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RPE-1

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 catheter. 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 (P_{1f}, f = 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 (P_{ref}) was measured. Next, it was passively emptied to 250 mL via syringe aspiration and pressure was recorded (P_{2f}). 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 (P_{1c}, c = compression) was recorded, and the bladder was isovolumetrically compressed to P_{ref}. The external pressure was held for 15s and released for 15s for 5 cycles. The 5 min equilibrium pressure after release (P_{2c}) 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 isovolumetrical compression with external pressure (P2c < P1c, t-test, $p < 0.05$). The pressure after filling-emptying was not statistically different from teh 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-passive emptying, indicating strain softening occurs via isovolumetric compression. Increasing bladder pressure through both filling and compression results in measureable strain softening. Repeated external bladder compression represents a potential means to lower intravesical pressure via strain softening, a novel, non-invasive technique with potential diagnostic and therapeutic clinical applications.

RPE-3

Post-Discharge Opioid Practices after Radical Prostatectomy: The ORIOLES Initiative

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Introduction: Opioid pain medications are overprescribed, but little data is available to appropriately tailor post-discharge opioid prescriptions after surgery. Prior studies are retrospective and based on incomplete responses (< 50%) to questionnaires with small sample sizes for any particular surgery. The objective of our study was to prospectively measure post-discharge opioid prescribing, use, and predictors for consecutive patients after radical prostatectomy to establish a reference value and compare open and robotic surgery.

Materials & Methods: A prospective, non-randomized, pre-post cohort study of patients undergoing radical prostatectomy for prostate cancer (2017-2018) as part of the Opioid Reduction Intervention for Open, Laparoscopic, and Endoscopic Surgery (ORIOLES) was conducted. The primary outcome was total oral morphine equivalents (OMEQ) used after surgery with a reference value set to meet the needs of > 80% of patients. Surgical approach and predictors of use were assessed via multivariable linear regression and mixed effects models. A prospective, post-intervention cohort was then evaluated after implementation of a discharge sheet, nursing education, and standardized prescribing based on the reference value.

Results: All 205 patients (100%) completed follow-up in the pre-intervention cohort. In units of OMEQ, a median of 225mg was actually prescribed and 22.5 mg used (compared to a provider-recommended reference value of 180 mg). There was no difference by surgical approach or among patients with a history of a pain-related diagnosis. Overall, 77% of post-discharge opioid medication was unused with 84% of patients requiring ≤ 112.5 mg OMEQ. Only 9.3% of patients appropriately disposed of leftover medication. About 5% reported continued incisional pain due to surgery at 30-days but none required continued opioid medication use. Prescribing more opioids was independently associated with greater opioid use in adjusted models. In the post-intervention cohort (N = 87), OMEQ prescribed was reduced by 45.5% (mean 226.5 mg to 123.4 mg) and use by 21.5% (mean 52.5 mg to 41.2 mg) with a slight increase in disposal (9.3% to 16.9%). Only 5 (5.7%) patients required additional opioid medication.

Conclusions: Opioid pain medications are overprescribed relative to actual use by patients after radical prostatectomy with more opioids used when a greater quantify is prescribed. An appropriate baseline reference value for prescriptions after radical prostatectomy is 112.5 mg OMEQ. The ORIOLES initiative demonstrated a reduction in prescribing and use after implentation of an evidence-based intervention.

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 ($p < 0.0001$), and average turnover time ($p < 0.0001$) 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.

Key Operating Room Performance Indicators and Reported Patient Safety Events
Fiscal Year 2017-2018, Q1-Q3

	FY 2017	FY 2018	p-value
Key Operating Room Performance Indicators			
Case Volume	18,895	18,195	**0.01**
Operating Room Utilization	81%	80%	**0.05**
First Case On-Time Start Rate	78%	58%	**<0.0001**
First Case On-Time Start Rate Inpatient Only	62%	43%	**<0.0001**
First Case On-Time Start Rate Urology Only	76%	61%	**<0.0001**
Average Turnover Time (min)	35	40	**<0.0001**
Reported Patient Safety Events			
All Perioperative Events	87	55	**0.011**
Consent-related Events	58	33	**0.016**
Surgery Prep Inadequate	12	6	0.142
Case Booking Error	7	6	1.000
Patient ID Band Missing/Incorrect	2	1	0.500
Other	7	7	1.000

RPE-4

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: Out 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 was obtained in 330 out of 515 patients, of which 123 (37.3%) patients had prostate size greater than 100 g. 38/52 or 72% 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 prostatic 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 their 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.

RPE-6

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 11/1/17-11/10/17 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 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.

Table 1: Comparison of Patient Characteristics

	Successful	Unsuccessful	p value
Age (mean)	55.1	54	*0.87*
Sex	F: 42 M: 36	F: 0 M: 6	***0.026****
Laterality (RUs)	Right: 37 Left: 41	Right: 3 Left: 3	*1.00*
Location (RUs)	Renal: 32 Ureteral: 46	Renal: 3 Ureteral: 3	*0.70*
Patients with History of Urolithiasis	39/66*	3/6	*0.69*
Patients with History of Intervention for Stones	23/32*	2/3	*1.00*
Patients with Post-op ED Visits	12/81	1/6	*1.00*
Narcotic doses prescribed per patient (mean)	45	41	*0.74*

*data incomplete
**statistically significant

RPE-5

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

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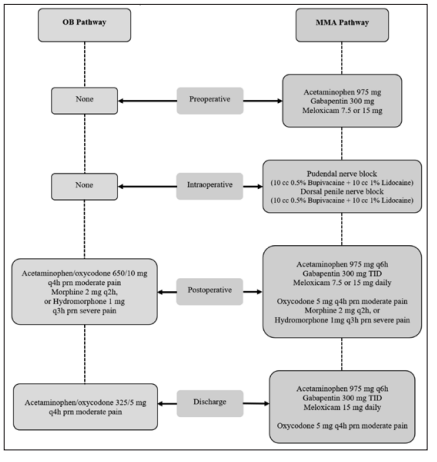
Introduction: Inflatable penile prosthesis (IPP) surgery is associated with significant perioperative pain that may reduce patient satisfaction. Though various pain management strategies have been proposed, most implanters manage patients with only prescription opioids. No protocol to date has been implemented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

Materials & Methods: We retrospectively analyzed our prospectively maintained IPP database from November 2015 through January 2018. The MMA 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 equivalents, 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 = 0.01; 2.62 vs. 4.73, p = 0.003; and 2.26 vs. 4.0, p = 0.01, respectively) and used fewer narcotics on POD0 (mean 4.08 vs. 13.8 mg TME, p = 0.0004) and POD1 (mean 5.05 vs. 25.1 mg TME, p = 0.0004). MMA patients were discharged home with fewer narcotics (mean 12.7 vs. 51.3 tabs, p = 0.0001), 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.



RPE-7

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 IIA) 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 pT-stage, presence of embryonal cancer and teratoma are suggested to predict retroperitoneal histology. We consequently evaluated pathologic findings from radical orchiectomy 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 NSGTC following radical orchiectomy 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 NSGTC, 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 1.08-15.78, p = 0.039); embryonal cancer was not predictive (p = 0.09). For each percent of teratoma noted on the orchiectomy 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 testis invasion was strongly predictive of node-positive disease for 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 testis may derive greater benefit from primary RPLND, with adjuvant chemotherapy utilized as needed.

RPE-9

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 RC and identify areas that can increase its incorporation into clinical practice.

Materials & Methods: We identified 5915patients 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 univariate 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 (cT2 36%; cT3 28%). On univariate analyses, NAC followed by RC was more likely at academic vs. community (p < 0.0001) and in the Midwest vs. West region (p = 0.002). 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: 1.05-1.65) 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: 0.38-0.99) 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 higher (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: AlthoughNAC 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.

RP-8

Disparities in Healthcare: Data from the National Inpatient Sample for Radical and Partial Nephrectomy

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Introduction: Despite a common goal of providing excellent healthcare to people across the country regardless of race, gender, payment method, and geographic location there are still significant disparities in both access to care and outcomes.

Materials & Methods: A retrospective cross sectional analysis was performed using data from the National Inpatient Sample (NIS) from January 2001 to December 2013. Radical nephrectomy cases were identified by ICD-9 codes 55.5 for complete nephrectomy and 55.54 for bilateral nephrectomy. Partial nephrectomies were identified by the code 55.4. The ICD-9 code 17.42 was used to identify robotic-assisted laparoscopic cases; 54.21 and 54.51 were used to identify laparoscopic cases. Demographic data as well outcomes including length of hospital stay, cost, and mortality were compiled. Multivariable analyses included generalized linear models for continuous outcome measures (length of stay and total costs) and logistic regression models for binary outcomes (mortality). All statistical analyses were performed using STATA, version 12.1.

Results: White patients represent a larger proportion of those undergoing robotic procedures in both the nephrectomy and partial nephrectomy cohort as compared to the total number of cases (Radical: 69.5% robotic vs. 59.6% all cases p < 0.001, Partial: 68.2% robotic vs. 63.6% all cases p < 0.001). In both cohorts the mean age of those undergoing surgery are substantially lower in minority populations (See Tables 1 and 2). Additionally, in a logistic regression the odds ratio for mortality was 2.3 for self-pay patients as compared to commercial insurance in the radical nephrectomy cohort, and 1.9 in the partial nephrectomy cohort (p < 0.001 and p = 0.229 respectively).

Conclusions: Unfortunately, statistically and likely clinically significant differences exist in the access to care and the outcomes for patients of different races, and insurance types.

Demographics and selected outcomes for the radical nephrectomy cohort, stratified by race

	Radical Nephrectomy Cohort					
Variable	White (N=63568)	Black (N=9132)	Hispanic (N=7402)	Asian (N=2162)	Other (N=2445)	P-Value
Age (mean, years)	60.5	53.0	51.9	55.6	57.8	<0.0001
Payor						
Medicare	45.3%	43.1%	30.4%	33.5%	39.1%	<0.0001
Medicaid	3.8%	9.6%	14.4%	12.8%	5.4%	<0.0001
Commercial	41.4%	33.6%	35.4%	38.9%	45.2%	<0.0001
Self-paying	3.3%	6.3%	8.3%	5.8%	4.3%	<0.0001
No Charge	0.4%	0.9%	2.2%	0.8%	0.2%	<0.0001
Other	5.7%	6.6%	9.3%	8.1%	5.8%	<0.0001
Surgical Method						<0.0001
Open	81.4%	84.8%	82.1%	84.1%	84.2%	<0.0001
Laparoscopic (non-Robotic)	14.6%	12.0%	15.2%	12.3%	13.6%	<0.0001
Laparoscopic (Robotic)	4.0%	3.2%	2.8%	3.6%	2.2%	<0.0001
LOS (mean, days)	5.3	6.4	5.7	5.5	5.3	<0.0001
Died	1.0%	1.8%	1.2%	1.6%	1.2%	<0.0001
Total Cost (2015 USD)	$18,330	$21,509	$21,484	$22,382	$18,360	<0.0001

LOS, length of stay
USD, United States Dollar

Demographic characteristics and selected outcomes for the partial nephrectomy cohort, stratified by race.

	Partial Nephrectomy Cohort					
Variable	White (N=1861)	Black (N=248)	Hispanic (N=145)	Asian (N=55)	Other (N=592)	P-Value
Age (mean, years)	59.6	57.4	54.9	57.0	58.1	<0.0001
Payor						
Medicare	37.3%	32.1%	25.7%	28.4%	32.8%	<0.0001
Medicaid	3.9%	10.8%	13.4%	13.2%	5.2%	<0.0001
Commercial	53.9%	47.3%	47.2%	49.5%	56.0%	<0.0001
Self-paying	1.9%	4.2%	7.0%	3.6%	2.7%	<0.0001
No Charge	0.3%	1.2%	2.4%	0.2%	0.1%	<0.0001
Other	2.6%	4.4%	4.3%	5.1%	3.2%	<0.0001
Surgical Method						<0.0001
Open	68.3%	70.7%	71.5%	64.4%	74.7%	<0.0001
Laparoscopic (non-Robotic)	6.9%	6.3%	7.9%	7.6%	7.2%	<0.0001
Laparoscopic (Robotic)	24.8%	23.0%	20.6%	28.0%	18.1%	<0.0001
LOS (mean, days)	4.0	4.6	4.4	4.3	4.5	<0.0001
Died	0.3%	0.2%	0.2%	0.0%	0.3%	<0.0001
Total Cost (2015 USD)	$16,075	$17,137	$18,185	$19,585	$17,314	<0.0001

LOS, length of stay
USD, United States Dollar

RPE-10

Rate of PSA Testing in Spinal Cord Injured Men: Analysis of National Veterans Health Administration Data

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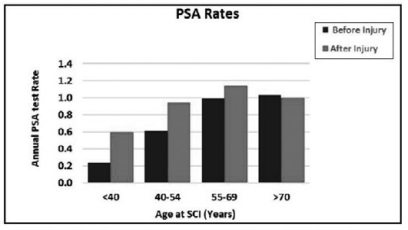
Introduction: Recommendations for prostate cancer screening with PSA remain controversial due to the ongoing debate regarding over-detection and over-treatment. As the life expectancy of spinal cord injured men has improved to near that of uninjured men, the debate has grown to include this unique patient 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: Utilizing 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 (0.61 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.



Injury Age Group	PSAs Before Injury	PSAs After Injury	Rate Before Injury	Rate After Injury
≤39 (33±5)	753	8533	0.23	0.60
40-54 (49±4)	16290	75883	0.61	0.94
55-69 (62±4)	91825	120786	0.90	1.14
≥70 (78±6)	64313	40756	1.03	1.00

RPE-11

Proteus UTI's 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 UTI's are often the first sign of a bladder or renal anomaly many of these boys get screened with renal bladder ultrasounds (RBUS) and voiding cystourethrograms (VCUG). The purpose of this study was to see if Proteus UTI's 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 to our emergency department (ED) 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. 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 charts. 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 Staphylococcus, 7 Streptococcus and 292 Escherichia UTIs were included. Patients who present with a Proteus infection are far less likely to be circumcised (1/37 or 2.7%) than Escherichia (37/226 or 16.4%) or a gram positive organism (15/20 or 75% $p < 0.0001$). Proteus UTIs were associated with a lower percentage of abnormal ultrasounds (3/19 or 13.64%) when compated to Staph (6/11 or 54.6%), 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 (2/13 or 15.38%) compared to 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 are less likely 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.

RPE-12

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 grade VUR or bladder diverticulum. Circumcision status was determined from emergency department and urology notes when available. 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 emergency department were evaluated and 357 met inclusion criteria. Median age was 7.7 months (2.5- 46.8 months IQR). Forty-two Proteus, 16 Staphylococcus, 7 Streptococcus and 292 Escherichia UTIs were included. When documented, the incidence of circumcision was significantly higher in Staphylococcus (78.57%, 11/14) and Streptococcus (66.67%, 4/6) infections when compared with Escherichia (16.37%, 37/226) and Proteus (2.70%, 1/36) infections (Fisher's Exact test $p < 0.001$). Of the patients who underwent cystogram, 71% (5/7) of Staphylococcus patients had abnormal cystograms compared to 50% (1/2) of Streptococcus, 16% (18/111) of Escherichia and 15% (2/13) of Proteus (Fisher's Exact test 0.004). High grade hydronephrosis (SFU grades 3 and 4) was seen in 27% of Staphylococcus compared to 17% of Streptococcus, 4% Escherichia and 0% of Proteus UTIs (Fisher's Exact test $p < 0.012$).

Conclusions: Staphylococcal and Streptococcal UTIs are more commonly seen in circumcised boys and are associated with higher rates of abnormal imaging findings. Pediatric-age males who present with first UTI with gram-positive organisms should be considered for additional imaging prior to developing a second UTI.

MP1-01

National Trends and Disparities of Minimally Invasive Surgery for Localized Renal Cancer, 2010 to 2015

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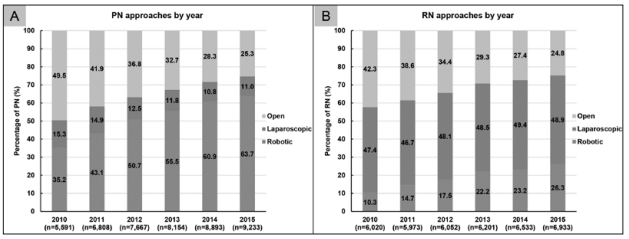
Introduction: Minimally invasive (robotic and laparoscopic) and open surgery for localized renal cancer offer comparable oncologic outcomes. However, the evolving trends in utilization of minimally invasive surgery at the national level as well as the barriers preventing access to minimally invasive 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 cT1N0M0 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). Younger (18-64 y) Medicare (OR = 0.83 [0.77-0.90]), 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 low socioeconomic status, upper middle (OR = 1.14 [1.07-1.21]) and high (OR = 1.24 [1.16-1.33]) socioeconomic status were associated with higher 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.



MP1-02

Does the Cost Justify the Means? A Comparison of Cost in Open, Laparoscopic, and Robotic Radical Nephrectomy and Partial Nephrectomy Using Data from the National Inpatient Sample

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Introduction: In well-selected patients the use of minimally invasive techniques has been shown not to compromise outcomes or complication rates. The question remains whether the additional cost of the equipment is warranted. Using a large national data set, we sought to perform a cost comparison between open, laparoscopic, and robotic radical nephrectomy (RN) and partial nephrectomy (PN) and examine variables that drive cost.

Materials & Methods: The National Inpatient Sample was queried from January 2001 to December 2013 for the following ICD-9 codes: 55.5 complete nephrectomy, 55.54 bilateral nephrectomy, and 55.4 partial nephrectomy. The ICD-9 code 17.42, available from 2008 onward, was used to identify robotic-assisted laparoscopic cases; 54.21 and 54.51 were used to identify laparoscopic cases. The primary outcome was total cost. Length of stay (LOS) was examined as a secondary outcome. Univariate analyses were performed with ANOVA tests for continuous variables and chi square tests for binary and categorical variables. A multivariate analysis was performed using generalized linear models for continuous outcome measures (total cost and LOS). Cost each year was adjusted for inflation to bring all values to the equivalent of US dollars in 2015. All statistical analyses were performed using STATA, version 12.1.

Results: The mean cost for PN open was $16,457, laparoscopic $16,486, and robotic $17,092 ($p = 0.002$). The mean LOS for PN open was 4.7 days, laparoscopic 3.5 days, and robotic 2.9 days ($p < 0.001$). The mean cost for RN open was $19,273, laparoscopic $16,650, and robotic $19,491 ($p < 0.001$). The mean LOS for a RN open was 5.7 days, laparoscopic 4.0 days, and robotic 3.7 days ($p < 0.001$). Variables found to significantly increase cost for both RN and PN include minority race, noncommercial insurance, increased severity of illness, transfer from another facility or admission through the emergency department, emergency status, and location in the west. For PN both the use of laparoscopy and robotics increased cost significantly, whereas for RN only the use of robotics increased cost significantly.

Conclusions: While minimally invasive approaches have become increasingly popular, this study demonstrates there is additional cost associated with them despite reduced length of stay for partial nephrectomy. Conversely, laparoscopic radical nephrectomy seems to offer both reduced cost and length of stay.

MP1-03

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

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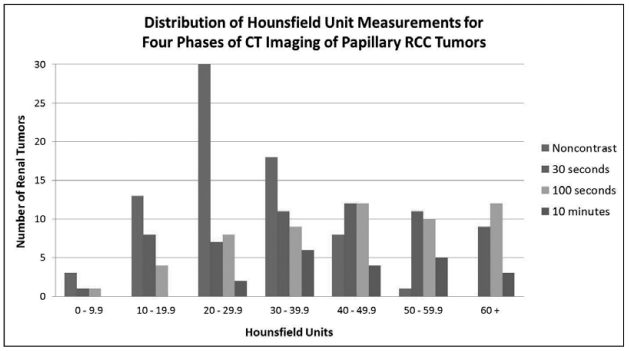
Introduction: Renal cysts and masses are common incidental findings on computed tomography (CT). It is often proposed that a cutoff of 20 Hounsfield units (HU) be used for renal cystic lesions to undergo further workup. It has been recognized that the papillary subtype of renal cell carcinoma (RCC) often 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 pathology - 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.



MP1-04

Robot-Assisted Radical Cystectomy Does Not Offer Lower Incisional Hernia Rates When Compared to Open Radical Cystectomy

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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 = 88) at our tertiary referral cancer center were included in this study. Infra-umbilical midline incision was performed during ORC and a periumbilical incision during RARC with extracorporeal urinary diversion. Patient demographics, type of urinary diversion and presence of preoperative umbilical hernia were evaluated. Skin-to-fascia depth (SFD) as well as rectus diastasis 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, diabetes, 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 1.07, 95%CI 1.01-1.13, p = 0.02). Stratified by surgical approach, receipt of an ileal conduit compared to continent diversion was associated with a deceased risk of PIH in only the open cohort (OR 0.37, 95%CI 0.15-0.89, p = 0.025). In the RARC cohort, preoperative umbilical hernia significantly increased the risk of PIH on multivariate analysis (OR 7.83, 95%CI 1.90-32.25, p = 0.004). After adjustment, increased supraumbilical RDW was a risk factor for PIH on multivariate analysis in patients who had an ORC (OR 1.9, 95%CI 1.15-3.17, p = 0.013). Conversely, patients undergoing RARC had no increased risk of PIH based on supraumbilical (p = 0.436) or infraumbilical (p = 0.347) 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.

MP1-06

Predicting Mortality in Renal Cell Carcinoma Patients Using Self-Reported Quality of Life

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

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

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

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.

MP1-05

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

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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 either NU, SU, or EM from 2004-2015. Patients were excluded with previous cancer diagnoses, non-urothelial histology or incomplete data. Treatment trends and survival outcomes were assessed for the cohorts utilizing multivariable logistic regression and Cox Proportional Hazards Regression.

Results: 7121 patients were included in the analysis (NU: n = 4121; 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 1.01-1.02) 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 5th 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 1.46-2.20).

Conclusions: Increasing tumor size, high grade histology and lower volume centers were associated with increased likelihood of NU compared to nephron-sparing management. When accounting for competing risks, no differences in OS were seen between treatment modalities, but lower volume centers may have worse outcomes. Prospective studies that validate the efficacy of nephron sparing management in appropriately selected patients can encourage adoption of these practices.

MP1-07

Propensity-matched Analysis of Stage-specific Efficacy of Adjuvant Chemotherapy for Bladder Cancer Following Radical Cystectomy

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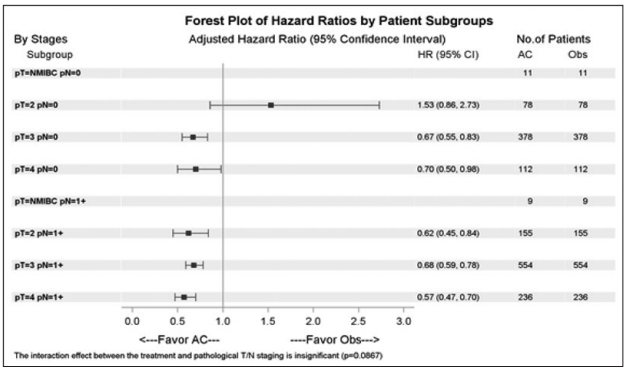
Introduction: In the past decade, there have been major advancements in the use of perioperative chemotherapy for bladder cancer. While neoadjuvant chemotherapy has garnered the support of several phase III trials, contemporary randomized controlled trials exploring adjuvant chemotherapy (AC) have yielded inconsistent results due to premature termination and/or poor patient accrual. To address this evidence void, we compared the efficacy of AC versus observation after radical cystectomy by disease stage from a nationally representative sample of patients with bladder cancer in the US.

Materials & Methods: We included patients who underwent radical cystectomy for any pT, N0-1, M0 bladder cancer from 2004 to 2014 from the National Cancer Data Base. Patients diagnosed at death or autopsy, death within 30 days of cystectomy, or receipt of single-agent chemotherapy, or any radiation were excluded. Patients who underwent AC were propensity matched (1:1) with patients within the observation-only cohort (OC) based on selected demographics and clinical characteristics. Overall survival was modeled with multivariable Cox hazards regression modeling. Adjusted hazard ratios (aHR) and 95% confidence intervals (95%CI) were calculated. Statistical analysis were performed in SAS v9.4.

Results: After propensity matching, 3,066 patients (AC 1,533; OC 1,533) were included in the analysis. There were no differences in patient-, facility-, or tumor-level characteristics between groups. Compared with patients in OC, recipients of AC had significantly improved overall survival (aHR 0.67; 95%CI 0.61-0.74). All pathologic T stages with pN1 disease significantly benefited from adjuvant chemotherapy. Among the pN0 cohort, improved survival from adjuvant chemotherapy was seen in only stages pT3 (0.67; 0.55-0.83) and pT4 (0.70; 0.50-0.98).

Conclusions: In this retrospective population-based cancer registry study, AC was associated with improved survival in locally advanced (pT3-4, pN0) and regionally advanced (pT2-4, pN1) bladder cancer. Our findings suggest that AC is best suited for patients within these stage-specific groups following radical cystectomy and support the recommendations made by the National Comprehensive Cancer Network for bladder cancer.



The interaction effect between the treatment and pathological T/N staging is insignificant (p=0.0867)

MP1-08

In the World of Bladder Tumors: Size Does Matter…

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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 intuitive with the belief that larger tumors warrant 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 2011-2015. 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; $p = 0.019$ 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.

Table 1. Demographic characteristics and selected outcomes for the bladder tumor cohort, stratified by tumor size.

Variable	Overall (N=17839)	Tumor Size: Small (N=7805)	Medium (N=6240)	Large (N=3794)	p-value
Age (mean, yrs)	71.0	71.0	70.9	71.3	0.2305
18-64	26.2%	25.9%	26.8%	25.9%	
65-74	31.5%	31.5%	31.9%	30.9%	
75-79	16.4%	16.9%	16.0%	16.0%	
≥80	25.9%	25.7%	25.4%	27.2%	
Race / Ethnicity					<0.0001
White	71.2%	61.8%	78.0%	79.5%	
Black	4.4%	3.9%	4.2%	5.6%	
Hispanic	4.2%	3.8%	4.2%	4.8%	
Sex					<0.0001
Male	75.4%	74.0%	76.5%	76.7%	
Female	24.6%	26.0%	23.5%	23.3%	
BMI (mean, kg/m2)	27.77	27.83	27.82	27.56	0.1142
Underweight (BMI <18.5)	7.0%	6.4%	7.2%	7.7%	
Normal (18.5≤BMI<25)	24.7%	24.6%	23.9%	26.4%	
Overweight (25≤BMI<30)	36.1%	37.1%	36.1%	34.1%	
Obese (BMI ≥30)	32.2%	31.9%	32.8%	31.7%	
Comorbidities / Pre-Surgical Risk Factors					
Diabetes	22.4%	21.8%	23.1%	22.5%	0.1820
Non-Insulin Dependent	15.1%	14.9%	15.7%	14.5%	
Insulin-Dependent	7.3%	6.9%	7.4%	8.0%	
Smoking	19.8%	17.6%	20.0%	24.0%	<0.0001
COPD	10.2%	9.6%	10.1%	11.6%	0.0040
CHF	1.0%	0.9%	1.0%	1.4%	0.0900
HTN	63.0%	62.5%	63.5%	63.4%	0.4300
Acute Renal Failure or Dialysis	1.2%	1.0%	1.1%	1.7%	0.0020
ARF	0.5%	0.3%	0.4%	1.0%	
Dialysis	0.8%	0.7%	0.8%	0.8%	
Bleeding Disorder	4.4%	4.4%	4.6%	4.1%	0.4130
Transfusion Pre-Op	1.4%	0.6%	1.3%	3.3%	<0.0001
ASA Class	2.64	2.60	2.66	2.72	<0.0001
1-No Disturbance	2.3%	3.0%	1.9%	1.7%	
2-Mild Disturbance	37.1%	39.5%	36.5%	33.3%	
3-Severe Disturbance	54.4%	52.4%	55.6%	56.6%	
4-Life Threatening	6.1%	5.2%	6.0%	8.4%	
5-Moribund	0.0%	0.0%	0.0%	0.1%	
Post-Surgical Complications					
Pneumonia	0.5%	0.3%	0.4%	0.9%	<0.0001
Renal Insufficiency or Acute Renal Failure	0.5%	0.3%	0.4%	0.9%	<0.0001
Renal Insufficiency	0.3%	0.3%	0.2%	0.6%	
ARF	0.2%	0.1%	0.2%	0.3%	
UTI	3.5%	2.6%	4.0%	4.5%	<0.0001
Transfusion Intra-Op / Post-Op	1.4%	0.7%	1.3%	3.3%	<0.0001
Blood Clot	0.4%	0.2%	0.4%	0.7%	<0.0001
Pulmonary Embolism	0.2%	0.1%	0.2%	0.3%	
Deep Vein Thrombosis	0.3%	0.1%	0.3%	0.6%	
Sepsis or Septic Shock	0.6%	0.4%	0.7%	1.0%	<0.0001
Sepsis	0.5%	0.3%	0.6%	0.8%	
Septic Shock	0.1%	0.1%	0.2%	0.2%	
Complication Number	0.08	0.05	0.08	0.12	<0.0001
Any	6.1%	4.0%	6.4%	9.8%	<0.0001
Operative Time (mean, mins)	33.13	24.70	33.56	49.76	<0.0001
≤15	24.6%	37.9%	18.3%	7.5%	
16-25	25.8%	29.4%	28.0%	14.8%	
26-40	23.8%	19.6%	27.6%	26.2%	
>40	25.8%	13.1%	26.0%	51.5%	
LOS (mean, days)	0.85	0.54	0.84	1.51	<0.0001
Reoperation	2.3%	1.7%	2.5%	3.4%	<0.0001
Readmitted	7.3%	5.4%	7.6%	10.7%	<0.0001
Death	1.1%	0.5%	1.1%	2.2%	<0.0001

BMI, Body Mass Index
COPD, Chronic Obstructive Pulmonary Disease
CHF, Congestive Heart Failure
HTN, Hypertension requiring medication for management
ARF, Acute Renal Failure
Transfusion of ≥1 unit of packed Red Blood Cells ≤72hrs prior to surgery start time
ASA, American Society of Anesthesiologists
UTI, Urinary Tract Infection
Transfusion of packed Red Blood Cells within the first 72hrs following surgery start time
LOS, length of stay
Reoperation that was related to the index or concurrent procedure catalogued within NSQIP
Readmitted for any reason within 30 days post-discharge

MP1-09

Association Between Anticoagulant and Antiplatelet Agents and Complications of Transurethral Resection of Bladder Tumors

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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) 1.2-3.7). 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.

		No AE % (count)	AE % (count)	Odds Ratio OR (95% CI)
All patients		74.1 (86)	22.4 (26)	
	Anticoagulation	50.0 (6)	50.0 (6)	
	No anticoagulation	80.0 (80)	20.0 (20)	
				4.0 (1.17-13.7)
	Clopidogrel	60.0 (6)	40.0 (4)	
	No clopidogrel	78.6 (81)	21.4 (22)	
				2.5 (0.64-9.47)
Patients not on anticoagulation or clopidogrel				
	Aspirin	83.6 (51)	16.4 (10)	
	No Aspirin	74.4 (29)	25.6 (10)	
				1.76 (0.66-4.72)
	Aspirin - paused perioperatively	76.7 (23)	23.3 (7)	
	Aspirin - not paused	50.0 (3)	50.0 (3)	
				3.29 (0.54-20.08)

MP1-10

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

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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

Site	N	HG	%	Grade Concordance Rate	NPV
Penn State SOM	286	39	13.6%	94.1%	93.6%
UPMC	248	72	29.0%	87.5%	85.0%
University of Michigan	675	236	35.0%	85.0%	81.2%
Fox Chase Cancer Center	531	201	37.9%	83.7%	79.2%

Abbreviations: HG: High Grade, RMB: Renal Mass Biopsy, NPV: Negative Predictive Value

MP1-11

Overuse of Cystoscopic Surveillance Among Patients with Low-risk Non-muscle-Invasive Bladder Cancer - A National Study of Patient, Provider, and Facility Characteristics

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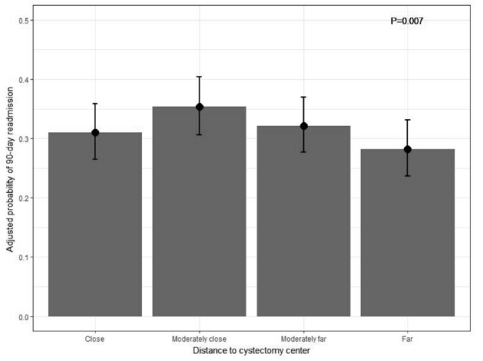
Introduction: Since 2005, multiple panels have recommended no more than 3 cystoscopies in the first two years after diagnosis for patients with low-risk non-muscle-invasive bladder cancer (NMIBC). We hypothesized that despite these recommendations many patients receive too much cystoscopic surveillance. We sought to understand the extent of overuse and to examine patient, provider, and facility characteristics contributing to it, potentially identifying targets for improvement.

Materials & Methods: Integrating administrative and pathology data extracted via a validated natural language processing algorithm, we included patients newly diagnosed with low-risk (i.e., low-grade Ta) NMIBC within the national Department of Veterans Affairs (VA) Corporate Data Warehouse (CDW) from years 2005 to 2011. Patients were followed until cancer recurrence, death, date of last VA encounter, or for 2 years after diagnosis. Procedure codes were used to enumerate the number of cystoscopy procedures during follow-up. Based on guideline recommendations and length of follow-up, overuse of cystoscopic surveillance was defined as > 1 cystoscopy if followed less than 1 year, > 2 cystoscopies if followed 1 to less than 2 years, or > 3 cystoscopies if followed for 2 years after diagnosis. We obtained patient (age, sex, race, year of diagnosis, number of comorbidities, household income, rural residence) and provider (age, gender, attending vs. resident vs. advanced practice provider) characteristics from CDW. Facility characteristics (size, complexity, number of urologists, rurality) were from VA operational data (Veterans Health Administration Support Service Center). We identified patient, provider, and facility characteristics associated with overuse using multivariable generalized estimating equations.

Results: We identified 1,206 patients with low-risk bladder cancer (mean age 76; 99% male; 85% white; 15% with 0 comorbidities, 47% with 1 to 2, and 38% with 3 or more). We found overuse of cystoscopy among 75% of patients (905 of 1,206). This included 226 (81%) of 280 patients followed less than 1 year, 194 (85%) of 227 patients followed 1 to less than 2 years, and 485 (69%) of 699 patients followed for 2 years. Across all patients in the cohort, 4,805 cystoscopy procedures were performed although only 2,831 would have been recommended. Of 14 patient, provider, and facility characteristics assessed, few were associated with overuse of cystoscopy: earlier year of diagnosis (2005-2006 vs. 2011), white race vs. other/missing, 1 to 2 comorbidities, and attending provider vs. resident (Figure).

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 earlier year of diagnosis with overuse suggests lack of knowledge of 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.

Figure 1: Adjusted probability of 90-day readmission by distance



Adjusted for age, sex, race, comorbidity, marital status, tumor stage, nodal status, population of county of residence, and SEER geographic region

Table 2. Unadjusted and adjusted estimated effects of each predictor on 90-day readmission

Predictor	Univariable analysis		Multivariable analysis	
	Odds ratio (95% CI)	*P* value*	Adjusted odds ratio (95% CI)	*P* value**
Distance		**0.001**		0.01
Close	reference		reference	
Moderately close	**1.17 (1.00-1.38)**		**1.22 (1.03-1.44)**	
Moderately far	1.00 (0.85-1.18)		1.06 (0.89-1.25)	
Far	**0.79 (0.67-0.93)**		0.87 (0.72-1.06)	
Age at diagnosis		**<0.001**		0.01
66-69	reference		reference	
70-74	1.12 (0.95-1.33)		1.09 (0.92-1.30)	
75-79	**1.34 (1.13-1.59)**		**1.28 (1.08-1.53)**	
80 and older	**1.48 (1.24-1.76)**		**1.37 (1.14-1.64)**	
Gender		0.86		0.18
Male	reference		reference	
Female	1.01 (0.89-1.16)		0.91 (0.79-1.05)	
Race		0.62		0.58
White	reference		reference	
Black	1.03 (0.77-1.37)		0.91 (0.67-1.23)	
Hispanic	1.00 (0.75-1.34)		1.00 (0.74-1.36)	
Other	0.82 (0.61-1.11)		0.82 (0.60-1.12)	
Comorbidity		**<0.001**		<0.001
0	reference		reference	
1	**1.31 (1.13-1.51)**		**1.32 (1.14-1.53)**	
2 or more	**1.97 (1.71-2.27)**		**1.93 (1.67-2.23)**	
Marital status		<0.001		0.001
Married	reference		reference	
Not Married	**1.31 (1.15-1.48)**		**1.30 (1.14-1.50)**	
Unknown	0.95 (0.68-1.32)		**0.92 (0.65-1.29)**	
T stage		**<0.001**		0.12
T1 or less	reference		reference	
T2	0.95 (0.82-1.11)		0.96 (0.82-1.12)	
T3	**1.25 (1.06-1.47)**		1.13 (0.95-1.35)	
T4	**1.31 (1.08-1.60)**		1.16 (0.94-1.44)	

MP1-12

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.

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 and were classified as early (≤ 90 day post-operatively) or delayed (>90 days post-operatively). Logistic regression was used to assess for predictors of developing complications after urinary diversion.

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 neurogenic 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. Accordingly, 77% of patients had at least one complication during the follow-up period. 51% and 75% of patients experienced early and delayed complications, respectively. Complications of Clavien-Dindo Score ≥ IIIB were seen in 48% of patients. The most common early complications included wound infection (15%), prolonged ileus (8%), and urinary tract infection (UTI) (7%). Urinary tract infection (39%), nephrolithiasis (31%) and uretero-enteric anastomotic stricture (17%) were the most frequent delayed complications. Univariate followed by multivariate logistic regression modeling found BMI and operative length (hr) to be independent positive predictors of complication (OR 1.16 and 2.49, respectively, p = 0.01).

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. BMI is an independent predictor of complication in this population.

MP1-13

Comparison of CxBladder and Cytology in Detecting Urothelial Carcinoma of the Bladder

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Introduction: Bladder cancer is the fifth most commonly diagnosed cancer in the US 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 Carcinoma of the Bladder

Test	Sensitivity*	Specificity*	PPV*	NPV*
Cytology	39.2% (39.0-39.8)	96.4% (95.5-97.4)	64.7% (64.3-65.6)	90.5% (89.6-91.4)
CxBladder Detect	55.0% (54.7-55.8)	95.3% (94.4-96.3)	68.8% (68.3-69.6)	91.8% (91.0-92.8)
CxBladder Monitor	66.7% (66.4-67.6)	68.3% (67.8-69.1)	23.5% (23.5-24.0)	93.3% (92.6-94.3)

*95% confidence interval

MP1-15

Obesity and 30-day Outcomes Following Minimally Invasive Nephrectomy

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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/m^2], class I obesity [BMI 30-34.9 kg/m^2], class II obesity [BMI 35-39.9 kg/m^2], and class III obesity [BMI ≥ 40 kg/m^2]). 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.

Table. Multivariable logistic regressions for overall (any) complications with alternately including BMI category, comorbidity score, and both variables in the model in the MIPN cohort and MIRN cohort

	BMI category		Comorbidity score		BMI category + Comorbidity score	
MIPN cohort (n=10,444)						
	OR (95%CI)	p-value	OR (95%CI)	p-value	OR (95%CI)	p-value
BMI category						
Non-obese	Reference		-	-	Reference	
Class I obesity	1.07 (0.90-1.26)	0.456	-	-	0.97 (0.82-1.16)	0.762
Class II obesity	**1.31 (1.06-1.61)**	**0.012**	-	-	1.12 (0.90-1.39)	0.310
Class III obesity	**1.46 (1.15-1.87)**	**0.002**	-	-	1.17 (0.90-1.50)	0.236
Comorbidity score						
0	-	-	Reference		Reference	
1	-	-	1.18 (0.98-1.41)	0.083	1.16 (0.96-1.39)	0.123
2	-	-	**1.87 (1.53-2.29)**	**<0.001**	**1.81 (1.47-2.24)**	**<0.001**
≥3	-	-	**2.55 (1.90-3.42)**	**<0.001**	**2.43 (1.80-3.29)**	**<0.001**
MIRN cohort (n=10,890)						
	BMI category		Comorbidity score		BMI category + Comorbidity score	
	OR (95%CI)	p-value	OR (95%CI)	p-value	OR (95%CI)	p-value
BMI category						
Non-obese	Reference		-	-	Reference	
Class I obesity	0.97 (0.84-1.13)	0.740	-	-	0.90 (0.78-1.05)	0.190
Class II obesity	0.96 (0.79-1.17)	0.695	-	-	0.81 (0.66-0.98)	0.041
Class III obesity	**1.32 (1.08-1.61)**	**0.006**	-	-	1.02 (0.84-1.26)	0.787
Comorbidity score						
0	-	-	Reference		Reference	
1	-	-	**1.20 (1.01-1.43)**	**0.040**	**1.23 (1.03-1.46)**	**0.025**
2	-	-	**2.12 (1.77-2.54)**	**<0.001**	**2.18 (1.81-2.63)**	**<0.001**
≥3	-	-	**3.14 (2.53-3.90)**	**<0.001**	**3.21 (2.57-4.00)**	**<0.001**

Adjusted for age, sex, race, and current smoking status.

MP1-14

Percutaneous Microwave Ablation is Safe for Treatment of Anterior RCC Tumors

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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: Procedure and ablation duration were similar regardless of tumor location ($p > 0.05$). Mean procedure duration was 180 minutes (range = 101-510). Ablation duration was longer for larger ($p = 0.01$), more complex ($p = 0.05$) tumors requiring more than 1 antenna ($p = 0.0004$). 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.

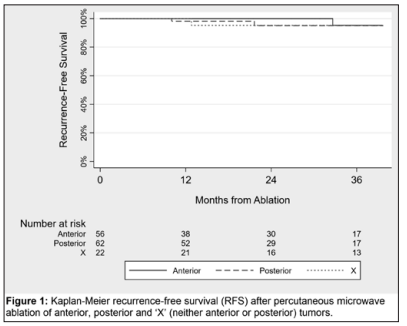

Figure 1: Kaplan-Meier recurrence-free survival (RFS) after percutaneous microwave ablation of anterior, posterior and 'X' (neither anterior or posterior) tumors.

MP1-16

Predictors of Benign Pathology Following Orchiectomy: Identifying Candidates for Testis Sparing Surgery

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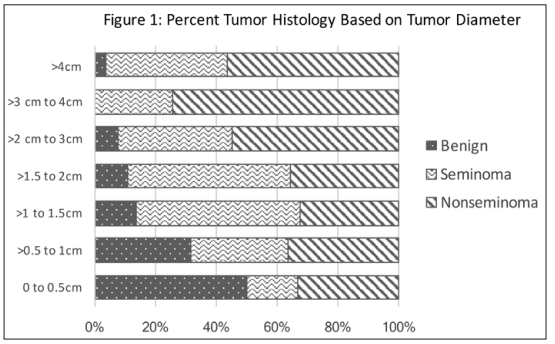
Johns Hopkins Brady Urological Institute[1]; Johns Hopkins Hospital[2]; Johns Hopkins Medical Institutions[3]; Johns Hopkins Medicine[4]

Introduction: Recent studies have demonstrated a significantly higher risk of benign pathology for non-palpable subcentemeter testicular masses diagnosed with higher-resolution testicular ultrasound. Recent studies have advocated for surveillance rather than proceeding to radical orchiectomy to avoid the overtreatment of benign testicular tumors. Our aim was to determine our institution's rate of benign pathology based on testicular mass size, identify predictors of benign pathology, as well as review our experience with partial orchiectomy.

Materials & Methods: Retrospectively, we reviewed our institutional testicular cancer database to evaluate patients who underwent a radical or partial orchiectomy for a suspicious testicular mass seen on ultrasound between 2003-2017. We evaluated tumor histology based on maximum diameter after orchiectomy, preoperative radiographic and patient characteristics associated with benign pathology, and reviewed our patients who underwent partial orchiectomy.

Results: We identified 272 patients who underwent a partial or radical orchiectomy for a testicular mass. Overall, 26 patients (9.6%) had benign pathology. Tumors ≤ 0.5cm and ≤ 1cm had a benign rate of 50% and 35%, respectively with a significantly decreasing rate of benign pathology as tumor size increased (Figure 1). Age and testicular cancer risk factors (infertility, prior history of testicular cancer, cryptorchidism, infertility) were not predictive of benign pathology with the exception of the absence of elevated tumor markers (OR 13.5, 95%CI 1.8-101.6, p = 0.01). Smaller tumor size (OR 1.7, 95%CI 1.2-2.4, p = 0.002), tumor volume (OR 1.06, 95%CI 1.1-1.0, p = 0.04), and percentage of total testicular volume (OR 16.5, 95%CI 1.4-194.0, p = 0.03) were significantly associated with benign pathology. 17 patients (6.2%) attempted a partial orchiectomy with 7 patients (41.1%) being converted to a radical orchiectomy for germ cell tumor identified on frozen section intraoperatively.

Conclusions: Testicular masses ≤ 1cm had a high benign rate after orchiectomy, however the majority of masses were germ cell tumors. Partial orchiectomy remains a feasible treatment option to reduce the overtreatment of benign tumors while avoiding a delay in the definitive surgical management of testicular cancer.



MP1-17

Effect of Neoadjuvant Chemotherapy on Programmed Death Ligand 1 (PD-L1) Staining Fidelity between the Primary Tumor and Lymph Node Metastases in Bladder Cancer

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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 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 1.974, 95% CI 0.673-5.784). Among clinical variables analyzed, male sex was associated with significantly decreased odds of PD-L1 fidelity (OR 0.243, 95% CI 0.079-0.744). Bladder and lymph node H-score were also significantly associated with PD-L1 fidelity.

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.

Variable	Odds ratio (95% CI)	p value
Age	1.015 (0.964, 1.070)	0.5678
Race (1=Caucasian, 2=African American, 3=Other)	1.047 (0.425, 2.578)	0.9199
Sex, (1=Male, 2=Female)	0.243 (0.079, 0.744)	0.0132
Received Intravesical Therapy	0.640 (0.198, 2.073)	0.4566
Received Neoadjuvant Chemotherapy	1.974 (0.673, 5.784)	0.2152
Pathologic T Stage	0.75 (0.400, 1.410)	0.3737
Primary Histology (1=UCC, 2=Adenocarcinoma, 3=Squamous Cell Carcinoma)	1.047 (0.321, 3.413)	0.9399
Presence of Lymphovascular Invasion	0.437 (0.128, 1.490)	0.1857
Presence of Carcinoma In Situ	0.526 (0.194, 1.425)	0.2065
Bladder H-Score	1.014 (1.004, 1.025)	0.0046
Bladder PD-L1 intensity	6.253 (2.918, 13.401)	<0.0001
Lymph Node H-Score	1.038 (1.007, 1.071)	0.0150
Lymph Node PD-L1 intensity	14.365 (4.509, 45.762)	<0.0001

MP1-18

External Validation of Tele-Cystoscopy

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Introduction: Urology workforce shortages in rural areas limit access to surveillance cystoscopy for patients with bladder cancer. To address this, we developed a tele-cystoscopy model in which urologic advanced practice professionals (APPs) perform cystoscopies which are interpreted in real-time by board-certified urologists at remote locations. The purpose of this study was to externally validate the newly trained APP's cystoscopy.

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 (observers 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 reviewers 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 different.

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.

Date	Patient no	Reviewer	Observes all regions of the bladder	Identifies UOs	Performs retroflexion	Identifies abnormality and location	Surveys urethra on completion	Identifies sphincter	Overall Score
11/2/16	1	Outside	Y	Y	Y	NA	N	N	3
11/2/16	1	UVA	Y	Y	Y	NA	Y	N	4
11/2/16	2	Outside	N	Y	Y	Y	Y	N	3
11/2/16	2	UVA	N	Y	Y	Y	Y	N	3
2/1/17	1	Outside	Y	Y	Y	Y	Y	Y	4
2/1/17	1	UVA	Y	Y	Y	Y	Y	Y	4
2/1/17	3	Outside	N	N	Y	N	Y	Y	3
2/1/17	3	UVA	Y	Y	Y	NA	Y	Y	4
2/1/17	4	Outside	N	N	Y	Y	N	Y	2
2/1/17	4	UVA	Y	Y	Y	Y	Y	Y	5

Table 1. Outside reviewer score comparison.

MP1-19

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

A.P. Gogoj, S.B. Merrill, E. Lehman, K. Lehman, J.D. Raman, M. Kaag
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 (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 was for decreasing VTE incidence with increasingly aggressive prophylaxis across all three groups (15% vs. 10% vs. 5%). 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.

Table 1: Univariate comparison of VTE prophylaxis Groups A and C

	Group A: in-hospital prophylaxis n=163	Group C: pre- and post-RC prophylaxis and teaching n=75	p-value
VTE incidence (%)	24 (15)	4 (5)	0.04
Smoking (%)	139 (85)	53 (71)	0.01
Median lymph node yield (IQR)	16 (11, 23)	20 (15, 29)	0.01
Bleeding complications (%)	17 (10)	10 (13)	0.5

MP2-01

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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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 Rezūm® 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 ($p < 0.001$). 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.

MP2-02

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

A.P. Gogoj, S.B. Merrill, E. Lehman, K. Lehman, J.D. Raman, M. Kaag
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 (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 was for decreasing VTE incidence with increasingly aggressive prophylaxis across all three groups (15% vs. 10% vs. 5%). 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.

MP2-03

Incidence and Risk Factors for Incomplete Holmium Laser Enucleation of the Prostate (HoLEP)

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Thomas Jefferson University Hospital

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 procedure or even conversion to suprapubic 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 7 (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 morcellation 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. A total of 300 grams of prostatic tissue was removed. In patient's 3, 4, and 5, the cystoscope was unable to reach the end of the bladder, so the operation was stopped and subsequently converted to 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 1. Mean prostatic gland volume on TRUS was 93.6 ± 56.6 grams for all patients. The average age and body mass index was 70.5 ± 8.5 years and 30 ± 11.9, respectively.

Patient	Complication	Subsequent procedure?
1	Bladder would not expand; unable to morcellate	Yes-2nd HoLEP was performed to morcellate tissue
2	Prostate was found to be too bloody on cystoscopy	Yes-Conversion to suprapubic prostatectomy with 300g prostate removed
3	Cystoscope could not reach end of bladder	Yes-Conversion to suprapubic prostatectomy
4	Cystoscope could not reach end of bladder	Yes-Conversion to suprapubic prostatectomy
5	Cystoscope could not reach end of bladder	Yes-Conversion to suprapubic prostatectomy
6	Patient developed fluid overload secondary to absorption after enucleation	Yes-2nd HoLEP was performed to morcellate tissue
7	Patient developed fluid overload secondary to absorption after enucleation	Yes-2nd HoLEP was performed to morcellate tissue

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.

MP2-04

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 abnormalities were then identified for patients with urine volume less than 2 liters and greater than 2 liters. Fishers 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 uric acid (ssUA) (91/206, 44.2%). 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) (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 < 550: 85.3% vs. 14.7%; p = 0.01). Interestingly, patients with low urine volume on 24-hour urine had lower frequencies of elevated urine oxalate (oxalate > 40: 42.3% vs. 57.8%; p = 0.001), elevated urine calcium in males (calcium > 250: 32.3% vs. 67.7%; p = 0.03), and elevated urine uric acid in males (uric acid > 0.8: 32.4% vs. 67.6%; p = 0.01). 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, and 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.

MP2-05

Percutaneous Nephrolithotomy for All: A Contemporary Analysis of Risk Factors for Post-Op Sepsis

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Northwell Health[1]; Temple University School of Medicine[2]; Smith Institute for Urology[3]

Introduction: Percutaneous nephrolithotomy (PCNL) is recommended for clearance of large stones. Post-PCNL sepsis can be a devastating sequela, and risk factors including diabetes mellitus, positive urine cultures, staghorn stones, and pre-existing nephrostomy tubes have been previously explored. We sought to explore other suspected risk factors for Post-PCNL sepsis.

Materials & Methods: The records of 147 consecutive PCNL procedures for nephrolithiasis between January and August 2015 were reviewed. We summarized demographics, medical history, and the presence of post-operative sepsis (two or more criteria of the systemic inflammatory response syndrome). We hypothesized that endoscopic intervention within the last year, central nervous system (CNS) impairments, history of UTI or urosepsis, ipsilateral PCNL, urinary diversion, preoperative nephrostomy or stent, and positive intraoperative stone cultures would increase the risk of sepsis. We speculated having documented clearance of a prior infection and "tubeless" PCNL (post-op stent or ureteral catheter without nephrostomy tube) would be associated with less risk of sepsis. We compared patients who did and did not develop sepsis with univariate analysis using SPSS version 23.0.

Results: In total, 140 operations met the inclusion criteria. Thirteen patients (9.3%) met sepsis criteria. Mean age (60.5 vs. 57.9), BMI (28.7 vs. 31.2), and hemoglobin A1c (5.5 vs. 6.4) did not differ significantly sepsis vs. no sepsis groups respectively. Results are summarized in Table 1. Only having CNS abnormalities showed statistically significant increased risk of sepsis. No patients with sepsis had an ipsilateral PCNL, urinary diversion, or pre-op nephrostomy tube. Other variables with large effect size were history of UTI, positive intra-op cultures, "tubeless" PCNL, and clearance of prior infection.

Conclusions: PCNL can be performed safely in patients with recent endoscopic intervention, treated infections, or reoperations on the same kidney. A pre-existing stent or positive stone culture does not significantly increase the risk of sepsis. Low sepsis rates for "tubeless" PCNL may be confounded by decreased case complexity. Patients with CNS deficits are at increased risk of post-PCNL sepsis and should be counseled appropriately.

Table 1. Factors associated with post-PCNL sepsis.

	OR	
Endoscopic procedure <1 year ago	1.25	
CNS abnormality	22	*p<0.05*
h/o UTI	2.5	
h/o urosepsis	1.3	
Preop stent	1.53	
Negative preop cultures	0.53	
Intraop +kidney urine culture	6.3	
Intraop +stone culture	1.9	
"Tubeless" PCNL	0.33	
Documented clearance of prior infection	0.28	

MP2-06

Rational Antibiotic Therapy for Percutaneous Nephrolithotomy: A Look at Preoperative Cultures and Stone Cultures

S. Mehta[1], P. Samson[1], A. Grieco[2], L. Griffiths, Z. Okeke, D.M. Hoenig[3]
Northwell Health[1]; Temple University School of Medicine[2]; Smith Institute for Urology[3]

Introduction: Current guidelines recommend treatment of positive preoperative cultures for percutaneous nephrolithotomy (PCNL) without a consensus on the duration of treatment. Furthermore, recent literature states that positive intraoperative stone cultures are associated with a higher rate of sepsis, again without clear guidance on directing therapy. We hypothesized that there is a minimum number of days needed to properly treat a documented UTI and that untreated stone cultures are associated with post-PCNL sepsis.

Materials & Methods: The records of 147 consecutive PCNL procedures for nephrolithiasis between January and August 2015 were reviewed. Pretreatment with oral or intravenous antibiotics is based on culture sensitivities. Most are discharged with three to five days of cephalexin or amoxicillin/clavulanate depending on surgeon preference. We stratified patients who developed sepsis from those who did not and then noted patients with positive pre-op or intra-op cultures. We summarized the organisms, antibiotic given, and duration.

Results: One hundred forty operations met the inclusion criteria. Thirteen patients (9.3%) met sepsis criteria. Of those, 9 (69%) had a positive pre-op urine culture. In comparison, 46 of 127 (36%) patients who did not have post-PCNL sepsis also had positive bladder urine cultures ($p = 0.02$). The duration of antibiotic therapy differed: 2 days (σ 1.4) versus 4.5 days (σ 2.5) in the sepsis versus no sepsis groups respectively ($p = 0.02$). Thirty-four patients had a positive intra-op stone or kidney urine cultures, 5 (38.5%) in the sepsis group and 29 (22.8%) in the no sepsis group ($p = 0.21$). Eleven of 35 (31.4%) intra-op cultures were concordant with the preoperative culture. Only two cultures showing candida were explicitly treated, and the rest had no impact on the clinical course. In four cases, preoperative cultures resulted as gram positive organisms or contaminated were associated with staphylococcus or streptococcus in the stone cultures.

Conclusions: A longer preoperative antibiotic duration decreases the risk of post-PCNL sepsis in patients with positive preoperative cultures. Intra-op stone and urine cultures may have less role in guiding therapy than previously though. One theory is that PCNL creates a low-pressure system minimizing pyelo-venous backflow. Furthermore, many of the organisms cultured may already be covered with routine post-op antibiotics. We also found that cultures showing gram positive organisms or contaminated may be associated with colonized stones and ought to be adequately pre-treated.

MP2-07

Retzius Sparing Robot-Assisted Simple Prostatectomy: Key Technique Modifications and Outcomes

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Temple University

Introduction: Retzius-sparing robot-assisted simple prostatectomy (RS-RASP) in the treatment of benign prostatic hyperplasia (BPH) and lower urinary tract symptoms (LUTS) has been described in the literature. As this robotic procedure is relatively new, several techniques have been described with the ideal approach having yet to be defined. After experimenting with several approaches, we have refined our technique and herein present our surgical modifications in the largest single-surgeon series of RS-RASPs to date.

Materials & Methods: We retrospectively reviewed 105 men who underwent our modified RS-RASP by a single surgeon (DDE) between 2014-2017. Notable technical modifications include: 1) The bladder is not dropped thus the Space of Retzius is not entered. 2) A vertical midline transvesical incision is utilized. 3) After adenoma enucleation, a 360-degree urethro-vesical anastomosis is undertaken, bypassing the prostatic fossa. 4) An 18 french 2-way catheter is left without need for continuous bladder irrigation (CBI). Primary outcomes were the American Urological Association Symptom Score (AUA-SS) with associated bother, the Sexual Health Inventory for Men (SHIM), and post-void residual (PVR) at 6 weeks postoperatively. The preoperative and postoperative outcomes were compared using paired t-tests.

Results: All patients presented with LUTS, with 84 of 105 (80%) in urinary retention pre-operatively. The average estimated prostate size vs. pathological volume of prostate resected was 120 cc and 80 cc, respectively. When comparing patients pre and post-operatively, a statistically significant difference was noted in AUA-SS (19 vs. 6, $p < 0.001$), Bother (5 vs. 1, $p < 0.001$), and PVR (160 vs. 12 cc, $p < 0.001$). There was no statistically significant change in SHIM score (13 vs. 12, $p = 0.416$). Transfusion rate was 2% and 91% of patients were discharged on post-operative day 1. Only 1 patient (0.9%) required catheter assistance post-operatively performing clean intermittent catheterization.

Conclusions: Our modified RS-RASP represents a feasible, reproducible technique to avoid CBI and large catheters while maintaining surgical efficacy; we minimize hematuria by utilizing the 360-degree anastomosis to exclude the prostatic fossa and maintain native bladder support by sparing the Space of Retzius. Our modifications to RS-RASP demonstrate an effective technique in the surgical management of BPH/LUTS by improving functional outcomes without compromising sexual function.

MP2-08

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 tumors. Consequently, lead-lined aprons are typically used to cover highly radiosensitive structures in the neck, chest, abdomen, and pelvis during fluoroscopy. More recently, data suggests that radiation exposure to typically unleaded areas such as eyes and hands may be harmful as well. There is, however, a paucity of data on the amount of radiation exposure experienced by urology residents. Given the high volume of cases that they assist in as part of intensive urologic training, we hypothesized that urology residents may be subjected to high levels of radiation, particularly at unleaded 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 dosimetry badge was worn at the waist under the lead apron. Radiation data from all three dosimetry 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 mrems (mean 83.75 mrems/month, anticipated 1,005 mrems/year), the lens-dose equivalent (LDE) was 337 mrems (84.25 mrems/month, anticipated 1,011 mrems/year), and the shallow-dose equivalent (SDE) was 324 mrems (81 mrems/month, anticipated 972 mrems/year). For the ring dosimeter, the total DDE was 2,250 mrems (562.5 mrems/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 surpass typical "As Low As Reasonably Achievable" (ALARA) recommended DDE limits of 5,000 mrems/year (416.67 mrems/month). While radiation safety recommendations suggest exposures up to 50,000 mrems annually may be tolerable at the extremities, our data indicate that residents performing routine "low-dose" procedures may still be incurring significant DDE exposure to unleaded 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.

MP2-09

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 (NCT02625545), 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 retract 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 to L.I.F.T. 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 and significantly better than baseline at every time point (p60% and > 70%, respectively at 3, 6 and 12 months). Qmax improved 90%-130% throughout follow up. At 1 month, 65% subjects reported ≥ 80 on the Quality of Recovery scale, 80% reported being "much" or "very much better," and 89% would recommend the procedure. There were no reports of de novo sustained erectile or ejaculatory dysfunction. Erectile function as measured by IIEF-5 remained stable and ejaculatory function (MSHQ-EjD score) was significantly improved throughout follow up ($p < 0.001$).

Conclusions: Patients in this study experienced excellent symptom improvement, recovery and preservation of sexual function. Obstructive median lobes can be safely and effectively treated with PUL and is supported by a new FDA median lobe indication.

Table 1: 12 month comparison of median and lateral lobe response to PUL

	Obstructive Median Lobe N=44			Lateral Lobe Only N=123			P-value
	Baseline	12 Months	Change	Baseline	12 Months	Change	
AUASI	24.1 ± 5.0	10.6 ±7.0	-13.5* ± 7.7	22.1 ± 5.6	11.5 ± 7.3	-10.6* ± 7.5	0.03
QOL	4.9 ± 0.8	1.9 ± 1.3	-3.0* ± 1.5	4.6 ± 1.0	2.3 ± 1.6	-2.3* ± 1.6	0.01
Qmax*	7.1 ± 2.7	13.5 ± 7.6	6.4* ± 7.4	8.0 ± 2.4	12.1 ± 5.3	4.0* ± 4.9	0.08
BPHII	7.7 ± 2.8	2.1 ± 2.5	-5.6* ± 3.5	6.8 ± 2.8	2.8 ± 2.9	-4.0* ± 3.3	0.007
IIEF-5	15.1 ± 9.0	16.4 ± 9.5	1.2 ± 5.6	16.0 ± 7.0	17.3 ± 7.6	0.7 ± 5.1	0.6
MSHQ-EjD	9.4 ± 3.1	11.4 ± 2.8	2.0* ± 2.8	8.7 ± 3.3	10.3 ± 3.2	1.6* ± 2.7	0.4

MP2-10

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 of 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] Arguably, some patients might have missed/undiagnosed hernias 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] 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 vs. 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.

MP2-11

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

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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 of the generalizability in men undergoing prostate procedures. Many institutions, including ours, have used FQ perioperatively due to lack of data supporting alternative agents. We aimed to evaluate FQ resistance among E. coli isolates in this population at Cooper University Hospital. We assessed E. coli as a marker of presence or absence of resistant genitourinary flora.

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. colifrom 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.

MP2-12

Are Industry Payments for Tadalafil Associated with Prescribing Habits Among Urologists and Primary Care Physicians?

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Introduction: Prior studies have shown that pharmaceutical industry payments may be associated with prescribing habits among physicians. The relationship between payments and prescription of phosphodiesterase type 5 inhibitors (PDE5i) has not been explored. In this study, we evaluated whether industry payments for tadalafil were associated with prescribing habits among urologists (URO) and primary care physicians (PCPs).

Materials & Methods: Medicare Part D Public Use File and Open Payments Program database (OPP) were linked to identify URO and PCPs who prescribed and received a payment for tadalafil in 2015. PCPs were defined as internal medicine and family medicine physicians. We determined whether presence of and extent of payment were associated with prescription of tadalafil as well as the number of claims. Statistical tests included chi-squared test, univariable logistic regression and Pearson correlation coefficient.

Results: Within Medicare Part D, 2,602 URO and 3,095 PCPs prescribed tadalafil. Within OPP, 2,304 urologists and 12,465 PCPs received a payment from Eli Lilly pertaining to tadalafil. Range of payments were $10.21-$15,478.88 (median $25.16) for URO and $1.39-$21,681 (median $20.11) for PCPs. Payments were associated with tadalafil prescription among PCPs, but not among URO (Table 1). For URO, increased payment amount was not associated with prescribing (Table 2), but claim count was very weakly correlated with payment amount (p = 0.042, r = 0.063) and frequency (p = 0.006, r = 0.089). For PCPs, increased payment amount was associated with prescribing (Table 2), and claim count was very weakly correlated with payment amount (p = 0.01, r = 0.1), but not frequency (p = 0.474, r = 0.032).

Conclusions: There does not appear to be a strong relationship between payments and prescribing habits, which is reassuring regarding the ethics of physician-industry interaction. However, given the presence of a weak association, further study in other samples (e.g. private insurance) and with other PDE5i may be worthwhile.

Table 1 - Effect of receiving an industry payment on the prescription of tadalafil

URO			
	Received Payment	**Did not receive payment**	**P**
Prescribed Tadalafil	1022 (39.3%)	1580 (60.7%)	0.922
Did not Prescribe Tadalafil	18 (40%)	27 (60%)	
PCP			
	Received Payment	**Did not receive payment**	**P**
Prescribed Tadalafil	683 (22.1%)	2412 (77.9%)	<.001
Did not Prescribe Tadalafil	120 (5.9%)	1904 (94.1%)	

Table 2 – Impact of increasing value of payments on prescribing among those who received at least one payment for tadalafil

Specialty	OR	95% CI	P
URO (n=1040)	1.01	(.99,1.02)	0.39
PCP (n=803)	1.01*	(1.00,1.02)	0.02

*for every $1 paid, the chance of prescribing tadalafil increased by 1%

MP2-13

Analysis of Urological Transfers to a Metropolitan Quaternary Care Center
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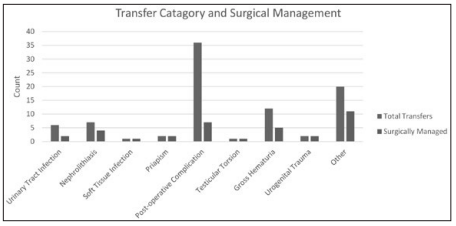
Introduction: Inpatient urological care is not universally available in the U.S. The inter-hospital transfer of patients represents one avenue to meet this critical need, but to date its use is largely unknown. Therefore, we performed an analysis of all patients transferred to the primary urology service 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 $30,980, 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 only received a relatively small number of urological transfers. Urological services were available at almost all referring hospitals. Once accepted, patients were transferred relatively quickly and over short distances. Less than half required a procedure. Future efforts may determine if these patients can safely avoid a transfer by leveraging our expertise through telemedicine with deference given to elective, ambulatory follow up if needed.



MP2-14

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 dilation, suprapubic catheter), as well as pre- and post-procedural novel PUC (NPUC), defined as no 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). 11.3% of patients also underwent recurrent FCP during the study period (n = 16). The total incidence of NPUC was 9.9% (n = 14) and the median time to NPUC was 19.0 days. 57.1% of NPUC had growth of an antibiotic resistant organism (n = 8). 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 CI 0.66-3.04; p = 0.522) or patients undergoing recurrent FCP (RR 2.27, CI 0.73-7.08; p = 0.172). Previous PUC was associated with an increased risk of development of NPUC (RR 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 = 0.002). Logistic regression revealed that previous PUC was the only significant predictor of NPUC (OR 16.39, CI 3.48-32.26; p < 0.001) and antibiotic resistant PUC (OR 71.43, CI 5.49-1000.00; p = 0.001), when taking into account type of procedure, repeat difficult catheter placement, and medical comorbidities.

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.

MP2-15

Variation in Kidney Stone Composition Within the United States
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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 chi-square or Fishers Exact Test for the binary indicator, and analysis of variance for the continuous percentage (using the log-transformed percentages 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.

MP2-16

Procalcitonin is a Useful Biomarker for Predicting Positive Urine and Blood Cultures in Cases of Acute Obstructive 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.

Figure 1 – Receiver operating characteristic (ROC) curves comparing diagnostic values of procalcitonin (PCT) and WBC in predicting positive urine and blood cultures

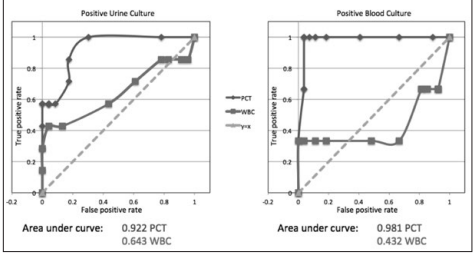

Table 1 – Predictive ability of procalcitonin (PCT) for positive urine and blood cultures

	Infection - Urine				
PCT (ng/mL)	Present	*n*	Absent	*n*	Total
>0.14	TP	6	FP	4	10
</=0.14	FN	1	TN	19	20
Total		7		23	30
Sensitivity	0.857142857		Specificity	0.826086957	
PPV	0.6		NPV	0.766666667	

	Infection - Blood				
PCT (ng/mL)	Present	*n*	Absent	*n*	Total
>1.0	TP	3	FP	1	4
</=1.0	FN	0	TN	26	26
Total		3		27	30
Sensitivity	1		Specificity	0.962962963	
PPV	0.75		NPV	0.9	

TP- True Positive, FP- False Positive, FN- False Negative, TN- True Negative

PPV- Positive Predictive Value, NPV- Negative Predictive Value

MP2-17

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.

	Bulbar	Penile	Peno-bulbar	Bulbo-membranous	Panurethral	Fisher's P value
Complication	20/123 (16.3%)	5/47 (10.6%)	3/9 (33.3%)	0/2 (0%)	9/30 (30%)	P=0.132
Recurrence of stricture	16/123 (13%)	7/47 (14.9%)	0/9 (0%)	0/2 (0%)	7/30 (23.3%)	P=0.402

Table 1. Complication and recurrence of stricture by location of urethroplasty.

MP2-18

Community Centered Retrospective Review of Prostatic Urethral Lift - A Single Surgeons Experience

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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 values improved significantly from 20.4 ± 6.2 to 6.3 ± 4.7 (-14.08 ± 6.6 p + 1.0 to 1.4 ± 1.3 (-2.82 ± 1.4 $p < 0.05$). Significant relationships existed between both pre-operative IPSS and IPSS score difference (IPSS at last follow up – preoperative IPSS) $r = -0.731$ ($p < 0.05$) and QOL and QOL difference $r = -0.463$ ($p < 0.05$). 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 score improvements. Continued follow up is needed to compare our results against previously published data.

MP2-19

Initiative to Improve Oncologic Management of Small Renal Masses: A Shared Decision-Making Model

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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 often 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 of 95% (1.5-2.9) validated 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 39%. 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 such patients.

MP2-20

Analysis of Online Urologist Ratings: Does Subspecialty Influence Mean Rating?

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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 stones/endourology. 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)

	N (%)	Median Rating (IQR)
Practice Size		
Large	424 (49)	3.9 [3.4, 4.4]
Academic	282 (32)	4.4 [3.8, 5.0]
Small	166 (19)	3.8 [3.2, 4.3]
Specialty		
General	426 (49)	3.9 [3.3, 4.4]
Robotics/Oncology	195 (22)	4.5 [3.8, 5.0]
Female	81 (9)	4.0 [3.3, 4.5]
Stones/endourology	65 (7)	4.3 [3.5, 5.0]
Infertility/Men's Sexual Health	48 (6)	3.8 [3.5, 4.5]
Pediatrics	45 (5)	4.1 [3.4, 5.0]
Reconstruction	12 (1)	4.0 [3.4, 4.8]
Region		
Midwest	289 (33)	4.2 [3.4, 4.8]
South	247 (28)	4.0 [3.4, 4.5]
Northeast	203 (23)	4.1 [3.5, 4.7]
West	133 (15)	4.0 [3.3, 4.4]
Gender		
Male	784 (90)	4.0 [3.4, 4.7]
Female	88 (10)	4.0 [3.4, 4.6]

MP2-21

An Analysis of Learning Curve to Achieve Competency at MR/US Fusion Biopsy at a Single Center

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Introduction: The number of targeted magnetic resonance/ultrasound (MR/US) fusion prostate biopsies required to reach competency has not been evaluated. The primary aim of this study is to determine the minimum number of MR/US fusion biopsies that urologists need to perform to attain proficiency, as defined by a detection rate of clinically significant prostate cancer (CS-PCa) at or above the level of standard sextant biopsy in men with PIRADS 4 and 5 lesions on prostate MRI.

Materials & Methods: Three-hundred sixteen men underwent concurrent targeted and standard prostate biopsies from January 2016 to October 2017 at our institution. The detection rate of CS-PCa of targeted biopsy was compared to standard biopsy. CS-PCa is defined as intermediate risk group or higher based on NCCN guidelines, i.e. grade group 1 with PSA > 10ng/mL or grade group 2 and above. Cumulative sum (CUSUM) analysis was used to produce a learning curve and determine the minimal number of targeted biopsies a urologist needs to perform to achieve a cancer detection rate at or above the rate of standard biopsy.

Results: Four fellowship-trained urologists performed targeted biopsies at our institution with varying case volumes of 11, 39, 80, and 186 cases for surgeons 1 through 4, respectively. The overall CS-PCa detection rate was 32.9% (104 men) on combined targeted and standard biopsies. Targeted biopsy detected 75 cases (72.1%) whereas standard biopsy detected 76 cases (73.1%). CUSUM analysis of CS-PCa detection showed that two urologists (surgeons 3 and 4) achieved proficiency in targeted biopsy at 40 and 85 cases, respectively. After the first 40 targeted biopsies, surgeon 3's targeted biopsy rate improved from 36% to 52% while his standard biopsy rate remained at 44%, $p < 0.001$. After the first 85 targeted biopsies, the CS-PCa detection rate on targeted biopsies by surgeon 4 improves by 7.9 fold (CI 1.15-41.3, $p < 0.02$). Two urologists (surgeons 1 and 2) have not performed enough targeted biopsies to determine their proficiency.

Conclusions: The ACGME requires at least 25 TRUS biopsies for graduating urology residents. As MR/US targeted prostate biopsy becomes a routine diagnostic tool in the management of prostate cancer, it is important to define minimal number of targeted biopsies required to achieve proficiency with the new platform.

MP2-22

Implementation and Outcomes of Prostate Needle Biopsy Using a Trans-Perineal Approach

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Introduction: Prostate cancer is the most common cancer in men, accounting for an estimated 164,000 new cases in 2018, and over 29,000 deaths. Prostate cancer has traditionally been diagnosed with prostate needle biopsy using a trans-rectal approach. However, prostate needle biopsy using a trans-perineal approach has become more prevalent because of its improved ability to sample the anterior and peripheral zones of the prostate, and decreased risk of infection. In this study we describe the experience of a single academic center during the implementation of prostate needle biopsy via the trans-perineal approach.

Materials & Methods: This retrospective study included the first 114 patients who underwent trans-perineal prostate needle biopsy between January 2017 and December 2017 with three attending urologists in a teaching environment. Cystoscopy was performed at the time of each biopsy, and conducted in an outpatient surgical center under general anesthesia with one dose of perioperative antibiotics. Follow-up was conducted within two weeks.

Results: The mean patient age was 63.5 years, and self-reported ethnicity was 88% Caucasian, 11% African American, and 1% Hispanic. The most common reason for biopsy was elevated prostate specific antigen (71%), active surveillance (15%), and abnormal prostate exam (14%). The median PSA was 7.5. The cancer detection rate was 66.9% overall, but was 71% for first time biopsies, and 40% in those with a previously negative biopsy. The mean time to complete each biopsy during the first 3 months was 33.7 minutes, whereas the mean time to complete each biopsy during the last 3 months was 24.8 minutes ($p = 0.001$). The cancer detection rate during the 1st v. 4thquarter was 58.3% v. 76.3%, respectively, ($p < 0.001$). The most common side effects were mild, self-limiting hematuria/hematospermia (8.8%), urinary retention (2.6%), perineal pain (3.5%), fever requiring admission (0.9%).

Conclusions: In this study we present the outcomes and implementation of the trans-perineal approach of prostate needle biopsy. We show evidence that this approach is safe, can be implemented quickly, and provides patients with an acceptable side-effect risk profile with excellent cancer detection rates.

MP2-23

The Use of Indocyanine Green during Robotic Ureteroenteric Reimplantation for the Management of Benign Anastomotic Strictures

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Introduction: Indocyanine green (ICG) has been utilized as a real-time intraoperative contrast agent to facilitate identification of the ureter and localization of ureteral stricture margins during robotic ureteral reconstruction. However, the use of ICG during robotic ureteroenteric stricture repair has yet to be reported. We describe our technique for using intraureteral and intraurinary diversion ICG during robotic ureteroenteric reimplantation and report our outcomes.

Materials & Methods: We retrospectively reviewed 8 patients who underwent 10 robotic ureteroenteric 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 strictured ureter and urinary diversion, which fluoresced green; and localization the anastomotic stricture margins, which poorly fluoresced 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 operative 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 minor (Clavien ≤ 2), and 2/8 (25.0%) patients suffered a major (Clavien > 2) 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), 8/10 (80.0%) ureteroenteric reimplantations were clinically and radiologically successful.

Conclusions: Intraureteral and intraurinary diversion ICG may be utilized as a real-time contrast agent during robotic ureteroenteric reimplantation to facilitate identification of the strictured ureter(s) and urinary diversion, and delineation of the ureteroenteric stricture margins. Despite this, robotic ureteroenteric reimplantation remains a significantly morbid procedure.

MP2-24

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

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Introduction: Creation of an ileal conduit may be complicated by late stomal complications such as stomal stenosis or stomal retraction both of which make 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-ileal anastomosis.

Materials & Methods: Eleven patients with stomal stenosis (4 patients) or stomal retraction (7 patients) underwent stomal repair 20.5 +/- 19.7 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 neurogenic 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 stomal stenosis if necessary, selection of an ileal segment chosen to reach from the proposed neo-stoma site to the already existing sub facial conduit, restoration of bowel continuity, end-to-end 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.

Moderated Poster Session 3: Prostate Cancer

MP3-01

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

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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 ≥ 0.2 ng/mL. Secondary outcomes included time to biochemical recurrence, 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% (2/33), $p = 0.002$. Among patients with BCR, time to recurrence was similar between delayed and home groups (mean 3.68 ± 1.9 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.

MP3-03

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

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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 in 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 (± 5.9) 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 2 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.

MP3-02

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

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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 ($cT_{1\text{-}2}N_0M_0$) prostate cancer diagnosed between 2010 and 2014 in the National Cancer Database. Hospital volume (cases/year) was defined as the average annual hospital RARP volume over the five-year duration. We categorized hospital volume into very low, low, medium, high, and very high by most closely sorting final included patients into five equal-sized groups (quintiles). Outcomes included 30-day mortality, 90-day mortality, conversion (to open), prolonged length of stay (PLOS, > 2 d), 30-day (unplanned) readmission, positive surgical margin (PSM), and lymph node dissection (LND) rates. PSM was analyzed in the overall cohort and intermediate/high-risk cohort and LND was analyzed in the intermediate/high-risk cohort only.

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

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

Figure. Unadjusted outcomes stratified by RARP hospital volumes

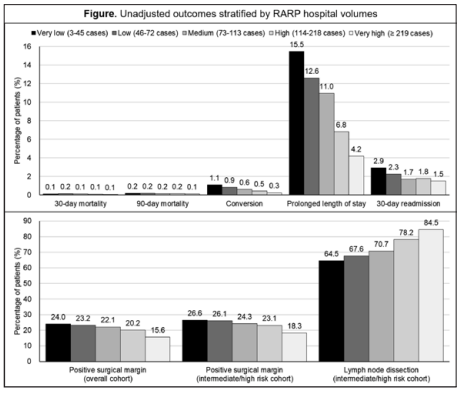

Table. Multivariable logistic regression results showing the associations between hospital volume and outcomes of RARP

	Conversion		Prolonged length of stay		30-day readmission	
Hospital volume	OR (95%CI)	p-value	OR (95%CI)	p-value	OR (95%CI)	p-value
Very low	Reference		Reference		Reference	
Low	0.77 (0.64-0.93)	0.007	0.79 (0.75-0.83)	<0.001	0.77 (0.68-0.86)	<0.001
Medium	0.57 (0.46-0.69)	<0.001	0.68 (0.64-0.72)	<0.001	0.58 (0.51-0.66)	<0.001
High	0.42 (0.33-0.53)	<0.001	0.41 (0.38-0.43)	<0.001	0.62 (0.54-0.70)	<0.001
Very high	0.23 (0.18-0.31)	<0.001	0.25 (0.23-0.27)	<0.001	0.53 (0.46-0.60)	<0.001

	Positive surgical margin (overall cohort)		Positive surgical margin (intermediate/high risk cohort)		Lymph node dissection (intermediate/high risk cohort)	
Hospital volume	OR (95%CI)	p-value	OR (95%CI)	p-value	OR (95%CI)	p-value
Very low	Reference		Reference		Reference	
Low	0.97 (0.93-1.02)	0.215	0.99 (0.94-1.04)	0.575	1.19 (1.13-1.25)	<0.001
Medium	0.91 (0.87-0.95)	<0.001	0.90 (0.86-0.95)	<0.001	1.36 (0.30-1.43)	<0.001
High	0.81 (0.78-0.85)	<0.001	0.84 (0.79-0.88)	<0.001	1.97 (1.86-2.08)	<0.001
Very high	0.61 (0.59-0.64)	<0.001	0.64 (0.60-0.67)	<0.001	3.23 (3.05-3.42)	<0.001

Adjusted for age, race, Charlson/Deyo comorbidity score, insurance, education level, income level, residence county type, clinical T stage, PSA level, Gleason score, and year of diagnosis.
OR = odds ratio; CI = confidence interval.

MP3-04

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

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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 (≤ 3) 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 (68% vs. 47%, p = 0.02), upgrading to ≥ GG3 (16% vs. 2%, p = 0.02), EPE (18% vs. 3.5%, p = 0.01), and any adverse pathology (≥ GG3, SVI, EPE or positive pelvic lymph nodes; 27% vs. 5%, p = 0.002). Men with PIRADSv2 < 4 had a NPV of 95% 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 (49% vs. 23%, p = 0.006), and had higher rates of upgrading to ≥ GG3 (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]; 6.6[5.5-14.4] 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 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

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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-specific parameters were strongly associated with a decreased utilization of AS.

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 (biopsy 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.

Table 1: Patient demographics and initial management strategy, by disease risk

		NCCN Disease Risk			Total
		Very-Low Risk	Low Risk	Intermediate Risk	
Age	< 60	56 (25.9%)	245 (43.1%)	343 (31.3%)	644 (34.3%)
	60 – 65	78 (36.1%)	172 (30.3%)	369 (33.7%)	619 (32.9%)
	> 65	82 (38.0%)	151 (26.6%)	384 (35.0%)	617 (32.8%)
Race/Ethnicity	Caucasian	137 (63.4%)	415 (73.1%)	728 (66.4%)	1280 (68.1%)
	African American	44 (20.4%)	120 (21.1%)	277 (25.3%)	441 (23.5%)
	Hispanic	14 (6.5%)	18 (3.2%)	34 (3.1%)	66 (3.5%)
	Asian and Pacific Islander	7 (3.2%)	4 (0.7%)	18 (1.6%)	29 (1.5%)
	Unknown/ Other	14 (6.5%)	11 (1.9%)	39 (3.6%)	64 (3.4%)
Initial Management Strategy	Active Surveillance	179 (82.9%)	271 (47.7%)	85 (7.8%)	535 (28.4%)
	Radical Prostatectomy	29 (13.4%)	260 (45.8%)	816 (74.4%)	1105 (58.8%)
	External Beam Radiation Therapy	8 (3.7%)	36 (6.3%)	184 (16.8%)	228 (12.1%)
	Brachytherapy	0	1 (0.2%)	10 (0.9%)	11 (0.6%)
	High Intensity Focused Ultrasound	0	0	1 (0.1%)	1 (0.1%)
Total		216 (11.5%)	568 (30.2%)	1096 (58.3%)	1880

Table 2: Multivariable logistic regression analysis of factors associated with AS utilization

		Odds Ration (95% CI)	p-value
Age	< 60	Reference	Reference
	60 - 65	2.10 (1.44 – 3.06)	<0.001
	> 65	2.43 (1.66 – 3.54)	<0.001
Race/Ethnicity	Caucasian	Reference	Reference
	African American	0.83 (0.57 – 1.21)	0.34
	Hispanic	1.17 (0.53 – 2.59)	0.69
	Asian/Pacific Islander	0.67 (0.23 – 1.94)	0.46
	Other/Unknown	2.19 (0.94 – 5.07)	0.07
Family History of Prostate Cancer	No	Reference	Reference
	Yes	1.05 (0.73 – 1.51)	0.78
Clinical Stage	T1	Reference	Reference
	T2a	0.98 (0.58 – 1.66)	0.94
	T2b/c	0.37 (0.09 – 1.44)	0.15
Biopsy Grade Group	1	Reference	Reference
	2	0.07 (0.05 – 0.11)	<0.001
	3	0.02 (0.01 – 0.06)	<0.001
PSA	< 5	Reference	Reference
	5 – 10	0.74 (0.54 – 1.02)	0.07
	> 10	0.32 (0.19 – 0.55)	<0.001
Percent of Positive Biopsy Cores	< 25	Reference	Reference
	25 - 50	0.38 (0.25 – 0.58)	<0.001
	> 50	0.11 (0.07 – 0.15)	<0.001
Maximum Percent Biopsy Core Positive	< 25	Reference	Reference
	25 - 50	0.47 (0.32 – 0.68)	<0.001
	> 50	0.27 (0.17 – 0.43)	<0.001

MP3-06

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

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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 correlative tissue biopsy cores using the ClariCore™ Optical Biopsy 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 correlative 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.

Algorithm Performance Measures	% (95% Confidence Interval)
Sensitivity	85.95% (80.09 – 90.61%)
Specificity	87.98% (85.76 – 89.95%)
Negative Predictive Value	97.05% (95.84 – 97.92%)
Positive Predictive Value	57.61% (53.15 – 61.93%)
Area Under Curve	0.87 (0.85 – 0.89)

MP3-07

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

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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 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 17.4x 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 (2,468 to 909 cases) but had stable ratios of outpatient procedures (85% to 86%). AUSs 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 increasingly 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 clinical information and four serum markers. While there have been several validation studies regarding use of the 4Kscore, there is a paucity of data on how this test impacts clinical practice. In this abstract, we aimed to assess how the 4Kscore influenced biopsy related decisions in men evaluated in an academic urology practice.

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

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

Patient	Patient Type	PI-RADS	Final Pathologic Findings	
		Score of index lesion	Standard 12-core Template	Targeted Biopsy
1	Biopsy Naïve	4	GP	GP
2	Biopsy Naïve	4	**GG Group 5**	**GG Group 5**
3	Biopsy Naïve	4	GP	GP
4	Previous Negative Biopsy	4	GP	GP
5	Previous Negative Biopsy	5	GP	GP
6	Previous Negative Biopsy	5	GP	GP
7	Active Surveillance	4	**GG Group 4**, GP	**GG Group 3**, GP
8	Active Surveillance	5	omitted	benign tissue
9	Active Surveillance	5	**GG Group 2**, GP	GP
10	Active Surveillance	5	**GG Group 1**, GP	GP

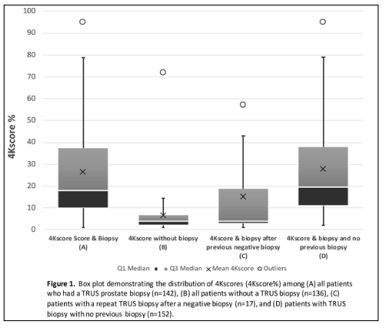

Figure 1. Box plot demonstrating the distribution of 4Kscores (4Kscore%) among (A) all patients who had a TRUS prostate biopsy (n=142), (B) all patients without a TRUS biopsy (n=136), (C) patients with a repeat TRUS biopsy after a negative biopsy (n=17), and (D) patients with TRUS biopsy with no previous biopsy (n=152).

MP3-10

Analyzing the Accuracy of PIRADS Stratified by Location within the Prostate

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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 a given final PI-RADS score communicates the same level of risk for patients with tumors in the PZ vs. TZ.

Materials & Methods: Using a prospectively maintained database, we identified men who underwent targeted fusion 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.

Figure 1:

Peripheral Zone (PZ) Targeted Lesion		Transitional Zone Targeted Lesion		P value
Likelihood of Positive Biopsy				
PZ PIRADS 5	71.30%	TZ PIRADS 5	80.77%	< 0.0001
PZ PIRADS 4	47.27%	TZ PIRADS 4	43.75%	< 0.0001
PZ PIRADS 3	22.48%	TZ PIRADS 3	16.67%	< 0.0001
Likelihood of Significant Cancer				
PZ PIRADS 5	55.36%	TZ PIRADS 5	59.62%	< 0.0001
PZ PIRADS 4	36.29%	TZ PIRADS 4	23.96%	< 0.0001
PZ PIRADS 3	11.76%	TZ PIRADS 3	7.69%	< 0.0001

MP3-12

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

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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 HVD 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), present in 5.3% of LVD patients and 30.3% of HVD patients (p = 0.033). 85.7% of those with BCP or biochemical recurrence (BCR) 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, 3 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 <./p>

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

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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 (2 doses each) injections of SC-LA lasting 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 studies; 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 below each target level 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.

Table

Dose	Mean Proportion of Time (%) T under Target Level		
	T≤10 ng/dL	T≤20 ng/dL	T≤50 ng/dL
1-Month (n=119)	85	99	100
3-Month (n=117)	66	94	100
4-Month (n=90)	68	95	100
6-Month (n=111)	68	96	100

MP3-13

In-vivo Trial of Subharmonic Contrast-enhanced Imaging for the Detection of Prostate Cancer

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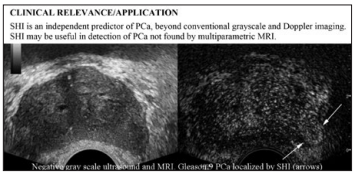
Introduction: Subhamonic imaging (SHI) is a new technique for imaging of microbubble ultrasound contrast agents with improved tissue suppression. We conducted a pilot study to evaluate contrast enhanced SHI of the prostate for detection of prostate cancer (PCa).

Materials & Methods: Fifty-five patients referred for prostate biopsy were included in this study supported by a grant from the NIH: R21 CA202214. 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 the World Health Organization and American Cancer Society, for 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 structural and socioeconomic variables (Fig. 1A; $P < 0.001$). Health systems with cancer control policies had lower rates of CaP mortality. For instance, mortality was negatively correlated with the extent of warning labels on cigarette packaging (as a proxy for cancer prevention programs) ($P < 0.001$); mean mortality was 11.7 and 11.8/100,000 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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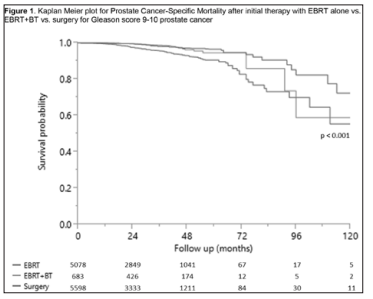
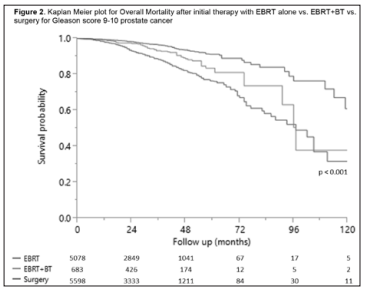
Introduction: Men with Gleason score 9-10 prostate cancer have significantly worse outcomes compared to those with Gleason score 8 disease. Choice of upfront treatments remain controversial for this patient cohort. Using the Surveillance, Epidemiology, and End Results (SEER) database, we evaluated the 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.

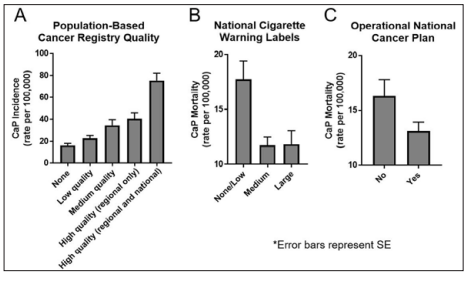
Materials & Methods: The SEER database was queried for men diagnosed with Gleason score 9-10 prostate cancer from 2004-2014. Only localized disease with clinical N0 and M0 status was included. Gathered data included demographic, pathologic, therapy received, and survival outcomes. Using JMP v11.0, Kaplan-Meier 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 0.57, 95% CI 0.33-0.90, $p = 0.015$ respectively). Comparison of PCSM and overall mortality between surgery and EBRT+BT revealed HR 0.56 (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 PIRADS 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 PIRADS 3, 14 were PIRADS 4, and 8 were PIRADS 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 PIRADS score to predict ECE, Decipher score to predict ECE, and Decipher and PIRADS scores combined to predict ECE. This demonstrated improved predictive value of ECE when Decipher and PIRADS scores are used together with the area under the curve (AUC) = 0.92 when compared to each score separately (Decipher score vs. ECE AUC = 0.71; PIRADS 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 PIRADS score and genomic testing scores may work synergistically to help predict pathologic ECE for prostate cancer at time of radical prostatectomy.

MP3-18

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.

Date	Patient no	Reviewer	Observes all regions of the bladder	Identifies UOs	Performs retroflexion	Identifies abnormality and location	Surveys urethra on completion	Identifies sphincter	Overall Score
11/2/16	1	Outside	Y	Y	Y	NA	N	N	3
11/2/16	1	UVA	Y	Y	Y	NA	Y	N	4
11/2/16	2	Outside	N	Y	Y	Y	Y	N	3
11/2/16	2	UVA	N	Y	Y	Y	Y	N	3
2/1/17	1	Outside	Y	Y	Y	Y	Y	Y	4
2/1/17	1	UVA	Y	Y	Y	Y	Y	Y	4
2/1/17	3	Outside	N	N	Y	N	Y	Y	3
2/1/17	3	UVA	Y	Y	Y	NA	Y	Y	4
2/1/17	4	Outside	N	N	Y	Y	N	Y	2
2/1/17	4	UVA	Y	Y	Y	Y	Y	Y	5

Table 1. Outside reviewer score comparison.

MP3-17

Impact of Age at Diagnosis on Cause of Death in Prostate Cancer

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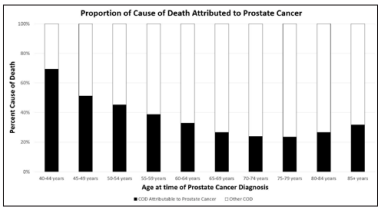
Introduction: Prostate cancer typically has a low rate of prevalence of lethal disease. However, patients who develop prostate cancer at an earlier age may be at risk for a greater risk of dying due to prostate cancer, as life expectancy is greater and younger age of onset is associated with more aggressive 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.



MP3-19

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 post-radical prostatectomy (RP) pathology. The Prolaris Score (PS), derived from a genomic Cell Cycle Progression 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 upgraded, downgraded, or no change. A PS on a continuum of 1 (less aggressive) to 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 (33.0%), 4+3 (15.0%), 4+4 (9.2%), and 4+5 (1.5%). 86% of patients had pre-biopsy PSA levels of ≤ 10.0. PS distribution included 6.2% with scores of 1-2.4, 53.8% 2.5-3.5, and 40% 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.

MP4-01

Bladder Dynamic Elasticity: A Novel Predictor of Volume Accommodation During Urodynamics

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Introduction: Dynamic elasticity, or reversible strain softening, is a material property of bladders that is identified using comparative-fill urodynamic studies (UDS), and may play a role in the bladder's ability to accommodate variable fill rates and volumes. The aim of this study was to test the hypothesis that individuals with acute dynamic elasticity can better accommodate the faster filling of UDS compared to individuals without dynamic elasticity.

Materials & Methods: Individuals with and without urgency based on ICIq-OAB survey question 5a (≥ 3 and = 0, respectively) were enrolled in this prospective study and completed 3-day void diaries. Vesical pressure (P_{ves}) data were collected during a repeat fill-and-empty UDS protocol at a rate of 10% of cystometric capacity per minute. Dynamic elasticity was quantified by comparing three fills (1-3). Fill 1 (before strain softening) was used as a baseline after an active void. Fill 2 (after strain softening) was used to show the degree of dynamic elasticity lost due to strain softening and occurred following passive emptying via syringe aspiration. Fill 3 (after active voiding) was used to show how much dynamic elasticity was recovered due to the active voiding. For each fill, the average P_{ves} was calculated. Individuals that showed decrease in P_{ves} from Fill 1 to Fill 2) and increase in Pves from Fill 2 to Fill 3) were defined as having dynamic elasticity.

Results: In this study, 5/12 (41.7%) participants with OAB and 6/7 (85.7%) participants without OAB exhibited dynamic elasticity. The maximum UDS volume (650 mL ± 64 mL) in 9/12 (75.0%) individuals with dynamic elasticity exceeded the maximum 3-day voided volume (519 mL ± 56 mL). This compares with only 1/7 (14.3%) individuals without dynamic elasticity. There was a significant association (Fisher's exact test, $p < 0.05$) between the presence of observed dynamic elasticity and the ability of the bladder to accommodate a larger volume during UDS.

Conclusions: Dynamic elasticity is a biomechanical property of the bladder that can be calculated using a repeat-fill UDS protocol, and individuals with OAB experience lower rates of dynamic elasticity compared to controls. These OAB individuals were unable to accommodate larger volumes during UDS compared to maximum voided volumes recorded on 3-day void diaries. Identification of reduced dynamic elasticity may help explain why individuals with OAB cannot adapt to faster filling and larger volumes, and quantification of dynamic elasticity could lead to improved subtyping of OAB and more targeted therapies.

MP3-20

Regional Variation in the "Diffusion" of Radical Prostatectomy

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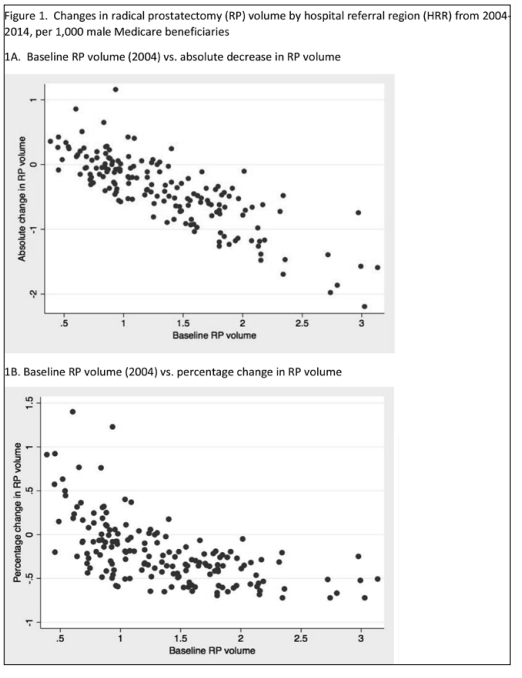
Introduction: Volumes of radical prostatectomy (RP) have decreased in recent years for a variety of reasons, including greater use of expectant management and decreased screening and diagnosis. It is not clear, however, how changes in surgical practice have varied across healthcare regions. In this study, 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. Regional rates of RP per year, and absolute and percent changes over time were identified. Pearson correlations were calculated to determine whether baseline regional volume was associated with the magnitude of change.

Results: The mean rate of RP per 1,000 male Medicare beneficiaries was 1.33 (standard deviation = 0.58) per HRR in 2004, with a range of 0.39-3.14. The mean absolute decrease in volume was -0.41 (median 0.37), range -2.20 to +1.15. There was a mean change of -20% (range -73% to +140%) between 2004-2014; median change was -27%. Regional volume in 2004 was significant correlated with the absolute decrease in RP volume in the ensuing 10 years ($r = -0.82$, $p < 0.001$), as well as the percent decrease ($r = -0.60$, $p < 0.001$). Despite the overall trend of decreased volume, some regions with low baseline practices had an increase in volume during the study period.

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.

Figure 1. Changes in radical prostatectomy (RP) volume by hospital referral region (HRR) from 2004-2014, per 1,000 male Medicare beneficiaries



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 (MtF-GAS), 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 MtF-GAS 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 neovaginoplasties. 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-NL. When sub-stratifying reoperations, PRP-NV was associated with an 88% reduction in the risk of reoperation 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 0.23, 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.

Table 1. Complications by Site of PRP Application

	PRP-NL (n=80)	PRP-NV (n=92)	RR	CI	p
Hematoma(%)	6(7.5)	10(10.9)	0.690	0.26-1.81	0.600
Tissue Necrosis(%)	17(21.3)	20(21.7)	1.00	0.57-1.78	1.000
Neovaginal Necrosis(%)	15(18.8)	15(16.3)	1.17	0.61-2.23	0.690
Labial Necrosis(%)	6(7.5)	11(12.0)	0.63	0.24-1.62	0.440
Stenosis Neovagina(%)	5(6.3)	1(1.1)	5.75	0.69-49.19	0.098
Dehiscence(%)	11(13.8)	5(5.4)	2.53	0.92-6.97	0.070
DVT(%)	0(0)	1(1.1)	1.01	0.99-1.03	1.000
Prolapse(%)	0(0)	1(1.1)	1.01	0.99-1.03	1.000
Rectovaginal fistula(%)	1(1.3)	2(2.2)	0.58	0.53-6.22	1.000
Meatal Stenosis(%)	4(5.0)	2(2.2)	2.30	0.43-12.23	0.418
Reoperation(%)	11(13.8)	5(5.4)	0.32	0.10-0.95	**0.033**

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: 40-81yo), and 11 of men (84.6%) were Caucasian. Two men who sustained intra-operative urethral injuries underwent complex repairs with suprapubic tube (SPT) placement. The remaining eleven men had stricture disease and required either stricture dilation, incision or urethroplasty. IPP revision (explantation/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.

COMBINED URETHRAL SURGERY AT TIME OF PENILE PROSTHESIS IMPLANTATION DOES NOT INCREASE RISK OF DEVICE INFECTION.

Dorota J. Hawksworth, Jeffrey Campbell, Arthur L. Burnett

Table 1. Clinical Characteristics.

Etiology of ED	Neurogenic/ post-surgical	11
	Vascular	1
	Trauma	1
Etiology of urethral defect	Bladder Neck Contracture	6
	Stricture	5
	Intra-op injury	2
Urethral interventions	Dilation	8
	Direct Vision Internal Urethrotomy	2
	Urethroplasty	1
	Injury repair	2

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: A total of 30/632 (4.7%) patients who received initial HoLEP operation required reoperation. Of these patients, 93% (28/30) opted to undergo repeat HoLEP procedure and 7% (2/30) opted for transurethral resection of the prostate. One-year reoperation rate was 1.6%. Five-year reoperation rate was 2.9%. Eight-year reoperation rate was 4.7%. Average trans-rectal ultrasound (TRUS) prostate size for patients undergoing reoperations (± standard deviation) was 110.7 ± 56.2 grams. Mean prostatic gland volume on TRUS was 93.6 ± 56.6 grams for all patients. The average age and body mass index was 70.5 ± 8.5 years and 30 ± 11.9, respectively.

Conclusions: 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.

MP4-05

The Relationship Between Erectile Dysfunction, Obesity, and Physical Activity: The West Virginia University Experience

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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 of obesity with negative health consequences. 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.

SHIM	"N"	Age	BMI	GODIN SCORE
Severe	54	64.15 + 7.26	30.83 ± 5.75	3.88 ± 11.77*#
Moderate	27	61.63 ± 7.88	31.25 ± 6.36	12.99 ± 14.08
Mild-Mod.	41	65.76 ± 9.21	28.86 ± 4.90	14.13 ± 14.14
Mild	83	64.68 ± 8.55	31.38 ± 5.72	17.63 ± 18.85*
No ED	84	62.20 + 7.23	29.62 + 5.64	22.53 + 19.31#
	ANOVA	NS (p=0.066)	NS (p=0.093)	P < 0.001

MP4-06

Features and Outcomes of Diabetic and Non-Diabetic Patients Presenting with Prostatic Abscess

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Introduction: Prostatic abscess is an uncommon disease and diabetes mellitus (DM) is a known risk factor for development. No prior studies have compared features or outcomes in diabetic and non-diabetic patients.

Materials & Methods: We retrospectively reviewed our series of 17 patients presenting with prostatic abscesses since 2012. We reviewed and compared patient demographics, presenting features, management and follow-up.

Results: Of the 17 patients presenting with prostatic abscess, 12 were diabetic and 5 non-diabetic. Mean age at presentation was 60.6 years and average HbA1c 8.3% in DM patients. No differences were observed between DM and non-diabetic patients with abscess size (3.3 vs. 3.2 cm, $p = 0.95$), abscess multifocality (58% vs. 50%, $p = 1.0$), BMI (29.4 vs. 31.6 kg/m^2, $p = 0.58$), WBC count on presentation (16.2 vs. 17.1, $p = 0.80$), LOS (11.3 vs. 16.8 days, $p = 0.49$), presence of abnormal UA (82% vs. 67%, $p = 0.58$), positive blood cultures (42% vs. 67%, $p = 0.61$) or history of tobacco use (58% vs. 67%, $p = 1.0$). Management included transurethral ($n = 12$), transrectal ($n = 4$), IR ($n = 1$), and laparoscopic ($n = 1$) drainage and was not dependent on presence of DM. Mean antibiotic duration was 4.3 weeks. The most common culture organism in our group was coagulase-positive staphylococcus ($n = 11$). Mean follow-up was 254 days with abscess recurrence in 1 non-diabetic patient.

Conclusions: In our small series, features and outcomes were not significantly different in patients with DM presenting with prostatic abscess.

MP4-07

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 hypogonadism 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 factory infertility, especially those considering IUI.

MP4-08

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

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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. Orchiectomy was required in 15% of patients. Average time to reconstruction was 16.65 days from initial debridement. 45% of patients underwent transposition 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

Reconstruction Type	Number of Patients	Average Length of Stay	Immediate post-op complications	Post Discharge complications	Clavien -Dindo I	Clavien -Dindo II	Clavien -Dindo III	Clavien -Dindo IV	Clavien -Dindo V
Pedicle Flap	4	47.25	4	4	4		3	1	
Advancement Flap	11	24.1	3	5	4	1	2		1
Advancement flap without testicular transposition	5	30	2	2			2		
Skin graft	8	29.43	2	3	1	1	2		1
Skin graft without testicular transposition	5	30.2	1	1			1		
Testicular transposition into thigh	9	18.29	2	5	4	1	1		2
Reconstruction of 1 testicle	7	19.67	2	4	3	1	1		1
Reconstruction of both testicles	2	10		1	1				1
Testicular reconstruction and skin graft	2	27.5	1	2	1	1	1		
Testicular reconstruction and local skin advancement	6	18.2	1	3	3	1			1

MP4-09

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/m^2, 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

	OR (95% CI)	p value
Age	1.02 (0.99-1.07)	.22
BMI	1.00 (0.92-1.09)	.93
Stricture length	0.75 (0.55-0.98)	.06
Stricture location		
posterior	2.77 (0.35-24.10)	.33
combined	2.49 (0.22-24.20)	.44
Etiology		
idiopathic	0.31 (0.02-8.61)	.49
iatrogenic	0.12 (0.02-10.32)	.41
trauma	0.13 (0.004-4.97)	.23
hypospadias	3.50 (0.14-142.30)	.46
Repair type		
EPA	0.59 (0.13-2.64)	.49
FC	0.07 (0.002-0.62)	.047

OR, odd ratio; CI, confidence interval; BMI, body mass index; EPA, excision and primary anastomosis; FC, fasciocutaneous

MP4-10

Weight-Based Gentamicin May Be Associated with Increased Acute Kidney Injury in Urologic Prosthetic Surgery

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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.

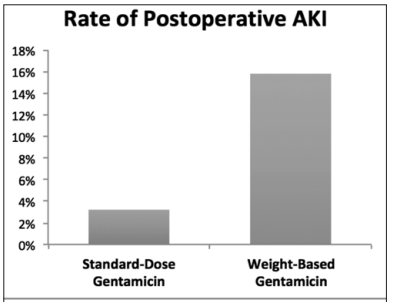

Figure 1. Comparison of rates of acute kidney injury (AKI) in standard and weight-based gentamicin groups. *p = 0.023

MP4-11

Medical Malpractice in Urology: Sources of Litigation, Risk Factors, and Outcomes

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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 resulting in litigation and details of case outcomes. Case outcomes included whether a payout was made to a plaintiff, payout amount, and postoperative complications.

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 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

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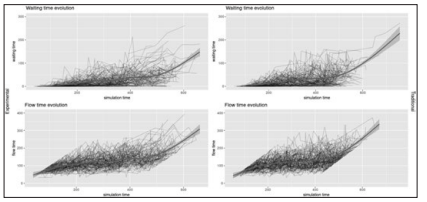
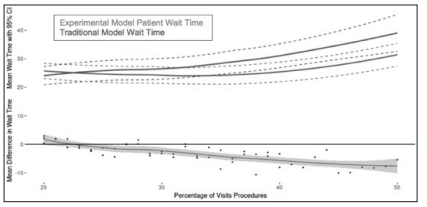
Introduction: Urology clinics have a relatively high number of procedures performed relative to other outpatient clinics. Incorporating these procedure visits into a standard office visit workflow can present a challenge due to differing demands on support staff and room/equipment turnover times. Our 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. Inputs included type and duration of procedure, type and duration of E&M, intake times based on visit type, and turnover times. The distribution of visits was based on one month of three urologist schedules while the other inputs were tracked for an eight month period.

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, 28.9) 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.





MP4-13

First Dose Efficacy of AV002, an Emulsified Microdose Desmopressin Nasal Spray, in Patients with Nocturia

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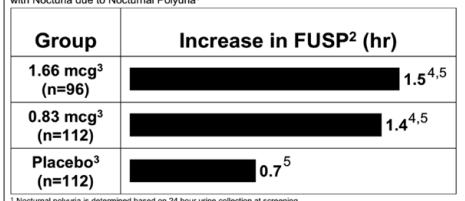
Introduction: Nocturia is a highly prevalent, under-recognized condition associated with disrupted sleep, reduced productivity, and negative impacts on overall health and health-related quality of life. It is often unclear whether a therapy is effective for nocturia given the lengthy time to confirm 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 nocturic void or awakening if no void occurred. The first 3-4 hours of sleep includes deep, 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 nocturic 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 more likely to not 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 hyponatremia (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[1]



[1] Nocturnal polyuria is determined based on 24 hour urine collection at screening
[2] The observed mean FUSP after treatment was 3.9, 3.8, and 3.2 hours for 1.66 mcg, 0.83 mcg, and placebo group, respectively; the baseline mean FUSP was 2.4 hours for 1.66 mcg, 0.83 mcg, and placebo group
[3] Patients were instructed to make every effort to administer the study medication approximately 30 minutes prior to bedtime
[4] P-value ≤0.01 compared to placebo
[5] P-value ≤0.0001 compared to baseline

Table 1B: Percentage of Patients with Nadir Post-Baseline Serum Sodium Level Below Normal Range (% (n)) in Safety Population (Patients with Nocturia due to Nocturnal Polyuria[1])

Nadir Serum Sodium Levels	Placebo	0.83 mcg	1.66 mcg
126-129 mmol/L (Moderate)	0 (0)	2.3 (8)	2.1 (7)
≤125 mmol/L (Severe)	0.3 (1)	0.0 (0)	1.5 (5[2])

[1] Nocturnal polyuria is determined based on 24 hour urine collection at screening
[2] 4 out of 5 patients who experienced severe hyponatremia with AV002 1.66 mcg were also on corticosteroids; use of systemic or inhaled glucocorticoids is now a contraindication for AV002; serum sodium level ≤125 mmol/L occurred on study day 21, 29, 60, 71, 99, and 99; 4 patients were male and 1 was female

MP4-14

Machine Learning Facilitates Early Detection of Ureteropelvic Junction Obstruction

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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 and the machine-learning model was retrained on the larger population of 77 patients. 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 analyzed the 77 patient cohort to predict which patients would proceed to pyeloplasty. $T_{1/2}$ of 20 and 30 minutes were used to analyze the cohort and were compared to the machine learning model.

Results: The retrained six feature model in the current study population had an accuracy of 92% (91% sensitivity, 94% specificity) and the five feature model had an accuracy of 87% (100% sensitivity and 68% specificity). Both the five and new six feature machine learning models were better predictors of requiring pyeloplasty than the conventionally used measure of $T_{1/2}$ of 20 minutes (76% accuracy) and $T_{1/2}$ of 30 minutes (75% accuracy; Table 1).

Conclusions: The machine learning model improved the diagnostic accuracy of DR and outperformed $T_{1/2}$. Furthermore, machine learning models may be better suited to analyze the dynamics of DR rather than the fixed variable of $T_{1/2}$. While further study is warranted, machine learning could lead to earlier detection of severe UPJO and may reduce the number of DR performed prior to surgical management.

	Five Feature Model	Six Feature Model	$T_{1/2}$ at 20 min	$T_{1/2}$ at 30 min
Previous Cohort n=59	93% Accuracy 91% Sensitivity 96% Specificity	N/A	77% Accuracy 71% Sensitivity 96% Specificity	78% Accuracy 66% Sensitivity 96% Specificity
Current Cohort n=77	87% Accuracy 100% Sensitivity 68% Specificity	92% Accuracy 91% Sensitivity 94% Specificity	76% Accuracy 70% Sensitivity 87% Specificity	75% Accuracy 61% Sensitivity 97% Specificity

MP4-15

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

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Introduction: The pelvic anatomy of females with classic bladder exstrophy (CBE) has been discussed anecdotally, 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, Bracco 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 verge 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 females with CBE (121.9 degrees) compared to normals (163.7 degrees). All four controls had anteverted cervical ora, while three of four females with CBE had a retroversion of the cervix, with the other cervix in slight anteversion. 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) when compared to normals (1.82 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.

MP4-16

The Role of Human Acellular Dermis in Preventing Fistulas after Bladder Neck Transection in the Exstrophy-Epispadias Complex

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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-Epispadias 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 exstrophy patients, 22 (15.0%) cloacal exstrophy patients, and 1 (0.7%) penopubic epispadias patient. A total of 12 (8.2%) BNTs resulted in fistulization, including 4 vesicoperineal fistulas, 7 vesicourethral fistulas, and one vesicovaginal fistula. There were 5 (22.7%) fistulas in the cloacal extrophy cohort, and 7 (5.6%) fistulas in the classic bladder exstrophy 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.

MP4-17

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

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Introduction: Epispadias repair, using the complete penile disassembly technique, is frequently combined with primary bladder closure in patients with classic bladder exstrophy (CBE). Yet, penile disassembly has been posited as a risk for penile injury by ischemic mechanisms. 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 were identified. The location, extent of injury, and subsequent management is reported. Triplanar magnetic resonance imaging (MRI) of the pelvis with volumetric analysis was used for penile compartment quantification.

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 often unilateral (72%), and involved the glans and/or corpora cavernosa. MRI of the pelvis confirmed anterior corporal deficiency that resulted from primary closure. Three patients were successfully managed with myocutaneous neophalloplasty between the ages of 15 and 16 years old.

Conclusions: As a 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 exstrophy.

MP4-18

Characterization of Pediatric Bowel and Bladder Dysfunction via Pupillometry

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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 pupilometer 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 rates 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.

	MAX	MIN	DELTA	LAT	ACV	MCV	ADV
Pre-voiding	0.035395	0.098949	0.342316	0.331914	0.056367	0.139481	0.175263
Post-voiding	0.069649	0.178029	0.224430	0.096806	0.256561	0.120460	0.310756
Change pre- to post-voiding	0.146567	0.015353	0.159828	0.097724	0.042967	0.482969	0.133028

MP4-19

Parental Compliance for Two Stage Fowler-Stephens Laparoscopic Orchiopexy: Is Everyone Following Up for the Second Stage and, if not, Who is at Risk?

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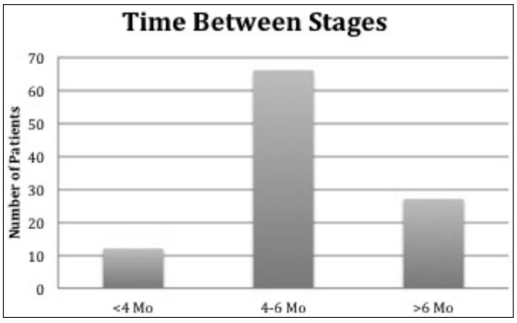
Introduction: Patients undergoing a two-stage Fowler-Stephens laparoscopic orchidopexy for intra-abdominal testes are typically recommended to undergo the second stage 4-6 months after the first stage. As part of a quality care initiative, our studied examined if patients were following up within this 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 orchidopexy 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-seven 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 parents chose to not 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 orchidopexy could potentially improve parental compliance with standard recommendations for timing of the 2nd stage.



MP4-21

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

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Introduction: This clinical investigation assessed the safety and effectiveness of the new T-DOC® 5 French (Fr) 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, urethral 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 stool 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.

MP4-20

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

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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 urethrotome 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 0.57-4.5), 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.

MP4-22

Predictors of Total Nephrectomy after Trauma: A Study from the National Trauma Data Bank

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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 type of intervention and outcomes.

Results: Of 65,577 patients identified, 57,565 were managed conservatively, 2,304 MI, 3,138 TN, and 2,570 Other. Significant differences in baseline characteristics of demographics and injury were noted between groups. (Table 1) On multivariate analysis, higher AAST grade, older age, penetrating injury, higher ISS, and hypotension predicted the need for any intervention with an increased likelihood of TN. (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 (OR 0.62, $p < 0.01$) and incidence of prolonged stay (OR 0.72 $p < 0.01$) 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.

Table1. Patient demographic and characteristics

Variable	Non-operative	Minimally Invasive	Open repair (other than TN)	Total nephrectomy	P value
Total number of patients	57,565	2,304	2,570	3,138	
Mean Age (in Years)	35 (22)	38 (24)	31 (17)	32 (18)	<0.001
Male Gender	42,447 (74%)	1,750 (76%)	2,072 (81%)	2,570 (82%)	<0.001
Race					<0.001
White	35,741 (65%)	1,424 (64%)	1,072 (43%)	1,172 (39%)	
Black	8,948 (16%)	376 (17%)	872 (35%)	1,148 (38%)	
Hispanic	6,606 (12%)	270 (12%)	362 (15%)	442 (15%)	
Other	3,847 (7%)	150 (7%)	160 (6%)	251 (8%)	
Insured	38,552 (79%)	1,613 (81%)	1,639 (75%)	1,927 (73%)	<0.001
Penetrating	6,168 (12%)	293 (15%)	1,260 (56%)	1,671 (61%)	<0.001
AAST grade					<0.001
I	23,544 (41%)	438 (19%)	277 (11%)	129 (4%)	
II	19,790 (34%)	583 (25%)	769 (30%)	274 (9%)	
III	7,610 (13%)	420 (18%)	325 (13%)	139 (4%)	
IV	5,688 (10%)	770 (33%)	1,014 (39%)	1,797 (57%)	
V	933 (12%)	93 (4%)	185 (7%)	799 (25%)	
Mean ISS	19 (13)	23 (14)	21 (13)	29 (14)	<0.001
ISS Categories					<0.001
0-8	11,658 (20%)	272 (12%)	310 (12%)	93 (3%)	
9-15	14,751 (26%)	432 (19%)	466 (18%)	158 (5%)	
16-24	15,817 (28%)	643 (28%)	831 (32%)	635 (20%)	
25-75	15,297 (27%)	953 (41%)	955 (37%)	2,224 (72%)	
Hypotensive	4,568 (8%)	273 (12%)	291 (12%)	776 (26%)	<0.001
Trauma level designation					0.014
1	35,031 (62%)	1,588 (69%)	1,804 (71%)	2,275 (73%)	
Other	21,366 (38%)	700 (31%)	731 (29%)	840 (27%)	

Table2. Multivariate analysis of predictors for type of procedure received

Outcome: Type of Procedure	RRR	P	95% CI	RRR	P	95% CI	RRR	P	95% CI
	Non-operative (base outcome)								
	Minimally-Invasive			Open repair other than TN			Total Nephrectomy		
AAST Grade vs. Grade 1)									
2	1.717	<0.01*	1.47 - 2	2.746	<0.01*	2.31 - 3.26	2.047	<0.01*	1.58 - 2.66
3	3.281	<0.01*	2.76 - 3.9	2.983	<0.01*	2.42 - 3.67	2.571	<0.01*	1.9 - 3.47
4	8.361	<0.01*	7.06 - 9.9	9.674	<0.01*	7.99 - 11.71	23.502	<0.01*	18.35 - 30.11
5	6.065	<0.01*	4.49 - 8.19	12.468	<0.01*	9.53 - 16.32	73.674	<0.01*	56.29 - 96.43
Age (vs 0-15)									
16-34	1.969	<0.01*	1.59 - 2.44	0.914	0.294	0.77 - 1.08	1.664	<0.01*	1.34 - 2.07
35-64	2.235	<0.01*	1.79 - 2.79	0.809	0.022	0.68 - 0.97	1.838	<0.01*	1.47 - 2.3
65 and above	3.601	<0.01*	2.83 - 4.59	0.840	0.196	0.64 - 1.09	2.185	<0.01*	1.62 - 2.94
Race (vs. White)									0 - 0
African American	0.941	0.430	0.81 - 1.09	1.169	0.018*	1.03 - 1.33	1.163	0.029*	1.02 - 1.33
Hispanic	1.062	0.463	0.9 - 1.25	1.144	0.086	0.98 - 1.33	1.331	<0.01*	1.13 - 1.56
Other	1.069	0.519	0.87 - 1.31	0.899	0.334	0.72 - 1.12	1.258	0.03*	1.02 - 1.55
Male gender	1.125	0.055	1 - 1.27	1.054	0.422	0.93 - 1.2	1.114	0.119	0.97 - 1.27
Insured	1.192	<0.01*	1.05 - 1.36	1.203	<0.01*	1.07 - 1.35	1.176	<0.01*	1.04 - 1.33
Penetrating (vs. Blunt)	0.895	0.176	0.76 - 1.05	6.273	<0.01*	5.57 - 7.06	5.449	<0.01*	4.82 - 6.16
ISS (vs. 0-8)									
9-15	0.878	0.190	0.72 - 1.07	0.950	0.587	0.79 - 1.14	0.872	0.413	0.63 - 1.21
6-24	0.987	0.886	0.82 - 1.19	1.124	0.204	0.94 - 1.35	1.305	0.080	0.97 - 1.76
25-75	1.026	0.798	0.85 - 1.24	0.869	0.152	0.72 - 1.05	2.190	<0.01*	1.63 - 2.94
Hypotension in ED	1.107	0.219	0.94 - 1.3	0.830	0.025*	0.7 - 0.98	1.236	<0.01*	1.08 - 1.41
Trauma level (vs. Level I)									
Other	0.837	<0.01*	0.75 - 0.94	0.863	<0.01*	0.77 - 0.96	0.813	<0.01*	0.72 - 0.91

MP4-23

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

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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 guidance is given 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 39% 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 of 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 (28 d vs. 22 d, $p = 0.46$), time from injury to normal fluorocystogram (19.8 d vs. 20.7 d, $p = 0.80$), and time from injury to repair (4.3 v. 60.5h, $p=0.23$) 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 multidisciplinary trauma teams to standardize management, streamline care, and minimize complications for patients presenting with traumatic bladder injuries.