-Invasive External Compress-Release Protocol to Measure Dynamic Elasticity in an Isolated Working Pig Bladder

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Introduction: Urodynamic studies have been used to demonstrate that filling and passive emptying results in a reduction of intravesical pressure, a material property termed strain softening. Active voiding reverses strain softening representing acute dynamic elasticity. Passive bladder emptying requires an invasive cannula. This study tested the hypothesis that strain softening can be produced non-invasively using an external compress-release protocol. The aim was to determine if strain softening produced by filling-passive emptying is equivalent to strain softening produced by repeated external compress-release cycles in an isolated, working pig bladder.

Materials & Methods: A perfused ex vivo functional porcine bladder model was filled to 250 mL and allowed 5 min to reach equilibrium pressure (P1f = filling). Then, effect of filling to 500 mL and passively emptying was compared to compressing and releasing the bladder. The bladder volume was increased to 500 mL, and peak pressure (P2f) was measured. Next, it was passively emptied to 250 mL via syringe aspiration and pressure was recorded (P2s). Active voiding was induced with potassium-enriched solution to reset strain softening. The bladder was filled to 250 mL and allowed to equilibrate, where pressure (P1c = compression) was recorded, and the bladder was isovolumetrically compressed to P2c. The external pressure was held for 15s and released for 15s for 5 cycles. The 5 min equilibrium pressure after release (P2r) was noted.

Results: Ten bladders were studied (n = 10). Strain softening occurred due to the filling-passive-emptying (P2f < P1f, t-test, p < 0.05) and due to isovolumetric compression with external pressure (P2c < P1c, t-test, p < 0.05). The pressure after filling-emptying was not statistically different from the pressure after compression-release (P2c vs. P2f, t-test, p > 0.05), suggesting a similar degree of strain softening was induced by each method.

Conclusions: Bladders undergoing compression-release showed a similar decrease in intravesical pressure compared to filling-emptying, indicating strain softening occurs via isovolumetric compression. Increasing bladder pressure through both filling and compression results in measurable strain softening.Repeated external bladder compression represents a potential means to lower intravesical pressure produced by repeated external compress-release cycles in an isolated, working pig bladder.

RPE-2

Impact of a Preoperative Checklist on Peri-operative Safety: Balancing Quality with Efficiency?

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Introduction: The Joint Commission Universal Protocol aims to increase patient safety by avoiding “never-events” involving the wrong patient, surgical site, or procedure. Recently, additional preoperative requirements at Penn State Health Milton S. Hershey Medical Center were implemented including attending surgeon attestation of surgical H&P and consent at patient bedside on the morning of surgery. We evaluated whether these added safety policies had an early impact on several key institutional OR performance indicators and reported patient safety events compared to the previous year.

Materials & Methods: The key institutional OR performance indicators from the first 3 quarters (Q1-Q3) of Fiscal Years 2017 and 2018 were reviewed. These included total case volume, OR utilization, first case on-time start rate, and average turnover time. The new requirements for attending surgeon H&P and consent attestation were implemented on July 1, 2017. Available data for the Department of General Surgery as well as Division of Urology were included. All reported perioperative patient safety events were reviewed and grouped into select categories. Patient safety events unrelated to the preoperative checklist and events that were not authenticated by Risk Assessment were excluded. Two-sample t-test, Chi square, and Fisher’s exact test were performed for statistical analyses.

Results: The key institutional OR performance indicators including total case volume (p < 0.01), OR utilization (p < 0.05), first case on-time start rate (p < 0.001), and average turnover time (p < 0.001) were all statistically significant between Fiscal Year 2017 and 2018. There were 87 reported perioperative events in FY 2017 compared to 55 events in FY 2018 (p = 0.011), of which 58 events were consent-related in FY 2017 compared to 33 events in FY 2018 (p = 0.016). There was no statistically significant difference in case booking error, inadequate surgical prep, missing patient ID bands, or miscellaneous reported events between FY 2017-2018.

Conclusions: Operative safety checklists and procedures are essential to minimize untoward events. These results highlight a decreased total number of reported perioperative events, primarily consent-related issues, after implementation of an added safety checklist attestation. Nonetheless, it is important to recognize that additional preoperative surgical safety processes can impact conventional metrics of productivity, including total case volume, OR utilization, first case on-time start rate, and average turnover time. These findings may be an early consequence of initial adoption and future study is necessary to determine if these effects persist over time.
The Incidence of Transient Stress Urinary Incontinence (SUI) after Holmium Laser Enucleation of the Prostate (HoLEP)

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Introduction: Transient SUI can occur in 15-20% of patients after HoLEP. Transient SUI can be a frustrating temporary outcome for patients undergoing HoLEP. We reviewed the charts of patients that had transient SUI post HoLEP and tried to identify factors that may lead to transient SUI. By identifying risk factors associated with transient SUI, we will be able to counsel our patients better and hopefully reduce their frustration level.

Materials & Methods: A retrospective review, from an IRB approved database, of all 515 patients that underwent a HoLEP at our institution between January 2012 and December 2017 was performed. Transient SUI after HoLEP was defined as any leakage of urine lasting up to 3 months post-operative date. Patients were stratified by gland size determined by transrectal ultrasound (TRUS) and whether they were catheter dependent. Catheter dependency was either clean intermittent catheterizations (CIC) or continuous urethral drainage catheter. Prostate gland size was either greater than 100 grams or less. Patients were seen for follow-up at 2 weeks, 6 weeks, and 3 months post-operative date. Univariate analysis was performed for baseline demographics.

Results: Of the 515 patients analyzed, 52 (10.1%) developed transient SUI. Stress urinary incontinence resolved in 46 out of 52 patients (88.5%) within the first 6 weeks post-operatively and 6 out of 52 (11.5%) within 6 weeks to 3 months. TRUS revealed that 330 out of 515 of patients, who had 373 (79.2%) patients with prostate size greater than 100 g, 38/52 or 72.3% with transient SUI were catheter dependent prior to their HoLEP. 86% of patients with transient SUI had larger than normal prostate size. In patients with resolution of transient SUI within 6 weeks, 84.8% had prostate size larger than 100 g while 100% of patients with resolution between 6 weeks to 3 months had prostate volume greater than 100 g. Mean post-prostate gland volume on TRUS was 93.6 ± 56.6 grams for all patients. The average age and body mass index (± standard deviation) was 70.5 ± 8.5 years and 30 ± 11.9, respectively.

Conclusions: The majority of patients with transient stress urinary incontinence fully recover control of their bladder within the first 6 weeks. Patients with prostate sizes greater than 100 g and catheter dependent urinary retention have a higher risk of transient SUI. These patients should be counseled appropriately to reduce their frustration level during their post-operative course. Currently, we are investigating the use of perioperative pelvic floor rehabilitation to hopefully reduce or eliminate transient SUI post HoLEP.

Failed Primary Ureteroscopy: Incidence and Patient Characteristics

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Introduction: Primary ureteroscopy (URS) is a well-established and common treatment for urolithiasis. Occasionally, primary URS is unable to be performed. In these cases, a ureteral stent is often placed and intervention is attempted at a later date. Previous failure rates for primary URS have been quoted at 7.7%-16%. Young females and proximal stones have been associated with a higher risk of failure, although data is limited. The objective of this study was to confirm these prior findings, as well as identify other characteristics associated with primary URS failure.

Materials & Methods: A retrospective chart review of consecutively scheduled URS for urolithiasis from 11/1/17-11/30/17 and 12/1/17-12/31/17 was performed. Data was obtained from a large, multi-physician urology practice. 190 renal units (RU) were identified. Of these, 99 were pre-stented and therefore excluded from analysis. Four non-stented RUs were excluded, as definitive therapy had not yet occurred at time of study end-date. Following this, 84 RUs (81 patients) were identified for analysis. Demographics, history of urolithiasis, stone location, emergency department (ED) visits, and narcotic prescription habits were analyzed using Fisher’s exact test and unpaired T-test. Failure was defined as the inability or unwillingness to access the ureter to perform stone manipulation.

Results: Overall failure rate was 7.1% (7/7 units). Five failures were due to narrow ureters and one was due to concern for infection. Average time from ureteral stent to definitive treatment was 21.7 days. Male sex was significantly associated with failure (Table 1).

Conclusions: Primary failed URS has both patient and system-wide implications. It subjects patients to increased general anesthesia and urinary tract manipulation, and results in unplanned loss of OR time. If patients at risk could be identified, interventions to reduce this event could be performed. Overall failure rate was 7.1% in this study, which is similar to previous reports. In contrast to the literature, we found male sex was significantly associated with primary URS failure. There was no difference in age, stone location, history of stones, previous interventions, post-op ED visits, or number of narcotics prescribed.

RPE-5

Dramatic Reduction of Narcotics Usage in Penile Implant Recipients: a Novel Pain Management Strategy

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Introduction: Inflatable penile prosthesis (IPP) surgery is associated with significant perioperative pain that may reduce patient satisfaction. Though various pain management strategies have been proposed, most implanters manage patients with only prescription opioids. No protocol to date has been implemented and reported for pain management in IPP patients throughout the entire recovery process. The aim of this study is to develop a multimodal analgesic management strategy for pain management in IPP patients.

Materials & Methods: We retrospectively analyzed our prospectively maintained IPP database from November 2015 through January 2018. The IPP protocol was instituted for all patients beginning June 2017, and these patients were matched in a 1:2 ratio to a cohort of eligible IPP patients managed through an opioid-based (OB) protocol. Only patients receiving a three-piece IPP were included; those with a history of narcotic dependence, neuropathy, or chronic NSAID use were excluded. Postoperative pain scores (visual analog scale, VAS) and opioid usage (total morphine equivalent, TME in mg) were compared temporally in the post-anesthesia care unit (PACU), post-operative day (POD) 0, POD 1, and following discharge.

Results: 57 patients were eligible for analysis: 19 (33%) and 38 (66%) in the MMA and OB groups, respectively. Groups were similar in demographics. MMA patients had significantly lower VAS scores in PACU, POD0, or POD1 (mean 0.84 vs. 2.97, p = 0.001; 2.42 vs. 4.73, p = 0.003; and 2.26 vs. 4.40, p = 0.03, respectively) and used fewer narcotics on POD0 (mean 4.08 vs. 13.8 mg TME, p = 0.004) and POD1 (mean 5.05 vs. 25.1 mg TME, p = 0.004). MMA patients were discharged home with fewer narcotics (mean 12.7 vs. 51.3 tabs, p = 0.001), and despite this, the MMA group needed less narcotic medication refills (11% vs. 49%, p = 0.007). Neither group experienced a medication-related postoperative adverse event.

Conclusions: In our rigorous assessment of IPP patients, implementation of a novel MMA protocol achieved equivalent and effective pain control, while resulting in substantially fewer narcotics throughout the entire post-operative period following IPP implantation.
Clinicopathologic Predictors of Teratoma and Node-Positive Pathology in Primary Retroperitoneal Lymph Node Dissection for Testicular Cancer

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Introduction: For patients with early-stage (clinical stage I and II) non-seminomatous germ cell tumor (NSGCT), primary retroperitoneal lymph node dissection (RPLND) accurately stages the retroperitoneum and affords a therapeutic benefit in men with limited nodal disease offering complete resection of chemoresistant teratoma and minimizing the need for chemotherapy. Lymphovascular invasion (LVI) is the only well-established predictor of retroperitoneal malignancy; while a number of variables including p-Tstage, presence of embryonal cancer and teratoma are suggested to predict retroperitoneal histology. We consequently evaluated pathologic findings from radical orchectomy specimens and patient characteristics to predict retroperitoneal pathology.

Materials & Methods: A retrospective review from an institutional testicular cancer database was performed of patients with clinical stage I and II NSGCT following radical orchectomy managed with primary RPLND for between 2003-2017. Open, laparoscopic, and robotic modalities were included. Clinicopathologic predictors of node-positive disease and teratoma following primary RPLND were assessed.

Results: Of 126 patients who underwent primary RPLND for early-stage NSGCT, 43 (34.1%) were found to have node-positive pathology, of which 6 (4.8%) had teratomatous elements, and 3 (2.3%) had teratoma only. On multivariable analysis, predictors of node-positive disease included the presence of LVI (OR 3.07, 95% CI 1.02-9.21, p = 0.046) and rete testis invasion (OR 4.12, 95% CI 1.06-15.78, p = 0.039); embryonal cancer was not predictive (p = 0.39). For each percent of teratoma noted on the orchectomy specimen, there was an OR 1.022 (per 1%, 95% CI 1.002-1.04, p = 0.032) that RPLND would yield teratoma in the retroperitoneum. Clinical N-stage was also predictive of teratomatous elements following RPLND (OR 4.4, 95% CI 1.08-17.98, p = 0.039).

Conclusions: The presence of LVI and rete tests invasion was strongly predictive of node-positive disease in patients undergoing primary RPLND for early-stage NSGCT. Patient with clinical stage I NSGCT with these primary tumor findings may consequently benefit from treatment over active surveillance to minimize risk of relapse. Furthermore, patients with clinical node positive disease and increasing portions of teratomatous elements in their tests may derive greater benefit from primary RPLND, with adjuvant chemotherapy utilized as needed.

Determinants of Neoadjuvant Chemotherapy Use in Muscle-Invasive Bladder Cancer: Results from the National Cancer Database

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Introduction: Neoadjuvant chemotherapy (NAC) with cisplatin-based regimens followed by radical cystectomy (RC) is standard of care for muscle-invasive bladder cancer (MIBC). However, NAC is used in less than 20% of patients with MIBC. Our goal is to investigate factors that contribute to the current underutilization of cisplatin-based NAC prior to and identify areas that can increase its incorporation into clinical practice.

Materials & Methods: We identified 5913 patients diagnosed with cT2-T3N0M0 MIBC who underwent RC between 2004 and 2014 from the National Cancer Database. 1113 (18.8%) received NAC prior to RC while 4802 (81.2%) were treated with RC alone. We used univariable and multivariable models to predict NAC administration, and estimated 5-year overall survival (OS) between patients treated with NAC vs RC alone.

Results: Overall rate of NAC increased over time, but its use remains low (cT3 26%; cT4 28%). On univariate analyses, NAC followed by RC was more likely at academic vs. community (p < 0.001) and in the Midwest vs. West region (p = 0.02). Also, lower education level education (p = 0.012) and lower median income (p = 0.017) were associated with treatment with RC alone. On multivariate analysis, higher education (HR = 1.32, 95% CI 1.01-1.65) and treatment in the Midwest area (HR = 1.34, 95% CI 1.10-1.63) was independently associated with NAC utilization, while older age (65-74 years old, HR = 0.62, 95% CI 0.58-0.67) and treatment at comprehensive community cancer programs (HR = 0.66, 95% CI 0.52-0.84) were less likely to receive NAC. OS was significantly lower (48.5% vs. 42.6%, p < 0.001) in patients treated with NAC followed by RC vs. RC alone, consistent with prior level one data.

Conclusions: Although NAC is associated with improved OS for patients with MIBC, we found that utilizing a nationwide population-based database most patients are not treated with NAC prior to radical cystectomy. We found that decreased utilization of NAC was associated with older patient age, lower education level, and regional variations. Our results suggest specific settings for intervention and education to increase use of NAC in patients with MIBC.
Rate of PSA Testing in Spinal Cord Injured Men: Analysis of National Veterans Administration Data

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Introduction: Recommendations for prostate cancer screening with PSA remain controversial due to the ongoing debate regarding over-detection and over-treatment. As the life expectancy of spinal cord injured men has improved to near that of uninjured men, the debate has grown to include this unique patient population. In this study, we sought to evaluate the national PSA testing rates before and after spinal cord injury among men in the Veterans Health Administration system.

Materials & Methods: Using the VA Informatics and Computing Infrastructure (VINCI) and Corporate Data Warehouse (CDW), we extracted PSA testing data for individuals with ICD 9/10 codes designating spinal cord injury. This data was further analyzed by annual rate of PSA testing stratified according to race and AUA guideline age groupings.

Results: A total of 41,344 patients from 129 VA Medical Centers were identified in the VINCI database with a diagnosis of spinal cord injury, and data was collected from 1999 to 2017. These men cumulatively underwent 419,140 PSA tests during the given timeframe. Following diagnosis of SCI, the rate of annual PSA testing increased 161% in the under 40 group (0.23 vs. 0.60 PSAs/year), increased 54% in the 40-54 group (0.63 vs. 0.94), and 27% in the 55-70 group (0.90 vs. 1.14), but decreased 3% following SCI diagnosis in the 70 and above group (1.03 vs. 1.00). African-American men had a significantly smaller increase in PSA testing rates following SCI diagnosis than the general population, despite increased risk of disease.

Conclusions: The rate of PSA testing in veterans increased significantly following diagnosis of spinal cord injury in all patients injured before age 70. The increase in testing was greater for the non-African-American population. Furthermore, there appears to be over-screening across all SCI populations, particularly in the under-40 and over-70 cohorts. High rates of PSA testing in veterans with spinal cord injury likely relates in part to structured annual evaluations performed in the VHA for this population, in addition to utilization of PSA in benign diagnostic testing.

Prostates UTIs in Boys is Highly Associated With an Intact Foreskin and Low Incidence of Anatomical Abnormalities: Is Imaging After 1st Proteus UTI necessary?

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Introduction: Circumcised males are 85% less likely to develop a UTI in the first year of life than uncircumcised males. Because UTIs are often the first sign of a bladder or renal anomaly, many of these boys had one or more imaging procedures (RBUS) and voiding cystourethrogram (VCUG). The purpose of this study was to see if Proteus UTIs were more likely associated with an uncircumcised foreskin than other bacterial species and if the incidence of anatomical abnormalities was less in these boys.

Materials & Methods: We retrospectively reviewed a cohort of male patients under 18 years of age who presented with a first UTI from 2011-2015. UTIs were defined as positive urine cultures from 2011-2015. Males under 18 years of age with > 50,000 CFU/mL Staphylococcal, Streptococcal, Proteus or Escherichia UTIs on clean cath or catheterized specimens were included. Both febrile and afebrile UTIs were included. Patients on intermittent catheterization or with augmented bladders were excluded. Ultrasound and cystogram images were reviewed on patients when available. Circumcision status was determined from the chart. Chi squared and Fisher's exact tests were performed using stata software, version 14.0 SE (Stata Corporation, College Station, Texas, USA).

Results: A total of 703 males with urine culture results from the ED were evaluated and 357 met inclusion criteria. Median age was 7.7 months (2.5- 46.8 months IQR). Forty-two Proteus, 16 Staphylococcal, 7 Streptococcal and 292 Escherichia UTIs were included. Patients who present with a Proteus infection are far less likely to be circumcised (1/37 vs. 2.7%) than Escherichia (37/226 or 16.4%) or a gram positive organism (15/20 or 75%) (Fisher’s Exact test 0.000). Proteus UTIs were associated with a lower percentage of abnormal ultrasounds (3/19 or 15.77%) compared with Staph (6/11 or 54.54%). Strep (3/6 or 50%) or Escherichia (61/203 or 30.05%) respectively (Fisher’s Exact Test p = 0.05). 19.55% of all patients (26/133) who had a cystogram done had any abnormalities. Among those, Proteus had the lowest rate (2/15 or 13.38%) compared with Staphylococcus (5/7 or 71.43%) Streptococcus (1/2 or 50%) or Escherichia (18/111 or 16.22%) although this did not reach statistical significance. None of the Proteus UTIs were associated with VUR.

Conclusions: Boys presenting with a urine culture positive for Proteus are almost exclusively uncircumcised and likely have less to have associated urinary tract abnormalities on imaging when compared to other uropathogens. Imaging after the 1st Proteus UTI in boys may not be necessary.

Gram Positive Urinary Tract Infections are Associated with Higher Incidence of Abnormal Imaging Findings in Pediatric Males

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Introduction: The 2011 AAP Guideline recommends against VCUG until the second febrile urinary tract infection (UTI). We hypothesized that UTI speciation might be predictive of abnormal findings on ultrasound and/or VCUG. We sought to identify if Staphylococcal and Streptococcal UTIs were more likely than those with other bacterial species to be associated with anatomic anomalies in males diagnosed with UTI after presentation to the emergency department.

Materials & Methods: We retrospectively reviewed a cohort of male patients under 18 years of age who presented to our emergency department and had positive urine cultures from 2011-2015. Males under 18 years of age with >50,000 CFU/mL Staphylococcal, Streptococcal, Proteus or Escherichia UTIs on clean catch or catheterized specimens were included. Both febrile and afebrile UTIs were included if culture inclusion criteria were met. Patients on intermittent catheterization or with augmented bladders were excluded. Ultrasound and cystogram images were reviewed when available. Abnormal cystogram was defined as the presence of any bacterial species and if the incidence of anatomical abnormalities was less in these boys. Both febrile and afebrile UTIs were included when available. Abnormal cystogram was defined as the presence of any bacterial species and if the incidence of anatomical abnormalities was less in these boys. Both febrile and afebrile UTIs were included. Patients on intermittent catheterization or with augmented bladders were excluded. Ultrasound and cystogram images were reviewed when available. Abnormal cystogram was defined as the presence of any bacterial species and if the incidence of anatomical abnormalities was less in these boys. Both febrile and afebrile UTIs were included.
**National Trends and Disparities of Minimally Invasive Surgery for Localized Renal Cancer, 2010 to 2015**

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**Introduction:** Minimally invasive (robotic and laparoscopic) surgery has gained popularity for localized renal cancer. However, the evolving trends in utilization of minimally invasive surgery at the national level as well as the barriers preventing access to minimally invasive surgery among specific patient populations are poorly understood.

**Materials & Methods:** A retrospective cohort study was conducted using the National Cancer Database to identify patients undergoing partial nephrectomy (PN) or radical nephrectomy (RN) for cT1aN0M0 renal cancer diagnosed between 2010 and 2015. Main outcomes of interest were the utilizations of minimally invasive (robotic and laparoscopic) PN and RN.

**Results:** A total of 46,346 and 37,712 subjects who underwent PN and RN, respectively, were analyzed. PN and RN surgical approach distributions by year of diagnosis are shown in the Figure. During the study interval, robotic PN increased from 35.2% to 63.7% and robotic RN increased from 10.3% to 26.3%. In the PN cohort, multivariable logistic regression showed non-Hispanic black (odds ratio [OR] = 0.90 [95%CI, 0.84-0.96]) and Hispanic (OR = 0.91 [0.84-0.99]) subjects were associated with less utilization of minimally invasive surgery (vs. non-Hispanic white). A Medicare (OR = 0.77 [0.69-0.86]), Medicaid (OR = 0.80 [0.74-0.87]), and uninsured (OR = 0.55 [0.49-0.62]) were also associated with less utilization of minimally invasive surgery (vs. private insurance). Compared with non-Hispanic white, non-Hispanic black and Hispanic subjects were associated with lower utilization of minimally invasive surgery. Similar demographic, insurance, and socioeconomic status related disparities were identified in the RN cohort.

**Conclusions:** Utilization of minimally invasive surgery for localized renal cancer has increased significantly and was mainly attributed to increased usage of robotic surgery. Racial/ethnic, insurance, and socioeconomic status related disparities in minimally invasive surgery utilization were identified. Our findings demonstrate a targetable subgroup of patients who do not have the same access to advances in surgical technology.

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**Computed Tomography Imaging Characteristics of Histologically Confirmed Papillary Renal Cell Carcinoma - Implications for Ancillary Imaging**

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**Introduction:** Renal cysts and masses are common incidental findings on computed tomography (CT). It is often proposed that a cutoff of 20 Hounsfield units (HU) be used for renal cystic lesions to undergo further workup. It has been recognized that the papillary subtype of renal cell carcinoma (RCC) often presents as a low attenuation tumor on noncontrast CT. The objectives of this study are to describe the CT characteristics of papillary RCC, to compare differences between type 1 and type 2 papillary RCC, and to determine the frequency with which papillary RCC is demonstrated as a low attenuation tumor on CT.

**Materials & Methods:** Data was reviewed on all partial and radical nephrectomies performed between July 2007 and July 2017 with pathology confirmed diagnosis of papillary RCC. Tumors with multiple RCC types were excluded. Preoperative CT scans were reviewed. The largest dimension of each tumor was recorded in millimeters. Each tumor had some combination of the four principle phases used to study renal pathologic - noncontrast, corticomedullary (30 seconds), nephrographic (100 seconds), and pyelographic (10 minutes). Density was recorded for each phase, when available, as the average of 6 evenly spaced axial regions.

**Results:** A total of 124 pathologic specimens were identified to contain papillary RCC, 84 of which had CT imaging available for review. Mean age was 61 years (range 21 to 94). Median largest dimension was 39.5 mm (range 1.8 to 170). 27 of these were reported to be type 1; 17 were type 2; and 40 were unspecified. Noncontrast CT was available for 73 tumors of which 16 (22%) had HU measuring fewer than 20. 12 of these 16 low density tumors (75%) were clinical stage T1 or T2. 5 were papillary type 1; 4 were papillary type 2; and 7 were unspecified. Attenuation varied within each CT phase. (Table) Mean attenuation at 100 seconds was 44.5 for type 1 papillary tumors and 48.8 for type 2.

**Conclusions:** Pathologically proven papillary RCC is a heterogeneous entity in terms of size and density on preoperative CT imaging. A noncontrast CT scan with HU fewer than 20 may not be adequate evaluation for incidental renal masses, as over 1 in 5 papillary RCCs measure at lower attenuation than this cutoff. Further study is needed to identify the appropriate role of ancillary imaging in the workup of benign-appearing renal cysts.
Robotic-Assisted Radical Cystectomy Does Not Offer Lower Incisional Hernia Rates When Compared to Open Radical Cystectomy

Moderated Poster Session 1: Oncology - Bladder, Testis, Renal

Introduction: Postoperative incisional hernias (PIH) are a well-established complication of abdominal surgery; however, contemporary rates after radical cystectomy (RC) are not well-established, especially since the introduction of robot-assisted techniques. Moreover, risk factors that may predict PIH have not been described. Herein, we assess and compare rates of PIH after robotic assisted radical cystectomy (RARC) and open radical cystectomy (ORC), and identify factors that may predict PIH in these cohorts.

Materials & Methods: Patients with >1 year follow up and available pre- and post-operative cross-sectional imaging who had undergone ORC from 2000-2015 (n = 381) and RARC from 2007-2015 (n = 58) at our tertiary referral cancer center were included in this study. Incruba-umbilical midline incision was performed during ORC and a periumbilical incision during RARC with extracorporeal urinary diversion. Patients undergoing RC had type of urinary diversion, characteristics of incisions, and presence of prior umbilical hernia were evaluated. Skin-to-fascia depth (SFD) as well as rectus distastaxis width (RDW) were captured from pre-operative imaging. Post-operative imaging was examined for presence of PIH.

Results: Of the 469 patients that met inclusion criteria, the incidence of PIH in our cohort was 14.3%. Analysis revealed no statistically significant differences in PIH rates between open and robotic cohorts (15.8% vs. 25.4%, p = 0.144). Age, gender, smoking status, receipt of chemotherapy, and race did not correlate with PIH on multivariate analysis (all p > 0.05). Increasing BMI was associated with a slightly increased risk of PIH (OR 1.03, CI 0.99-1.06, p = 0.02). Stratified by surgical approach, receipt of an ideal conduit compared to continent diversion was associated with a decreased risk of PIH in only the open cohort (OR 0.36, CI 0.15-0.99, p = 0.025). In the RARC cohort, preoperative umbilical hernia significantly increased the risk of PIH on multivariate analysis (OR 7.8, CI 3.8-16.1, p = 0.001). After adjustment, increasing supraumbilical RDW was a risk factor for PIH on multivariate analysis in patients who had an ORC (OR 1.9, CI 1.1-3.1, p = 0.031). Conversely, patients undergoing RARC had no increased risk of PIH based on supramesal (p = 0.436) or infraumbilical (p = 0.374) RDW. SFD did not correlate with hernia rates in any of our patient cohorts (all p values > 0.05).

Conclusions: Patients undergoing RC are at significant risk of PIH regardless of surgical approach. Anthropomorphic factors and urinary diversion type appear to be associated with PIH risk. Further research is needed to understand how risks of PIH can be reduced in patients undergoing cystectomy.

Nephroureterectomy Versus Nephron-Sparing Management of Clinically Localized Ureteral Carcinoma of the Ureter: Practice Patterns and Outcomes

Introduction: Nephroureterectomy (NU) is the gold standard for upper-tract urothelial carcinoma (UTUC) of the ureter, but segmental ureterectomy (SU) and endoscopic management (EM) are attractive nephron-sparing approaches in appropriate patients. We sought to determine treatment patterns and outcomes associated with these modalities for ureteral tumors alone.

Materials & Methods: The National Cancer Database (NCDB) was queried for patients with clinically localized ureteral UTUC (< cT2N0M0) undergoing NU, SU, or EM from 2004-2015. Patients were excluded with previous cancer diagnoses, non-urothelial histology or incomplete data. Treatment trends and outcomes were assessed for the cohorts utilizing multivariable logistic regression and Cox Proportional Hazards Regression.

Results: 721 patients were included in the analysis (NU: n = 4321; SU: n = 1658; EM: n = 1342). On multivariable logistic regression with respect to EM, increasing tumor size (OR 1.04, CI 1.03-1.05) and high grade histology (OR 4.23, CI 3.20-5.58) were associated with increased likelihood of NU. No specific trend was noted with age, sex, race, payer status, CDCC score, facility designation, or increasing facility volume and treatment with EM or NU (all p > 0.05). With respect to SU, increasing tumor size (OR 1.01, CI 1.00-1.02) and female gender (OR 1.27, CI 1.04-1.54) were associated with increased likelihood of NU. Facility volume in the 1st (OR 1.32, CI 0.95-1.84), 2nd (OR 1.63, CI 1.16-2.28), 3rd (OR 2.24, CI 1.63-3.07) and 4th (1.93, CI 1.44-2.60) quintiles were associated with increased likelihood of NU compared to facilities in the top 3rd quintile of treatment volume. No specific trend was noted with age, race, payer status, CDCC score, histology, or facility designation and treatment with SU or NU (all p > 0.05). On Cox Regression when accounting for age and comorbidities, there was no difference in OS between NU and SU (p = 0.281) or EM (p = 0.605). Facility volume in the 1st (HR 1.39, CI 1.08-1.79), 2nd (HR 1.39, CI 1.06-1.81) and 3rd (HR 1.30, CI 1.01-1.67) quintiles was associated with increased mortality compared to those in the 4th and 5th. Positive margins increased the risk of mortality by 78.7% (HR 1.79, CI 1.46-2.19).

Conclusions: Models with self-reported QOL metrics predict all-cause mortality in RCC patients with higher accuracy and parsimony than those without QOL metrics in two separate database tests. Physical health in particular was a stronger predictor of mortality than mental health.
In the World of Bladder Tumors: Size Does Matter…

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Penn State Hershey Medical Center¹, Penn State Health Milton S. Hershey Medical Center², Penn State Milton S. Hershey Medical Center³; Penn State Health – Milton S. Hershey Medical Center⁴

Introduction: Cystoscopy with transurethral resection of bladder tumor (TURBT) is fundamental to the diagnosis and staging of bladder cancer. Variability among patients, tumors, and surgeons has made it difficult to standardize care. Management of small, medium, and large tumors is largely intuitively guided by larger tumors warranting longer duration of an indwelling catheter and length of hospital stay. We sought to compare outcomes following TURBT of small, medium, and large tumors to determine if larger tumors truly resulted in a greater degree of complications.

Materials & Methods: The National Surgical Quality Improvement Project (NSQIP) Participant Use File (PUF) was queried to extract all TURBT cases performed from 2011-2013. CPT codes 52234 (small), 52235 (medium), and 52240 (large) were queried to stratify the data into three cohorts. Outcomes of interest included the presence of any post-surgical complications, hospital length of stay (LOS), reoperation, 30-day readmission, and mortality. ANOVA was used to detect statistical significance between continuous variables across the three cohorts and chi2 tests were used for binary variables. Linear and logistic regressions were utilized to control for potential confounders.

Results: 17,839 patients who underwent TURBT were included. 44% had small tumors (n = 7,805), 35% had medium tumors (n = 6,240), and 21% had large tumors (n = 3,794). Univariate analysis revealed statistically significant differences in complication number, length of stay, reoperation rate, readmission at 30-days, and mortality between the three cohorts (p < 0.0001). (Table 1) In the multivariable regression models, medium and large tumors were associated with significantly greater odds of a post-operative complication (OR = 1.37 and 1.64; p < 0.0001), reoperation (OR = 1.33 and 1.52; p = 0.009 and p = 0.002), readmission at 30 days (OR = 1.27 and 1.56; p = 0.001 and p < 0.0001), and death (OR = 1.65 and 2.59; p = 0.015 and p < 0.0001). Large tumors were associated with a significantly longer LOS compared to small tumors, although this difference was likely clinically insignificant (0.40 days longer; p < 0.0001).

Conclusions: Larger tumor size (> 5 cm) is associated with greater length of stay, reoperation, readmission, and death following TURBT. These patients should be counseled appropriately and may warrant a longer period of observation prior to discharge.
**Association Between Anticoagulant and Antiplatelet Agents and Complications of Transurethral Resection of Bladder Tumors**

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University of Pennsylvania1; University of Miami2; Drexel University3; Division of Urology, Department Of Surgery, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA4

**Introduction:** There is little procedure-specific data to guide the perioperative management of antiplatelet and anticoagulant medications in patients undergoing transurethral resection of bladder tumors (TURBT). We sought to determine the association between these medications and complications after TURBT.

**Materials & Methods:** We retrospectively reviewed the charts of 116 patients at the Hospital of the University of Pennsylvania who underwent their first TURBT between January 2016 and June 2017. Antiplatelet and anticoagulant medication was previously prospectively documented, including whether and for how long these were held perioperatively. Specific categories of these included aspirin, novel antiplatelet agents (only clopidogrel in our cohort), anticoagulants, omega-3 supplements, and non-steroidal anti-inflammatory drugs. Additional retrospectively collected exposure variables included patient age, sex, surgeon, size of tumor on imaging, mitomycin administration, and final tumor stage. Our primary outcome was adverse events (AEs), a composite of unplanned postoperative admission, emergency department (ED) presentation, and return to the operating room.

**Results:** 27 (23.2%) patients suffered AEs, including 11 postoperative admissions, 18 ED presentations, and 2 returns to the operating room. There were no thromboembolic or cardiac events. All ED presentations were prompted by hematuria, suprapubic pain, catheter problems, and/or urinary retention. The median date of ED representation was 3 days postoperatively (interquartile range 1-4.25). All anticoagulants and clopidogrel were paused perioperatively. Nevertheless, patients taking anticoagulants were significantly more likely to suffer AEs (odds ratio (OR) 4.0, 95% confidence interval (CI) 1.2-13.7). Multivariate logistic regression similarly yielded anticoagulation as the exposure most closely associated with AEs, although this narrowly failed to reach statistical significance (p = 0.064). No significant difference in adverse events was detected in patients taking clopidogrel, NSAIDs, omega-3 supplements or aspirin even if the last of these was not paused perioperatively.

**Conclusions:** Anticoagulation but not antiplatelet therapy was significantly associated with adverse events after TURBT.

<table>
<thead>
<tr>
<th>No AE</th>
<th>AE</th>
<th>Odds Ratio OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% (count)</td>
<td>% (count)</td>
<td></td>
</tr>
<tr>
<td>All patients</td>
<td>74.1 (86)</td>
<td>22.4 (26)</td>
</tr>
<tr>
<td>Anticoagulation</td>
<td>50.0 (6)</td>
<td>50.0 (6)</td>
</tr>
<tr>
<td>No anticoagulation</td>
<td>80.0 (80)</td>
<td>20.0 (20)</td>
</tr>
<tr>
<td>Clopidogrel</td>
<td>60.0 (6)</td>
<td>40.0 (4)</td>
</tr>
<tr>
<td>No clopidogrel</td>
<td>78.6 (81)</td>
<td>21.4 (22)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No AE</th>
<th>AE</th>
<th>Odds Ratio OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% (count)</td>
<td>% (count)</td>
<td></td>
</tr>
<tr>
<td>Patients not on anticoagulation or clopidogrel</td>
<td>83.8 (51)</td>
<td>16.2 (10)</td>
</tr>
<tr>
<td>Aspirin</td>
<td>74.4 (29)</td>
<td>25.6 (10)</td>
</tr>
<tr>
<td>No Aspirin</td>
<td>1.76 (0.66-4.72)</td>
<td></td>
</tr>
<tr>
<td>Aspirin - paused perioperatively</td>
<td>78.7 (23)</td>
<td>23.3 (7)</td>
</tr>
<tr>
<td>Aspirin - not paused</td>
<td>50.0 (3)</td>
<td>50.0 (3)</td>
</tr>
</tbody>
</table>

**Frequency of High Grade Disease in Surgically Resected Kidney Cancer Specimens: An Unrecognized Factor Impacting Test Characteristics of Percutaneous Renal Mass Biopsy**


Division of Urology at Cooper University Health Care1; Fox Chase Cancer Center2; Penn State Health - Milton S. Hershey Medical Center3

**Introduction:** Clinical utility of renal mass biopsy (RMB) for differentiating benign from malignant tumors is well-established; however, its ability to accurately predict tumor grade remains controversial. Indeed, grade concordance reports in the literature vary. Here, we query four large institutional kidney cancer surgical cohorts to better understand how the prevalence of high-grade disease affects RMB tumor grade concordance rates.

**Materials & Methods:** The prospectively maintained kidney cancer databases of 3 large volume centers across the State of Pennsylvania and 1 from Michigan were queried for the histopathological characteristics (pathological size, histology, nuclear grade) of resected pT1a renal masses. Only masses with clear cell histology and those with a documented nuclear grade were included in the analysis. The prevalence of HG disease, defined as Fuhrman nuclear grade 3 or 4 was calculated for each center. Using the biopsy sensitivities from the largest RMB series to date (Richard et al Eur Urol, 2015), we then calculated the expected RMB grade concordance rate and negative predictive value for RMB at each participating site.

**Results:** A total 1740 patients met criteria for analysis. The institutional prevalence of high-grade disease markedly varied from 13.6% to 37.9% (Table 1). Increased prevalence of HG disease was associated with a decrease in RMB overall grade concordance rates (94.1% to 83.7%) and reduced negative predictive value (93.6 to 79.2%) (Table 1).

**Conclusions:** The prevalence of high-grade disease in patients with a renal mass significantly varies even among institutions in the same state and across state lines. In turn, rates of high-grade disease have a significant impact on tumor grade concordance at RMB. As such, each institution must be cognizant of its case-mix and interpret RMB results accordingly.

**Table 1: Prevalence of High Grade Disease and its Impact on RMB Concordance and NPV rates**

<table>
<thead>
<tr>
<th>Site</th>
<th>N</th>
<th>HG</th>
<th>% Concordance Rate</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penn State SOM</td>
<td>286</td>
<td>30</td>
<td>84.1%</td>
<td>93.6%</td>
</tr>
<tr>
<td>UPenn</td>
<td>248</td>
<td>72</td>
<td>87.5%</td>
<td>85.0%</td>
</tr>
<tr>
<td>University of Michigan</td>
<td>675</td>
<td>246</td>
<td>85.0%</td>
<td>81.2%</td>
</tr>
<tr>
<td>Fox Chase Cancer Center</td>
<td>533</td>
<td>201</td>
<td>89.5%</td>
<td>79.2%</td>
</tr>
</tbody>
</table>

References: HG - High Grade; RMB - Renal Mass Biopsy; NPV - Negative Predictive Value
Overuse of Cystoscopic Surveillance Among Patients with Low-risk Non-muscle-Invasive Bladder Cancer - A National Study of Patient, Provider, and Facility Characteristics

Davide Allievi, RN, BS; Amanda R. Swanton, MD, PhD; David S. Han, BS; Amanda R. Swanton, MD, PhD; Ji Won Blane, PhD; Kristine B. Ryan, PhD; Ji Won Blane, PhD; Ji Won Blane, PhD; Brenda Sirovich, MD, MS; Douglas J. Robertson, MD, MPH; John D. Seigle, MB; Philip P. Goodney, MD, MS; Florian R. Schoeck, MD, MS

Department of Urology, University of Virginia; Department of Urology, Medical College of Wisconsin

Introduction: There are limited studies evaluating outcomes following urinary diversion for benign indications. We sought to analyze complications following urinary diversion for non-malignant conditions, with specific focus on early and delayed complications over long-term follow-up.

Materials & Methods: We performed a retrospective review of patients undergoing urinary diversion for benign indications between January 2000 and December 2017. Data were collected including patient demographic and clinical characteristics, with focus placed on surgical characteristics and post-operative complications. Complications were graded according to the Clavien-Dindo classification.

Results: A total of 73 patients were identified for study analysis with median follow-up of 24 (6-71) months. 70% and 23% of patients underwent diversion for neuromuscular bladder and complications related to pelvic radiation, respectively. A majority (93%) underwent ileal conduit with the remainder undergoing continent diversion. A total of 133 complications were identified, comprising 56 early and 77 delayed. Accordinly, 77% of patients had at least one complication during the follow-up period. 53% and 75% of patients experienced early and delayed complications, respectively. Complications of Clavien-Dindo Score ≥ IIIB were seen in 48% of patients followed less than 1 year, 10% for 1 to 2 years, and 8% for > 2 years.

Conclusions: Overuse of cystoscopy among patients with low-risk NMIBC in our cohort was common, raising concerns about the cost and quality of bladder cancer surveillance. However, we found few patient and provider factors associated with overuse. The association of overuse with year of diagnosis among patients with low-risk NMIBC suggests that guidelines and surveillance recommendations as a potential cause of overuse. Further qualitative research is needed to confirm this hypothesis and to identify other determinants of overuse not captured in administrative data.

Early and Delayed Complications of Urinary Diversion for Benign Etiology

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Introduction: There are limited studies evaluating outcomes following urinary diversion for benign indications. We sought to analyze complications following urinary diversion for non-malignant conditions, with specific focus on early and delayed complications over long-term follow-up.

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Conclusions: Our study demonstrates that urinary diversion for benign etiologies is associated with a significant rate of complication. A large percentage of these occur in the delayed period and are classified as serious complications. BIM is an independent predictor of complication in this population.
Comparison of CxBladder and Cytology in Detecting Urothelial Carcinoma of the Bladder

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Eastern Virginia Medical School

Introduction: Bladder cancer is the fifth most commonly diagnosed cancer in the U.S in 2018. Unfortunately, it also happens to be one of the most expensive cancers to treat due to the frequent surveillance required. Practically, a urinary biomarker with both high sensitivity and specificity for urothelial carcinoma (UC) could decrease the number of surveillance cystoscopies. The goal of the study was to determine the accuracy of cytology as compared CxBladder in detecting UC of the bladder confirmed by cystoscopy and biopsy.

Materials & Methods: This was a single institution, retrospective chart review study of all patients 18 years of age or older who were tested with urinary cytology and CxBladder (Detect or Monitor) as part of a standard bladder cancer surveillance protocol between 10/2013 through 02/2017. Urinary cytology was defined as positive if suspicious for malignancy or urothelial carcinoma. It was defined as negative if negative for malignancy or one of the three atypical subtypes including atypical suspicious for neoplasm. Sensitivity, specificity, positive predictive values (PPV), and negative predictive values (NPV) at the 95% confidence interval were used to assess the validity and reliability of above urinary biomarkers to detect the presence or absence of UC compared to the gold standard, cystoscopic examination +/- biopsies. Analyses were performed in SAS 9.4 (SAS Institute, Cary, NC).

Results: A total of 223 urine samples were collected from patients undergoing surveillance for UC. 195 cytology reports and 173 CxBladder reports (126 for Detect, and 47 for Monitor) were included in the analysis. The results for the urinary biomarkers are outlined in Table 1. Urinary cytology had a sensitivity of 39.2% and a specificity of 96.4%. CxBladder Monitor had the best sensitivity of 66.7%. The best NPV was recorded by CxBladder Monitor and indicates 93.3% of patients who tested negative truly did not have recurrence of urothelial carcinoma.

Conclusions: CxBladder Monitor has overall superior sensitivity and NPV compared to cytology, which makes it a better surveillance adjunct for patients with history of UC of bladder. This urinary biomarker improves our ability to “rule-out” disease recurrence non-invasively.

| Table 1: Comparison of Diagnostic yield of CxBladder and Cytology for Urothelial Carcinomas of the Bladder |
|-----|-----|-----|-----|-----|
| Test | Sensitivity | Specificity | PPV | NPV |
| CxBladder Monitor | 66.7% | 93.3% | 68.0% | 91.4% |
| CxBladder Detect | 54.5% | 84.4% | 62.0% | 84.9% |
| CxBladder Monitor | 58.8% | 83.3% | 62.0% | 84.8% |
| CxBladder Detect | 27.2% | 100% | 0.0% | 100% |
| CxBladder Monitor | 27.2% | 100% | 0.0% | 100% |

Percutaneous Microwave Ablation is Safe for Treatment of Anterior RCC Tumors

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University of Virginia1; University of Wisconsin School of Medicine2; University of Wisconsin3; University of Wisconsin School of Medicine and Public Health4

Introduction: To evaluate the impact of anterior tumor location on oncologic efficacy and complication rates for 151 consecutive biopsy-proven cT1a RCC tumors treated with percutaneous microwave (MW) ablation.

Materials & Methods: This HIPAA-compliant, single center retrospective study was performed under a waiver of informed consent from the institutional review board. One hundred forty-eight consecutive patients [103 M/45 F; median age: 67 years, IQR 61-73] with 151 cT1a biopsy-proven RCC [median diameter: 2.4 cm, IQR 1.9-3.0 cm] were treated with percutaneous MW ablation between March 2011 and August 2017. Patient and procedural data were collected including RENAL nephrometry score, use/volume of hydrodisplacement, number of antennas, MW generator power/time, procedure (anesthesia induction-postprocedure CT) and ablation (preprocedure imaging-postprocedure CT) duration. Technical success, recurrence-free (RFS), overall survival (OS) and complications were assessed at immediate and follow-up imaging. The Kaplan-Meier method was used for survival analyses.

Results: Ablation duration was longer for larger (p = 0.05), more complex (p = 0.05) tumors requiring more than 1 antenna (p = 0.0034). Technical success was achieved for all 151 tumors (100%) including 67 anterior, 61 posterior and 23 ‘X’ (neither anterior nor posterior) tumors. Median length of hospitalization was 1 day (range = 0-5). Median clinical and imaging follow-up was 30 months (range = 0-77) and 23 months (range = 0-71), respectively. There were 3 (2%) high-grade (Clavien ≥ II) procedure-related complications and 6 (4%) delayed complications, all urinomas. Six local recurrences (4%) were identified at a median of 41 months (range = 10-50) post-ablation. Three-year RFS was 95% (95% CI: 70-99%) for anterior, posterior and ‘X’ tumors. Three-year OS was 96% (95% CI: 89-98%).

Conclusions: Percutaneous MW ablation of anterior cT1a RCC is safe and effective. Long-term follow-up is needed to establish durable oncologic efficacy.

Obesity and 30-day Outcomes Following Minimally Invasive Nephrectomy

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University of Pennsylvania1; Cooper Medical School of Rowan University2; University of Pennsylvania Perelman School of Medicine3; University of Pennsylvania4

Introduction: To evaluate the association between obesity and postoperative outcomes following minimally invasive partial nephrectomy (MIPN) and minimally invasive radical nephrectomy (MIRN).

Materials & Methods: Using the National Surgical Quality Improvement Program database, we identified adult patients who underwent either MIPN or MIRN from 2012 to 2016. Patients were stratified by body mass index (BMI) according the World Health Organization classification of obesity (non-obese [BMI 18.5-29.9 kg/m2], class I obesity [BMI 30-34.9 kg/m2], class II obesity [BMI 35-39.9 kg/m2], and class III obesity [BMI ≥ 40 kg/m2]). Multivariable logistic regressions alternately including obesity class, comorbidity score, and both were used to evaluate the association among these variables with postoperative outcomes.

Results: A total of 21,334 patients (MIPN = 10,444, MIRN = 10,890) were included. When only obesity class or comorbidity score was included in our multivariable logistic regression model, both variables were associated with increased odds of overall 30-day complications. However, when both obesity class and comorbidity were included in the model, comorbidity but not obesity was found to be associated with increased postoperative complications (Table). Obesity was also not found to be associated with unplanned readmission. However, obesity was independently associated with prolonged operative time and discharged to continued care in the full model.

Conclusions: This NSQIP study suggests that obesity does not independently predict the likelihood of overall complications or readmission within 30 days and should not be considered a major barrier for MIPN or MIRN. Instead, obesity should be taken into consideration with other comorbidities when risk-stratifying patients prior to minimally invasive nephrectomy.

Figure 1: Kaplan-Meier recurrence-free survival (RFS) for percutaneous microwave ablation of anterior, posterior and X tumors.
Effect of Neoadjuvant Chemotherapy on Programmed Death Ligand 1 (PD-L1) Staining Fidelity between the Primary Tumor and Lymph Node Metastases in Bladder Cancer

K. Patel, B.L. Taylor1, F. Khani1, T.J. Guzzo2, D. Scherrer3, R. Ravishankar4, P. Lai2, S. Malkowicz2
Weill Cornell Medicine1; University of Pennsylvania2; New York Presbyterian Hospital, Weill Cornell Medical College3; Perelman School of Medicine4; Division of Urology, Department Of Surgery, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA5

Introduction: Study of the tumor microenvironment in various cancers including urothelial cell carcinoma (UCC) of the bladder has identified programmed death ligand 1 (PD-L1) as a potential target for immunotherapy. Uninhibited, malignant cells expressing PD-L1 complex with programmed death protein 1 (PD-1) and inhibit native T-cell responses to the tumor. Five agents have been approved for bladder cancer which bind to PD-L1 expressed by tumor cells and impede the formation of this complex. Several studies have attempted to validate PD-L1 staining of bladder tumors as a biomarker predictive of response to these agents, but with variable results. It is the goal of this study to evaluate PD-L1 staining fidelity between the primary tumor and lymph node metastases from cystectomy specimens and to evaluate whether neoadjuvant chemotherapy affects this relationship.

Materials & Methods: In this multicenter trial, two prospectively maintained bladder cancer databases were queried to identify 67 subjects who underwent radical or partial cystectomy between 2008 and 2015 and were found to have residual bladder cancer as well as positive lymph nodes. These cases were retrospectively reviewed, and original pathologic specimens were stained for PD-L1. Primary histology and PD-L1 staining was re-reviewed by a genitourinary pathologist. Specimens were considered “positive” if tumor cells exhibited > 1% PD-L1 staining and were also evaluated by H-score. Systematic analysis was used to assess how various clinical variables, including NAC, affected odds of PD-L1 fidelity between primary and metastatic tumors.

Results: Overall PD-L1 staining status was preserved in 79.1% of cases. The interclass correlation coefficient (ICC) between the average bladder and lymph node H-scores was 0.85 (95% CI 0.75-0.91). NAC did not significantly impact odds of PD-L1 fidelity (OR 1.074, 95% CI 0.797-1.454, p = 0.60). However, a significant correlation coefficient (ICC) between the average bladder and lymph node H-scores was observed in > 75% of cases in this study. Standard NAC did not impact PD-L1 fidelity between primary bladder and metastatic lymph node tumors was observed in > 75% of cases in this study. Standard NAC did not impact PD-L1 concordance of tumor cells in this cohort. Further observation of PD-L1 status of both tumor and infiltrating immune cells in metastatic bladder cancer, particularly in the setting of checkpoint inhibitor therapy, will help further elucidate changes in the tumor microenvironment at the time of metastasis and guide therapeutics.

Conclusions: PD-L1 fidelity between primary bladder and metastatic lymph node tumors was observed in > 75% of cases in this study. Standard NAC did not impact PD-L1 concordance of tumor cells in this cohort. Further observation of PD-L1 status of both tumor and infiltrating immune cells in metastatic bladder cancer, particularly in the setting of checkpoint inhibitor therapy, will help further elucidate changes in the tumor microenvironment at the time of metastasis and guide therapeutics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.015 (0.964, 1.070)</td>
<td>0.5678</td>
</tr>
<tr>
<td>Race (1=Caucasian, 2=African American, 3=Other)</td>
<td>1.047 (0.845, 2.578)</td>
<td>0.9109</td>
</tr>
<tr>
<td>Sex, (1=Male, 2=Female)</td>
<td>0.243 (0.079, 0.744)</td>
<td>0.0132</td>
</tr>
<tr>
<td>Received Intravesical Therapy</td>
<td>0.640 (0.198, 2.073)</td>
<td>0.4566</td>
</tr>
<tr>
<td>Received Neoadjuvant Chemotherapy</td>
<td>1.974 (0.673, 5.784)</td>
<td>0.2152</td>
</tr>
<tr>
<td>Pathologic T Stage</td>
<td>0.75 (0.400, 1.410)</td>
<td>0.3737</td>
</tr>
<tr>
<td>Primary Histology</td>
<td>1.047 (0.321, 3.413)</td>
<td>0.9399</td>
</tr>
<tr>
<td>(1=UCC, 2=Adenocarcinoma, 3=Squamous Cell Carcinoma)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presence of Lymphovascular Invasion</td>
<td>0.437 (0.128, 1.499)</td>
<td>0.1857</td>
</tr>
<tr>
<td>Presence of Carcinoma In Situ</td>
<td>0.526 (0.194, 1.425)</td>
<td>0.2065</td>
</tr>
<tr>
<td>Bladder H-Score</td>
<td>1.014 (1.004, 1.025)</td>
<td>0.0046</td>
</tr>
<tr>
<td>Bladder PD-L1 intensity</td>
<td>0.253 (2.918, 13.401)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Lymph Node H-Score</td>
<td>0.018 (1.007, 1.071)</td>
<td>0.0159</td>
</tr>
<tr>
<td>Lymph Node PD-L1 intensity</td>
<td>14.365 (4.509, 45.762)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
Materials & Methods: We have previously presented our systematic method for APP training in cystoscopy. Pilot tele-cystoscopy was performed by an APP with both an offsite UVA urologist to guide and interpret and an onsite urologist as backup support. The off site UVA urologist evaluated the APP’s ability to perform a complete cystoscopy (observes all areas of the bladder, identifies UOs, etc.). De-identified recordings of the transmitted video were then sent in an electronic survey (Qualtrics, Provo, UT) to community urologists. External urologists were asked to evaluate the completeness of the transmitted cystoscopy.

Results: Five videos clips were reviewed by both an internal reviewer and external reviewer for completion. External reviewer generally agreed that the APP appeared to perform a complete cystoscopy identifying the essential anatomic landmarks (Table 1). The first three pairs of assessments are almost identical, and the last two pairs are very consistent.

Conclusions: External urologist evaluation of the quality of transmitted cystoscopy is feasible via electronic survey. Tele-cystoscopy may be a viable solution provide diagnoses to remote areas.

### MP1-19

**The Institution of a Venous Thromboembolism Directed Quality Improvement Protocol in Patients Undergoing Radical Cystectomy for Bladder Cancer**

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Penn State Health - Milton S. Hershey Medical Center

**Introduction:** Radical cystectomy (RC) with urinary diversion performed for bladder cancer is associated with a significant rate of venous thromboembolic events (VTE). While VTE prophylaxis is recommended, there is lack of agreement regarding optimal protocols. We sought to determine the VTE risk reduction associated with each iteration of our VTE protocol.

**Materials & Methods:** We retrospectively reviewed our RC experience between 2006 and 2018. We assessed the prevalence of VTE risk factors in our RC population, and documented the evolution of our VTE prophylaxis protocols.

**Results:** 297 patients underwent RC. Results are summarized in Table 1. 163 received anticoagulation (AC) only while hospitalized and (Group A). 59 received AC while hospitalized and for 3-4 weeks post-discharge (Group B). 75 received AC prior to RC and for 3-4 weeks post-RC with focused teaching on the importance of compliance with early ambulation and AC use (Group C). When comparing Groups B and C with Group A, only Group C demonstrated a significant decrease in VTE events (p = 0.04), although the trend toward decreasing VTE incidence with increasingly aggressive prophylaxis across all three groups (15% vs. 10%). Further comparing Groups A and C, smoking was more prevalent in Group A (85% vs. 71%, p = 0.01) and more lymph nodes were harvested in Group C (p = 0.01), reflecting evolving practice patterns within our group (Table 1). There were no other statistically significant differences in the incidence of known VTE risk factors between groups. VTE prophylaxis, lymph node yield, and smoking were not independent predictors of VTE rates in a multivariable model.

**Conclusions:** Institution of an aggressive VTE prophylaxis program is associated with diminished VTE rates with no evidence of increased bleeding complications. However, VTE prophylaxis program is not shown to be an independent predictor of VTE rate on multivariable analysis, possibly because of changes in smoking incidence in the population that occurred concurrently with changes in VTE prevention protocols.

### MP2-02

**Convective Water Vapor Thermal Therapy: 3-Year Durable Outcomes of a Randomized Controlled Study for Treatment of Lower Urinary Tract Symptoms due to Benign Prostatic Hyperplasia**

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Chesapeake Urology

**Introduction:** Convective water vapor thermal therapy is a unique minimally invasive procedure for rapid ablation of prostate obstructive tissue including the median lobe and hyperplastic central zone tissue. We report 3-year outcomes of a randomized, controlled trial for treatment of moderate to severe lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia (BPH).

**Materials & Methods:** 197 men ≥ 50 years old with International Prostate Symptom Score (IPSS) > 13, maximum flow rate (Qmax) ≤ 15 mL/s and prostate volume 30-80 cc, enrolled in 15 centers were randomized 2:1 to thermal therapy with Rezum® System (136) or control (61). Control procedure was rigid cystoscopy with simulated active treatment sound. The total number of treatments in each lobe of the prostate was determined by the length of the prostatic urethra; it can be customized to the configuration of the gland including the median lobe/enlarged central zone. The primary endpoint compared IPSS reductions at 3 months after unblinding, evaluations continued annually for 3 years.

**Results:** Mean IPSS improvement by 3 months after thermal therapy was -11.2 vs. -4.3 points for control (p < 0.0001), remaining durable with 50% improvements from baseline throughout 3 years (p < 0.0001). Commensurate 50% improvements in quality of life and Qmax were sustained over 3 years (p < 0.0001). Ablation of the median lobe in 30/135 subjects resulted in significantly decreased PVR. At 36 months PVR decrease was 61% of the mean baseline vs. 18% for subjects without a treated median lobe (p = 0.0109). No late related adverse events occurred; no de novo erectile dysfunction was reported. The surgical retreatment rate was 4.4% (6/135), primarily due to failure to initially treat the median lobe in 4/135 (3%) subjects.

**Conclusions:** The 3-years results indicate that convective water vapor thermal therapy achieves rapid and durable relief of LUTS, quality of life and flow rates and preservation of sexual function. This office or ambulatory outpatient procedure requires minimal anesthesia; subjects experience minimal transient perioperative side effects. The thermal therapy warrants positioning as a procedure for LUTS relief, both as an initial therapy versus medications and as an alternative to transurethral surgery for selected patients.
Incidence and Risk Factors for Incomplete Holmium Laser Enucleation of the Prostate (HoLEP)

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Introduction: Holmium laser enucleation of the prostate (HoLEP) is a surgical treatment option for patients with benign prostatic hyperplasia (BPH). Inability to finish the procedure is a possible complication of the procedure that can lead to the need for a second HoLEP operation or conversion to open prostatectomy. The purpose of this study was to investigate the incidence and reasons as to why certain patients undergoing HoLEP procedures could not be successfully completed.

Materials & Methods: A retrospective review, from an IRB approved database, of 515 patients that underwent a HoLEP by a single-surgeon at our institution between January 2012 and December 2017 was performed. Patients who were unable to complete the procedure were retrospectively identified and analyzed via chart review. Univariate analysis was performed for demographics and baseline characteristics.

Results: A total of 71 (1.4%) patients undergoing HoLEP who could not be completed were identified. All patients required either a 2nd HoLEP procedure (3/7) or conversion to suprapubic prostatectomy (4/7). Patient 1 had a bladder that would not expand and was not possible. The patient subsequently underwent a second HoLEP operation one week later to undergo morcellation of tissue. Patient 2 underwent cystoscopy at the start of HoLEP procedure and was found to have a bloody prostate. The procedure was stopped and converted to open suprapubic prostatectomy. Lastly, in patient 6 and 7, enucleation was completed, but the patients afterwards became edematous due to fluid overload secondary to absorption. A second HoLEP procedure was required for morcellation of tissue. Details of all 7 patients are listed below in Table 6.

Conclusions: HoLEP is a safe and effective treatment for patients suffering from lower urinary tract symptoms. Inability to complete initial operation leading to necessity for a second HoLEP operation or conversion to open procedure is a rare but possible complication. Management and counseling should be directed towards providing patients with information in regards to this possibility.

Are 24-hour Urine Abnormalities Predictable in Patients With Low Urine Volume?

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Einstein Healthcare Network

Introduction: Maintaining urine volume above 2.5 liters is a common recommendation made by clinicians to help prevent kidney stone formation as adequate urine volume is a potential inhibitor of stone formation. Our goal was to identify the prevalence of low urine volume amongst stone formers as well as identify if low urine volume was associated with specific 24-hour urine abnormalities for patients in an underserved community.

Materials & Methods: A retrospective chart review was performed of patients treated at a single center between August 2014 and January 2018. Patients who submitted 24-hour urine samples were identified. Patients were divided into two groups based on whether their urine volume was less than or greater than 2 liters, as it was unlikely for patients to be above 2.5 liters on an initial collection. Frequency of 24-hour urine samples were identified. Patients were divided into two groups based on whether their urine volume was less than or greater than 2 liters, as it was unlikely for patients to be above 2.5 liters on an initial collection. Frequency of 24-hour urine abnormalities were then identified for patients with urine volume less than 2 liters and greater than or equal to 2 liters. Fisher’s exact test and multivariate logistic regression was then used to identify if low urine volume was associated with specific 24-hour urine abnormalities.

Results: Of 461 patients, 208 (45.1%) submitted an initial 24-hour urine collection. Low urine volume was the most prevalent 24-hour urine abnormality (133/208, 63.9%) followed by low urine citrate in females (68/109, 62.4%) and elevated supersaturation of calcium oxalate (ssCaOx > 10: 100% vs. 0%; p = 0.001). On bivariate analysis, low urine volume was associated with low urine pH (pH< 5.8: 73.1% vs. 26.9%; p = 0.04), elevated supersaturation of calcium oxalate (ssCaOx > 10: 100% vs. 0%; p = 0.001), elevated supersaturation of calcium phosphate (ssCaP > 2: 80.6% vs. 19.4%; p = 0.02), elevated ssUA (ssUA > 1: 75.8% vs. 24.2%; p = 0.002), and low urine citrate in females (Citrate < 80.55% vs. 14.7%; p = 0.001). Interestingly, patients with low urine volume on 24-hour urine had lower frequencies of elevated urine oxalate (oxalate > 42.3% vs. 57.6%; p = 0.001), elevated urine calcium in males (calcium > 250.32.3% vs. 67.7%; p = 0.001), and elevated urine uric acid in males (uric acid > 8.32.4% vs. 67.6%; p = 0.001). On multivariate logistic regression low urine volume was an independent predictor of elevated ssCaP, elevated ssUA, low urine citrate in females, and low urine oxalate.

Conclusions: More than half of the patients in an underserved community fell short of achieving 80% of the recommended fluid volume necessary to lessen the risk of kidney stone formation. This has implications on other metabolic parameters. Optimizing urine volume is a simple, low cost treatment and should be the first education point when counseling patients on strategies for stone prevention.
Hand Radiation Exposure Among Urology Residents May Exceed ALARA Limits
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Introduction: Ionizing radiation exposure is associated with an increased risk of developing leukemias and solid organ tumors. Consequently, residents may be particularly at-risk of radiation exposure; however, the cumulative radiation exposure for urology residents is largely unknown. As this study is the first to systematically assess resident exposure, we hypothesized that urology residents may be subjected to high levels of radiation, particularly at unlabeled areas of the body.

Materials & Methods: Junior urology residents wore dosimeters during all urologic surgeries where fluoroscopy was utilized during a four-month rotation at a single institution from March 2017 to June 2017. A ring dosimeter was worn on the hand and a badge dosimeter was worn on the external surface of the lead thyroid collar to determine radiation exposure to the hand and eyes, respectively. A control dosimeter badge was worn on the waist under the lead apron. Radiation data from all three dosimeter badges were then recorded at 30-day intervals.

Results: Junior residents assisted in 109 cases requiring the use of intraoperative fluoroscopy. For the collar dosimeter, the deep-dose equivalent (DDE) was 335 mrem (mean 83.75 mrem/month, median 109 mrem/month, range 10 to 935), whereas the lens-dose equivalent (LDE) was 337 mrem (84.25 mrem/month, anticipated 1,011 mrem/year), and the shallow-dose equivalent (SDE) was 324 mrem (81 mrem/month, anticipated 1,293 mrem-year). For the ring dosimeter, the total DDE was 2,250 mrem (562.5 mrem/month, anticipated 6,750 mrem/year). Waist dosimetry badges had undetectable radiation exposure.

Conclusions: At our institution, DDE levels measured at the hands are on pace to exceed the 5,000 mrem/year ALARA limit. As “Less As Reasonably Achievable” (ALARA) recommends DDE limits of 5,000 mrem/year (416.62 mrem/month). While radiation safety recommendations suggest exposures up to 50,000 mrem annually may be tolerable at some centers, residents demonstrated that routine “low-dose” procedures may still be incurring significant DDE exposure to unlabeled parts of the body. As a result, further investigation into hand radiation exposure and opportunities to improve hand radiation safety for residents should be pursued. Lens exposure for residents appears well within the ALARA recommendations.

12 Month Study Results of the Prostatic Urethral Lift for Obstructive Median Lobe
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Introduction: The Prostatic Urethral Lift (PUL) procedure for benign prostatic hyperplasia (BPH) has been proven to deliver rapid, significant, durable symptom relief with low morbidity and no sexual dysfunction. To date, the clinical evidence has been based on studies of men with lateral lobe enlargement only (LL). The objective of this study was to determine the safety and effectiveness of the PUL procedure using a new technique to treat obstructive median lobe (OML).

Materials & Methods: 45 subjects were prospectively enrolled in the MedLift clinical trial (NCT02623545), an extension of the L.I.F.T. randomized study. Inclusion criteria were identical to those in the L.I.F.T. study (age ≥ 50 years, AUASI ≥ 13, peak flow rate (Qmax) ≤ 12 mL/s and prostate volume ≤ 80cc) except for requiring an OML. During the PUL procedure, small Urolift® implants were placed to resect the lateral lobes. If median lobe obstruction persisted, a modified technique using the same design Urolift® system was used to deploy implants into the median lobe to create an unobstructed anterior channel. LUTS, quality of life (QOL), Qmax and sexual function were compared between L.I.F.T. and MedLift study results at 12 months.

Results: Symptom response for OML subjects was significant and better than for LL subjects in the L.I.F.T. study (Table 1). AUASI improvement for OML subjects was at least 13.4 points at 1, 3, 6 and 12 months (p<0.01). Qmax improved 90%-130% throughout follow up. At 1 month, 65% subjects reported a Qmax ≥ 12 mL/s and prostate volume ≤ 80cc except for requiring an OML. During the PUL procedure, small Urolift® implants were placed to resect the lateral lobes. If median lobe obstruction persisted, a modified technique using the same design Urolift® system was used to deploy implants into the median lobe to create an unobstructed anterior channel. LUTS, quality of life (QOL), Qmax and sexual function were compared between L.I.F.T. and MedLift study results at 12 months.

Conclusions: Patients in this study experienced excellent symptom improvement, meaningful improvement in QOL, and preservation of sexual function. Obstructive median lobes can be safely and effectively treated with the PUL and is supported by a new FDA median lobe indication.
**Outcomes of Minimally Invasive Hernia Repair in Robotic Assisted Radical Prostatectomy**

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**Introduction:** Robotic assisted laparoscopic prostatectomy (RALP) is the current standard care for the surgical management of prostate cancer. Inguinal and ventral hernias is a well known post operative complication, and incidence in the literature ranges from 7-21%.1,2 Arguably, some patients might have missed/undiagnosed hernia preoperatively that may become symptomatic post operatively. Studies have shown feasibility in concurrent hernia repair at time of RALP without a significant increase in complications, length of hospital stay (LOS) or need for reoperation.2,3

The objective of our study was to analyze our database of patients who underwent concurrent RALP with hernia repairs.

**Materials & Methods:** This was a retrospective chart review of patients who underwent concurrent RALP with inguinal or ventral hernia repairs at our institution between 2007 through 2016. The control group comprised randomly selected patients who underwent RALP alone during the same time period by the same surgeons. Primary outcomes were overall complications, recurrence rate, and LOS.

**Results:** There was a total of 51 patients who underwent concurrent RALP with hernia repair between 2007 through 2016 at our institution. Majority of patients had either one inguinal or umbilical hernia, but some had bilateral hernias or an umbilical and unilateral inguinal hernia. In total 32 inguinal and 24 umbilical hernias were repaired. There was no difference in mean age or BMI between the hernia group versus control, 60.2 ± 60.0 years and 29.7 vs. 29.9, respectively. No hernia recurrence was recorded in the study group. No difference was found in LOS (1.35 vs. 1.09, p = 0.122). One patient in the hernia group was taken back to the OR a week later due to a partial small bowel obstruction for a negative diagnostic laparoscopy.

**Conclusions:** Our data shows that concurrent RALP with hernia repair is safe, effective, and not associated with increased LOS or complications. Men should be evaluated preoperatively for hernias and if present, should be offered the option of concurrent repair.

**Evaluation of Escherichia Coli Resistance to Fluoroquinolones in Men Undergoing Prostate Procedures: It’s Time to Change Preoperative Prophylaxis**

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Cooper Medical School of Rowan University1; Cooper University Hospital Department of Pharmacy2; Cooper University Hospital, Department of Surgery, Division of Urology2; Cooper University Hospital Department of Medicine, Division of Infectious Diseases2; Cooper University Hospital Department of Surgery, Division of Urology2; Cooper University Hospital Department of Surgery, Division of Urology2

**Introduction:** The AUA recommends fluoroquinolones (FQ) as primary perioperative prophylaxis for many urologic procedures. However, the Infectious Disease Society of America (IDSA) recommends avoiding empiric FQ use in genitourinary (GU) infections due to rising Gram-negative resistance. In particular, FQ resistance to the most common GU pathogen, E. coli, has reached 50% in some U.S. regions. While our hospital reports ~ 30% FQ resistance to E. coli, we are unsure if these data are reliable to predict resistance in this patient population.

**Materials & Methods:** We utilized TheraDoc® to retrospectively review men ≥ 18 years of age who underwent a primary prostate procedure between January 2014 and December 2017. All patients had a positive E. coli isolate from urine or blood within 12 months of the procedure. We excluded patients who underwent more than one prostate procedure. EPIC® was utilized for chart review. The primary endpoint was the prevalence of FQ resistant E. coli in men undergoing prostate procedures. This study was approved by the IRB on December 19, 2017 as a performance improvement project.

**Results:** Fifty-seven men met criteria for chart evaluation. The most common procedure identified was radical prostatectomy (44%), followed by prostate photovaporization (23%). Preoperative antibiotics were administered to all patients and most received a single agent. Cefazolin or FQ were administered to 49% and 26%, respectively. Of 57 E. coli isolates, 31/57 (54%) were FQ resistant, while 8/57 (14%) were ceftriaxone resistant. Rates of FQ resistant E. coli from the hospital antibiogram (32%) were significantly lower than our study population (54%) (P = 0.0010). Forty-one patients (72%) received prior FQ within 1 year of the procedure. FQ resistance was significantly associated with prior FQ usage (P = 0.0091).

**Conclusions:** FQ resistance to E. coli was unacceptably high (53%) in this urologic population. If pre-procedure culture data are unavailable, an alternative agent such as ceftriaxone should be considered for trans-urethral or trans-rectal prostate procedures. 1st generation cephalosporins remain 1st choice for radical prostatectomy. Based on our internal data, we now currently recommend ceftriaxone for prostate biopsy and prostate resection. Lastly, whole hospital antibiograms may not be reliable to predict resistance in this patient population.
Analysis of Urological Transfers to a Metropolitan Quaternary Care Center
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Introduction: Inpatient urological care is not universally available in the U.S. The inter-hospital transfer of patients represents one avenue to meet this critical need, but to date its use is largely unknown. Therefore, we performed an analysis of all patients transferred to the primary urology service of a metropolitan quaternary care center.

Materials & Methods: A cross-sectional retrospective review of all patients transferred to our health system from 9/1/2015-9/30/2017 was performed. Cases with a urology attending as the accepting physician underwent a chart review to confirm a urological diagnosis as the reason for transfer. Transfers were categorized into one of 10 mutually exclusive categories based on the primary diagnosis. We examined the specialty of requesting physician, availability of urology services at the requesting hospital, transfer distance, level of transfer, time to admission, need for surgical management, length of stay, and cost.

Results: A total of 87 primarily urological transfers were identified (0.5% of total transfers to the health system). The majority were transferred at emergent level (68%). This required on average 9.8 hours (SD ± 10.9 hours) for arrival. Average travel distance was 37 miles (SD ± 25 miles). While 92% of requesting hospitals had an associated urologist, they comprised only 15% of referring physicians. Hospitalists (38%) made up the largest category of referring physicians, followed by emergency medicine (33%). Categories of transfers and management are shown in the figure. Overall, 40% of patients required a procedure during their stay. The median LOS was 4 days (IQR: 2-8 days) and was not significantly different between surgically and medically managed patients (p = 0.60). The average total cost per transfer was $20,980, with an average fixed cost of $18,698 and an average variable cost of $12,282.

Conclusions: Despite being a large quaternary care referral center, our institution transferred relatively quickly and over short distances. Less than half required a surgical procedure. Future efforts may determine if these patients can safely avoid a transfer altogether, with a urology attending as the accepting physician undergoing a chart review to confirm urological diagnosis as the reason for transfer.

Bedside Urologic Procedures Do Not Increase the Risk of Novel Positive Urine Cultures Compared to Foley Catheter Placement
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Introduction: Rates of positive urine cultures (PUC) in patients undergoing bedside urologic procedures (BUP) compared to Foley catheter placement (FCP) are poorly represented in available literature. We report our experience with PUC in patients undergoing FCP versus BUP, as well as risk factors for development of PUC and antibiotic-resistant bacteria.

Materials & Methods: A retrospective analysis was performed of a prospectively maintained database of patients between 1/2015 and 12/2017. Type of procedure was indexed (catheter alone, cystoscopy, urethral dilatation, suprapubic catheter), as well as pre- and post-procedural novel PUC (NPUC), defined as new prior culture present, a prior negative culture, or a culture with a newly represented organism obtained within 30 days of the procedure. Fisher’s exact test and multivariable logistic regression were performed to assess the comparative risk of NPUC associated with each procedure.

Results: 141 patients met criteria for analysis. 73.0% of patients had successful FCP alone (n = 103), while 27% required BUP (n = 38). BUP included cystoscopy (n = 14), cystoscopy with dilation (n = 18) and suprapubic tube placement (n = 6). Of patients also undergoing recurrent FCP, 68% required a total of 16. The total incidence of NPUC was 9.9% (n = 14) and the median time to NPUC was 19.0 days. 37.1% of NPUC had growth of an antibiotic-resistant organism (n = 6). NPUC occurred in 13.5% of patients undergoing BUP (n = 5) and 6.4% of patients with FCP (n = 9). There was no significant difference in NPUC between patients undergoing BUP versus FCP (RR 1.42, CI 1.06-1.65; p = 0.221) or patients undergoing recurrent FCP (RR 2.27, CI 1.03-5.00; p = 0.047). Logistic regression revealed that previous NPUC was the only significant predictor of NPUC (OR 9.07, CI 3.38-24.36; p < 0.001) as well as a subsequent antibiotic-resistant PUC (RR 8.31, CI 3.17-21.82; p = 0.001). Logistic regression revealed that previous NPUC was the only significant predictor of NPUC (OR 9.07, CI 3.38-24.36; p < 0.001) as well as a subsequent antibiotic-resistant PUC (RR 8.31, CI 3.17-21.82; p = 0.001). Logistic regression revealed that previous NPUC was the only significant predictor of NPUC (OR 9.07, CI 3.38-24.36; p < 0.001) as well as a subsequent antibiotic-resistant PUC (RR 8.31, CI 3.17-21.82; p = 0.001). Logistic regression revealed that previous NPUC was the only significant predictor of NPUC (OR 9.07, CI 3.38-24.36; p < 0.001) as well as a subsequent antibiotic-resistant PUC (RR 8.31, CI 3.17-21.82; p = 0.001).

Conclusions: There is no difference in NPUC or the development of antibiotic resistance between bedside urologic procedures and Foley catheter placement. Recurrent difficult Foley catheter placement also does not increase this risk. Previous PUC significantly increases the risk of NPUC and the development of antibiotic-resistant bacteria, likely secondary to previous antibiotic therapy and patient-specific factors. Future research should examine antibiotic usage in these patients.

Variation in Kidney Stone Composition Within the United States
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George Washington University

Introduction: Kidney stone incidence has been known to vary with temperature and climate. But very little is known about any variation in the composition of kidney stones across different regions of the United States. We attempted to evaluate whether stone composition changes depending on region.

Materials & Methods: We were given access to de-identified data from LABCORP’s database of kidney stone composition from 8/1/2016 and 10/24/2016 for states in 7 representative areas of the country: Virginia, Minnesota, Florida, Arizona, Colorado, Florida and Texas. We analyzed each component of kidney stones with optical microscopy supplemented with FT-IR spectrometry using both the percentage of the stone that was composed of that component (a continuous variable), as well as a binary variable coded none versus any. Univariate associations between component and state were examined using Fisher’s exact test for the binary indicator, and analysis of variance for the continuous percentage (using the log-transformed percentage if they were non-normal). The same set of analyses was used for decade of age versus each component. The association between age and state was examined using analysis of variance.

Results: Data were available for 4335 kidney stones, from patients in the 7 states mentioned. The most common components across all stones were Calcium Oxide Monohydrate and Calcium Phosphate (both present in 93% of stones), Calcium Oxide Dihydrate (in 57% of stones), and uric acid (in 12% of stones). Stone composition did not vary widely across regions except for uric acid stones which were more prevalent in Florida compared to other states, with an OR of 1.43 (95% CI 1.12-1.83).

Conclusions: Kidney stone composition does not vary widely by region within the United States. While temperature and humidity play a role in stone incidence, there does not appear to be a large variation between different climates with the exception of uric acid stone formation in Florida.
Procalcitonin is a Useful Biomarker for Predicting Positive Urine and Blood Cultures in Cases of Acute Urolithiasis

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Introduction: Patients presenting with obstructive urolithiasis warrant emergent urinary drainage if there is clinical suspicion of concurrent urinary infection. Procalcitonin (PCT) is an ultrasensitive serum marker of systemic infection and sepsis. Our objective was to evaluate the utility of PCT as an early marker for the diagnosis and differentiation of urinary tract infection and sepsis in patients presenting with obstructive urolithiasis.

Materials & Methods: With IRB approval, we generated a prospective database of patients presenting to Hershey Medical Center with obstructive urolithiasis. All patients had PCT drawn at time of presentation along with standard of care workup. Clinical course, including urine and blood cultures, was followed and correlated with admission PCT and WBC values. Comparison between values was made with the Mann-Whitney test. Receiver operating characteristic (ROC) curves were constructed to assess the predictive ability of PCT and WBC for infection and sepsis.

Results: Of the 30 patients accrued, 7 and 3 patients were found to have positive urine and blood cultures, respectively and 7 patients met criteria for sepsis. Elevated PCT was highly prognostic of positive cultures (p = 0.00056) and sepsis (p = 0.00028). PCT was more sensitive than WBC in predicting positive cultures with an area under the ROC curve of 0.922 (urine) and 0.981 (blood) for PCT compared to 0.643 (urine) and 0.432 (blood) for WBC. Youden’s indices for PCT were determined to be 0.14 ng/mL and 1.0 ng/mL for diagnosis of positive urine and blood cultures, respectively. PCT > 0.14 ng/mL was sensitive (0.86) and specific (0.83) for positive urine culture, while a PCT of > 1.0 ng/mL was highly sensitive (1) and specific (0.96) for positive blood cultures.

Conclusions: PCT is an effective biomarker in the setting of obstructive urolithiasis, and outperformed WBC as an early predictor of urinary tract infection, including bacteremia and sepsis. Further studies may prove PCT to be a valuable tool in the urologist’s armamentarium in the workup of acute obstructive urolithiasis.

Complications and Recurrence Following Urethroplasty

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Introduction: We sought to describe our post-operative complications and stricture recurrence following anterior urethroplasty, and to investigate any correlation between them.

Materials & Methods: We retrospectively reviewed patients undergoing anterior urethroplasty at MedStar Washington Hospital Center by a single surgeon. We recorded peri-operative complications and classified them as infectious, anastomotic, voiding, bleeding, oral mucosa related, or non-urologic, including cardiac, pulmonary, hematologic, or other systemic complications. Complications were classified by the Clavien-Dindo system. Recurrence was diagnosed by urethrogram or cystoscopy.

Results: From September 2012 to March 2018, 211 anterior urethroplasties were performed. Mean patient age was 51 years (17-81). Thirty-seven of 211 (17.5%) procedures resulted in post-operative complications. Complications were categorized as infectious (14), anastomotic (7), bleeding (2), voiding (8), related to the oral buccal mucosal graft site (2) or otherwise non-urologic (4). Peno-bulbar urethroplasty had the highest rate of complication (33.3%) however there was no significant difference in complication by location, as demonstrated in Table 1 (p = 0.132). Ten procedures (4.7%) resulted in Clavien grade III or higher complication: 3/14 infectious, 1/7 anastomotic, 2/2 bleeding and 3/8 voiding complications. One procedure resulted in mortality due to cardiac arrest on post-operative day one. Complications were not significantly associated with recurrence of stricture (p = 0.367). Thirty of 211 (14.2%) procedures resulted in stricture recurrence at a mean 5.7 months (1-22) time to recurrence. As shown in Table 1, there was no significant difference in recurrence rates based on urethroplasty location (p = 0.402).

Conclusions: Urethroplasty is safe and serious complications are rare; infection is the most common complication. Our results are consistent with prior published rates of complications and recurrence. Complications, while unlikely, should always be included in pre-operative counseling. Fortunately, if they do occur, complications do not appear to portend a greater risk of stricture recurrence.

Table 1 – Predictive ability of procalcitonin (PCT) for positive urine and blood cultures

<table>
<thead>
<tr>
<th>Infection - Urine</th>
<th>PCT (ng/mL)</th>
<th>Present</th>
<th>n</th>
<th>Absent</th>
<th>n</th>
<th>Total</th>
<th>P&lt;0.14</th>
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<td>FN</td>
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<table>
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<th>Infection - Blood</th>
<th>PCT (ng/mL)</th>
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<th>Absent</th>
<th>n</th>
<th>Total</th>
<th>P&lt;0.14</th>
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<td></td>
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<td>TP</td>
<td>3</td>
<td>TN</td>
<td>19</td>
<td>22</td>
<td>0.85742857</td>
<td>0.820696957</td>
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<td></td>
<td></td>
<td>FP</td>
<td>0.75</td>
<td>FN</td>
<td>9</td>
<td>9.75</td>
<td>0.76666667</td>
<td>0.687562693</td>
</tr>
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</table>

Table 1: Predictive ability of procalcitonin (PCT) for positive urine and blood cultures.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Value</th>
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<tbody>
<tr>
<td>Location</td>
<td>0.132</td>
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<tr>
<td>Recurrence of stricture</td>
<td>0.402</td>
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</table>

Table 2: Comparison of recurrence of stricture by location of urethroplasty.
MP2-18

Community Centered Retrospective Review of Prostatic Urethral Lift - A Single Surgeons Experience
G. McMahon1, M. Thaker2, M. Wilson3, T. Mueller4
Rutgers University SOM/Jefferson Health/Our Lady of Lourdes2; Rutgers University SOM, New Jersey Urology3

Introduction: Benign prostatic hyperplasia (BPH) with associated lower urinary tract symptoms (LUTS) has a significant impact on quality of life. Multi-institutional projects have demonstrated prostatic urethral lift (PUL) as a minimally invasive procedure with strong 5-year durability, minimal side effect profile, and no associated erectile or ejaculatory dysfunction. Long term single series data are needed. We aim to evaluate the performance of PUL in our single series community cohort.

Materials & Methods: We completed a retrospective chart review of men who underwent PUL in the office from January 2016 to August 2017. PUL, also known as UroLift (NeoTract, Pleasanton, CA, USA), was performed in the office under sedation by a single surgeon. International prostatic symptom score (IPSS) and quality of life (QOL) were recorded at baseline and at subsequent office visits. A paired-samples T-test was used to compare pre and post treatment values and a Pearson coefficient was used to determine the strength of relationships between variables. A value of p < 0.05 was set as the threshold for statistical significance.

Results: We identified 122 men who had undergone a PUL. Descriptive statistics demonstrated an average age of 69.5 ± 9.6, prostate volume of 51.6 ± 27.8, and number of implants used 5.5 ± 1.0. When comparing IPSS and QOL 83 and 80 paired samples were available and the mean follow up period was 9.3 ± 6.03 months. IPSS and QOL improved significantly from 20.4 ± 6.2 to 6.3 ± 4.7 (14.08 ± 6.6 p < 0.05). The number of implants used was found to be associated with prostate volume (r = 0.492 p < 0.05) but not IPSS or QOL score differences.

Conclusions: Our single surgeon series demonstrated statistically significant improvement in IPSS and QOL at an average of 9 months. In addition, initial IPSS and QOL scores were found to significantly correlate with IPSS and QOL improvement in IPSS and QOL at an average of 9 months. In addition, initial IPSS and QOL scores were found to significantly correlate with IPSS and QOL.

MP2-19

Initiative to Improve Oncologic Management of Small Renal Masses: A Shared Decision-Making Model
A.M. Caruso
Perelman School of Medicine at the University of Pennsylvania

Introduction: The finding of small renal mass (SRM) on radiological imaging and the potential of a cancer diagnosis is anxiety provoking for most patients. When diagnosed with a SRM, patients are confronted with multiple treatment options forcing a decision on a therapeutic course. The decision-making process occurs in the absence of any framework to guide patients. The purpose of this initiative was to develop and implement a shared-decision-making (SDM) model for newly diagnosed patients. Specific goals of the SDM model were to improve patient knowledge, alleviate patient anxiety, and improve patient confidence to make evidence-based decisions.

Materials & Methods: A SDM model was developed and implemented utilizing an educational video [Urology Care Foundation’s “What is a renal mass?” video] and a structured provider discussion. Patient knowledge, anxiety, and confidence in decision-making was assessed using a pre- and post-intervention survey. Structured provider discussions included risks and benefits of each management strategy individualized to the patient’s situation. Initial preference, informed preference and final treatment decision were recorded for each patient.

Results: RESULTS: Thirty-four participants demonstrated improved knowledge with a mean of 1.8, 4 were unchanged, 2 decreased. A Wilcoxon signed rank test was used for data analysis, P value (0.001). 1.8, CI 0.9 (1.5-2.9) yielded a significant improvement in knowledge post intervention. Two questions pertained to patient’s self-assessment of anxiety and confidence in decision-making. Approximately 40% of patients reported a decrease in their anxiety rating by a mean of 38%. When confidence in decision-making improved, it improved by a mean of 38%.

Conclusions: There was clear trend towards a greater patient understanding of SRMs. A SDM model which incorporated an intervention (educational video and structured provider discussion) showed improved patient knowledge, alleviation of anxiety and improved confidence in decision-making. The findings demonstrate the feasibility of implementing a SDM model with newly diagnosed patients. Results should encourage providers who aspire to incorporate a SDM model as a Best Practice for educating and counseling all patients.

MP2-20

Analysis of Online Urologist Ratings: Does Subspecialty Influence Mean Rating?
J. Zillioux1, C. Pifer2, D. Sharma1, D. Rapp2
University of Virginia1, Department of Urology, University of Virginia2

Introduction: Americans are increasingly using online rating websites to obtain information about physicians and to provide feedback. We sought to perform an analysis of online ratings information, with specific focus on the relationship between overall urologist rating and urologist subspecialty.

Materials & Methods: We conducted an analysis of urologic physician ratings on Healthgrades.com. We selected 20 states throughout four US geographical regions and collected ratings data for all urologists across three practice sizes within each state (largest private practice group; largest academic center; three small urology practices, < 5 physicians). Using available online information, physicians were further categorized into one of the following subspecialty groups: general, female urology, infertility and men’s sexual health, pediatrics, reconstruction, robotics/ oncology, and stories/endorchology. Ratings data were collected, which are provided on a scale of 1-5 (1 = “poor”, 5 = “excellent”). Statistical analysis was performed using Kruskal-Wallis analysis to assess for significant differences in the distributions of ratings within each subgroup.

Results: Data was analyzed on 872 urologists with a mean age of 53 (+/-10) years. Comparison of median ratings by physician and practice characteristics are detailed in Table 1. The median overall urologist rating was 4.0 (IQR [3.4-4.7]). Kruskal-Wallis analysis demonstrated that academic practice type and robotics/oncology subspecialty ratings were significantly higher when compared to remaining practice types or subspecialties (p < 0.001 for both). All other comparisons throughout practice type, specialty, region, and gender failed to demonstrate statistically significant differences.

Conclusions: In our study of online urologist ratings, academic practice setting and robotics/oncology subspecialty were associated with higher overall ratings. Further study is needed to assess whether this finding persists across other online rating websites.

Table 1: Classification of Physicians and Summary Statistics (n=872) (IQR)

<table>
<thead>
<tr>
<th>Practice Size</th>
<th>N (%)</th>
<th>Median Rating (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>424 (47)</td>
<td>3.9 [3.4, 4.4]</td>
</tr>
<tr>
<td>Academic</td>
<td>282 (32)</td>
<td>4.4 [3.8, 5.0]</td>
</tr>
<tr>
<td>Small</td>
<td>166 (19)</td>
<td>3.8 [3.2, 4.3]</td>
</tr>
<tr>
<td>Specialty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>426 (49)</td>
<td>3.9 [3.3, 4.4]</td>
</tr>
<tr>
<td>Robotics/Oncology</td>
<td>195 (22)</td>
<td>4.5 [3.8, 5.0]</td>
</tr>
<tr>
<td>Female</td>
<td>81 (9)</td>
<td>4.0 [3.5, 4.3]</td>
</tr>
<tr>
<td>Stones/Endo</td>
<td>65 (7)</td>
<td>4.3 [3.5, 5.0]</td>
</tr>
<tr>
<td>Infertility/Men's Health</td>
<td>48 (6)</td>
<td>3.8 [3.5, 4.5]</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>45 (5)</td>
<td>4.1 [3.4, 5.0]</td>
</tr>
<tr>
<td>Reconstruction</td>
<td>12 (1)</td>
<td>4.0 [3.4, 4.8]</td>
</tr>
<tr>
<td>Region</td>
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<tr>
<td>Midwest</td>
<td>209 (33)</td>
<td>4.2 [3.4, 4.8]</td>
</tr>
<tr>
<td>South</td>
<td>247 (28)</td>
<td>4.0 [3.4, 4.5]</td>
</tr>
<tr>
<td>Northeast</td>
<td>203 (23)</td>
<td>4.1 [3.5, 4.7]</td>
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<tr>
<td>West</td>
<td>133 (15)</td>
<td>4.0 [3.3, 4.4]</td>
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<tr>
<td>Gender</td>
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<tr>
<td>Male</td>
<td>704 (90)</td>
<td>4.0 [3.4, 4.7]</td>
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<tr>
<td>Female</td>
<td>88 (10)</td>
<td>4.0 [3.4, 4.6]</td>
</tr>
</tbody>
</table>
The Use of Indocyanine Green during Robotic Ureterorectal Reimplantation for the Management of Benign Anatomic Stenoses

Z. Lee1, M. Lee1, M. Sterling, A.Y. Keehn2, M.J. Metro3, D.D. Eun2
1Temple University Hospital, 2Temple University, 3Temple University School of Medicine

Introduction: Indocyanine green (ICG) has been utilized as a real-time intraoperative contrast agent to facilitate identification of the ureter and localization of ureteral strictures, and for monitoring of ureteral reimplantation during robotic ureterecto-reimplantation. However, the use of ICG during robotic ureterorectal strictures repair has yet to be reported. We describe our technique during intravesical and intraduodenal diversion ICG during robotic ureterorectal reimplantation and report our outcomes.

Materials & Methods: We retrospectively reviewed 8 patients who underwent robotic ureterorectal reimplantations by a single surgeon between August 2013 and July 2017. ICG (25 milligrams in 10 milliliters of distilled water) was injected antegrade and/or retrograde into the lumen of the ureter via a percutaneous nephrostomy tube and/or ureteral catheter, and retrograde into the lumen of the urinary diversion via a Foley catheter. All patients consented to off-label use of ICG. Postoperatively, all patients were assessed for clinical success: the absence of flank pain attributable to ureteral pathology; and radiological success: the absence of obstruction on renal scan and/or loopogram.

Results: Visualization of ICG under near-infrared fluorescence allowed for precise identification of the structured ureter and urinary diversion, which fluoroscoped green, and localization the anastomotic stricture margins, which poorly fluoroscoped green compared to healthy ureter. Five of 8 (62.5%) patients underwent a Bricker anastomosis, 1/8 (12.5%) patients underwent a Wallace anastomosis, 1/8 (12.5%) patients underwent an appendiceal interposition, and 1/8 (12.5%) patients underwent a left to right transureteroureterostomy. The median operating time was 208 minutes (IQR 191-299), estimated blood loss was 125 milliliters (IQR 69-150), and length of stay was 6 days (IQR 1-8). Three of 8 (37.5%) patients suffered a major (Clavien ≥2) and 2/8 (25%) patients suffered a major (Clavien ≥3) post-operative complication within 90 days of surgery. There were no complications related to ICG use. At a median follow-up of 29 months (IQR 21-38), 7/8 (80%) ureterorectal reimplantations were clinically and radiologically successful.

Conclusions: Intravesical and intraduodenal diversion ICG may be utilized as a real-time contrast agent during robotic ureterorectal reimplantation to facilitate identification of the structured ureter(s) and urinary diversion, and delineation of the ureterorectal stenosis margins.

Ileal Conduit Reconstruction in Patients With Stomal Stenosis or Retraction Using a New Segment of Ileum

A. Syed, M.S. Shah, A.M. Murphy, A.K. Das, P.J. Shenot
Thomas Jefferson University Hospital

Introduction: Creation of an ileal conduit may be complicated by late stomal complications such as stomal stenosis or stenosis of the conduit. Preoperative identification of the adherence of an ostomy appliance problematic. These complications can be difficult to manage. Many of these complications may not occur for years following creation of the stoma. Complete resection of the old conduit with reconstruction of a new conduit using a new loop of ileum is technically challenging primarily due to difficulty performing a new uretero-ileal anastomosis. We present our experience with ileal conduit reconstruction for late stomal complications using a second segment of ileum that avoids any revision of the existing uretero-ileoanastomosis.

Materials & Methods: Eleven patients with stomal stenosis (4 patients) or stoma retraction (7 patients) underwent stoma repair 20.5 +/- 1.97 years following initial ileal conduit construction. Mean patient age was 55.5 +/- 9.8 years. The indication for the ileal conduit was bladder cancer in three patients and neobladder bladder in eight patients (three with spinal cord injury and five with spina bifida). The five patients with spina bifida all had ileal conduit surgery as children over 40 years prior to revision. Surgery progressed in the following order: exploratory laparotomy, takedown of ostomy, excision of the stoma, and creation of an ileoileostomy (old subfascial conduit to new loop which forms the stoma) and maturation of new ileal stoma.

Results: Mean operative time was 219 +/- 54 minutes. Estimate blood loss was 134.0 +/- 59 mL. All patients have functioning, viable stomas with a minimum of 36 months follow-up. We have observed no bowel related complications.

Conclusions: Surgical revisions necessary for the management of late stomal complications of ileal conduit may be technically complex. Reconstruction with additional ileal segment to create a composite conduit is a viable option with excellent outcomes. We have found this technique particularly useful in obese patients and in patients with pediatric constructed conduits.
MP3-01

Surgical Delay for Radical Prostatectomy May Be Associated with Higher Positive Surgical Margin Rates and Increased Biochemical Recurrence


Virginia Commonwealth University; Virginia Commonwealth University School of Medicine

Introduction: There is limited evidence on whether delays in surgical therapy for prostate cancer lead to adverse outcomes in the long run. At our institution, patients referred from outside facilities for radical prostatectomy (RP) experienced longer time intervals between diagnostic biopsy and surgical intervention, when compared to patients from our own facility. Therefore, the goal of our investigation was to determine any association between delay in RP, and incidence of biochemical recurrence (BCR).

Materials & Methods: We performed a single-institution retrospective study of all patients undergoing RP at our institution between the years 2010-2011. Patients were stratified into two groups based on whether they were referred to our institution for surgical intervention, or whether they were already followed by our institution at time of initial biopsy. Patient characteristics and perioperative outcomes were identified. Primary outcome was incidence of biochemical recurrence (BCR), defined by American Urological Association guidelines as two subsequent PSA values above 0.2 ng/ml, positive surgical margins, and Gleason score upgrade (defined as an increase in total Gleason score from initial biopsy to surgical pathology).

Results: A total of 71 patients underwent RP at our institution during the study period. Of these, 38 patients were referred from outside facilities (delayed group), and 33 were from our institution (home group). Preoperative characteristics were similar between delayed and home groups, apart from the interval between initial biopsy and surgical intervention (mean 211.9 and 134.4 days respectively, p < 0.001). The delayed group was followed for a mean of 6.5 ± 1.3 years, and the home group for a mean of 6.2 ± 1.4 years. Groups were similar in regards to method of RP (robotic vs. open), Gleason score on surgical pathology, Gleason score upgrade, and extra-capsular extension. There was a trend towards higher rates of positive surgical margins in the delayed group at 21.1% (8/38), vs. the home group at 6.3% (2/32), p = 0.069. The incidence of BCR was significantly higher in the delayed group at 36.8% (14/38), vs. the home group at 6.1% (2/32), p = 0.002. Among patients with BCR, time to recurrence was similar between delayed and home groups (mean 3.68 ± 1.9 years vs. 2.88 ± 0.19 years), p = 0.817.

Conclusions: Our data suggest delays in radical prostatectomy may be associated with a higher rate of BCR in patients with prostate cancer, implying efforts should be made to minimize surgical delay.

MP3-02

Spatial Distribution of Biopsy Cores and the Detection of Intra-Lesion Pathologic Heterogeneity


Thomas Jefferson University Hospital

Introduction: To determine if spatial distribution of multiparametric MRI-transrectal ultrasound (mpMRI-TRUS) fusion biopsy cores to the index lesion reveals trends in the detection of intra-lesion Gleason heterogeneity and a more optimal biopsy strategy to sample the prostate.

Materials & Methods: A prospectively maintained single-institution database was analyzed for patients who underwent mpMRI fusion with targeted and systematic 12-core biopsy in 2017. Index lesion was defined as the lesion with longest diameter on T2W-MRI. In order to improve diagnostic accuracy of fusion biopsies, we changed our template for biopsy in July 2017. In cohort 1 (starting July 2017), fusion biopsy cores biopsies were taken in areas of the center of the target as well as 1cm laterally on each side. For cohort 2 (prior to July 2017), targeted biopsies were taken from the center of the lesion only. Gleason heterogeneity was defined as a difference in the maximum Gleason score obtained from fusion cores in the center of the index lesion vs. cores obtained from the periphery (cohort 1), or any difference in maximum Gleason score obtained from fusion cores targeted to the index lesion (cohort 2) compared with systematic 12 cores TRUS biopsy. Chi square test was used to compare Gleason heterogeneity between cohorts.

Results: 99 consecutive patients (35 and 64 in cohorts 1 and 2, respectively) with median age (SD) and PSA of 66.9 (± 9) and 9.7 (± 8.2) respectively were included. Mean index tumor diameter was 16.4 ± 4.9 and 15.8 ± 6.1, respectively (p = 0.047). Age, PSA, PI-RADS score, pre-operative MRI lesion size and Gleason score from 12-core biopsy were not significantly different between cohorts. Median number of biopsy cores taken from cohort 1 was 4 (2 center, 2 periphery) and in cohort 2 Gleason heterogeneity was observed at a significantly higher rate in cohort 1 vs. cohort 2 (58% vs. 24%, p < 0.041). In cohort 1, Gleason score from cores obtained from the center of the lesion were higher than Gleason scores obtained from the periphery of the targeted lesion in 57% of cases.

Conclusions: Presently, there is no consensus on the spatial placement or number of biopsy cores within lesions during mpMRI-TRUS fusion biopsy. Since changing our fusion biopsy strategy, we demonstrate that there is tumor heterogeneity in biopsy specimens, and that increased number of cores, as well as cores focused to the center of the largest lesion in the prostate, yield higher Gleason scores than cores focused to the periphery of the lesion. These results may contribute to the spatial recommendations for biopsy cores in the future.

MP3-03

Associations Between Hospital Volume and Outcomes of Robot-Assisted Radical Prostatectomy

L. Xie, B.L. Taylor, R. Talwar, R.R. Chelluri, J.D. Ramani, T.J. Guzzo

University of Pennsylvania; Weill Cornell Medicine; Penn State Health - Milton S. Hershey Medical Center; University of Pennsylvania

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

Materials & Methods: We identified RARPs for clinically localized (cT 1-2N0M0) prostate cancer diagnosed between 2010 and 2014 in the National Cancer Database. Hospital volume (cutoffs) were defined as the average annual hospital RARP volume over the five-year duration. We categorized hospital volume into very low, low, medium, high, and very high by most closely sorting final included patients into five equal-sized groups (quintiles). Outcomes included 30-day mortality, 90-day mortality, conversion (to open), prolonged length of stay (PLOS, > 2 d), 30-day (unplanned) readmission, positive surgical margin (PSM), and lymph node dissection (LND) rates. PSM was analyzed in the overall cohort and intermediate/high-risk cohort only.

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

Conclusions: Patients undergoing RARP at higher volume hospitals are likely to have better perioperative and oncologic outcomes than lower volume hospitals.
**MP3-04**

**Association of PI-RADS Classification and Adverse Pathologic Features Following Radical Prostatectomy: Evaluating Radiologic-Pathologic Discordance**

Z.R. Schwen, M. Mamawala, M. Huang, H. Carter

**Johns Hopkins Brady Urological Institute, Johns Hopkins University School of Medicine; Johns Hopkins University School of Medicine**

**Introduction:** Multiparametric magnetic resonance imaging (mpMRI) has emerged as a valuable tool to improve the risk stratification of patients with clinically localized prostate cancer (PCa). We hoped to better identify the risk of adverse pathologic features following radical prostatectomy (RP) in patients with Grade Group (GG) 1 and 2 on biopsy who had high PI-RADS scores.

**Materials & Methods:** Between 2014 and 2017, we retrospectively analyzed 203 patients who had an mpMRI prior to radical prostatectomy (RP) with Grade Group (GG) 1 (Gleason 3 + 3 = 6) and GG 2 (Gleason 3 + 4 = 7) prostate cancer on systematic +/- mpMRI-TRUS fusion targeted prostate biopsy. PI-RADS version 2 (PI-RADSv2) scores were grouped into high (4 and 5) and low (<4) and compared to adverse RP pathology results including any upgrading, upgrading to ≥ GG 3 (Gleason 4 + 3 = 7), extraprostatic extension (EPE), seminal vesical invasion (SVI), and positive pelvic lymph nodes.

**Results:** On biopsy, 102 and 101 patients had GG1 and GG2 pathology, respectively, prior to RP. 43.6% (44/102) of patients with GG1 and 61.8% (63/102) with GG2 had PI-RADSv2 4 and 5 lesions. For GG1, PI-RADSv2 4 and 5 lesions were significantly associated with any upgrading (66% vs. 47%, p = 0.02), upgrading to ≥ GG 3 (16% vs. 2%, p = 0.02), EPE (18% vs. 3.5%, p = 0.01), and any adverse pathology (≥ GG 3, SVI, EPE or positive pelvic lymph nodes, 27% vs. 5%, p = 0.02). Men with PIRADSv2 < 4 had a NPV of 99% for adverse pathology. For GG2, compared to low PI-RADSv2 scores, PI-RADSv2 4 and 5 scores were significantly associated with EPE (40% vs. 21%, p = 0.03), adverse pathology (48% vs. 23%, p = 0.06), and had higher rates of upgrading to ≥ GG 3 (21% vs. 13%, p = 0.21) although the latter did not reach significance at conventional thresholds. Pre-RP PSA was higher in those with any adverse pathology in GG1 group (median [IQR]: 7.4 [5.6-21] vs. 5.4[3.8-8.3], p = 0.005), as well as GG2 group (median [IQR]: 6.45[5.14-8] vs. 6.1[4.3-7.6], p = 0.02).

**Conclusions:** For patients with GG1 and GG2 PCa on biopsy, high PI-RADSv2 lesions are associated with adverse pathologic features on RP. For those with GG1 PCa, PI-RADSv2 4 and 5 lesions are associated with a 7-fold risk of adverse pathology on RP, raising the suspicion for radiologic-pathologic discordance. Additional studies are required to determine whether high PI-RADSv2 scores should influence eligibility for active surveillance or need for repeat targeted biopsy.

**MP3-05**

**Factors Associated with Active Surveillance Utilization as Initial Management Strategy for Men with Newly-Diagnosed Prostate Cancer**


**Johns Hopkins Brady Urological Institute, Johns Hopkins University School of Medicine; The Health Care Improvement Foundation; Penn State Health - Milton S. Hershey Medical Center; Fox Chase Cancer Center; Cooper University Hospital**

**Introduction:** Active surveillance (AS) is a recommended management strategy for men with low risk prostate cancer. Prior studies have shown significant variation in AS utilization among providers. We aimed to characterize factors associated with AS utilization among men with newly diagnosed prostate cancer in a regional collaborative.

**Materials & Methods:** We performed an analysis of the Pennsylvania Urologic Regional Collaborative (PURC), a voluntary collaborative of both private and academic urology practices in Southeastern Pennsylvania and New Jersey. We identified men with newly-diagnosed NCCN very-low, low, and intermediate risk prostate cancer, and determined the initial treatment modality used to manage these men. Multivariable logistic regression analysis was then used to identify factors associated with the use of active surveillance as initial management strategy.

**Results:** A total of 1880 men with low and intermediate risk prostate cancer were identified from PURC. Table 1 shows patient demographics and initial management strategy, stratified by disease risk. Table 2 shows the results of a multivariable logistic regression analysis of factors associated with AS utilization. Patient age was inversely associated with the use of AS, whereas no significant associations were observed with race or family history. With the exception of clinical stage, more-advanced disease-stage was strongly associated with AS utilization, whereas no significant associations were observed with disease-risk grade group, PSA, tumor volume on biopsy, or prior biopsy eligibility for active surveillance or need for repeat targeted biopsy.

**Conclusions:** Within PURC, AS was the most common initial treatment modality for men with NCCN very-low and low risk prostate cancer. Patient age and measures of disease-risk (grade group, PSA, tumor volume on biopsy) were strongly associated with AS utilization. Studies of large collaborative datasets such as PURC may allow for a better understanding of the factors underlying practice and provider-level variation in AS utilization.

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**MP3-06**

**Multi-center Clinical Trial of Real-time Prostate Cancer Diagnosis Using Optical Spectroscopy Guided Prostate Biopsy**


**New York University Langone Health; Carolina Urologic Research Center; The James Buchanan Brady Urological Institute, Johns Hopkins University School of Medicine; Memorial Sloan Kettering Cancer Center; The Urology Center of Colorado; Comprehensive Urology; Associated Medical Professionals; LLUMC; Department of Urologic Oncology, University of Colorado Denver Anschutz Medical Campus**

**Introduction:** Greater than 90% of TRUS-guided prostate biopsy cores are histopathologically classified as benign. Optical spectroscopy allows characterization of tumors by measurement of spectral tissue properties. As tissue undergoes malignant growth, the optical properties change. Assessment of changes in tissue optical properties may permit the diagnosis of prostate cancer (PCA) at the time of biopsy. The objective of this study was to acquire and analyze spectral data and correlate tissue biopsy cores using the Claricore Optical System (COBS) for training and development of a prostate tissue classification algorithm.

**Materials & Methods:** COBS is comprised of a 16-gauge core biopsy needle with an integrated optical sensor and a console which provides real-time prostate tissue classification information prior to taking the biopsy. Auto advancing of the inner needle via a built-in motor allows tissue classification along the length of the core in 1 mm increments. Men > 22 years old, scheduled for TRUS-guided prostate biopsy with a prostate volume > 20 were included in this multicenter study. Using COBS, 10-12 tissue biopsy cores were targeted from each patient. Fluorescence spectra at 280 and 340 nm excitations and elastic scattering spectra between 400-750 nm were collected for every core in 1 mm steps. For each tissue core, 1 mm segments were histopathologically classified either as benign or malignant and correlated with respective spectra measurements.

**Results:** Of the 144 patients included in the intent to treat analysis, 142 (98.6%) had biopsy cores successfully collected with the COBS. In total, 1,158 biopsy cores collected with the COBS were used for algorithm development. Of these cores, 185 (16.0%) were found to contain PCA. The COBS algorithm performance results are provided in Table 1. During the course of the study no serious adverse events were reported.

**Conclusions:** This study demonstrated that COBS can successfully acquire spectral data and correlate tissue biopsy cores for algorithm development. High sensitivity and negative predictive value can be used for precise targeting of PCA lesions with subsequent improvement in the diagnostic yield of TRUS-guided prostate biopsies. The COBS procedure was safe and well-tolerated by patients. Additional studies are underway to further establish Claricore accuracy and clinical utility.

**Table 1. Diagnostic performance of the developed classification algorithm.**

<table>
<thead>
<tr>
<th>Algorithm Performance Measures</th>
<th>% (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>85.9% (80.9 - 90.9%)</td>
</tr>
<tr>
<td>Specificity</td>
<td>97.9% (95.0 - 99.2%)</td>
</tr>
<tr>
<td>Negative Predictive Value</td>
<td>97.5% (95.8 - 99.2%)</td>
</tr>
<tr>
<td>Positive Predictive Value</td>
<td>61.9% (56.1 - 69.1%)</td>
</tr>
</tbody>
</table>

**Table 2. Multivariate logistic regression analysis of factors associated with AS utilization.**

<table>
<thead>
<tr>
<th>Factors Associated with AS Utilization</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>0.97 (0.95 - 0.98)</td>
</tr>
<tr>
<td>Race (White vs. Black)</td>
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</tr>
<tr>
<td>Family History (Yes vs. No)</td>
<td></td>
</tr>
<tr>
<td>Clinical Stage (Low vs. Intermediate)</td>
<td></td>
</tr>
<tr>
<td>Disease Risk (Low vs. Intermediate)</td>
<td></td>
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</tbody>
</table>
Moderated Poster Session 3: Prostate Cancer

MP3-07
Trends in Robotic Prostatectomy and Surgical Treatment for Male Stress Urinary Incontinence

G. Joice1, H.D. Patel2, A. Srivastava3, E. Wright, C. Pavlovich4
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Introduction: Robot-assisted laparoscopic radical prostatectomy (RALRP) has steadily increased in adoption over the past several years. However, it is controversial if the increased penetration of RALRP has led to a decrease in male stress urinary incontinence requiring surgical correction. Current studies analyzing trends in artificial urinary sphincter (AUS) and sling placement have been limited by only assessing inpatient procedures.

Materials & Methods: We queried the Nationwide Inpatient Sample (NIS) from 2009 to 2014 for all annual inpatient rates of AUS, male sling, and radical prostatectomy utilizing appropriate ICD-9 codes. National estimates were generated utilizing the included weighting methodology. RALRP was identified by searching secondary procedure codes for ICD-9 code 17 as indicating a robotic assisted procedure. The percent of outpatient surgeries was determined utilizing the National Surgery Quality Improvement Program (NSQIP) database to calculate inpatient/outpatient case mix for AUS, male sling, and radical prostatectomy during the same time period. Total national caseload was calculated by applying the percentage outpatient surgery to the inpatient case volume per year to produce overall estimates. Trends for case volume was calculated using linear regression.

Results: We identified 13,060 male slings, 14,970 AUS placements, and 391,128 radical prostatectomies from 2009 to 2014. Overall, male slings decreased from 2009 to 2014 (2,466 to 909 cases) but had stable ratios of outpatient procedures (85% to 86%). AUS similarly decreased over the time period (3,000 to 1,796 cases) but also increased in percentage of outpatient procedures (54% to 73%). Radical prostatectomy decreased over the time period (77,235 to 46,365) with overall few outpatient procedures (3% to 6%). However, RALRP increased from 27,805 to 37,130 cases as did percent robotic prostatectomies (36% to 80%).

Conclusions: In this contemporary national cohort of both inpatient and outpatient incontinence procedures, both AUS and male slings are decreasing overtime though are more increasing being performed in the outpatient setting. Radical prostatectomy is overall decreasing in incidence but RALRP is increasing both absolutely and relative to open prostatectomy. Future longitudinal studies are necessary to assess for the role that robotics plays in the decreasing incidence of male incontinence procedures after prostatectomy.

MP3-08
Our Initial Experience with the 4Kscore® and How It Changes Practice in an Academic Urology Practice

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Introduction: Since the early 1990’s, PSA screening has resulted in a 45% reduction in prostate cancer mortality. Despite this, there has been a lack of consensus among national policy panels about the optimal PSA threshold for biopsy recommendations due to its poor specificity. Hence, there have been efforts to risk-stratify patients with abnormal PSA values to better guide biopsy decisions. The 4Kscore® is a novel test which predicts the percentage risk of clinically significant prostate cancer (≥ Gleason 3 + 4) by assessing PSA values to better guide biopsy decisions. The 4Kscore® is a novel test which predicts the percentage risk of clinically significant prostate cancer (≥ Gleason 3 + 4) by assessing PSA values to better guide biopsy decisions. The 4Kscore® is a novel test which predicts the percentage risk of clinically significant prostate cancer (≥ Gleason 3 + 4) by assessing PSA values to better guide biopsy decisions. The 4Kscore® is a novel test which predicts the percentage risk of clinically significant prostate cancer (≥ Gleason 3 + 4) by assessing PSA values to better guide biopsy decisions.

Results: Our analysis included a total of 308 men. The most common indications for 4Kscore testing were elevated PSA (58%), and abnormal digital rectal exam (34%). The rate of transrectal ultrasound (TRUS) guided prostate biopsy within 6 months of 4Kscore testing was 50% (152/308). The mean 4Kscore was 26.4% in the biopsy group, while the mean 4Kscore in the non-biopsy group was 6% (p Fig 1). Clinically significant disease was found in 36/142 (25%) of biopsies. Treatment consisted of radical prostatectomy in 19 (33%), open prostatectomy, 4 (26%) patients, 5/19 (26%) opted for radiation therapy. Fifty patients that underwent TRUS biopsy had a PSA > 4 ng/mL and 4Kscore < 7.5%, with a TRUS biopsy risk of 15/34 (28%).

Conclusions: Use of the 4Kscore test in conjunction with other clinical factors in an academic urology practice resulted in a reduction in the number of prostate biopsies by over 50%. A significant difference was seen in the 4Kscore of patients who underwent TRUS biopsy and those who did not. Based on our data, the 4Kscore is a beneficial adjunct screening tool to prevent unneeded prostate biopsies and diagnosis of men with clinically insignificant disease.

MP3-09
Granulomatous Prostatitis is a Common Finding on Multiparametric MRI in Patients with Previous Exposure to Intravesical Bacillus Calmette-Guerin and may be Indistinguishable from Clinically Significant Prostate Cancer

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Introduction: Granulomatous prostatitis (GP) secondary to Bacillus Calmette-Guerin (BCG) exposure is a well-described clinical entity. Influence of previous BCG exposure on imaging findings in patients undergoing multiparametric Magnetic Resonance Imaging (mpMRI) for detection and management of prostate cancer is poorly understood. As such, we describe a cohort of patients with previous BCG exposure who underwent US/MRI fusion biopsy at our institution.

Materials & Methods: We reviewed our prospective database containing patients who underwent US/MRI fusion biopsy (n = 444) and identified men with prior intravesical BCG exposure. We then reviewed mpMRI results and subsequent fusion prostate biopsy findings.

Results: Ten men treated with BCG who were found to have PIRADS 4 or 5 lesions on mpMRI and underwent fusion biopsy were identified (Table 1). Men who were biopsy naïve (30%), had history of previous negative biopsy (30%) and who were on Active-Surveillance for low risk prostate cancer (40%) were included. The cohort was a median 64 (IQR 59-69) years of age and had median PSA of 6.3 (IQR 4.5-9.2). 80% of patients demonstrated biopsy-proven granulomatous prostatitis (GP). Pathology revealed clinically significant (Gleason Grade Group (GG Group) ≥ 2) prostate cancer in 3 patients (30%) with 1 additional patient (10%) harboring GG Group = 1 disease. Targeted biopsy of MRI abnormalities revealed significant cancer in 20% of cases, with 90% demonstrating GP. Previously-described “Actionable Intelligence Metric” (AIM) was 0% for this cohort (i.e. targeted cores did not provide additional information over information from the 12-core template).

Conclusions: In this largest series to date, we show that although high risk lesions on mpMRI in patients with previous exposure to intravesical BCG likely represent GP, clinically significant prostate cancer may be present and is radiographically indistinguishable from granulomas. These limited data raise questions about the clinical utility of mpMRI in patients who have received intravesical BCG.
MP3-10

Analyzing the Accuracy of PIRADS Stratified by Location within the Prostate

Introduction: The Prostate Imaging Reporting and Data System (PI-RADS) v.2.0 instructs the radiologist to take into account tumor location; however, the final PI-RADS score is agnostic to whether the tumor is in the peripheral (PZ) or the transitional zone (TZ) of the prostate. As such, we sought to assess whether the score is sensitive to specific tumor location.

Materials & Methods: Using a prospectively maintained database, we identified men who underwent targeted prostate biopsy using the UroNav System (Invivo) at our institution. Patients underwent mp-MRI at our institution or at a referring institution. Targetable lesions on multiparametric MRI performed at outside facilities were not formally re-interpreted by our own institution’s radiologists, but were traced for biopsy. PI-RADS score, tumor location, and pathologic findings were indexed.

Results: 457 biopsies (in 444 men) performed at our institution qualified for inclusion into our study (median age = 64, IQR 59-69, median PSA = 6.28, IQR 4.5-9.2). 231 targeted biopsies were taken from the PZ, while 226 targets were from the TZ. Significant cancers were defined as Gleason Group ≥ 2. A two-sided Fisher’s exact test was used to determine the association between a given PI-RADS grade and biopsy pathology (Figure 1). Biopsies of lesions in the TZ with PIRADS score of 5 were more likely to be positive for cancer than similar PZ counterparts. Meanwhile, PIRADS score 3 and 4 lesions were more likely to be consistent with malignancy if they appeared in the PZ.

Conclusions: A given PI-RADS Score appears to have different test characteristics for detection of prostate cancer based on its location. Better understanding of this clinical nuance is needed.

MP3-12

Does Gleason 4+4 Disease Volume at Prostate Biopsy Predict Surgical Pathology and Outcomes after Radical Prostatectomy for Prostate Cancer

Introduction: When patients with high risk clinically localized prostate cancer seek definitive treatment, urologists can face prognostic challenges regarding the risk of disease recurrence. A larger volume of disease identified on diagnostic prostate biopsy may place patients at increased risk for recurrence following radical prostatectomy, and this could have an important impact on preoperative counseling. This study seeks to explore the relationship between Gleason 4+4 tumor volume on diagnostic prostate biopsy and postoperative disease recurrence after robot-assisted radical prostatectomy (RARP).

Materials & Methods: All consecutive patients who underwent RARP at a single academic referral center between November 2009 and February 2016 for biopsy-proven Gleason 4+4 prostate cancer were reviewed retrospectively. Patients were assigned to high-volume (HVD) or low-volume disease (LVD) groups, with LVD defined as ≤ 4 or more cores showing Gleason 4+4 cancer on standard 12-core biopsy. Pathologic findings including extracapsular extension (ECE), seminal vesicle invasion (SVI), disease volume on surgical pathology, and positive surgical margins were tracked. Chi-square test and Fisher’s exact test were employed to determine associations between pathologic findings and clinical outcomes in each group where appropriate.

Results: A total of 52 identified patients met inclusion criteria, including 19 with LVD and 33 with HVD preoperatively. ECE was present on surgical pathology in 54.5% of patients with HVD versus only 15.8% with LVD (p = 0.006), while SVI was present in 27.3% of HVD patients and 0% of those with LVD (p = 0.018). No patients demonstrated pathologic lymph node involvement. Biopsy volume predicted biochemical persistence (BCP) in 5.3% of LVD patients and 30.3% of HVD patients (p = 0.033). 85.7% of those with BCP or biochemical recurrence (BRCR) over the first 3 years postoperatively were classified as HVD; 76.2% of these patients underwent salvage radiation therapy and 47.6% initiated androgen deprivation therapy. In the available follow-up, 5 patients (5.8%) developed bone metastases and 1 patient died from metastatic disease. Positive surgical margins, final Gleason score on surgical pathology, and the incidence of BCR did not differ statistically between groups.

Conclusions: Our analysis suggests that a higher biopsy volume of Gleason 4+4 disease is correlated with adverse pathologic outcomes after RARP. These patients unsurprisingly face a higher incidence of disease recurrence postoperatively. Patients with LVD may have a better chance of cure with RARP than predicted based upon their Gleason score alone.

MP3-11

Onset and Maintenance of Testosterone Suppression in Four Pivotal Trials of Subcutaneously Administered Leuprolide Acetate Formulated with Biodegradable Polymer Delivery System

Introduction: Subcutaneously administered leuprolide acetate (SC-LA) formulated with a biodegradable polymer delivery system has demonstrated efficacy in suppressing testosterone (T) levels to achieve and maintain medical castration (T < 50 ng/dL) in patients with advanced prostate cancer (PCa). Increasing evidence suggests that reaching and sustaining the lowest T possible is desirable during androgen deprivation therapy and correlates with disease specific survival. Data were pooled from four pivotal trials to determine the onset and maintenance of T levels at or lower than castrate levels with SC-LA treatment.

Materials & Methods: Eugonadal PCa patients received either 7.5 (6 doses), 22.5, 30, or 45 mg doses of SC-LA every 1, 3, 4, or 6 months, respectively, in 4 open-label, fixed-dose, pivotal trials. T was measured 2-4 times on day 0 and once on days 1, 2, 3, 7, and every week until the next dose through the end of the study; the 45 mg group had an additional measurement taken on day 2. Target T levels were 50, 20, and 10 ng/dL. The onset of T suppression and the proportion of time serum T remained below the target levels were calculated for each patient by extrapolating the time point when T first crossed the target. Proportion of time below target was calculated as total time T remained below target divided by time after target first achieved to end of study.

Results: In the pooled population (N = 437), median onset of T levels ≤ 50, ≤ 20, and ≤ 10 ng/dL were 21, 28, and 35 days respectively. Once target T was achieved, the mean proportion of time that patients maintained T suppression was 100%, 94%-99%, and 66%-85% for T ≤ 50, 20, and 10 ng/dL respectively (Table).

Conclusions: SC-LA achieved effective onset of T ≤ 50, ≤ 20, and ≤ 10 ng/dL at 3, 4, and 5 weeks respectively. SC-LA maintained consistently low T levels, with over 66% and 94% of the treatment period remaining below 10 and 20 ng/dL, and 100% of the treatment period remaining below 50 ng/dL. This T suppression profile may have implications for improved patient survival and extended time to disease progression.
Moderated Poster Session 3: Prostate Cancer

**MP3-13**

In-vivo Trial of Subharmonic Contrast-enhanced Imaging for the Detection of Prostate Cancer
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**Introduction:** Subharmonic imaging (SHI) is a new technique for imaging of microbubble ultrasound contrast agents with improved tissue suppression. We conducted a pilot study to evaluate contrast enhanced SHI of the prostate for the detection of prostate cancer (PCa).

**Materials & Methods:** Fifty-five patients referred for prostate biopsy were included in this study supported by a grant from the NIH R21 CA220214. Each patient was imaged with a transrectal IC5-9D ultrasound transducer on modified Logiq E9 system (GE Healthcare; Milwaukee, WI) that was altered to perform SHI (transmit/receive: 7.0/3.5MHz). Ultrasound contrast was infused intravenously over 10 minutes using 3 mL of Definity™ (Perflutren Lipid Microsphere, Lantheus Medical Imaging, N. Billerica, MA) diluted in 50 mL of saline. Images were obtained using conventional grayscale, color and power Doppler, conventional contrast harmonic imaging (HI) as well as SHI and flash replenishment in combination with SHI (MIP-SHI). Doppler flow and contrast enhancement were rated on a 5 point subjective scale for each sextant of the prostate. Prostate biopsy was performed with up to 6 targeted cores based on contrast-enhanced imaging, followed by a 12 part systematic biopsy.

**Results:** Contrast enhancement was clearly observed with both HI and SHI techniques in all subjects. SHI provided improved contrast signal and tissue suppression relative to conventional HI. Microvascular architecture and increased vascularity were best delineated with MIP-SHI. Each contrast enhanced technique demonstrated statistically significant predictive value for localization of PCa.

**Conclusions:** This first in vivo application of contrast enhanced SHI in the prostate demonstrated enhancement in all patients, with focal areas of contrast enhancement predictive of PCa in targeted biopsy specimens. Detection of PCa included 9 patients whose PCa was not identified by MRI.

**MP3-14**

Impact of National Cancer Policies on Global Prostate Cancer Incidence and Mortality: A Cancer Atlas Analysis
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**Introduction:** Prostate cancer (CaP) is an epidemiologically complex disease with heterogeneous incidence and mortality. In global CaP epidemiology, the influence of health systems-level factors on disease burden is unclear. This study examines how cancer surveillance programs and policies of national health infrastructures impact the global burden of CaP.

**Materials & Methods:** We queried the Cancer Atlas, a global cancer database of structural and socioeconomic variables pertinent to CaP in national health systems. We performed Pearson correlations and multiple regression analyses using these variables and country-specific rates of CaP incidence and mortality.

**Results:** We analyzed CaP incidence and mortality rates reported by 187 national health systems. Country-specific incidence was strongly positively correlated with the quality of population-based cancer registries (PBCR), which collect and measure surveillance statistics (P < 0.001). Having a national high-quality PBCR (vs. regional high-quality or lesser quality) was the strongest predictor of CaP incidence among all health systems. Country-specific incidence was strongly positively correlated with health systems (P < 0.001). Mean mortality was 17.7 and 31.8/100,000 for countries with medium and large labels, respectively, vs. 17.8/100,000 for small/ no labels (Fig. 1B). CaP mortality was also lower in countries with vs. without an operational national cancer control strategy (Fig. 1C; 13.1 vs. 16.3/100,000, P = 0.05).

**Conclusions:** Although the substantially higher incidence of CaP in countries with a high-quality PBCR may reflect differences in screening practices, a portion may be explained by a decreased capture of clinically-significant CaP in countries with regional-only or lower quality PBCR. Given the heterogeneity of this disease and diverse national healthcare priorities, the significance of these findings warrants further study.

**MP3-15**

Survival Outcomes of Initial Local Therapy on Clinically Localized Gleason 9-10 Prostate Cancer: A Surveillance, Epidemiology, and End Results Database Analysis
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**Introduction:** Men with Gleason score 9-10 prostate cancer have significantly worse outcomes compared to those with Gleason score 8 disease. Choice of upfront treatments remain controversial for this patient cohort. Using the Surveillance, Epidemiology, and End Results (SEER) database, we evaluated the impact of initial treatment with external beam radiation therapy (EBRT), external beam radiation therapy with brachytherapy (EBRT+BT), or surgery on prostate cancer-specific mortality (PCSM) and overall mortality in Gleason 9-10 disease.

**Materials & Methods:** The SEER database was queried for men diagnosed with Gleason score 9-10 prostate cancer from 2004-2014. Only localized disease with clinical T0 and M0 status was included. Gathered data included demographic, pathologic, therapy received, and survival outcomes. Using JMP v11.0, Kaplan-Meier survival curves and univariate and multivariate analyses were generated for initial therapy with EBRT, EBRT+BT, or surgery.

**Results:** A total of 11,359 men were included with 5,078 (44.7%) who underwent upfront treatment with EBRT alone, 683 (6.0%) with EBRT+BT, and 5,598 (49.3%) with surgery. 7-year PCSM rates were 26.8%, 14.1%, and 9.4% for EBRT, EBRT+BT, and surgery respectively (p < 0.001) (Figure 1). 7-year overall mortality rates were 41.7%, 26.3%, and 16.0% for EBRT, EBRT+BT, and surgery respectively (p < 0.001) (Figure 2). When controlling for age, Gleason score, clinical tumor stage, and PSA level on multivariate analysis, EBRT had greater PCSM than either surgery or EBRT+BT (HR 0.32, 95% CI 0.23-0.44, p < 0.001 and HR 0.37, 95% CI 0.30-0.40, p = 0.015 respectively). Comparison of PCSM and overall mortality between surgery and EBRT+BT revealed HR 0.36 (95% CI 0.34-1.00, p = 0.052) and HR 0.58 (95% CI 0.42-0.81, p < 0.001) respectively.

**Conclusions:** Among men with localized Gleason 9-10 disease, surgery and EBRT+BT showed significant improvement in survival outcomes compared to EBRT alone. When compared with EBRT+BT, surgery showed improvement in overall mortality but no significant difference in PCSM. Future prospective studies are warranted.
MP3-16

Combination of Magnetic Resonance Imaging and Decipher Test Provide Improved Predictive Value of Extracapsular Extension in Prostate Cancer
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Introduction: Magnetic resonance imaging (MRI) is emerging as a highly-utilized tool for diagnosis and risk-stratification of prostate cancer. One area of interest has been in detection of extracapsular extension (ECE) of prostate tumors. The approach, however, has demonstrated limited accuracy with a 49% sensitivity and 74% specificity for ECE. The Decipher test is a genomic classifier that measures RNA expression of 22 different biomarkers using biopsy or prostatectomy specimens that is being used for prognostic analysis of prostate cancer. The aim of this study was to determine if the combined use of MRI and Decipher test would result in an improvement in risk stratification through an improved predictive value of ECE.

Materials & Methods: Between April 2015 and August 2017, 26 patients underwent robot-assisted radical prostatectomy following prostate MRI at the University of Maryland Medical Center. Specimens obtained were sent for analysis of Decipher scores, which reported 5-year metastasis risk of the cancer. MRI was evaluated for several criteria including imaging-based suggestion of ECE and Prostate Imaging Reporting and Data System (PI-RADS) score. Multivariate and receiver operating characteristic (ROC) curve analysis was used to assess the predictive values of Decipher scores and PI-RADS scores for pathologic ECE.

Results: In total, 26 patients with complete data were analyzed of whom 14 had ECE (62%). 4 of these patients were PI-RADS 3, 14 were PI-RADS 4, and 6 were PI-RADS 5. The 5-year metastasis risks obtained from Decipher tests ranged from 1% to 45.9%. Three ROC curves were created to compare the ability of PI-RADS score to predict ECE, Decipher score to predict ECE, and Decipher and PI-RADS scores combined to predict ECE. This demonstrated improved predictive value of ECE when Decipher and PI-RADS scores are used together with the area under curve (AUC) = 0.92 when compared to each score separately (Decipher score vs. ECE AUC = 0.71; PI-RADS score vs. ECE AUC = 0.83; p < 0.05). Thus combining the genomic testing and MRI improved prediction of pathologic ECE in the prostatectomy sample.

Conclusions: Use of prostate MP-MRI PI-RADS score and genomic testing scores may work synergistically to help predict pathologic ECE for prostate cancer at time of radical prostatectomy.

Impact of Age at Diagnosis on Cause of Death in Prostate Cancer
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Introduction: Prostate cancer typically has a low rate of prevalence of lethal disease. However, patients who develop prostate cancer at an earlier age may be at risk for a greater risk of dying due to prostate cancer, as life expectancy is greater and younger age of onset is associated with more aggressive disease. Understanding risk of death from prostate cancer by age may affect treatment decisions. This study attempts to characterize the mortality and cause of death (COD) trends associated with age at diagnosis of prostate cancer.

Materials & Methods: The relationship between COD and age at diagnosis was investigated using data obtained from the US Surveillance, Epidemiology, and End Results Program (1973-2014) for prostate cancer (N = 1,210,922). Patients in which the cancer was their primary cancer, COD data was missing, and those with incomplete survival months were excluded. In patients who had known COD, the percent COD due to prostate cancer versus other COD was examined.

Results: A total of 803,331 men were examined. The median follow-up was 74 months. Figure 1 demonstrates the proportion of COD attributable to prostate cancer from age 40-85+. Notably, the percent COD attributed to prostate cancer peaks in the 40-44 year age group at 69%, then gradually decreases until it nadirs in the 75-79 year old age group where it was 24% (p < 0.0001).

Conclusions: In the United States, men who were diagnosed at a younger age with prostate cancer were more likely to have their death attributed to prostate cancer than men diagnosed at an older age.

MP3-17

Practice Patterns for Use of Prostate Cancer Biomarkers in the Pennsylvania Urologic Regional Collaborative (PURC)
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Introduction: A major paradigm shift in the PSA-based approach to prostate cancer screening has led to the development of a number of prostate cancer biomarkers designed to supplement PSA-based screening approaches. Numerous prostate cancer biomarkers have overlapping indications and are marketed heavily, but to date there is little data regarding their utilization. We review practice patterns for prostate cancer biomarker utilization in a large statewide quality registry with a focus on the extent of heterogeneity across practices and providers.

Materials & Methods: The Pennsylvania Urologic Regional Collaborative (PURC) is a voluntary collaborative of urology practices in Pennsylvania and New Jersey focused on evaluation and improvement of prostate cancer care. Established in 2015, 9 participating practices encompassing 88 physicians have accrued over 5,600 patients into the registry. We identified all men whom underwent prostate cancer biomarker testing, and report utilization patterns. Additionally, a survey regarding biomarker use was administered to all practitioners within the collaborative.

Results: 260 (17.9%) men underwent prostate cancer biomarker testing. Biomarker testing was most commonly performed in men with NCCN low and intermediate-risk disease (28.6% and 39.1%, respectively). When stratified by treatment type, biomarker testing was most common among patients whose primary treatment was active surveillance (52.2%). There was significant variation in genomic testing by practice and within each practice site (Fig 1). The survey response rate was 29.5%. 84.2% of respondents utilize biomarkers in their prostate cancer patients; doubts regarding clinical efficacy was the number one reason cited for not using biomarkers. When posed with a hypothetical clinical scenario, 25% of respondents selected a non-indicated biomarker.

Conclusions: Within a large prostate cancer quality collaborative, we identified significant variation in prostate cancer biomarker utilization by practice and provider. Understanding practice-level biomarker testing trends may identify targets for quality improvement and enhance appropriate test utilization.

Table 1: Rate of Percent of Patients by Biomarker Test

Impact of Age at Diagnosis on Cause of Death in Prostate Cancer
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Introduction: Prostate cancer typically has a low rate of prevalence of lethal disease. However, patients who develop prostate cancer at an earlier age may be at risk for a greater risk of dying due to prostate cancer, as life expectancy is greater and younger age of onset is associated with more aggressive disease. Understanding risk of death from prostate cancer by age may affect treatment decisions. This study attempts to characterize the mortality and cause of death (COD) trends associated with age at diagnosis of prostate cancer.

Materials & Methods: The relationship between COD and age at diagnosis was investigated using data obtained from the US Surveillance, Epidemiology, and End Results Program (1973-2014) for prostate cancer (N = 1,210,922). Patients in which the cancer was not their primary cancer, COD data was missing, and those with incomplete survival months were excluded. In patients who had known COD, the percent COD due to prostate cancer versus other COD was examined.

Results: A total of 803,331 men were examined. The median follow-up was 74 months. Figure 1 demonstrates the proportion of COD attributable to prostate cancer from age 40-85+. Notably, the percent COD attributed to prostate cancer peaks in the 40-44 year age group at 69%, then gradually decreases until it nadirs in the 75-79 year old age group where it was 24% (p < 0.0001).

Conclusions: In the United States, men who were diagnosed at a younger age with prostate cancer were more likely to have their death attributed to prostate cancer than men diagnosed at an older age.
Can Prolaris Score be Used to Predict Change in Gleason Score from Biopsy to Post-radical Prostatectomy Pathology?

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Introduction: Gleason Score (GS) assignment from prostate biopsy has a significant rate of discordance with that assigned from postoperative radical prostatectomy (RP) pathology. The Prolaris Score (PS), derived from a genomic Cell Cycle expression analysis and Prostate Cancer Risk Assessment (CAPRA) score, has been validated in numerous settings as an independent predictor of cancer-related death and biochemical recurrence. The score is used to predict whether an individual’s cancer is more aggressive, less aggressive, or consistent with others in his AUA risk group. Thus far, the ability of the PS to predict a change in GS between biopsy and RP has not been evaluated.

Materials & Methods: We evaluated 66 men with prostate cancer who underwent treatment with RP at one tertiary care center between 2015 and 2017. Patients were stratified by AUA risk score with representation in low (LR), intermediate (IR), and high-risk (HR) groups. They were subsequently sub-grouped by change in GS as upgradation, downgrading, or no change. A PS of less than 1.15 was designated as low expression (less aggressive), 1.15-2.0 as intermediate expression (more aggressive), and greater than 2.5 as high expression (5 more aggressive) was obtained for each patient. The mean PS for each subgroup was then calculated to assess for correlation between Prolaris-predicted risk and grade-change.

Results: The analyzed cohort included 9 HR, 45 IR, and 12 LR patients with biopsy GS of 3+3 (15.4%), 3+4 (33.9%), 4+3 (15.0%), 4+4 (9.2%), and 4+5 (15.0%). 86% of patients had pre-biopsy PSA levels of ≤ 10.0. PS distribution included 62% with scores of 1-2.4, 33.5% 2.5-3.5, and 4% 3.6-5. Overall, upgraded (n = 18), no change (n = 34), and downgraded (n = 12) groups had average PS (with standard deviations) of 3.48 ± 0.76, 3.34 ± 0.58, and 3.84 ± 0.71, respectively. A one-way analysis of variance (ANOVA) was calculated on patients’ Prolaris Scores, stratified by grade change. The analysis was not significant, F (2, 63) = 2.46, p = 0.094.

Conclusions: When analyzed as a whole, and when stratified by AUA risk, there was no correlation between average PS and grade change from biopsy to post-RP pathology. While the average PS for the “no change” group was within the 2.5-3.5 range, there was high degree of variance within the group. Furthermore, the ANOVA revealed that the average PS was not significantly different than those of the upgraded or downgraded groups. Our data suggest that the Prolaris Score may not be used to reliably predict a change in biopsy GS. Both its independence from GS and its validated efficacy in predicting mortality and biochemical recurrence make the Prolaris Score a valuable tool to be used in risk stratification and shared decision-making.

Regional Variation in the “Diffusion” of Radical Prostatectomy

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Introduction: Volumes of radical prostatectomy (RP) have decreased in recent years for a variety of reasons, including greater use of expectant management and decreased screening and diagnosis. It is not clear, however, how changes in surgical practice have varied across healthcare regions. In this study, we 1) investigated regional variation in changes in RP volume, and 2) hypothesized that high initial volume was associated with a greater decrease over time, assuming that high volume may represent overtreatment of older patients.

Materials & Methods: Using publicly available longitudinal research files (http://www.dartmouthdiffusion.org/index.php) from The Dartmouth Atlas, we examined annual incidence of RP across hospital referral regions (HRRs) between 2004-2014 in a Medicare population. RP rates were adjusted for age and race, and procedure codes included both open and laparoscopic/robotic surgery. Rates of RP per year, absolute and percent changes over time were identified. Pearson correlations were calculated to determine whether baseline regional volume was associated with the magnitude of change.

Results: The mean rate of RP per 1,000 male Medicare beneficiaries was 1.33 (standard deviation = 0.58) per HRR in 2004, with a range of 0.39-3.14. The mean absolute decrease in volume was -0.41 (median 0.37), range -2.20 to +1.15. There was a mean change of -20% (range -73% to +148%) between 2004-2014, median change was -27%. Regional volume in 2004 was significant correlated with the absolute decrease in RP volume in the ensuing 10 years (r = -0.82, p < 0.001), as well as the percent decrease (r = -0.60, p < 0.001). Despite the overall trend of decreased volume, some regions with low baseline practices had an increase in volume during the study period.

Conclusions: There is substantial regional variation in both rates of RP, and in the magnitude of change over time. High baseline surgery volume was associated with a greater decrease in volume, possibly reflecting “overuse” of RP that decreased over time. Interestingly, a subset of regions with low baseline volume had increases in volume during the study period.
MP4-02

The Effect of Site-Specific Autologous Platelet-Rich Plasma Application During Vaginoplasty for Gender Affirmation Surgery

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Introduction: We utilize the application of autologous platelet-rich plasma (PRP) to improve outcomes during vaginoplasty for male-to-female gender affirmation surgery (MF-AGAS), but the optimal site of application is not well-defined. This study compares site-specific application of PRP to the neo-labia (PRP-NL) versus the neo-vagina (PRP-NV) to assess risk factors and outcomes.

Materials & Methods: A retrospective review of 172 patients who underwent penile inversion vaginoplasty MF-AGAS from 11/2016 to 11/2017 was performed. Data included site of PRP application, complications, operative data, age, BMI, medical comorbidities and patient compliance with postoperative care.

Results: Patients (n = 172) had median follow-up of 2.99 months, median BMI of 25.2, and a median age of 38.1 years. PRP was applied to the neolabia and the neovagina in 46.5% (n = 80) and 53.5% (n = 92) of patients in a nonrandomized fashion. 2.9% (n = 5) were undergoing revision vaginoplasties. Median length of stay (LOS) was 2 days and median blood loss (EBL) was 100 cc. Overall, complication rates were low (Table 1). A total of 16 patients (8.7%) required reoperation/revision. PRP location did not significantly influence LOS (mean = 2.0 vs. 2.2, p = 0.118), however there was a significant difference in EBL between the cohorts with PRP-NV associated with decreased EBL compared to PRP-NL (mean = 91.2 cc vs. 115.6 cc, p = 0.003). PRP-NV was associated with a 68% reduction in the risk (Table 1) of future reoperations compared to PRP-NLV. When sub-stratifying reoperations, PRP-NV was associated with an 88% reduction in the risk of repair for vaginal stenosis/narrowing. Location of PRP application was not significantly associated to any other complication. Multivariate logistic regression confirmed that PRP-NV reduced the likelihood of surgical revision (OR 0.22, CI 0.05-0.99, p = 0.049) compared to PRP-NL. BMI, history of prior neovaginal surgery, HIV status, diabetes, hypertension, smoking, COPD, breast augmentation, and noncompliance did not affect risk of reoperation/revision (all p > 0.05).

Conclusions: Our current study demonstrates similar overall outcomes between the two cohorts, with improvements in EBL and decreased revisions necessary in the PRP-NV cohort. Future studies should prospectively evaluate the efficacy of such interventions in order to continue to achieve improved patient outcomes.

MP4-03

Long Term Reoperation Rates in Patients Post-Holmium Laser Enucleation of the Prostate

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Introduction: Holmium laser enucleation of the prostate (HoLEP) is a surgical treatment option for patients with benign prostatic hyperplasia (BPH). Reoperation rates are thought to be relatively low after initial HoLEP. The purpose of this study was to determine that long-term reoperation rates in patients after HoLEP.

Materials & Methods: A retrospective review, from an IRB approved database, of 632 patients that underwent a HoLEP at our institution between January 2010 and December 2017 was performed. Long-term reoperation was defined as patients who underwent initial HoLEP operation and then later on, a subsequent HoLEP or transurethral resection of the prostate (TURP) was required. Reoperation rates were analyzed at 1, 5, and 8 years post initial operation. All procedures were performed by a single-surgeon. Univariate analysis was performed for demographics and baseline characteristics.

Results: The average age and body mass index was 70.5 ± 8.5 years and 30 ± 11.9, respectively. Patients undergoing reoperations (± standard deviation) was 110.7 ± 56.2 grams. Average trans-rectal ultrasound (TRUS) prostate size for patients undergoing reoperation was 110.7 ± 56.2 grams. The average age and body mass index was 70.5 ± 8.5 years and 30 ± 11.9, respectively.

Conclusions: Holmium laser enucleation of the prostate (HoLEP) is a safe and effective treatment for patients suffering from lower urinary tract symptoms. Long-term reoperation rates are relatively low. Prostate gland size may be associated with increased need for reoperation. Management and counseling should be directed towards a plan, especially in patients with larger prostate size.

MP4-04

Combined Urethral Surgery at Time of Penile Prosthesis Implantation Does Not Increase Risk of Device Infection

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Introduction: Urethral surgery for stricture disease or urethral trauma sustained at the time of inflatable penile prosthesis (IPP) implantation is thought to significantly increase rates of device infection. The classic teaching requires procedure abortion, urethral repair and a future, delayed IPP implantation. We report our experience with patients who had urethral surgery at the time of IPP implantation in order to further elucidate potential risk factors associated with device complications.

Materials & Methods: Consecutive records of patients who underwent IPP implantation at our institution between May 2007 and March 2017 were queried retrospectively. Medical records of patients with a history of urethral surgery at the time of IPP implantation were evaluated. Patient demographics, pre-operative workup, intra-operative maneuvers and post-operative follow-up data were analyzed with use of standard statistics.

Results: Records of thirteen men were identified. Average patient age was 63.9 years (range: 40-81), and 31 of men (84.6%) were Caucasian. Two men who sustained intra-operative urethral injuries underwent complex repairs with suprapubic tube (SP) placement. The remaining eleven men had stricture disease and required either stricture dilatation or urethroplasty. IPP revision (implantation/implantation) was performed in two of the men undergoing urethral dilation for stricture disease. There were no device infections or erosions. (Table 1).

Conclusions: Urethral surgery required to address either stricture disease or intra-operative urethral injury appears to be safe, when performed at the time of IPP implantation. SPT should be strongly considered during repairs of more significant urethral injuries, especially when graft material is utilized.

Table 1: Clinical Characteristics.

<table>
<thead>
<tr>
<th>Device type</th>
<th>N</th>
<th>Urethral surgery</th>
<th>N</th>
<th>Surgery related infection</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPP</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
The Relationship between Erectile Dysfunction, Obesity, and Physical Activity: The West Virginia University Experience

N.H. Yousef1, D. Riggs2, B. Jackson, T.L. Overholt1, A.O. Batin3, A. Luchey, M. Samuels, H.I. Foeks, S. Kandzari, S. Zaslau4
West Virginia University School of Medicine; WVU Medicine - Department of Urology; West Virginia University School of Medicine; West Virginia University School of Medicine

Introduction: The relationship between erectile dysfunction (ED) and age is well established and significant. Obesity and the lack of physical activity are major health concerns in the United States. West Virginia has the distinction of being the most obese state in America, with an obesity rate of 37.7% in 2017. Currently, West Virginia has some of the highest rates of heart disease, physical inactivity, diabetes, and smoking in the United States. Herein, we examine the possible effect of obesity and physical activity on ED through analysis of data on 289 subjects (age 50 or greater) who completed the Sexual Health Inventory for Men (SHIM).

Materials & Methods: SHIM surveys were given to patients at a university-based urology clinic being seen for general urological problems. A total of 653 surveys were administered and 289 of these surveys were completed sufficiently for analysis. Results were sorted into levels by SHIM score as follows: Severe ED (1-7), Moderate ED (8-11), Mild to Moderate (12-16), Mild ED (17-21) and No ED (22-25). Self-reported leisure time physical activity was measured by the Godin Leisure-Time Exercise Questionnaire. Data is reported as Mean ± St. Deviation. Statistical analysis was determined by ANOVA.

Results: No difference was observed in Age or Body Mass Index (BMI) when compared across the SHIM levels. Significant differences were observed between SHIM levels across Godin Questionnaire scores (P < 0.001), with the Severe ED group exhibiting significantly lower levels of physical activity compared to both the Mild ED (P < 0.001) and No ED levels (P < 0.001).

Conclusions: The obesity epidemic is a serious health concern in the United States due to the association with negative health outcomes. In our patient population, BMI had no effect on the degree or presence of ED. Individuals with increased physical activity as measured by the Godin Questionnaire exhibited improved SHIM scores. Increased physical activity exhibits many beneficial effects, and our results support this. Further investigation into the effects of obesity and increased physical activity on ED is ongoing.

<table>
<thead>
<tr>
<th>SHIM</th>
<th>&quot;N&quot;</th>
<th>Age</th>
<th>BMI</th>
<th>GODIN SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>54</td>
<td>64.13±7.26</td>
<td>30.83±5.75</td>
<td>3.88±1.17*</td>
</tr>
<tr>
<td>Moderate</td>
<td>27</td>
<td>61.63±8.88</td>
<td>31.25±6.36</td>
<td>12.99±4.08</td>
</tr>
<tr>
<td>Mild</td>
<td>83</td>
<td>64.68±8.55</td>
<td>31.38±5.72</td>
<td>17.63±1.85*</td>
</tr>
<tr>
<td>No ED</td>
<td>84</td>
<td>62.20±7.73</td>
<td>29.62±5.64</td>
<td>22.63±19.31F</td>
</tr>
</tbody>
</table>

ANOVA NS (p=0.066) NS (p=0.093) P < 0.001

Increased Reproductive Options in Men Treated with Clomiphene Citrate

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Introduction: Clomiphene citrate (CC) is commonly used off-label for the treatment of male infertility. Response rates are variable and there is a paucity of data to guide patient selection. To aid in shared decision making with patients, this study aimed to define response rates among men receiving CC, specifically in regards to improvement in total motile count (TMC) in semen analysis.

Materials & Methods: A retrospective analysis was performed on a cohort of 151 men treated with at least 25 mg of CC daily for male infertility and/or hyponogadism at two institutions between 2004 and 2014. Inclusion criteria consisted of documented pretreatment hormone profiles and pre- and post-treatment semen analyses. Men previously on testosterone were excluded. The primary outcome was change in semen parameters. Based on values available in the literature, a patient with a TMC > 5 million was considered a candidate for intrauterine insemination (IUI), while a patient with a TMC > 20 million was considered a candidate for spontaneous pregnancy.

Results: A total of 77 men met criteria for analysis. Median duration of therapy was 2.8 months. There was a statistically significant increase in TMC from 13 million to 28 million (p = 0.04). Sixty-three men (82% of the cohort) had abnormal pretreatment TMC (< 20 million). 12 of these men (19%) became candidates for spontaneous pregnancy post-treatment. Forty-six men (60% of the cohort) were not IUI candidates pretreatment (TMC < 5); 16 of these men (35%) became candidates for IUI post-treatment.

Conclusions: Men receiving CC showed a statistically significant improvement in TMC post-treatment. Among men who were not initially candidates for IUI, over one third became candidates after less than three months of therapy. CC may help increase reproductive options for couples with male factor infertility, especially those considering IUI.
Effect of Body Mass Index on Recurrence Following Urethroplasty

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Introduction: In the treatment of urethral strictures, urethroplasty has been demonstrated to be an effective, durable, and cost-effective surgical option. Limited investigation exists to understand whether obesity is an independent risk factor for urethroplasty failure. We sought to assess whether BMI is an independent predictor for stricture recurrence following urethroplasty.

Materials & Methods: We performed a retrospective review of patients undergoing urethroplasty between 2007 and 2014, identifying 137 patients for study inclusion. Data collected included body mass index (BMI), patient demographics, and surgical characteristics including age, stricture length and location, etiology, and urethroplasty technique. Logistic regression was performed to assess predictors for stricture recurrence using both univariate and multivariate models.

Results: Mean patient age and follow-up was 47 years (± 16.4) and 92 months (± 30.5), respectively. A recurrence rate of 17% was identified, with a mean time to recurrence of 29 months. There was no difference when comparing the mean BMI in patients with and without recurrence (28.9 vs. 30.4 kg/m², respectively) (p = 0.40). A higher rate of stricture recurrence was seen when comparing the cohort with a BMI < 25 versus remaining cohorts (BMI 25-30; BMI > 30). However, in univariate and multivariate analysis, BMI failed to demonstrate statistical significance as a predictor for urethroplasty outcome (Table 1). On multivariate analysis, fasciocutaneous repair type was predictive of stricture recurrence. No additional potential predictors assessed were found to be significant.

Conclusions: In the present study, BMI did not independently predict stricture recurrence following urethroplasty.

Table 1. Potential Predictors for Stricture Recurrence, Multivariate Analysis

<table>
<thead>
<tr>
<th>Predictor</th>
<th>OR (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.02 (0.99-1.07)</td>
<td>0.22</td>
</tr>
<tr>
<td>BMI</td>
<td>1.00 (0.92-1.09)</td>
<td>0.93</td>
</tr>
<tr>
<td>Stricture length</td>
<td>0.75 (0.53-0.98)</td>
<td>0.06</td>
</tr>
<tr>
<td>Stricture location</td>
<td>2.77 (1.25-24.19)</td>
<td>0.37</td>
</tr>
<tr>
<td>Procedure</td>
<td>2.49 (0.23-24.60)</td>
<td>0.44</td>
</tr>
<tr>
<td>Etiology</td>
<td>0.31 (0.02-6.61)</td>
<td>0.49</td>
</tr>
<tr>
<td>Associated comorbidities</td>
<td>0.12 (0.02-1.05)</td>
<td>0.41</td>
</tr>
<tr>
<td>Malignancy</td>
<td>0.33 (0.00-4.97)</td>
<td>0.33</td>
</tr>
<tr>
<td>Associated conditions</td>
<td>3.50 (0.14-142.56)</td>
<td>0.46</td>
</tr>
<tr>
<td>Repair type</td>
<td>0.59 (0.13-2.63)</td>
<td>0.49</td>
</tr>
<tr>
<td>Testicular transposition + local skin advancement</td>
<td>0.07 (0.00-6.40)</td>
<td>0.87</td>
</tr>
</tbody>
</table>

OR, odd ratio; CI, confidence interval; BMI, body mass index; TPS, tunicas and primary anastomosis; FC, fasciocutaneous.

Testicular Transposition Trends Towards Decreasing Length of Stay in Fournier’s Gangrene

J. Barnard, J. Patterson, A. Lachey, P. Bonasso
West Virginia University; West Virginia University School of Medicine

Introduction: Fournier’s Gangrene (FG) is a rapidly progressive necrotizing infection of the genitalia. Despite aggressive treatment, mortality rates are reported to be as high as 67%. Much of the morbidity is incurred during the initial hospital stay after the initial debridement. Transposition of testicles into subcutaneous thigh pouches with local skin advancement is one strategy by which soft tissue defects can be repaired. The present study sought to analyze the effect of testicular transposition on length of stay and rate of complications in FG patients.

Materials & Methods: Retrospective chart review was undertaken to identify FG patients from 2009 to 2012. Abstracted data included age, sex, length of stay, BMI, mortality, tobacco and alcohol use. Comorbidities were classified based on organ system. Length of stay and complications were compared across reconstruction types (Table 1). Data were analyzed using non-paired, two tailed t-test with significance p < 0.05.

Results: 31 male patients were identified with FG of which 20 met inclusion criteria. Patient comorbidities associated with FG included diabetes (70%), hypertension (70%), and smoking (55%). An average of 2.9 debridements were required for each patient and 80% had removal of scrotal skin. Orchietomy was required in 15% of patients. Average time to reconstruction was 16.65 days from initial debridement. 45% of patients underwent transplantation of one or more testicles with 55% also receiving local skin advancement. Skin grafting was required in 40% of patients. Testicular transposition trended towards a decreased length of stay relative to other reconstructive methods (18.82 vs. 28.78 days p = 0.09). Mortality was 10% for our study. Postoperative complications did not vary significantly based on type of reconstruction (Table 1).

Conclusions: Our findings validate the diagnosis of Fournier’s gangrene as a challenging clinical paradigm requiring multidisciplinary care and often protracted hospital stays with significant morbidity. The majority of our patients were obese, diabetic, smokers with hypertension and advanced age. Further investigation through larger volume studies may validate testicular transposition with local skin advancement as the optimal reconstructive strategy to decrease length of stay in FG patients.

Table 1. Length of Stay and Complications by Reconstructive Modality

<table>
<thead>
<tr>
<th>Reconstructive Type</th>
<th>Number of Patients</th>
<th>Mean Length of Stay (days)</th>
<th>Immediate post-op complications</th>
<th>Post-debridage complications</th>
<th>Clavien grade I</th>
<th>Clavien grade II</th>
<th>Clavien grade III</th>
<th>Clavien grade IV</th>
<th>Clavien grade V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedicle flap</td>
<td>4</td>
<td>47.15</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Advancement flap</td>
<td>11</td>
<td>24.41</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Advancement flap without testicular transposition</td>
<td>5</td>
<td>20.43</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Skin graft</td>
<td>9</td>
<td>20.43</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Skin graft without testicular transplantation</td>
<td>5</td>
<td>30.2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Testicular transposition</td>
<td>9</td>
<td>18.23</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testicular transposition into thigh</td>
<td>7</td>
<td>19.97</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reconstruction of 1 testicle</td>
<td>5</td>
<td>18.2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reconstruction of both testicles</td>
<td>2</td>
<td>37.6</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testicular transposition and skin graft</td>
<td>6</td>
<td>18.2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

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MP4-10

Weight-Based Gentamicin May Be Associated with Increased Acute Kidney Injury in Urologic Prosthetic Surgery
R.H. Moore1, U.A. Anele, S.C. Krzastek2, J.T. Rosenman3, A.P. Klausner1 Virginia Commonwealth University School of Medicine1; University of Virginia Department of Urology2; Virginia Commonwealth University3

Introduction: Despite the known nephrotoxicity of gentamicin, many societies (including the American Urological Association in 2008) have published guidelines recommending a single perioperative gentamicin dose of 5 mg/kg for antimicrobial prophylaxis during urologic prosthetic surgery. This recommendation is based on the theoretical renal safety and increased antimicrobial activity of a single large dose. The goal of our investigation was to identify rates of acute kidney injury (AKI) in urologic prosthetic surgery both before and after adoption of weight-based gentamicin dosing.

Materials & Methods: We performed a single-institution retrospective study of all patients receiving perioperative gentamicin during implant, revision, or explant of penile prostheses or artificial urinary sphincters between 2000-2017. Patient characteristics and perioperative outcomes were identified. Patients with available pre- and postoperative (≤ 7 days) creatinine values were included. AKI was defined by Kidney Disease: Improving Global Outcomes (KDIGO) criteria. Comparative analyses were performed between patients receiving standard-dose gentamicin and weight-based gentamicin.

Results: Of 415 urologic prosthetic surgeries performed during the study period, 124 met inclusion criteria with paired pre- and postoperative creatinine values. Sixty-seven received standard-dose gentamicin and 57 received weight-based gentamicin (mean dose 1.0 ± 1.4 vs. 3.7 ± 1.4 mg/kg, p < 0.05). There were no significant differences in preoperative renal function or various comorbidities between groups; however, the standard-dose group was slightly younger (mean age 60.5 ± 8.5 vs. 64.0 ± 7.4 years, p < 0.05), and comprised more explant cases (13.4 vs. 1.8%, p = 0.02) than the weight-based group. Two of 67 (3.0%) in the standard-dose group vs. 9 of 57 (15.8%, p = 0.02) in the weight-based group developed AKI (figure 1). Device infection rate was similar between standard-dose and weight-based groups (5.2 vs. 5.3%, p = 1.00).

Conclusions: Our data suggest weight-based perioperative gentamicin dosing may be associated with an increased risk of AKI, without noticeably improving infection rates. Weight-based dosing may warrant closer perioperative monitoring of renal function, and merits larger investigations to determine risks and benefits.

MP4-11

Medical Malpractice in Urology: Sources of Litigation, Risk Factors, and Outcomes
J. Kashkoush1, R. Shah1, A. Kashkoush2, A. Baccala3 University of South Florida Morsani College of Medicine1; University of Pittsburgh Medical Center2; Lehigh Valley Health Network3

Introduction: Litigation often causes changes in practice patterns. Urologists, like many other specialists, will refer difficult patients to other providers and limit the scope of their practice due to concerns of litigation. The aim of this study was to examine medical malpractice lawsuits involving urologists.

Materials & Methods: A retrospective analysis of Westlaw database was conducted to identify medical malpractice suits involving urologists between 2000-2015. General characteristics of cases were identified including geographic distribution, sex of plaintiff, and age range of patients. Cases were further divided into procedural and nonprocedural lawsuits. The primary outcomes of interest were the claims diagnosis and treatment success, and claims diagnosis and treatment time. The secondary outcomes were the claims diagnosis and treatment cost, and claims diagnosis and treatment rate.

Results: 63 cases were included for analysis with a urologist as a defendant. 70% (n = 44) of cases were procedural cases, with 30% (n = 13) involving the prostate. The most common postoperative injuries included sexual dysfunction, chronic pain, and lower urinary tract symptoms. 30% (n = 19) of cases were identified as nonprocedural. The most common nonprocedural case claims included failure to diagnose 22.5% (n = 9) and treat in a timely manner 20% (n = 8). 17 cases provided indemnity payment data. 59% (n = 10) of cases resulted in a payout. The average indemnity payout was $1,096,210 with a median payment of $731,415.

Conclusions: Common causes of litigation among urologists were identified in this study. In most cases, urologists faced litigation for an error or complication occurring within a procedural case involving the prostate or urinary tract. Urologists faced highest payout for unnecessary radiation therapy and misdiagnosis of prostate cancer.

MP4-12

Discrete Event Simulation of a Dedicated Procedure Day in Urology Clinics
M. Clements1, C. Piko2, T.L. Krupski1, J.M. Lebow1
Department of Urology, University of Virginia2; University of Virginia1

Introduction: Urology clinics have a relatively high number of procedures performed relative to other outpatient clinics. Incorporating these procedure visits into a standard office visit workflow can present a challenge due to differing demands on support staff and room/equipment turnover times. Our objective was to model the impact of a procedure-only-day compared with the traditional clinic day that has procedure visits interspersed with evaluation and management (E&M) visits in terms of staff utilization and patient wait times.

Materials & Methods: We used discrete event simulation to compare an experimental model (procedure-only-day plus two E&M days) compared to traditional model (three mixed days) per week. Resources included front desk, nursing/medical staff, and urologists. Percent utilization of resources, patient wait times, and total time through the system were compared between the two models. Results: Over 1 month, 25% of visits were procedures with an even distribution of cystoscopy, cystoscopy with stent removal, and transrectal ultrasound-guided prostate biopsy. Mathematical distributions were fit to the inputs and used for modeling over a simulated 4-week period, with 10 repetitions. The mean wait time in the traditional model was 25.3 minutes (95% confidence interval [CI] 21.6, 29.9) compared to 22.9 (95% CI 19.6, 26.3) in the experimental model. The mean total time in the system was the same at 125 minutes. A sensitivity analysis varying the percent of procedure visits from 20-50% showed more favorable wait times in the experimental model with increasing percent procedures. There were no differences physician and nurse utilization between models.

Conclusions: Addition of a procedure-only clinic day does not appear to increase wait times, time through the system, or decrease physician or nursing utilization.
First Dose Efficacy of AV002, an Emulsified Microdose Desmopressin Nasal Spray, in Patients with Nocturia

J. Miles-Thomas, A.C. Yang, L.P. Francis, D. Sussman
Urology of Virginia

Introduction: Nocturia is a highly prevalent, under-recognized condition associated with impaired sleep, reduced productivity, and negative impacts on overall health and health-related quality of life. It is often unclear whether a therapy is effective for nocturia given the lengthy time to confirm responsiveness. Hence, the rapidity of effect on nocturia is of keen interest. First uninterrupted sleep period (FUSP) is defined as elapsed time from bedtime to first nocturnal void or awakening if no void occurred. The first 3-4 hours of sleep includes deep sleep, slow wave, restorative sleep, which is correlated with improved productivity. AV002 is an emulsified microdose desmopressin nasal spray approved for the treatment of nocturia due to nocturnal polyuria (NP). The efficacy of the first dose of AV002 on FUSP and safety were assessed in two Phase 3 randomized, double-blind pivotal studies. Patients’ difficulty getting enough sleep was assessed in one study.

Materials & Methods: Patients ≥50 years old with NP at screening and a history of ≥2 nocturnal voids per night for ≥6 months (n = 1,045) were randomized to AV002 1.66 mcg, 0.83 mcg, or placebo and treated for 12 weeks. After first dose, FUSP was measured. Patients’ level of difficulty getting enough sleep was reported via the Impact of Nighttime Urination (INTU) health-related quality of life instrument. Safety evaluations included adverse events (AEs) and incidence of hyponatremia. Safety and INTU were evaluated throughout the study period.

Results: On first dose, increase in FUSP was significant compared to baseline in both AV002-treated groups (Table 1A). Patients on AV002 were 3 times less likely not to have any difficulty getting enough sleep. Throughout the two studies, incidence and severity of AEs in AV002-treated groups were similar to placebo. No patients treated with 0.83 mcg experienced severe hypotension (Table 1B).

Conclusions: Patients treated with AV002 experienced significant improvement in duration of FUSP on first dose and their difficulty getting enough sleep. The incidence of hyponatremia was low for both doses. These results suggest AV002 has rapid efficacy with a favorable safety profile in patients with nocturia due to NP. Rapidly reducing nocturia on first dose enables clinicians and patients to quickly confirm responsiveness while providing confidence in ongoing therapy.

Table 1A: Mean Increase in First Uninterrupted Sleep Period (FUSP) After First Dose in Patients with Nocturia due to Nocturnal Polyuria

<table>
<thead>
<tr>
<th>Group</th>
<th>Increase in FUSP (hr)</th>
</tr>
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<tbody>
<tr>
<td>1.66 mcg</td>
<td>1.5 ± 0.5</td>
</tr>
<tr>
<td>0.83 mcg</td>
<td>1.4 ± 0.5</td>
</tr>
</tbody>
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Table 1B: Percentage of Patients with Nocturnal Polyuria on Sleep LAB and Body Mass Index (BMI) (NP) Comparison

<table>
<thead>
<tr>
<th>BMI</th>
<th>Normal</th>
<th>Overweight</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>23%</td>
<td>33%</td>
<td>44%</td>
</tr>
<tr>
<td>25-29</td>
<td>15%</td>
<td>30%</td>
<td>55%</td>
</tr>
<tr>
<td>30+</td>
<td>12%</td>
<td>17%</td>
<td>71%</td>
</tr>
</tbody>
</table>

MP4-14

Machine Learning Facilitates Early Detection of Ureteropelvic Junction Obstruction

S.A. Holzman1; A. Porras2; R. Zee3; R. Sussman4; E. Blum, B. Sprague5; M.G. Lingurani6; H.G. Pohl7
Medstar Georgetown1; Children’s National Health System2; Children’s National Medical Center3; New York University Medical Center4; Children’s National Medical Center5; Children’s National Health System6

Introduction: Patients with congenital ureteropelvic junction obstruction (UPJO) are at risk of renal function deterioration. While diuresis renography (DR) provides useful metrics by which pyeloplasty can be recommended, such as differential renal function and drainage half-time, we have previously reported improved accuracy for the prediction of the decision for pyeloplasty using machine learning. Here, we sought to validate this machine-learning model in a larger patient population.

Materials & Methods: A retrospective review of patients who underwent DR for suspected UPJO at our institution between 2009 and 2015 was performed. Patients who had reached the endpoint of pyeloplasty or discharged from urologic care were included. Eighteen patients were added to the previous cohort of 59 patients who had reached the endpoint of pyeloplasty or discharged from urologic care. Six optimal features of the DR curves were selected to maximize the area under the receiver operator curve; these differed from the five optimal features used in the previously reported model. Both the six feature model and five feature model were included. Eighteen patients were added to the previous cohort of 59 patients and the machine-learning model was retrained on the larger population of 77 patients. Eighteen patients were added to the previous cohort of 59 patients and the machine-learning model was retrained on the larger population of 77 patients.

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</tr>
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MP4-15

Novel Observations of Female Pelvic Anatomy in Classic Bladder Exstrophy Using Three-Dimensional MRI Reconstruction

Horns Hopkins Hospital

Introduction: The pelvic anatomy of females with classic bladder exstrophy (CBE) has been discussed ad nauseam, but has never been quantified in anticipation of reconstruction. Measuring and understanding the unique female anatomy in CBE is paramount for surgical navigation and reconstructive outcomes. This study presents quantitative measurements about the cervix, vagina, and erectile bodies in unaltered female CBE pelvises.

Materials & Methods: Three-dimensional reconstruction of pelvic Magnetic Resonance Imaging (Avanto, Siemens, Erlangen, Germany), acquired using T1 and T2 weighted sequences, were performed (Dextroscope, Braeco Imaging S.p.A., Milan, Italy) on 8 females ranging in age from 0.67-12.17 months. Four female CBE patients (mean age 6.8 months) with MRIs before their osteotomy and primary closure were compared to four age matched controls with normal pelvises (mean age 5.8 months). Measurements of the erectile bodies, the cervix, and the vagina were taken.

Results: The mean distance between clitoral halves in CBE females was 1.35 cm (mean diastasis 3.9 cm), while the mean distance in controls was 0.04 cm. The distance between the anal and vagina was larger in CBE females (mean 2.64 cm) than in controls (mean 1.62 cm). The total vaginal length in CBE females (mean 1.67 cm) was half the length compared to controls (mean 3.39 cm). The mean angle between the cervical os axis and the vaginal axis was more acute in CBE females with CBE (121.9 degrees) compared to normals (163.7 degrees). All four controls had a retroversion of the cervix, with the other cervix in slight anteverision. The mean clitoral body angle is less in CBE females (88.05 degrees, right; 88.90 degrees, left) than in controls (134.5 degrees, right; 138.75 degrees, left). The average total length of each clitoral body was comparable in CBE females (26 mm) and controls (29.1 mm), however the proportion of anteriorly dependent clitoris to pelvic rami associated clitoris was over five times larger in CBE patients (9.56 anterior/posterior) compared to normals (3.82 anterior/posterior).

Conclusions: Along with quantifying several anecdotal relationships of the cervix and vagina with implications for fertility, this study offers novel observations about the anatomy of the erectile bodies in female exstrophy infants. Most importantly, contrary to the erectile bodies in male CBE patients, females have the majority of the clitoral body anterior to the pelvic attachment.
The Role of Human Acellular Dermis in Preventing Fistulas after Bladder Neck Transection in the Exstrophy-Epispidias Complex

K. Benz, J. Jayman, M. Maruf, G. Joice, M. Kasprenski, N. Sopko, H. DiCarlo, J. Gearhart
Johns Hopkins Hospital

Introduction: Fistulas are a common complication following bladder neck transection (BNT), and methods of tissue interposition are utilized to decrease fistulization rates post-operatively. The purpose of this study is to evaluate Human Acellular Dermis (HAD) as an adjunct during BNT by comparing its surgical outcomes with other types of tissue interposition.

Materials & Methods: A prospectively-maintained institutional database of Exstrophy-Epispidias Complex (EEC) patients was reviewed for those who underwent a BNT with at least 6 months follow-up. The primary outcome was the occurrence of BNT-related fistulas.

Results: In total, 147 EEC patients underwent a BNT with a mean follow-up time of 6.9 years (range 0.52 years to 23.35 years). There were 124 (84.4%) classic epispadias patients, 22 (15.0%) cloacal epispadias patients, and 1 (0.7%) penopubic epispadias patient. A total of 12 (8.2%) BNTs resulted in fistulization, including 4 vesicourethral fistulas, 7 vesicovaginal fistulas, and one vesicovaginal fistula. There were 5 (22.7%) fistulas in the cloacal epispadias cohort, and 7 (5.6%) fistulas in the classic bladder extrophy cohort (p = 0.019). Using either HAD or native tissue flaps resulted in a lower fistulization rate than using no interposed layers (5.8% vs. 20.8%; p = 0.039). Of those with HAD, the use of a fibrin sealant did not decrease fistulization rates when compared to HAD alone (6.5% vs. 8.8%, p = 0.695). There was no statistical difference in surgical complications between the use of HAD and native flaps (8.6% vs. 5%, p = 0.716).

Conclusions: Use of soft tissue flaps and HAD is associated with decreased fistulization rates after BNT. HAD is a simple option and an effective adjunct that does not require harvesting of tissues in patients where a native flap is not feasible.

Characterization of Pediatric Bowel and Bladder Dysfunction via Pupillometry

E.L. Malphrus1, D. Strum2, K. Jackson2, J. Finkel2
George Washington University1; Children’s National2

Introduction: Bowel and Bladder Dysfunction (BBD) refers to a heterogenous group of voiding disorders, accounting for an estimated 40% of pediatric urology visits. Symptoms of BBD include enuresis, urgency, and urinary retention, often accompanied by constipation. While the role of the autonomic nervous system (ANS) in regulation of voiding is well-characterized, it is not known if children presenting with BBD exhibit distinct patterns of ANS activity that could be measured for diagnosis, or targeted for intervention. Pupillometry allows for assessment of systemic ANS activity, and therefore could elucidate differences in ANS function among BBD patients. This study aimed to determine whether a pupillary response can be characterized for BBD.

Materials & Methods: The Neuroptics PLR-2000 pupillometer was used to assess 7 pupillary parameters: maximum diameter (MAX), minimum pupil diameter (MIN), change in diameter (DELTA), latency (LAT), average constriction velocity (ACV), maximum constriction velocity (MCV), and average dilation velocity (ADV). Both BBD patients and controls were recruited from the urology clinic at Children’s National. Pupillometry was conducted before and after voiding.

Results: BBD patients showed a significantly larger MAX in the pre-voiding condition relative to controls. Additionally, several pre- and post-voiding parameters showed near-significant differences. The changes in values pre- and post-voiding were also compared, and BBD patients showed significantly larger changes in both MAX and ACV. These results suggest that BBD patients may have a distinctive profile of ANS activity, and that this profile may be detectable in a clinical setting via pupillometry.

Conclusions: The role of the ANS in voiding is well described, with the parasympathetic nervous system (PNS) generally more active during voiding, and the sympathetic nervous system (SNS) more active during the retention phase in healthy patients. The larger MAX seen in the pre-voiding condition among BBD patients could indicate relatively higher SNS activity during the retention phase. This is consistent with a finding from a study of cardiac autonomic activity among BBD patients, which found higher baseline heart rate relative to controls. The significantly larger changes in MIN and ACV between pre- and post-voiding conditions among BBD patients could indicate greater variability in ANS activity.

Clinical and MRI Manifestations of Penis Loss After Complete Primary of Bladder Exstrophy

M. Maruf, M. Kasprenski, J. Jayman, K. Benz, J. Michaud, E. Dunn, J. Gearhart
Johns Hopkins Hospital

Introduction: Epispadias repair, using the complete penis disassembly technique, is frequently combined with primary bladder closure in patients with classic bladder extrophy (CBE). Yet, penile disassembly has been posited as a risk for penile injury. Herein, the authors present all CBE cases referred to their institution where primary closure with penile disassembly epispadias repair was complicated by penile injury.

Materials & Methods: A prospectively-maintained institutional database of 1336 exstrophy-epispadias complex patients was reviewed for complete primary repair of CBE cases referred to the authors’ institution, and those with injury to the penis or pelvis confirmed anterior corporal deficiency that resulted from primary closure. Median follow-up time was 9.8 years (range 3.3-21.3). Penile injury was identified in 25 (14%) of 173 CBE patients referred after a prior complete primary repair, 22 (15.0%) cloacal extrophy (CBE). Yet, penile disassembly has been posited as a risk for penile injury.

Results: Of the 173 CBE patients referred after a prior complete primary repair, 25 (14%) were identified with penile loss. A majority (80%) were closed in the neonatal period, and 52% had a pelvic osteotomy. Ten patients (40%) had a failed primary closure. Median follow-up time was 9.8 years (range 3.3-21.3). Penile injury was identified in 25 (14%) of 173 CBE patients referred after a prior complete primary repair, 22 (15.0%) cloacal extrophy (CBE). Yet, penile disassembly has been posited as a risk for penile injury.

Conclusions: As part of the primary bladder closure, penile disassembly for epispadias repair may lead to penile ischemia. In addition to reconstructive planning, MRI may be used to quantify penile injury. CBE patients with penile injury can be managed with myocutaneous phalloplasty. Because of the soft tissue loss with complete penile disassembly, it may be time to reevaluate the application of this technique in the reconstruction of bladder extrophy.
Parental Compliance for Two Stage Fowler-Stephens Laparoscopic Orchiopexy: Is Everyone Following Up for the Second Stage and, if not, Who is at Risk?

C.M. Granger1, H.G. Rushford2, T. Davis2
George Washington University1, Children’s National Medical Center2

Introduction: Patients undergoing a two-stage Fowler-Stephens laparoscopic orchiopexy for intra-abdominal testes are typically recommended to undergo the second stage 4-6 months after the first stage. As part of a quality care initiative, our studied examined if patients were following up within this window and, if not, why patients were lost to follow up.

Materials & Methods: We retrospectively reviewed a cohort of 105 patients who underwent the first stage of a 2-stage Fowler-Stephens orchiopexy at our institution between 1/2005 and 1/2015. Bivariate and multivariate analyses were performed to compare clinical, surgical, and socioeconomic factors. Patients identified as having undergone the first but not second stage procedure were contacted in an attempt to schedule the second stage procedure.

Results: Of the 105 patients, the mean and median interval between the 1st and 2nd stage procedure was 7.2 months and 5 months (2-65 months). Twenty-seventy of the 105 patients (25.7%) followed up > 6 months after their first stage procedure. Four (3.8%) did not ever undergo a second stage procedure at our institution. Three patients were not able to be contacted. Contact was re-established with one patient who subsequently underwent the second stage of the procedure at 8 years of age, 45 months after the first stage procedure. The patients chose not to follow up for the second stage due to fear of another procedure under general anesthesia, despite knowledge that a second procedure would be required. Of patients who completed the second stage of their Fowler-Stephens, those that were older were less likely to have followed up within 4-6 months. (OR 0.78 p = 0.02).

Conclusions: Although uncommon, some patients offered a two-staged operation will not follow up for the second stage, highlighting the importance of thorough counseling. As patients with undescended testicles get older, they are less likely to follow up within the recommended time frame. Protocols for routinely contacting patients 3 months after a first stage Fowler-Stephens orchiopexy could potentially improve parental compliance with standard recommendations for timing of the 2nd stage.

Cold-Knife Incision of Posterior Urethral Valve (PUV) in Neonates

C. Crigger1, A. Hajiran1, O. Al-Omar2
West Virginia University1, WVU Medicine Children’s - Chief of Pediatric Urology2

Introduction: Posterior urethral valves (PUVs) are found in 1 in 8000-25,000 male live births. Standard of care is to relieve obstruction and drain the bladder by either ablating the valve or performing vesicostomy within the first week of life. Treatment options vary widely and range from endoscopic fulguration (bugbee, hot-knife, and laser), and cold-knife incision to blind passage of a valvotome. Usage of a standard resectoscope requires 180-degree inversion of the scope to incise at 5- and 7-o'clock positions as the hook is inserted ventrally. This can prove technically difficult in small neonates. Barber et al reported their experience with a modified urethrotome in which the hook is inserted dorsally. We report the efficacy and safety of using a 9 Fr Wolf resectoscope for cold-knife incision of PUV using a dorsally inserted hook.

Materials & Methods: We report our case series of 6 males who underwent this technique from May 2015 to February 2018. We collected pre- and postoperative serum creatinine (Cr), voiding cystourethrography (VCUG), and renal-bladder ultrasonography (RBUS) were obtained, when possible.

Results: Age at date of surgery ranged from 3 to 149 days-old (mean 41.5 days-old). Preoperatively, 6 patients had elevated Cr levels based on age (mean 1.62 mg/dL, range 0.37-4.5), and bilateral hydronephrosis was evident in all patients, with 5 patients having at least grade 3 hydronephrosis. Additionally, 5 patients had at least unilateral reflux with 3 patients having severe grade 5 reflux. Intraoperatively, no complications occurred. Postoperatively, Cr levels reflected improved renal function in all 6 patients (mean 0.9, range 0.39-2.67) with paired t-test showing a mean improvement in Cr within our cohort of 0.73, just outside significance (p = 0.0514), likely the result of our study being under-powered. Four patients had their Foley catheter removed within 48 hours while 2 patients required a Foley catheter for 4 and 10 days. Of the 4 patients who underwent postoperative RBUS, 1 showed complete resolution, with the remainder showing improvement, and importantly, no worsening hydronephrosis. These same 4 patients underwent postoperative VCUG, with evidence of improvement in reflux in all and complete resolution of reflux in 2 patients.

Conclusions: While humble in its size, our case series sheds further light on the safety of cold-knife valvotomy as no morbidity was observed with marked improvements in serum Cr levels and, by correlation, renal improvement, bordering on significance.

An Essential Study to Assess the Performance and Safety Data of a New 5 French Air-Charged Catheter for Use in Pediatric Patients for Urodynamic Pressure Studies

A. Wildasin1, O. Al-Omar2
WVU Medicine Children’s - Pediatric Urology2, WVU Medicine Children’s - Chief of Pediatric Urology2

Introduction: This clinical investigation assessed the safety and effectiveness of the new T-DOC© 5 French vesicle and abdominal catheters for measuring urodynamic pressure in pediatric patients. Secondly, to obtain feedback related to user feasibility. Currently, a T-DOC® 7 Fr catheter is used. The 5 Fr catheter is a smaller version of the 7 Fr catheter. The 5 Fr version is intended for both adult and pediatric patients, however, there are no published data related to use in the pediatric population.

Materials & Methods: Study site obtained ethics board approval. Parents completed informed consent and assent as applicable. Study conducted from January 2018 – May 2018. Inclusion criteria are pediatric patients 12 and younger indicated for Video Urodynamics (VUDS) for medically necessary reason per physician discretion. Exclusion criteria are patients with bladder infections, urothelial strictures, or suprapubic catheter. To assess first objective, T-DOC© 5 Fr vesical and abdominal catheters were connected to VUDS transducers. Product competency was tested. Vesicle and then abdominal catheter was placed. Catheter insertion depth, problems during insertion, and catheters staying in place were assessed. Unexplained artefacts and patient factors that affect tracing were recorded. Any adverse events during study were documented. An Investigator Assessment evaluation of the safety and effectiveness of the vesical and abdominal catheter was recorded. Patients received a follow up telephone call 5-7 days after study to assess for any adverse events. Physicians that inserted 3 or more catheters completed a Clinical User Questionnaire (CUQ) to rate subjective interpretation regarding use of catheters.

Results: Four female and 8 male patients were in the study. Average insertion depth of vesical and abdominal catheter was 11.3 cm and 14.5 cm. One problem noted with insertion of abdominal catheter was related to patient stoll retention. Catheters stayed in place on all studies. There were no unexplained artefacts or non-physiologic causes on study tracing. No adverse events occurred during the VUDS studies. On follow up call, 4 of 11 patients reported an adverse event after VUDS. All resolved within 24 hours. One patient was unable to reach and did not return phone call. Two physicians completed CUQ and rated the new T-DOC© 5 Fr vesicle and abdominal catheters overall much easier to use, much easier for patient to void around, and much more stable pressure tracing. Noted comment felt 5 Fr catheter felt less traumatic.

Conclusions: The T-DOC© 5 Fr air charged catheter is safe and effective for use with pediatric patients age 12 and younger in need of VUDS testing.
Predictors of Total Nephrectomy after Trauma: A Study from the National Trauma Data Bank

A. Zeineddin1, M.F. Nunez2, G. Ortega3, A.R. Metwalli1
Howard University Hospital1; Research Centers in Minority Institutions Program Howard University, Clive O. Callender Howard-Harvard Health Sciences Outcome Research Center2; Howard University Hospital1; Research Centers in Minority Institutions Program Howard University, Clive O. Callender Howard-Harvard Health Sciences Outcome Research Center3

Introduction: Nephron sparing surgery is a mainstay in managing renal tumors. In renal trauma, conservative management strategies are increasingly being utilized. We queried the National Trauma Data Bank (NTDB) to identify predictors of total nephrectomy (TN) and assess the impact of insurance status and race on intervention for renal trauma.

Materials & Methods: We examined all patients with renal injuries in NTDB from years 2007-2015. Patients were divided into four management groups: Non-operative (conservative), minimally-invasive (MI), open repair other than TN (Other), and TN. Bivariate and multivariate models were performed to predict the probability of TN after renal trauma. Insurance status and race were not robust predictors. The finding of decreased in-hospital mortality with any intervention correlated most strongly with measures of injury severity, higher ISS, and hypotension predicted the need for any intervention with an increased probability for renal trauma. (Table 2) Non-white race correlated with higher likelihood of any open repair (other or TN) compared to conservative or MI. Surprisingly, having any intervention correlated with lower in-hospital mortality and with a higher probability of major complications (OR 0.62, p < 0.01) but a higher probability of major complications (OR 1.9, p < 0.01).

Conclusions: Measures of injury severity correlated most strongly with the probability of TN after renal trauma. Insurance status and race were not robust predictors. The finding of decreased in-hospital mortality with any intervention compared to observation warrants further study.

Table 1: Patient demographic and characteristics

<table>
<thead>
<tr>
<th>Total number of patients</th>
<th>Mean Age (in Years)</th>
<th>Mean BMI</th>
<th>Male over Female</th>
<th>Race</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-operative</td>
<td>35,855</td>
<td>22.44 (74%)</td>
<td>315.2</td>
<td>31.67 (5%)</td>
</tr>
<tr>
<td>Open repair (other than TN)</td>
<td></td>
<td></td>
<td>32.67 (5%)</td>
<td></td>
</tr>
<tr>
<td>Minimally invasive</td>
<td>1,767</td>
<td>58.72 (3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total nephrectomy</td>
<td>9567</td>
<td>25.16 (8%)</td>
<td>318.5</td>
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</tr>
</tbody>
</table>

Table 2: Multivariate analysis of predictors for type of procedure received

<table>
<thead>
<tr>
<th>Non-operative</th>
<th>Open repair (other than TN)</th>
<th>Total nephrectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (in Years)</td>
<td>2.790</td>
<td>-0.07</td>
</tr>
<tr>
<td>Mean (s.d.)</td>
<td>1.800</td>
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<tr>
<td>Sex (male)</td>
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<tr>
<td>Mean (s.d.)</td>
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<tr>
<td>Mean (s.d.)</td>
<td>4.700</td>
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</tr>
<tr>
<td>Mean (s.d.)</td>
<td>5.000</td>
<td>-0.07</td>
</tr>
</tbody>
</table>

Traumatic Bladder Ruptures: A 10 Year Review at a Level 1 Trauma Center

T.L. Overholt1, J. Barnard2, A. Hajarian3, C. Crigger4, M. Jessop5, J. Knight6, C. Morley7
West Virginia University School of Medicine1; West Virginia University2

Introduction: Bladder rupture occurs in only 1.6% of blunt abdominopelvic trauma cases. Although rare, bladder rupture may result in significant morbidity if undiagnosed or inappropriately managed. AUA urotrauma guidelines suggest that urethral catheter drainage is a standard of care for both extraperitoneal and intraperitoneal bladder ruptures regardless of the need for surgical repair. However, no specific data are available regarding length of catheterization. The present study seeks to summarize management of bladder trauma at our center using 10 years of data, assess the impact of catheterization on bladder injuries and complications, and work towards a protocol for management of bladder injuries with respect to length of catheterization.

Materials & Methods: A retrospective review was performed on 34,413 blunt trauma cases to identify patients presenting with traumatic bladder ruptures over the past 10 years (January 2008-January 2018) at our rural tertiary care facility. Patient data were collected including age, gender, BMI, mechanism of injury, and type of injury. The primary treatment modality (surgical vs. catheter drainage), length of catheterization, and complications were also assessed.

Results: Chart review identified 44 patients with bladder trauma. Mean age was 41.84 years, mean BMI was 24.8, 95% were Caucasian, and 55% were female. MVC was the most common mechanism, representing 45% of total injuries. Other mechanisms included falls (20%) and ATV accidents (13.6%). 31 patients had extraperitoneal injury and 13 were intraperitoneal. Pelvic fractures were present in 93% and 9% had additional solid organ injuries. Formal cystogram was performed in 59% on presentation and mean time to cystogram was 4 hours. Gross hematuria was associated with 95% of cases. Operative management was required for all intraperitoneal injuries and 35.5% of extraperitoneal cases. Bladder closure in operative cases was typically performed in 2 layers with absorbable suture in a running fashion. The intraperitoneal and extraperitoneal injuries managed operatively were compared and length of catheterization was 26 vs. 22.4, p = 0.46, time from injury to normal fluorocystogram (19.8 vs. 20.7, p = 0.80), and time from injury to repair (4.3 vs. 5.0, p = 0.22) were not statistically different between cohorts.

Conclusions: The present study provides a 10 year retrospective review characterizing the presentation, management, and follow up of bladder trauma patients at a rural tertiary care facility. Further study will seek to allow comparison of data, assess the impact of catheterization on bladder injuries and complications, and minimize complications for patients presenting with traumatic bladder injuries.