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1

A Single Institution Experience of Complete Primary Repair of Bladder Exstrophy in Girls: Risk Factors for Urinary Retention

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Introduction: Following recent technical modifications, we have observed a high rate of urinary retention in girls post-complete primary repair of exstrophy (CPRE). The aim of this investigation was to identify factors that may be responsible for this observation by reviewing our historical outcomes in comparison to current outcomes.

Materials & Methods: A retrospective review of all girls that underwent CPRE from December 1998 through September 2016 from a single institution was performed. Operative age and weight, type of pelvic immobilization, use of pelvic osteotomies, imaging, clinical course, and need for additional surgical procedures were recorded. Patients were deemed in retention if their clinical course was consistent with such, included a procedure or procedures to relieve urinary retention, and/or a requirement for clean intermittent catheterization (CIC).

Results: Nineteen girls underwent CPRE in this time period. In the mid-2000s, a change to delaying CPRE to approximately 2-months of age was made and this led us to divide the girls into newborn (< 72 hours of age) and delayed (> 72 hours of age) repair subgroups. Eight (42%) had newborn and eleven (58%) had delayed repair. None of the newborn and all of the delayed repairs had posterior iliac osteotomies. There were no girls with retention in the newborn group. One delayed repair was complicated by bladder rupture secondary to retention, necessitating surgical exploration and CIC. A second delayed CPRE required CIC. Long-term outcomes greater than nine years are available for six girls in the newborn group and two (33%) required bladder neck procedures for incontinence.

Conclusions: The absolute absence of retention in the newborn group (without osteotomy) is concerning for the delayed (with osteotomy) group incurring a higher risk of retention post-CPRE. The increased risk of retention could be secondary to compression of the urethra at the time of pubic symphysis approximation, which may cause a compartment syndrome-like phenomenon leading to urethral ischemia. Different from the newborn CPRE girls, additional technical revision of CPRE, namely elongation of the urethra and the dissection it involves, may also place the delayed CPRE girls at risk for urinary retention.

2

Continuous Antibiotic Prophylaxis for Urinary Tract Infections in Prenatal Hydronephrosis: A Systematic Review and Meta–Analysis

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Introduction: While continuous antibiotic prophylaxis (CAP) is recommended to prevent urinary tract infections (UTI's) in infants with prenatal hydronephrosis (HN), this recommendation is not evidence based. Herein, we attempted to systematically assess current literature to determine whether CAP reduces UTI's in patients with prenatal HN.

Materials & Methods: Applicable trials were identified through an electronic search of MEDLINE (1948-2015), EMBASE (1980-2016), CINAHL (1982-2016), and CENTRAL (1993-2016) and through a hand search of American Urological Association (2012-2015), European Society of Pediatric Urology (2012-2015) abstracts and reference lists of included trials. The search strategy was not limited by language or year of publication. Eligible studies compared CAP versus no CAP in male and/or female infants < 2 years of age, and included grade of HN and development of UTI for all patients. Two independent reviewers performed title and abstract screening, full text review and quality appraisal.

Results: Of 1518 citations screened, 10 full studies were included, contributing 3909 patients for final analysis. Of these, three (30%) were considered high quality when assessed by the Newcastle Ottawa Scale. Meta-analysis of non-randomized trials (n=10) provided similar pooled UTI rates, regardless of CAP use: 9.9% (95% CI: 8.4% to 11.4%) overall for CAP and 7.5% (95% CI: 6.4% to 8.6%) without CAP. The forest plot for CAP versus no CAP **(Figure 1)** showed a pooled odds ratio of 0.84 (95% CI: 0.45-1.55). The pooled UTI rate for high-grade hydronephrosis was 21% (95%CI: 17.2, 24.7) compared to 10.5% (95%CI: 8.2, 12.7) for low-grade hydronephrosis, confirming previous findings (**Figure 2**). A significant degree of heterogeneity existed among included studies, as evidenced by an I^2 of 77%. Heterogeneity may have been due to very low-quality data and lack of randomization in all included studies.

Conclusions: This systematic review and meta-analysis suggests there may be value in providing CAP to infants with high grade HN, however, due to high heterogeneity and low quality of included studies, the results of this systematic review should be interpreted with caution.

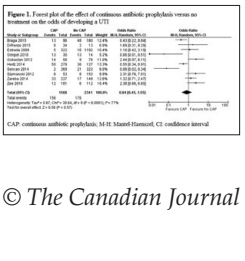

Figure 1. Forest plot of the effect of continuous antibiotic prophylaxis versus no treatment on the odds of developing a UTI

CAP: continuous antibiotic prophylaxis; M-H: Mantel-Haenszel; CI: confidence interval

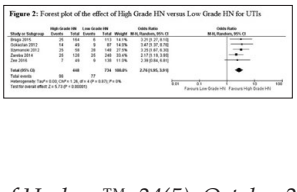

Figure 2: Forest plot of the effect of High Grade HN versus Low Grade HN for UTIs

3

Endothelialization of a 3D Tissue–Engineered Human Vaginal Mucosa for Implantation

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Introduction: Tissue engineering of autologous vaginal mucosa opens the door to new surgical applications for vaginal reconstruction for paediatric patients with congenital urogenital abnormalities such as the Mayer-Rokitansky-Küster-Hauser syndrome (MRKH). Vascularization of tissue-engineered constructs represents a major challenge as graft survival and success rate highly depend on it. In this study, we aim at reconstructing a pseudo-capillary network within a tissue-engineered vaginal mucosa, free of exogenous materials, using the self-assembly technique.

Materials & Methods: Vaginal stromal and epithelial cells were isolated from healthy donors' biopsies. Vaginal stromal cells were co-seeded with endothelial cells derived from a human umbilical cord vein (HUVEC). The self-assembly technique relies on the intrinsic properties of fibroblasts to secrete their own extracellular matrix in the presence of ascorbic acid. Different cell culture techniques were tested to determine the one that is most adapted for the vascularization of the vaginal mucosa while retaining good mechanical properties: classical self-assembly (SA), reseeding (RS) and a hybrid SA/RS method. At week two of culture, the conditions that required reseeding had a second seeding of vaginal fibroblasts and HUVEC onto the newly formed stromal sheets. The culture was continued for a total of four weeks for all conditions. After four weeks, vaginal epithelial cells were seeded on top of most stromal sheets and they remained in submerged conditions for one additional week to ensure epithelial cell proliferation. In the SA and SA/RS conditions, one epithelialized sheet was stacked with a non- epithelialized one to form constructs. Differentiation of the vaginal epithelium required an additional three weeks at the air-liquid interface for all conditions. Furthermore, mechanical uniaxial strength tests were performed on all conditions to evaluate their mechanical properties.

Results: Firstly, this reconstructed vaginal mucosa model closely mimics native tissue and undergoes adequate vaginal epithelium differentiation (Figure 1). Secondly, thebiomechanical properties of the reconstructed tissues demonstrate mechanical resistance values that are suitable for implantation in an animal model. Thirdly, the presence of a pseudo-capillary network has been confirmed by immunofluorescence using endothelial cell specific markers such as PECAM-1/CD31 and Von Willebrand factor. Additionally, the vascular maturity of the capillary-like network we assessed by the presence of NG2 positive cells, a pericyte marker, in the constructs produced by the RS and SA/RS conditions.

Conclusions: Our results have demonstrated that the use of a combined SA/RS technique is most adapted for the pre-vascularization of the vaginal mucosa as it generates more mature capillary networks within the constructs and has intermediate mechanical properties that are interesting for surgical handling.

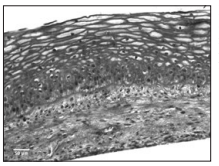

Figure1. Masson's Trichrome stain of an endothelialized reconstructed model of the vaginal mucosa produced with the self-assembly technique.

4

A Contemporary Series Comparing Perioperative Outcomes Following Robotic Partial Nephrectomy to Open Partial Nephrectomy in Pediatric Patients with Poorly Functioning Renal Moieties

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Introduction: Small series about the initial use of robotic partial nephrectomy (RALPN) in children exist. Contemporary data, excluding cases performed during an era of robotic adoption, do not. The aim of this study is to compare surgical outcomes in a contemporary cohort of patients undergoing either RALPN or open partial nephrectomy (OPN).

Materials & Methods: We performed a single-institution retrospective review of RALPN and OPN between 2/2007 and 7/2014. Patient characteristics (age, gender, race, ASA score, laterality, affected moiety, affected moiety function, surgical indication and urologic history), procedure characteristics (surgeon, operative time [OT] and intraoperative complications) and postoperative outcomes (LOS, complications, readmission and improvement) were collected. PNs for renal masses were excluded. Descriptive statistics were calculated; all statistical tests were 2-sided with a $p < 0.05$ statistically significant.

Results: 46 partial nephrectomies (PN) were performed: 3 patients with renal masses were excluded, resulting in 27 RALPNs and 16 OPNs. Median follow up was 2.7 years for OPN and 1.1 for RALPN ($p = 0.03$). RALPN patients were older (3.5 vs. 0.7 years, $p = 0.002$), otherwise there was no difference in baseline characteristics. In both groups, the majority of patients had complete duplication (95.3%) and a dysplastic upper moiety (64.3%) with a mean function of 4.1% (± 2.9%). Severe reflux accounted for the majority of lower moiety dysplasia. Mean OT was similar (RALPN 206 vs. OPN 195 minutes, $p = 0.5$), but RALPN had a shorter LOS (1 vs. 3 days; $p = 0.002$). There were no intraoperative complications in either group. Six patients had 7 postoperative complications (4 OPN vs. 3 RALPN). For OPN, complications included a seizure, prolonged intubation due to oversedation, intraoperative bleeding requiring transfusion, and recurrent febrile urinary tract infections (UTI). For RALPN, complications included a chronic fluid collection requiring IR drainage, an abscess with concurrent UTI, and a C. difficile infection. There was no significant loss in size of the residual moiety in either group. Both groups demonstrated clinical improvement at follow up ($p = 0.43$).

Conclusions: For pediatric PN, the RALPN has similar safety and OT to OPN. Importantly, there was no adverse affect on the residual renal moiety despite a minimally-invasive, upper tract approach. RALPN offers the advantage of a shorter LOS. This study is limited by small sample sizes; larger studies are needed.

5

Primary Non-Refluxing Megaureter: Analysis of Risk Factors for Spontaneous Resolution and Surgical Intervention

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Introduction: The risk of febrile urinary tract infection (fUTI) in primary non-refluxing megaureter (PM) patients has been extensively studied in the literature, however, a paucity of information exists regarding risk factors for surgical intervention and spontaneous resolution. Therefore, we sought to analyze data from our prospective PM cohort to determine risk factors that would predict surgery and resolution in this population.

Materials & Methods: Patients with PM were identified from our prospectively collected prenatal hydronephrosis(HN) database from 2008-2016. Primary outcomes included surgical intervention and resolution of ureteral dilation. Resolution was defined as ureteral dilation < 7 mm at last follow-up. Age at presentation, gender, development of fUTI, HN grade [low(SFU I/II) vs. high(SFU III/IV)], anteroposterior diameter (APD) measurements and ureteral dilation at baseline and last follow-up were recorded. Univariate and multivariable analyses (binary logistic and cox regressions) were performed to identify risk factors for surgery and spontaneous resolution.

Results: Of 101 patients, 86 (85%) were male, and 80 (79%) had high grade HN. Median age at baseline and last follow-up were 2 (0-23) and 29 (2-107) months, respectively. Overall, 23 (23%) patients underwent surgery at a median age of 22 (3-35) months. Mean ureteral diameter was larger in surgical patients versus those treated non-surgically (14+4 mm vs.11+3 mm;p < 0.01). Of the 78 (77%) non-surgical patients, 43 (55%) showed resolution of their ureteral dilation at a median age of 24 (4-56) months. Survival analysis demonstrated that 12 patients resolved by year 1, 22 by year 2, 30 by year 3, 40 by year 4, and 43 by year 5. However, when considering resolution as APD < 10 mm, 62 (79%) children resolved their HN by last follow-up (29 months). Univariate and multivariable analyses (Table 1) revealed that high-grade HN at baseline, development of fUTI, and ureteric dilation ≥ 14mm were significant risk factors for surgical intervention. Cox regression (Figure 1) found that ureteral dilation < 11 mm was the only independent risk factor significantly associated with PM resolution (Table 2).

Conclusions: PM children with high-grade HN, ureteral dilation ≥ 14 mm and fUTI were at a significantly higher risk of undergoing surgical treatment, and those with ureteral dilation < 11 mm were more likely to resolve spontaneously within 24 months.

Table 1. Univariate and multivariable analysis of risk factors for surgical intervention

		Univariate		Multivariable	
	Surgery n = 23(%)	**Total n = 101**	**p-value**	**HR (95% CI)**	**p-value**
Gender Male Female	20 (23) 3 (20)	86 15	1.00	Ref 1.4 (0.3-7.2)	0.67
HN Grade Low grade (I/II) High grade (III/IV)	1 (5) 22 (28)	21 80	0.04	Ref 12.8 (1.3-122.9)	0.03
fUTI Yes No	11 (46) 12 (16)	24 77	< 0.01	Ref 7.7 (2.2-26.1)	< 0.01
Ureteral Dilation < 14 mm ≥ 14 mm	12 (15) 11 (48)	78 23	<0.01	Ref 5.8 (1.8-18.8)	<0.01

Table 2. Univariate and multivariable analysis of risk factors for resolution

		Univariate		Multivariable	
	Resolution n = 43(%)	**Total n = 101**	**p-value**	**HR (95% CI)**	**p-value**
Gender Male Female	36 (42) 7 (47)	86 15	0.73	Ref 1.2 (0.5-2.7)	0.69
HN Grade Low grade (I/II) High grade (III/IV)	13 (62) 30 (38)	21 80	0.04	Ref 1.6 (0.8-3.0)	0.19
Ureteral Dilation < 11 mm ≥ 11 mm	23 (53) 20 (34)	43 58	0.06	Ref 2.4 (1.3-4.5)	< 0.01

Figure 1. Cox proportional regression analysis of ureteral dilation

6

A Sock Option: Compressive Externally Applied Stockings for Enuresis (CEASE Study)

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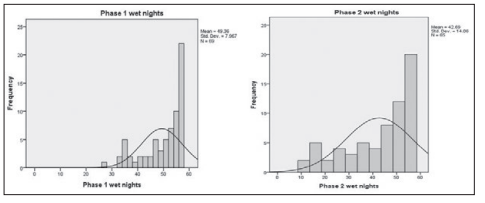
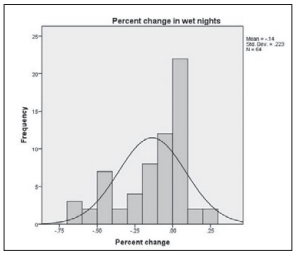
Introduction: Primary nocturnal enuresis is a common condition which frustrates pediatric patients and their parents. There are many treatment options to accelerate resolution, which may be intrusive (alarm systems, acupuncture), expensive (hypnotherapy, mediations), or seem to pose unacceptable risks for a benign, self-limiting condition (medication adverse reactions). The authors examined a novel intervention which is simple, cheap and without serious side effects. The CEASE study explores the sequential use of compressive stockings in confirmed enuretic patients to decrease the number and volume of wet episodes associated with nocturnal enuresis.

Materials & Methods: Consecutive children between 6-12 years of age with a history of nocturnal enuresis were recruited from a single institution from November of 2015 to October of 2016. Inclusion criteria included primary nocturnal enuresis with a minimum of 3 enuretic events per week. Patients with less than 3 events per week or secondary enuresis were excluded. Patients were monitored over an 8 week baseline period with a calendar to confirm enuresis frequency. If the child qualified, they were given compressive, size-appropriate soccer stockings to wear at night and were asked to record their results over the subsequent 8 week intervention period. Patients were given a quality of life evaluation at the beginning, and again after a long term follow up at 24 weeks. Medication or alarm therapies were allowed to continue. Descriptive statistics and paired samples t-tests were calculated to compare the number of wet nights between the baseline and intervention periods. Results were analyzed using IBM SPSS 23.

Results: A total of 71 patients met inclusion criteria and continued the study to completion. 71% (n=50) were male, and 73% (n=52) were age 8 or younger. There was a significant difference between wet nights during the baseline period (M=49.3, SD=7.86) and the intervention phase (M=43.17, SD=13.63); t (63) = 4.96, p < .001 (Frequency distribution of wet nights during each study period featured in Figure 1). Thus, there was an average reduction in 6 wet nights between the baseline period and the intervention phase; 95% CI (3.66, 8.59). Parents reported a significant decrease in volume in 25% of cases (n=18) during the intervention period. Furthermore, 59% of patients (n=38) reported some extent of reduction in wet nights, 21% reported no change (n=15), and 16% (n=11) reported an increase (see Figure 2).

Conclusions: Nighttime compressive stockings are a safe and appealing strategy for families hoping to reduce the morbidity of primary nocturnal enuresis while minimizing the expense, burden and side effects of more traditional interventions. The authors found a statistically and clinically significant benefit.





7

Equilibrated Bladder Pressure at End Filling: A Lower and Less Variable Measure than Maximum Detrusor Pressure

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Introduction: Maximum detrusor pressure (MaxPdet), obtained at the end of the filling phase in cystometry, is regarded as an important variable in predicting renal deterioration, but it may be susceptible to artifact induced by the artificial rate of bladder filling. To address this potential artifact, we recorded bladder and intra-abdominal pressures for two minutes after filling had stopped to allow the bladder to reach an equilibrium pressure. The aim of this study was to characterize the equilibrated pressure at end filling (EPEF), a new urodynamic parameter, and to determine its relationship to MaxPdet.

Materials & Methods: We randomly selected 200 initial urodynamic studies performed in children >= 6 years old between 1/2015 and 1/2016, excluding those lacking a recorded EPEF and MaxPdet. The remaining studies (n=181) were reviewed for parameters, MaxPdet and EPEF. The difference between MaxPdet and EPEF was evaluated using the paired t-test, and their variances were then compared with the Pitman-Morgan test. Thereafter, a subset analysis evaluating the effect of anticholinergic or beta agonist usage was completed using the paired t-test.

Results: The study included 181 patients (104 females: 77 males). Median age = 13.1 years (IQR: 9.4-17.0). The three most common indications for study involved: spina bifida (n=85, [47.0%]), incontinence (n=51, [28.2%]), and tethered cord (n=41, [22.7%]), with some children having >1 indication. 92 (50.8%) were taking either an anticholinergic or beta agonist at the time. Of 181 studies, EPEF was lower on average than MaxPdet by 6.2 cm H20 (95%CI: 5.0-7.4, p<0.0001). The standard deviation of EPEF was smaller than that for MaxPdet (9.7 vs. 11.0, p=0.0123) (Figure 1). An in-depth analysis of 35 children (19.3%) who did not leak between MaxPdet and EPEF measurements revealed that, on average, EPEF was < MaxPdet by 4.0 cm H20 (95%CI: 1.8-6.2, p=0.0007). When analyzing children on bladder modulating medication, the difference between MaxPdet and EPEF was smaller for those taking either an anticholinergic or beta agonist than for those on no medicines (4.6 vs. 7.9 cm H20, p=0.0045) (Figure 2).

Conclusions: Allowing for equilibration after maximum bladder filling results in a significant average decrease in detrusor pressure by 6.2 cm H20. The EPEF demonstrates a smaller variance and may more accurately reflect the maximal pressure exhibited by the bladder under physiologic conditions. Given the difference between MaxPdet and EPEF is smaller in children taking either an anticholinergic or beta agonist, we hypothesize these medications may provide a protective benefit against pressure artifacts introduced by standard fill (10% of expected capacity/min) cystometry.

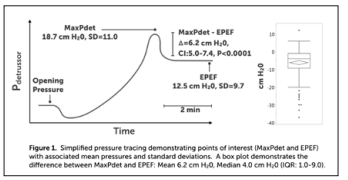

Figure 1. Simplified pressure tracing demonstrating points of interest (MaxPdet and EPEF) with associated mean pressures and standard deviations. A box plot demonstrates the difference between MaxPdet and EPEF: Mean 6.2 cm H_2O, Median 4.0 cm H_2O (IQR: 1.0-9.0).

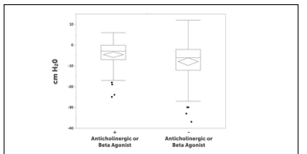

Figure 2. Box plots demonstrating the difference between MaxPdet and EPEF, grouped by anticholinergic/beta agonist usage: Mean 4.6 cm H_2O vs. 7.9 cm H_2O, p=0.0045.

8

DSD Management: Balancing Patient Self-Determination with Parental Preferences

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Introduction: A central ethical dilemma in management of the patient with a disorder of sex development (DSD) is the potential conflict between respect for the fundamental right of the child for physical and emotional integrity and self-determination and the right of parents to serve as surrogate decision-makers and act in their child's best interest. Often decisions must be made based on incomplete information before it is possible to ascertain the child's self-identified gender.

Materials & Methods: Over the past 2 years we have encountered 3 complex DSD cases on the spectrum of mixed gonadal dysgenesis to ovotesticular DSD in which gender assignment and therefore optimal surgical management was uncertain. All patients had mosaic karyotypes with Y chromosomes, dysgenetic ovary and dysgenetic testis, a urogenital sinus and prominent phallus (table 1). In all 3 cases a team (Endocrinology, Urology, Psychology, Ethics) approach was taken to assess functional potential and risks along either gender pathway and to develop a spectrum of treatment options for parental consideration, including:

1. Masculinization with removal of dysgenetic ovary
2. Initial vaginoplasty but with retention of the phallus (+/- bilateral gonadectomy)
3. Initial vaginoplasty with "burial" of corporal bodies (Pippi Salle procedure) (+/- bilateral gonadectomy)
4. Vaginoplasty and clitoroplasty (with bilateral gonadectomy)
5. No surgical intervention

Results: In all 3 cases, after consideration of risks and benefits (table 2) of all options, parents selected option 2: gonadectomy to eliminate tumor risk and vaginoplasty, taking advantage of the child's young age to exteriorize urinary and reproductive tracts to avoid incontinence and infection and supporting parental bias toward female gender, but preservation of phallic structures to insure a male option should the patient later declare a male gender identity.

Conclusions: In the setting of exposure of the neonatal brain to testosterone, vaginoplasty and phallic preservation afforded a balance between parental preferences and preservation of anatomic options, allowing potential reconstruction of male or female phenotype as gender identity is ascertained thereby respecting both parent and patient rights.

Table 1.

	SS	EH	NS
Karyotype	45,X/ 46,XY/47,XYY	46XX/47XXY	45,X/46,XY
Gonads	/. Dysgenetic Testis /I Dysgenetic Ovary	/. Dysgenetic Testis /I Dysgenetic Ovary	/. Dysgenetic Ovary /I Dysgenetic Testis
Ductal Structures	Uterus /I Fallopian Tube	Uterus	Uterus /. Fallopian Tube
UG Sinus	Mid Confluence	Low Confluence	Low Confluence
Phallus	4 x 1.5 cm	2.7 x 1.3 cm	3 x 1 cm
Gender Assignment	Female	Neutral	Female

Table 2.

	Preserve Patient Options	Respect Parental Wishes	Technical Considerations, Surgical Timing	Established Outcomes
(1) Full Masculinization	-	-	+	+
(2) Vaginoplasty; Preserve Phallus	+	+	+	+/-
(3) Vaginoplasty + Buried Phalloplasty	+	+	-	-
(4) Full Feminization	-	+	+	+
(5) No Surgery	+	+/-	-	-

9

Transversus Abdominis Plane (TAP) Catheters versus Intraoperative Regional Field Infiltration in Reducing Postoperative Opioid Requirements in Children Undergoing Renal Transplantation: A Retrospective Age-Matched Comparison

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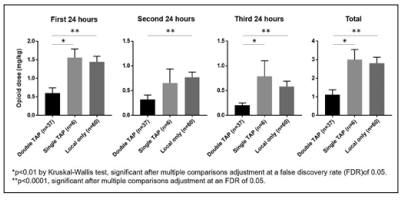
Introduction: After renal transplantation, children often exhibit large opioid requirements, which leads to significant side effects and complications. To address this problem, we introduced the use of transversus abdominis plane (TAP) catheters with continuous postoperative local anesthetic (bupicavaine) infusion, placed under direct vision at the time of RT. Herein, we present a retrospective study of the effectiveness of this novel approach as part of a multi-modal pain management strategy.

Materials & Methods: The intra-operative procedure involved ipsilateral deployment of 3-hole epidural catheters between the internal oblique and transversus abdominis muscles, at one or two different locations along the Gibson incision, following the direction of the nerves. Postoperative opioid utilization (mg/kg) for the first 24 hours (Day 1), second 24 hours (Day 2), third 24 hours (Day 3), and total dose was obtained from 103 pediatric renal transplant recipients. Postoperative opioid use was compared between children who underwent renal transplantation managed with two TAP catheters at two locations with local anesthetic infusion (Double TAP; n=37), one TAP catheter at one location with local anesthetic infusion (Single TAP; n=6), or local anesthetic infusion only (Control; n=60).

Results: The Double TAP group demonstrated significantly decreased postoperative opioid use compared to the Control group for Day 1, Day 2, Day 3, and total dose (p<0.0001) (Figure 1). The Double TAP group also demonstrated significantly decreased use compared to the Single TAP arm for Day 1, Day 3, and total dose (p<0.01). No significant differences were found between the Single TAP and Control groups (p>0.05). No major adverse events were reported. Minor adverse events included 2 cases of catheter leaks and 1 case of right thigh numbness in the Double TAP group, and 1 case of post-op opiate-related apnea in the Control group.

Conclusions: Our data demonstrates that the novel use of dual ipsilateral TAP catheters with local anesthetic infusion significantly lowers mean opioid utilization after pediatric RT when compared to single TAP catheters with local anesthetic and local anesthetic only controls. These results suggest that double TAP catheter placement with local infusion is a superior anesthesia technique for pediatric RT that should be validated in larger randomized trials.

Figure 1



*p<0.01 by Kruskal-Wallis test, significant after multiple comparisons adjustment at a false discovery rate (FDR)of 0.05.
**p<0.0001, significant after multiple comparisons adjustment at an FDR of 0.05.

10

What are the Implications for Obtaining VCUG for All Infants with High Grade Prenatal Hydronephrosis?

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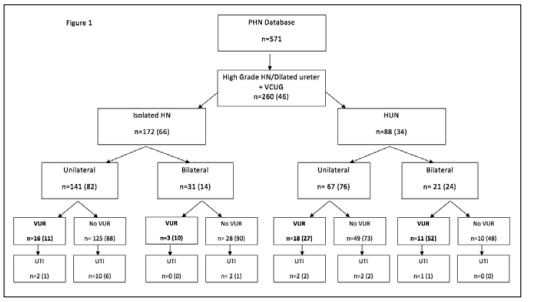
Introduction: Voiding cystourethrogram (VCUG) is often recommended for infants with Society for Fetal Urology (SFU) grade III/IV prenatal hydronephrosis (HN) and/or those with dilated ureters. A recent survey reported lack of uniformity in this practice, particularly for patients without prior history of urinary tract infections (UTIs). Herein we evaluate the yield of vesicoureteral reflux (VUR) detection and determine the risk of subsequent UTIs, to explore the value of this diagnostic practice and merit for routine, universal request for all cases.

Materials & Methods: We reviewed our prospectively-collected prenatal HN database of patients 0-24 months from 2008-16 (n=571), selecting those with SFU III/IV HN and/or ureteric dilatation and no history of UTI, who underwent VCUG according to our institutional protocol. We excluded children with associated uropathies and those with previous UTI (n=326). Children were segregated in 2 groups (those with hydroureteronephrosis (HUN) (ureter diameter ≥ 7mm) and those with isolated HN) and then further stratified them by VUR status (present or not). Outcomes included rates of UTI and subgroup analysis on the rate of VUR in patients with unilateral vs. bilateral HN. Univariate analyses were conducted and stratification was employed to control for confounding.

Results: Of 245 patients, median age at presentation was 2 months (0-21), 193(79%) were male, 172(66%) had isolated HN and 88(34%) had HUN. Mean follow-up time was 28±21 months. In the isolated HN group, 82% had unilateral dilatation and 11% of those had VUR compared to 10% in those with bilateral HN (p=0.92). For children with HUN, 76% had unilateral dilatation and 27% of those had VUR compared with 52% in infants with bilateral dilatation (p=0.03). There was a significant difference in continuous antibiotic prophylaxis (CAP) use between infants with isolated HN and HUN (34% vs. 57%; p=0.02). When we compared rates of UTI, we noted that there was no difference between isolated HN vs. HUN (8% vs. 6%; p=0.62) as well as between infants with VUR vs. those without, regardless of etiology(10% vs. 7%; p=0.34) (Figure 1).

Conclusions: The rate of VUR in patients with isolated HN was low (11%) compared to infants with HUN (33%), however VUR was rarely associated with subsequent development of febrile UTIs in either group. Significantly more children with HUN received CAP, which could provide a protective effect for development of UTIs in this group. Having bilateral involvement did not increase the likelihood of diagnosing VUR in those with isolated HN; but in children with bilateral HUN, the likelihood of finding VUR increased to more than 50%. Therefore, ordering VCUG solely based on laterality of HN appears justified for children with HUN. Based on these data, we propose that a more selective approach can be offered when determining which children with high-grade prenatal HN should be investigated with VCUG and those who would benefit from CAP.

Figure 1



11

A Single-Institution Series of Perioperative Outcomes Following Robotic Redo Pyeloplasties

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Introduction: Recurrence after pyeloplasty occurs in around 3% of cases. Revision after a failed pyeloplasty can be more complex due to increased inflammation and scarring. For this reason, it is unclear whether a robotic approach is preferable for these difficult reconstructive cases. Understanding the outcomes following redo RALP will help counsel families regarding the best approach for a revision procedure. As such, we aim to describe in detail perioperative outcomes following redo RALP.

Materials & Methods: We performed a single-institution retrospective case series of our redo RALP cases between 2/2007 and 7/2014. We focused on perioperative outcomes, including operative time (OT), length of stay (LOS), complications, readmission, recurrence and improvement. Patient and procedure level characteristics were summarized using frequencies (percentage) and medians (range or IQR) for categorical and continuous variables, respectively.

Results: Twenty-four redo RALPs were performed in 22 patients; 2 patients had 2 redo RALPs and were analyzed individually. A majority of patients were healthy (ASA scores 1-2), White (55%) boys (77%) with a left-sided obstruction (72%). Median age at initial pyeloplasty was 4.2 years (IQR 1.1-7.4), compared to 7.2 (IQR 2.5-10.9) at redo. The median time from initial pyeloplasty to redo was 1.55 years (IQR 1.1-3.5). Nine patients were decompressed via stent or PCN prior to redo RALP and the median function of the affected kidney was 47% (IQR 33-51). One patient had a concomitant nephrolithotomy. Median LOS was 1 day (range 1-3) and OT was 178 minutes (IQR 165-207). During follow up (median 1.9 years [IQR 1.4-2.7]), 5 complications (21%) occurred in 4 patients: a pseudomonal febrile UTI after stent removal, stent migration requiring endoscopic repositioning, and 3 recurrent stenoses. The complications were associated with 2 ER presentations, 3 admissions, 1 nephrectomy and 2 redo RALPs. Both patients improved after the second redo RALP. Radiologic improvement was observed following 67% of cases and clinical improvement in 88%.

Conclusions: The robotic approach for managing complex repairs after a failed primary pyeloplasty can be performed efficiently, with a short LOS, and provide good clinical improvement. However, complication rates are notable. Providers can use this information to counsel families when redo pyeloplasty is necessary.

12

Active Surveillance is a Viable Option for Men Under 60 Years of Age with Low-Risk Prostate Cancer

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Introduction: Active surveillance (AS) is increasingly used in managing low-risk and favorable intermediate-risk prostate cancer. While most centers do not have a strict age criterion for AS eligibility, younger men are typically counseled to undergo definitive treatment. However, there is limited data on the outcomes of AS in younger men. Here, we evaluate the role of active surveillance for men under 60 years of age diagnosed with low-risk prostate cancer.

Materials & Methods: We retrospectively reviewed two prospective institutional AS cohorts of men diagnosed with low-risk prostate cancer between 1990-2016 (n = 2152) to identify 432 men who began AS before 60 years of age. Clinical outcomes were analyzed, including repeat biopsy data, progression to treatment, and pathologic staging in those who had surgical treatment. Survival analyses for treatment-free survival, metastasis-free survival, cancer-specific survival, and overall survival were conducted using the Kaplan-Meier method.

Results: At diagnosis, median age was 55 years (IQR 53-57) and median PSA was 4.6 ng/mL (IQR 3.1-5.9), with only 11 of 432 men with PSA ≥ 10 ng/mL. The vast majority of patients had Gleason ≤ 6 (97.7%) and clinical stage T1 (91.9%) disease. With a median follow-up of 5.1 years (range: 0.05-21.7; IQR: 3.1-8.4), 84.3% (364/432) had a repeat biopsy with 62.6% (228/364) showing prostate cancer, 24.5% (89/364) benign, 7.7% (28/364) with PIN, and 5.2% (10/364) with atypia. Kaplan-Meier actuarial treatment-free survival was 74.3% at 5 years and 55.4% at 10 years. Of all 432 patients, 131 (30.3%) progressed to treatment for the following reasons: pathologic progression (64.1%), PSA progression (18.3%), patient preference (11.5%), volume progression (3.1%) and other reasons (3.1%). Involvement of > 20% of any core on diagnostic biopsy (HR 2.01, 95% CI: 1.14-3.54) and PSA density ≥ 0.15 (HR 1.94, 95% CI: 1.13-3.32) were significant independent predictors of progression to treatment. Among the 131 treated patients, 62.6% underwent radical prostatectomy, 13.0% underwent high-intensity focal ultrasound therapy, 12.2% underwent external beam radiation and 10.7% had brachytherapy. On pathologic review after surgery, 88.2% (60/68) were pT2, and 11.8% (8/68) pT3. The only significant predictor of pT3 disease among patients who underwent radical prostatectomy was > 33% core involvement on diagnostic biopsy (OR 2.38, P = 0.01). Five patients developed metastasis (2 with positive lymph nodes at time of radical prostatectomy, 3 with distant metastasis). Metastasis-free survival was 99.7% and 97.5% at 5 and 10 years, respectively. There were no prostate-cancer specific deaths.

Conclusions: Active surveillance is a reasonable option for carefully selected men under 60 with low-volume, low-risk prostate cancer. However, patients must be surveyed closely and understand the significant risk of ultimately needing treatment.

13

Treatment Trends for Metastatic Prostate Cancer over the Last Decade: Insights from the National Cancer Database

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Introduction: The incidence of metastatic prostate cancer has been increasing over the past decade. The landscape of treatment options has changed over this time period with the addition of new approaches to treatment, including the immunologic Sipuleucel-T (approved in 2010), and the chemotherapeutic agent Docetaxel, for which level 1 evidence for its first line use in hormone-sensitive disease became available in 2015. To our knowledge, there is no previous large scale study investigating the trends in management over the last 10 years, nor baseline utilization of newer agents.

Materials & Methods: The National Cancer Database (NCDB) was used to identify cases of metastatic prostate cancer, defined as cM1, between 2004-2014. No changes to diagnostic criteria of metastatic disease were made during this time period. To minimize reporting bias, only hospitals contributing at least one case per year for the entire decade were included. Treatments codes were categorized and compared between years of diagnosis. Descriptive statistics were performed in Stata.

Results: A total of 49,586 cases were included. The percentage of patients opting for surgical intervention as a care component (mostly palliative TURP) decreased over time, 12.7% in 2004 vs. 11% in 2014. Likewise, there has been a slight decrease in utilization of all forms of radiation therapy with 26.9% receiving radiotherapy in 2004 compared to 24.6% in 2014. The use of hormone therapy has increased 10% over the last decade (70.5% vs. 80.8%). Use of chemotherapy rose sharply over recent years but remains low. Single agent chemotherapy has increased from 3% in 2013 to 14% in 2014. Sipuleucel-T immunotherapy has seen modest use since its FDA approval in 2010, comprising < 1% of patients in 2010, to 6.4% in 2014.

Conclusions: The treatment landscape for prostate cancer has changed dramatically over the last 10 years. Primary treatment plans are less likely to include radiation or surgical intervention, as one would expect given that local control is uncommonly recommended in the context of metastatic disease. The usage of hormone therapy continues to rise. Use of immunotherapy with Sipuleucel-T remained low at CoC accredited hospitals four years after its introduction. Possibly as a reflection of CHAARTED demonstrating benefit in high volume M1 disease, docetaxel use increased in 2014. Based on recent evidence supporting its first-line use for castrate sensitive M1 disease we suspect increased utilization going forward, with our study serving as a baseline for future comparison.

14

Adverse Effects of Androgen Deprivation Therapy on Cognitive Function and Dementia in Men with Prostate Cancer: A Systematic Review and Meta-Analysis

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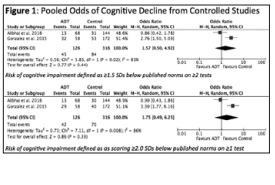
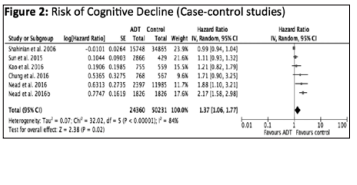
Introduction: Use of androgen deprivation therapy (ADT) for prostate cancer has many well-known side effects. ADT may confer a higher risk of cognitive impairment. Published results are variable and lack consensus. Our objective was to perform meta-analysis of the risk of overall cognitive impairment in men receiving ADT for prostate cancer.

Materials & Methods: Relevant studies were identified through the search of English language articles indexed in PubMed, Medline, PsycINFO, Cochrane Library and Web of Knowledge/Science until December 21st 2016. Articles were included if they were published in English, reported on original research with adult male subjects undergoing treatment for prostate cancer, incorporated longitudinal comparisons, and included a control group. Controlled intervention studies were required to assess an established cognitive-related endpoint that was measured by a validated instrument, and measure cognitive impairment based on the International Cognition and Cancer Task Force (ICCTF) criteria. The effect of ADT on cognitive impairment was pooled using a random-effects model for controlled intervention and case-control studies separately.

Results: Of 221 abstracts, 25 were selected for full-text review, and 8 studies, with 2 controlled studies and 6 case-control studies were identified. Overall cognitive impairment was not significantly different when the results of the 2 prospective studies were pooled (OR: 1.57, 95% CI: 0.50-4.92, P= 0.44), with significant heterogeneity between estimates (I^2: 83%). In retrospective data, the odds of developing any cognitive impairment were significantly higher in men treated with ADT (HR: 1.37, 95% CI: 1.06-1.77, P= 0.02), with considerable heterogeneity (I^2: 84%).

Conclusions: The relationship between overall cognitive impairment and use of ADT defined according to the ICCTF criteria in a pooled-analysis of two prospective studies was inconclusive. Although retrospective studies suggest a higher risk of overall cognitive impairment after ADT, we caution readers not to over-interpret this finding given the limitations of retrospective data. Better well-designed prospective studies are needed to assess the effect of ADT on cognitive impairment with long-term follow-up.





15

MRI–Targeted TRUS–Guided Fusion Biopsy: Are Anterior Targeted Lesions Different then Posterior Lesions? Now that we Have Targeting Technology?

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Introduction: Accurately targeting anterior prostate lesions for biopsy remains a clinical challenge. MRI imaging of prostatic lesions has improved significantly in recent years. With computer-aided drafting models we are now able to perform targeted biopsies of these lesions by overlaying MRI images on ultrasound images in real time. We assessed whether these anterior targets are more likely to be cancerous then their posterior lesion counterparts.

Materials & Methods: Patients from a single large urology group practice who underwent MRI-fused ultrasound-guided trans rectal biopsy between July 2015 and December 2016 were retrospectively studied. Multiparametric prostate MRI including T2 weighted, diffusion weighted, and dynamic contrast image sequencing was performed on all patients. A single radiology group read all MRIs to score lesions using Prostate Imaging Reporting and Data System version 2 (PI RADs v2) criteria. For inclusion, each patient must have had a standard 12 core systematic biopsy procedure, with 1-2 cores per lesion. Data on PI RADs v2 score, age, PSA, previous biopsy history, prostate size and cancer outcomes were analyzed.

Results: Of the 212 patients meeting inclusion criteria, there were 86 patients representing 108 mpMRI Anterior lesions (Average Age 66.2, PSA 10.7, TRUS size 56.9 cm^3), and 126 patients representing the 153 mpMRI Posterior lesions (Average Age 65.4, PSA 7.5, TRUS size 61.7 cm^3). The cancer rates found in Anterior vs. Posterior lesions was 49.1% vs. 29.4%, respectively (Chi squares, p = 0.001235). Higher grade disease (Gleason 4 or 5) was found in 83% of Anterior lesions vs. 71% in Posterior lesions, but the difference was not statistically significant (Chi Square, p = 0.14). No statistically significant differences were found between the groups in terms of age, PSA, previous biopsy history, or prostate size.

Conclusions: Anterior prostatic lesions found on mpMRI are more likely to be cancerous when compared to Posterior lesions, and there is trend toward a higher grade disease in Anterior lesions.

16

USPSTF Fallout: Is Disease Burden at Diagnosis of Metastatic Disease Rising?

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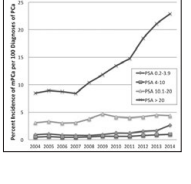
Introduction: The impact of the USPSTF on PSA screening behavior would not be expected to impact metastatic disease rates (mPCa) for several years. However a delay in diagnosis for men with prevalent mPCa might be measurable in the near term. Since PSA is a rough surrogate for disease burden, we sought to determine if the PSA at the time of diagnosis of mPCa is rising in the National Cancer Database (NCDB).

Materials & Methods: The NCDB was used to examine PCa diagnoses from 2004-2014. To minimize reporting bias, only hospitals contributing at least one case per year for the entire decade were included. Cases with cM1 disease were defined as metastatic. PSA at initial cancer diagnosis was divided into 4 groups: 0.2-3.9, 4.0-10.0, 10.1-20, and > 20 ng/ml. The ratio of mPCa compared to total PCa diagnoses were compared for each year. Descriptive statistics and a multivariate logistic regression were performed in Stata.

Results: The proportion of mPCa present at initial diagnosis increased over the 10-year period for every PSA group. The most significant proportional increase was observed in patients with PSA >20, from 8.5% (2004) to 22.9% (2014). The most significant rate of increase was observed after 2007 (Figure 1). On multivariate regression, PSA category was independently associated with the presence of metastatic disease at initial diagnosis (p < 0.001). The percentage of patients with mPCa at initial diagnosis who had a PSA > 20 was 47% in 2004 vs. 72% in 2014. Patients with a PSA < 4 had a higher rate of metastatic disease at diagnosis when compared to the PSA 4-10 group. Those with PSA < 4 experienced a proportional increase in mPCa from 0.92% (2004) to 2.65% (2014).

Conclusions: As expected, the presence of mPCa increases with increasing PSA, but the new finding of disproportionately more men with PSA > 20 at diagnosis of mPCa in recent years is notable. We hypothesize this may represent higher disease burden at diagnosis as a near term result of USPSTF recommendations. Secondary observation of a proportionate increase in overall mPCa in the NCDB must be interpreted with caution, given that this is a registry rather than a population based dataset. Further studies are needed to elucidate if these trends equate to a greater burden of disease at diagnosis of mPCa, and whether screening behavior is causative.



17

Perioperative Outcomes of Aspirin Use in Radical Prostatectomy

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Introduction: Despite clear evidence demonstrating the benefit of perioperative aspirin (ASA) in reducing the risk of cardiac and cerebrovascular complications, ASA is commonly discontinued before surgery due to a concern for surgical bleeding. To date, there exists a paucity of studies assessing the effect of perioperative ASA on surgical outcomes within urology. The majority of those available investigations are limited to high volume centers, which may not be reflective of the general urologic community practice. As a result, we sought to evaluate the impact of perioperative ASA on outcomes for those undergoing radical prostatectomy (RP) across a broad range of practice settings.

Materials & Methods: A retrospective review of patients undergoing RP (ICD9 60.5, 60.62) from 2003 to 2015 was performed on the Premier Hospital Database (Premier Inc, Charlotte NC, USA), a nationally representative hospital discharge dataset. We restricted the study to elective procedures with a diagnosis of prostate cancer (ICD 185), and excluded patients with a possible cardiovascular or cerebrovascular event on the day of surgery. To reduce unmeasured confounders, we limited the cohort to hospitals that - during the course of study - had at least one patient that received perioperative aspirin yielding a total cohort of 157,674 patients. The cohort was dichotomized into two groups: those receiving perioperative ASA (2.8%, n = 4400) and those with no perioperative ASA (97.2%, n = 153,274). In terms of outcomes, we assessed in-hospital rates of: major bleeding, overall transfusion, day-of-surgery transfusion, prolonged (> 2 days) length of stay (LOS), and prolonged (> 270 minutes) operative time. We also assessed 90-day rates of: myocardial infarction, cerebrovascular accident, readmission, major complication (Clavien-Dindo ≥ 3), deep vein thrombosis/pulmonary embolism, and death. The statistical analysis was based on crude and adjusted logistic regression models, which accounted for patient, hospital, and surgical characteristics.

Results: Patients continuing with perioperative ASA tended to be older (51.5% vs. 41.8% ≥ 65 years, p = 0.002), less healthy (13.8% vs. 5.3% with a Charlson Comorbidity Index score ≥ 2, p < 0.0001), and more likely to receive an open RP (42.3% vs. 28.1%, p < 0.0001). With respect to in-hospital outcomes, no significant differences were associated with the use of perioperative ASA. For 90-day outcomes, those patients receiving perioperative ASA were more likely to suffer a myocardial infarction (OR 5.88, CI [3.4-10.18], p < 0.001), experience a major complication (OR 2.95, CI [1.58-5.5], p < 0.001), or be readmitted (OR 1.63, CI [1.18-2.26], p < 0.05). Subgroup analysis showed that the disparity in morbidity was limited to patients undergoing minimally invasive RP.

Conclusions: This contemporary, population-based study demonstrates that perioperative ASA is not associated with increased in-hospital surgical morbidity following RP. Although these findings suggest that patients on perioperative ASA do not have an elevated risk for bleeding, they are associated with higher 90-day morbidity, which is likely attributed to their baseline comorbidities.

18

Clinical and Socioeconomic Disadvantaged Socioeconomic Status is Strongly Associated with Metastatic Prostate Cancer

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Introduction: Since the USPSTF recommendations against PSA screening in 2008 and 2012, there is renewed interest in focusing screening efforts towards at-risk populations in order to identify clinically significant disease. As such, defining characteristics associated with patients ultimately developing metastatic disease is valuable. Other than the well recognized association between African American race and aggressive prostate cancer (PCa), patient demographics are underexplored. We used a large hospital-based database to describe socioeconomic characteristics at diagnosis of metastatic prostate cancer.

Materials & Methods: The National Cancer Database (NCDB) was used to examine PCa diagnoses from 2004-2014. To minimize reporting bias, only hospitals contributing at least one case per year for the entire decade were included. Cases with clinical M1 disease were defined as metastatic. No changes to the diagnostic criteria of M1 disease were made during this time. A robust multivariate regression model was created to assess the relationship of M1 disease with included covariates: year of diagnosis, age, race, income, regional insurance and education status, Charlson-Deyo index, and PSA at diagnosis.

Results: A total of 1,235,869 cases of incident PCa were included, of which 49,586 (4.01%) were metastatic. The NCDB captured a declining proportion of total PCa cases in the US (cancer.org) year over year, from 68% in 2004 to 38% in 2014. Patients with medicaid or uninsured had the highest odds of bearing metastatic disease (OR 3.35 and 4.33, respectively) compared to private insurance (p < 0.001). Other factors associated with metastasis include African American race (OR 1.31, p < 0.001), more recent year of diagnosis (OR 1.12 per year vs. 2004, p < 0.001), income < $38,000 (OR 1.12 vs. ≥ $63,000, p < 0.001) and PSA > 20 at diagnosis (OR 9.37 vs. PSA < 4, p < 0.001).

Conclusions: Our data support well known associations of high PSA and African American race with metastatic prostate cancer. Of interest, disadvantaged socioeconomic status (low income, no insurance, medicaid) is associated with metastatic disease at initial diagnosis. In addition to patient education and selective screening, efforts must be made to address upstream issues impacting early detection in disadvantaged patients who may have suboptimal access to care.

19

Secular Trends in Prostate Biopsy Criteria and Outcomes: The Dartmouth Experience

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Introduction: More restrictive prostate specific antigen (PSA) screening guidelines issued in 2012 have led to lower rates of screening nationwide, as well as lower rates of prostate cancer diagnosis across risk categories. It is not known, however, how guidelines may have affected regions with less aggressive *a priori* screening practices. Dartmouth-Hitchcock Medical Center (DHMC) is a large academic center within the hospital referral region (HRR), or regional healthcare market, with the lowest rate of PSA screening among Medicare patients in 2012. We evaluated the impact of changed screening guidelines on biopsy and diagnosis of prostate cancer at DHMC to determine secular trends at an institution with low baseline screening rates.

Materials & Methods: Using a data warehouse query and chart review, we retrospectively analyzed all patients at DHMC who underwent a trans-rectal ultrasound guided (TRUS) prostate biopsy January 2011 through March 2016. We excluded patients on active surveillance and those with clinical metastatic disease. Demographic and clinical characteristics were collected and analyzed, stratifying on time. Multivariable analysis was conducted using *a priori* variables to assess for factors associated with higher grade cancer diagnoses. Statistical analysis was performed using SAS 9.4 (Cary, NC).

Results: During the study period, 614 prostate biopsies were performed. The mean age at biopsy was 63.7 (42-87) and the mean PSA was 8.2 (0.14-49.9). Pathology results included 276 (44.9%) benign, 104 (16.9%) Gleason 3+3, and 234 (38.1%) with ≥ 3+4 disease. When analyzed by year, the mean PSA at biopsy increased with time (7.2 in 2011 vs. 10.1 in 2016; p = 0.0085), while mean age did not. The proportion of benign results remained stable (46.1% in 2011 vs. 45.8% in 2015), however the proportion of low grade disease decreased while intermediate/high grade disease increased (2011 vs. 2015: 21.1% vs. 10.8% Gleason 3+3, 32.9% vs. 43.3% ≥ Gleason 3+4, p = 0.0454). On multivariable analysis comparing low grade (Gleason 3+3) to intermediate/high grade disease, factors predictive of worse disease included abnormal digital rectal exam (OR 2.19, p-value 0.0076), higher PSA level (OR 1.09, p-value 0.0040), and later biopsy date (OR 1.01, p-value 0.0469).

Conclusions: In an environment of already conservative screening practices, there has been a shift in both prostate biopsy criteria and outcomes post-2012, namely a rising PSA threshold for biopsy and a 50% decrease in the rate of diagnosis of low grade disease. There has been a concomitant increase in the rate of higher grade disease by 30%. These trends demonstrate the potential benefit of more restrained screening and biopsy practices, even in regions with low baseline screening rates. Additional study of the downstream effects of changing screening and biopsy practices is needed to ensure these are favorably impacting the overall quality of care.

20

V. A. Multi-Institutional Prospective Study Confirms the 4Kscore Test Predicts Aggressive Prostate Cancer

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Materials & Methods: Men were prospectively enrolled from eight VA locations. All were referred for prostate biopsy and underwent phlebotomy for 4Kscore prior to biopsy. Data was analyzed for discrimination, calibration, and clinical utility of the 4Kscore for predicting Gleason 7 or higher (G7+) CaP, and compared to a base model consisting of age, digital rectal exam findings, and PSA. Additionally, the 4Kscore test was compared amongst African-American (AA) and non-AA men.

Results: 403 men were enrolled and 366 had both 4Kscore and complete data available. Among these, 208 (56%) were AA, and 134 (36%) had G7+ CaP. The 4Kscore exhibited better discrimination (AUC: 0.81 vs. 0.74, p = 0.011) and higher clinical utility on decision analysis than the base model. 4Kscore Calibration plots of for the entire cohort afforded predictions that closely matched the observed risk of G7+ CaP in the population. No difference in the discrimination of the 4Kscore test between AA and non-AA men (0.80 vs. 0.84; p = 0.32) was seen. Because of the inherent higher risk for aggressive prostate cancer in African American men, a prospectively defined factor for modification of the 4Kscore for African American men was demonstrated to provide near perfect calibration for African American men while not impacting the calibration of non-African American men.

Conclusions: The 4Kscore test accurately predicts the likelihood of aggressive prostate cancer and outperforms standard clinical information for biopsy decision making in both AA and non-AA men.

21

Outcomes of Serial MRI-Fusion Biopsy in Men with Low-Risk Prostate Cancer Managed with Active Surveillance

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Introduction: Although targeted multi-parametric MRI (mpMRI) - ultrasound (US) fusion biopsy has demonstrated improvements in diagnostic yield compared with standard systematic biopsy, the outcomes of repeated biopsy among men with clinical low risk prostate cancer (PCa) managed with active surveillance (AS) has not been clearly defined.

Materials & Methods: We queried a single institution prospectively collected database of patients undergoing mpMRI fusion biopsy to identify patients on AS with at least two fusion biopsies. AS inclusion criteria included any volume of Gleason (Gl) 3+3 PCa and a PSA < 15. The primary study endpoint was the occurrence of Gl upgrading on subsequent biopsy. For patients with Gl upgrading, mpMRI changes were documented only if PI-RADS suspicion score data was available. The chi-square and independent samples t-test were used to compare categorical and continuous variables, respectively, and assess associations with biopsy upgrade.

Results: Between December 2013 and November 2016 there were 209 patients on AS who received a mpMRI/US fusion targeted biopsy. Of these, 20.5% (43/209) had at least two targeted biopsies. The average time between biopsies was 15 months. Initial clinical stage T1c disease was documented in 88% (38/43), while 12% (5/43) were clinical stage T2a. Median age was 62 years, (interquartile range (IQR), 59-66), median (IQR) PSA and PSA density was 4.7 (3.8-6.9) and 0.10 (0.06-0.15), respectively. There were 24% (10/43) of patients who had Gl ≥ 7 PCa detected on subsequent biopsy. Of these 80% (8/10) were upgraded to Gl 3+4 disease, while two patients had Gl ≥ 4+3 PCa. 50% (5/10) of patients were upgraded on both systematic and targeted biopsy, 30% (3/10) were upgraded with only systematic biopsy, while 20% (2/10) were upgraded with only targeted biopsy. For patients who had biopsy upgrade, PI-RADS data were available in 5 cases. Of these, 60% (3/5) were found to have associated mpMRI upgrading. Of patients with Gl upgrading, 50%, (5/10) went on to receive curative therapy. There were no significant associations between Gl upgrading and mpMRI change (p = 0.7). Initial PSA density was higher for those who went on to have Gl upgrading (0.15 vs. 0.10, p = 0.04), however there were no differences in age, PSA, or time on AS (p > 0.05).

Conclusions: In our initial experience with repeat mpMRI/US fusion targeted biopsy in the AS setting, we found that 24% of patients had Gl upgrading on subsequent biopsy. Of these patients, only 50% had concordant findings between targeted and systematic biopsy, with 20% and 30% detected with either targeted or systematic biopsy alone, respectively. MR-MRI upgrading did not predict Gl upgrading, and a clear role for systematic biopsy in AS remains. Although mpMRI has great potential in the AS setting, further data with larger sample size and utilizing a uniform method of lesion assessment will be useful.

23

Early Discharge Following Decompression for Sepsis and an Obstructing Stone? A Multi–Institutional Study to Identify Predictors of Antibiotics Sensitivity

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Introduction: Patients presenting with sepsis and an obstructing stone undergo urgent urinary tract decompression. Following this, patients are hospitalized for hemodynamic support and broad spectrum antibiotics. Urine culture results are used to tailor outpatient antibiotic therapy. At times patients achieve early clinical stability but remain hospitalized while awaiting antibiotic sensitivities. We sought to identify predictors of antibiotic resistance that may allow clinicians to select candidates for discharge on empiric oral antibiotics prior to culture results being available.

Materials & Methods: All patients that underwent emergent urinary tract decompression for sepsis and an obstructing ureteral stone over the last 2 years at the two above institutions were included. Clinical factors, including urine culture sensitivities and patient demographics were recorded. Student's t-test and the chi-squared test were used to identify statistical difference.

Results: 134 patients were identified that met inclusion criteria. Eighty-four patients (62.7%) had urine cultures with antibiotic resistance. Comparison was made between patients with pan-sensitive and resistant urine cultures (Table 1). Patients with resistant cultures were more likely to have had previous urologic surgery (44.7% vs. 22.0%, p = 0.008) - the most notable difference was in patients that had had previous ureteroscopy (38.9% vs. 8.0%, p = 0.0002). Those with resistant cultures were more likely to require postoperative ICU-level care (27.1% vs. 12.0%, p = 0.039), have bacteremia (48.2% vs. 24.0%, p = 0.005) and a longer length of stay (5.4 vs. 3.4 days, p = 0.026). Resistance patterns were noted to be similar between the two institutions (Table 2).

Conclusions: Patients that have had previous urologic surgery, especially ureteroscopy, appear to be poor candidates for early discharge on empiric antibiotics prior to the completion of urine culture results due to a higher likelihood of having antibiotic resistance. These results were noted to be consistent at both institutions participating in this study.

Table 1. Differences in demographic and clinical factors between patients with resistant and sensitive urine cultures.

	Sensitive (n = 50)	Resistant (n = 84)	p value
Age	59.9 years	58.9 years	0.763
Gender	22.0% male	27.1% male	0.516
BMI	31.2 kg/m^2	31.8 kg/m^2	0.874
Diabetes	22.0%	22.4%	0.962
Paraplegia	2.0%	4.7%	0.425
Stone Size	6.7 mm	7.6 mm	0.249
WBC, serum	15.0	15.9	0.403
Temperature	99.3°F	100.4°F	0.489
Systolic Blood Pressure	113 mmHg	113 mmHg	0.782
Heart Rate	107 bpm	109 bpm	0.498
Previous Urologic Surgery	22.0%	44.7%	0.008
Previous Ureteroscopy	8.0%	38.9%	0.0002
Previous PCNL	4.0%	7.1%	0.471
ICU admission (postop)	12.0%	27.1%	0.039
Length of stay, mean	3.4 days	5.4 days	0.026
Positive Blood Culture	24.0%	48.2%	0.005

Table 2. Antibiotic resistance patterns noted by institution.

Antibiotic	Providence, Rhode Island	New York, New York	p value
Ampicillin / sulbactam	12.3%	60.0%	0.0002
Aztreonam	7.7%	10.0%	0.746
Cephalexin	13.8%	30.0%	0.212
Ciprofloxacin	35.4%	45.0%	0.619
Gentamicin	16.9%	30.0%	0.330
Levofloxacin	29.2%	45.0%	0.302
Meropenem	1.5%	5.0%	0.378
Piperacillin / tazobactam	3.1%	20.0%	0.009
Trimethoprim / sulfamethoxazole	29.5%	45.0%	0.302

22

Patient Navigation and Its Association with Treatment Selection for Low-Risk Prostate Cancer

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Introduction: Patient navigation (PN) has many theoretical and reported benefits in cancer care, including improved access to and coordination of care. In 2008, our large multi-institution health system developed a PN program to achieve these goals and to promote shared decision-making in the treatment of prostate cancer (PCa) by an independent nurse navigator. Coinciding with the implementation of our program, active surveillance had become an increasingly accepted low-risk PCa management modality, with reported national rates of about 50% by 2014. We hypothesized that our navigation program, with its emphasis on patient-centered decision-making, would be associated with increased utilization of active surveillance in men with National Comprehensive Cancer Network (NCCN) low-risk disease.

Materials & Methods: Data were collected from our Multi-institution tumor registry from 2009 to 2015. Patients with unknown staging, node positive, and metastatic disease were excluded. A subset of patients with NCCN very-low/ low-risk disease were extracted (clinical stage ≤ T2a, Gleason score ≤ 6, serum PSA < 10 ng/mL). Multivariable logistic regression analyses were performed to determine factors associated with decision to use active surveillance as initial treatment, controlling for year and age at diagnosis, race, primary payer, marital status, tobacco use, urologist volume, distance from treatment facility, ZIP Code based income, and PCa characteristics (Gleason score, PSA, clinical stage, NCCN risk group).

Results: Data from 1,533 patients with local PCa in 2009-2015 were reviewed and treatment types assessed. Of these, 454 men had very-low/ low-risk disease. In this population over the study period, 193 men underwent radical prostatectomy and 213 chose active surveillance as initial treatment. Active surveillance increased from 20% in 2009 to 68% in 2015 (Figure). Following adjustment, patients were significantly more likely to choose active surveillance if they were navigated, treated later, treated by a low-volume surgeon, or never married (Table). Distance from care was not associated with treatment choice. Approximately 90% utilized navigation services, and PN was independently associated with active surveillance (Odds Ratio (OR) = 8.0, 95% Confidence Interval (CI) 3.2-19.7).

Conclusions: Active surveillance as initial treatment modality for men with low-risk prostate cancer increased over the study period. Patient navigation was significantly associated with active surveillance. This may reflect increased decision support provided by the clinical patient navigator, who acts as an independent entity facilitating consults between multiple disciplines, educating patients and families based on NCCN guidelines, and focusing on shared decision making in treatment discussions. This may reflect changing practice patterns, as well as community perception as active surveillance became more common over the study period. This study demonstrates that navigation services may help to increase active surveillance for low-risk disease. More research is necessary to evaluate long-term patient satisfaction with treatment decision.

Figure Treatment of Low-Risk Prostate Cancer over Time, 2009-2015

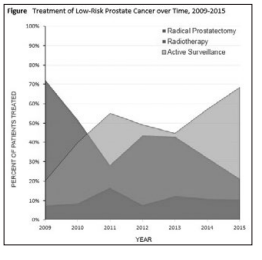

Table: Factors associated with Active Surveillance of Low-Risk Prostate Cancer, 2009-2015.*

Characteristic	OR (95% CI)	P Value
Year of Diagnosis	Ref	**<0.001**
2009		
2010	**4.3 (1.4-13.2)**	**0.011**
2011	**5.9 (1.5-17.9)**	**0.002**
2012	**7.6 (2.4-24.5)**	**<0.001**
2013	**8.4 (2.6-27.2)**	**<0.001**
2014	**16.7 (5.15.3)**	**<0.001**
2015	**21.2 (6.5-69.3)**	**<0.001**
Patient Navigator Utilization		
No	Ref	-
Yes	**8.0 (3.2-19.7)**	**<0.001**
Surgeon Volume**		
Low	Ref	-
High	**0.1 (0-0.1)**	**<0.001**
Race/ Ethnicity		
White	Ref	
Black	1.1 (0.2-7.7)	0.954
Unknown/ Other	5.1 (0.1-350.7)	0.448
Marital Status		**0.029**
Never Married	0.4 (0.2-1.1)	0.077
Separated/ divorced/ widowed	**0.1 (0-0.1)**	**0.003**
Other/ Unknown	0.5 (0.1-1.9)	0.328

Abbreviations: PCa=Prostate Cancer, OR=odds ratio, CI=confidence interval

*Low-risk PCa is defined per NCCN guidelines including Grade<T2a, Gleason score ≤6, PSA< 10 ng/mL. 454 low-risk PCa participants were assessed. Multivariable logistic regression analysis controlled for factors in table, as well as the following: age at diagnosis, race, tobacco use, distance from home to treatment facility, ZIP Code-associated income, and primary payer. Items in bold were significant with p<0.05.

**High Volume Surgeons: the 4 highest volume surgeons had >150 diagnoses over the study period and accounted for 32% of all diagnosed PCa.

24

A Randomized Control Trial of Preoperative Prophylactic Antibiotics Prior to Percutaneous Nephrolithotomy in the Low Risk Population: A Report from the EDGE Consortium

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Introduction: Single institution studies have suggested possible benefit of a week of pre-operative antibiotics prior to percutaneous nephrolithotomy (PNL). Yet prior studies are limited by lower methodology (Level IIa)[1], including heterogeneous populations[2], or utilizing quasi-sepsis definitions[2]. Other than the recommended peri-operative dose of IV antibiotics < 24 hours per AUA Best Practice Statement, the duration/benefit of pre-operative antibiotics remains unclear. We sought to perform a rigorous (adhering to CONSORT guidelines) multi-institutional trial assessing utility of pre-operative PNL antibiotics for patients at low risk of infectious complications.

Materials & Methods: We performed a randomized controlled trial (RCT) coordinated across 7 academic stone centers for low risk PNL patients. Low risk patients were defined as those with negative urine cultures and under no antibiotic treatment course within 14 days of procedure, and without any urinary drains (catheters, stents, nephrostomy tubes). Patients randomized to the intervention arm received nitrofurantoin 100 mg twice daily for 7 days preceding surgery. All enrolled patients received standard preoperative dose of ampicillin (vancomycin if allergic) and gentamicin (ceftriaxone if eGFR < 60 or allergic). PNL was performed per the usual practice of each treating surgeon. Baseline patient and stone characteristics were recorded. Perioperative infection related adverse events within the first 30-days were compared in both groups.

Results: Thirty-four patients were randomized to each arm. Adverse events occurring within the first 30 days of procedure are reported in Table 1. The infection rate after PNL in the intervention arm was 17.6% (6/34) versus 11.8% (4/34), p = 0.49. Two of the patients in the intervention arm with infectious complications needed readmission and two others required admission to the intensive care unit. Total length of hospital stay demonstrated no difference between the two groups (1.09 versus 1.47, p = 0.2). There was no mortality reported during this study period.

Conclusions: There appears to be no advantage to providing one week of pre-operative oral antibiotics in patients at low risk for infectious complications. Less than 24 hours peri-operative antibiotics as per AUA Best Practice Statement appears sufficient. We continue to analyze this low risk group with a more robust data set, as well as analyze preoperative antibiotic benefit in other stratified risk groups.

1. Mariappan et al. *BJUI Int* 2006
2. Kumar S. et al. *Urol Res* 2012

25

Radiation Exposure during Percutaneous Nephrolithotomy: A Comparative Analysis of Single Specialty versus Multi-Specialty Procedures

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Introduction: Patient and personnel ionizing radiation doses during percutaneous nephrolithotomy (PCNL) can be significant, especially while obtaining percutaneous renal access. In the US the majority of renal access for PCNL is obtained by interventional radiologists with theoretical decrease in operative times and radiation exposure for the patient and operating room staff, especially if access is obtained prior to PCNL in a dedicated interventional radiology (IR) suite. The aim of this study was to assess if staging renal access may lead to shorter operative times and lower radiation dose during PCNL.

Materials & Methods: We performed a retrospective analysis of an endourology database of 66 adults undergoing PCNL between August 2013 to March 2017 at a single tertiary institution. Of these, 54 had complete information including fluoroscopy and radiation dosimetry times. Fluoroscopy time included the time for percutaneous access (IR suite or operating room), tract dilation, PCNL, and placement of postoperative drains. Patients were stratified into two groups: Group 1 (n = 30) had single stage PCNL with renal access obtained in the operating room using fluoroscopic guidance by the urologist; Group 2 (n = 24) had renal access obtained in the IR suite by the radiologist 1 day before or just prior to PCNL. Decision regarding timing/method of access was at the discretion of the operating surgeon. Data was collected regarding patient demographics, stone complexity, operative time, estimated blood loss (EBL), IR access time, and radiation exposure. The Mann-Whitney U and chi-square tests were used for statistical analysis.

Results: The patients in Group 2 were older (65.9 vs. 61.8 yrs, p = 0.0476), but the two groups were similar in terms of existing co-morbidities, using American Association of Anesthesiologist (ASA) classification. Guy's stone score, a metric of stone complexity, was comparable between the two groups (p = 0.118). There was no difference in EBL between the two groups (p = 0.34). Group 2 had longer mean total procedure times at 216.2 minutes than Group 1 at 133.2 minutes (p < 0.001). However, when comparing OR times not including the IR access time, there was no difference in operative length (133.2 vs. 124.9 minutes, p = 0.52). For Group 1, total average fluoroscopy time was 224.1 seconds and total radiation dose was 4.3 mSv. Group 2 had a total average fluoroscopy time of 997.7 seconds and total average radiation dose of 7.7 mSv. When controlling for Guy's stone score, total fluoroscopy time and total radiation dose were both significantly higher for the group with access obtained in the IR suite (p < 0.001).

Conclusions: In the setting of multi-specialty involvement in PCNL, we found a significant increase in total radiation dose and fluoroscopy time for the patient, without identifying a significant reduction in operative room times. Although benefits exist in obtaining percutaneous renal access ahead of the operation and the decision to obtain access by IR versus the operating urologist may be surgeon- or institution-dependent, this study highlights important differences in operative length and radiation exposure between the two groups that warrant further investigation.

26

A Decision Analysis of Observation vs. Immediate Re-Intervention for Asymptomatic Residual Fragments &lt 4 mm Following Ureteroscopic Lithotripsy

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Introduction: To assess the cost-effectiveness of observation vs. intervention on asymptomatic residual fragments less than 4 mm in diameter following ureteroscopic laser lithotripsy using a decision analysis model.

Materials & Methods: Outcomes data from a retrospective analysis evaluating the natural history, complications, and re-intervention rates of asymptomatic residual stone fragments performed by the EDGE consortium were utilized. A decision analysis model was constructed to compare the cost-effectiveness of initial observation of residual fragments compared to immediate intervention. Cost for the observation arm consisted of ED visits, hospitalizations, and re-interventions. The cost-analysis model extended for 3 years to account for delayed re-intervention rates on fragments of this size. For the immediate intervention arm, costs for ureteroscopy and shockwave lithotripsy were accounted and weighted depending on actual usage. Expected value calculations and sensitivity analyses were performed to determine the optimal treatment pathway based on overall cost-effectiveness inclusive of equipment, secondary costs from complications, emergency department visits, hospital readmission, and re-interventions. Costs of emergency department visits, readmissions, and re-interventions were calculated based on published figures from the literature.

Results: Two hundred thirty-two patients were found to have asymptomatic residual fragments &lt 4 mm on follow-up imaging following ureteroscopic lithotripsy. There were 191 patients in the observation group and 41 in the immediate-intervention group. Decision analysis modeling demonstrated that when comparing initial observation to immediate re-intervention, the cost was $2965 vs. $4504, respectively. The difference in cost was largely driven by the fact that over 3 years, approximately 56% of patients remain asymptomatic and thus incur no ED visit, hospitalization, or re-intervention costs. This represents an approximate annual per-patient savings of $513, and $1539 over three years when observation is selected over immediate re-intervention.

Conclusions: Our decision analysis model demonstrates superior cost-effectiveness for observation over immediate re-intervention for asymptomatic residual stones &lt 4 mm following ureteroscopic lithotripsy. The cost-savings are primarily due to a plurality of patients not requiring intervention if observed. Based on these findings, careful stratification and selection of patients may enable surgeons to improve cost-effectiveness of managing small, asymptomatic residual fragments following ureteroscopic lithotripsy.

27

The Effect of Medication Use on Stone-Related Quality of Life

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Introduction: Potassium citrate and thiazide diuretics have well-established roles in the medical management of stone disease. While a reduction in stone proclivity is desirable and may improve health-related quality of life (HRQOL), this benefit must be weighed against potential risk of unwanted side effects, including nausea, fatigue and sexual dysfunction. It is not currently well understood how the use of these medications affects patients' HRQOL. We sought to evaluate whether the use of potassium citrate or thiazides reduces a patient's stone-related HRQOL.

Materials & Methods: Utilizing the previously validated Wisconsin Stone-QOL questionnaire (WISQOL), a kidney stone-specific instrument, we analyzed cross-sectional data from patients both new to and already established in stone prevention, enrolled at sites participating in the North American Stone QOL Consortium. We compared HRQOL in the WISQOL domains of social impact, emotional impact, disease impact, and vitality between patients treated and those not treated with either potassium citrate or thiazides using student's t-test. Additionally, univariate and multivariate logistic regression were used to assess likelihood of complaints of nausea and stomach upset or cramps between those prescribed and not prescribed potassium citrate. This was also done to assess the likelihood of complaints of fatigue and reduced sexual interest/activity between those prescribed and not prescribed thiazides.

Results: 1511 stone formers were included (787 male, 724 female), of whom 258 were on potassium citrate and 207 on a thiazide at study enrollment. Patients prescribed potassium citrate scored significantly higher (better HRQOL) in each of the domains. With multivariate analysis, these differences maintained their significance (mean domain scores were higher by 2.5, 2.8, 2.8, 1.3 points, respectively, all p<0.0001). Patients prescribed a thiazide had significantly higher scores in each domain compared to those not prescribed a thiazide. These differences maintained significance with multivariate analysis (mean domain scores higher by 1.9, 2.3, 2.1, 1.0 points, respectively, all p < 0.01). In item-level analysis, patients prescribed potassium citrate were less likely than those not prescribed to report any nausea, stomach upset or cramps (43% vs. 55%, p < 0.001). Multivariate logistic regression showed a 40% lower likelihood of having GI complaints among patients prescribed potassium citrate, p = 0.001, when controlling for age, gender, BMI, and number of stone events. Patients prescribed thiazides were less likely than those not prescribed to report any fatigue (59% vs. 68%, p = 0.008). Those on thiazides were less likely to report reduced sexual interest/activity (24% vs. 31%, p = 0.02). On multivariate logistic regression, patients on thiazides were overall 32% less likely to report fatigue, p = 0.02, and 33% less likely to report reduced sexual interest/activity, p = 0.026, when controlling for the aforementioned factors.

Conclusions: Among stone formers, use of potassium citrate and thiazide diuretics is associated with higher HRQOL across all domains of the WISQOL. Specifically, those prescribed potassium citrate were less likely to endorse GI complaints compared to those not taking potassium citrate. Similarly, use and tolerance of thiazides is not associated with either fatigue or reduced sexual interest/activity. These findings may be useful when counseling patients regarding initiation of potassium citrate or thiazides for medical management of stones.

28

Percutaneous Renal Access by Urologist vs. Radiologist: Trends and Perioperative Outcomes in PCNL

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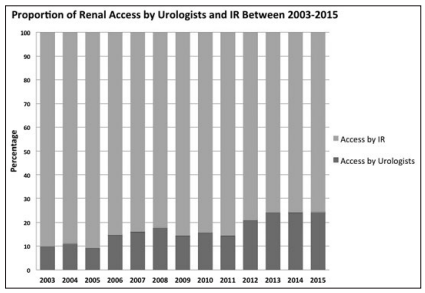
Introduction: Percutaneous nephrolithotomy (PCNL) is an effective minimally invasive technique for removal of large upper urinary tract calculi. The initial step in percutaneous nephrolithotomy is access to the renal calyceal system via a percutaneous approach. Historically, interventional radiologists have obtained renal access; however, urologist-acquired access is feasible and appropriate in most cases. The aim of the study was to examine temporal trends of renal access by physician specialty, and to evaluate the impact of the specialty of the physician obtaining access on length of stay (LOS), complications, and costs of PCNL.

Materials & Methods: We used data from a national hospital discharge database to identify patients who underwent PCNL between 2003-2015. Procedure codes related to renal access were linked to physician specialty. We examined patient demographics, Charlson comorbidity index, postoperative complications, LOS, and direct hospital costs. We also investigated hospital and surgeon characteristics stratified by specialty of the physician obtaining renal access. Logistic regression was used to identify trends in access acquisition. A multivariable regression model was created adjusting for potential confounders to examine complications, costs, and LOS.

Results: We identified 19,976 patients undergoing PCNL between 2003-2015. The proportion of urologist- obtained access increased over time (Figure 1) with 9.8% of patients having percutaneous renal access attained by urologists in 2003, compared to 24.3% in 2015 (p for trend < 0.001). High volume urologists were more likely to obtain their own access (36.5% vs. 9.7% p < 0.001). Renal access by urologists was associated with a lower 90-day complication rate (15.2% vs. 17.0% p = 0.008) and lower rates of prolonged hospitalization ≥ 4 days (9.3% vs. 13.4%, p < 0.001). On multivariable analysis, renal access by urologist was associated with lower rates of any complication (Clavien 1-5) (OR 0.86, p = 0.006), shorter LOS (< 4 days) (OR 0.71, p < 0.001), and lower direct hospital costs (OR 0.83, p < 0.001).

Conclusions: In the United States, radiologists obtain percutaneous renal access in the majority of PCNLs. Though the majority of access for PCNLs continues to be done by radiologists, there is an increasing proportion of renal access for PCNL being acquired by urologists. Access by urologist may be associated with lower overall complications, shorter hospitalizations, and lower direct hospital costs. Coding errors and absence of stone complexity information may limit the cogency of our findings and requires further investigation.



29

Analysis of Stent Omission After Uncomplicated Ureteroscopic Lithotripsy Shows Significant Cost Savings and Decreased Patient Morbidity

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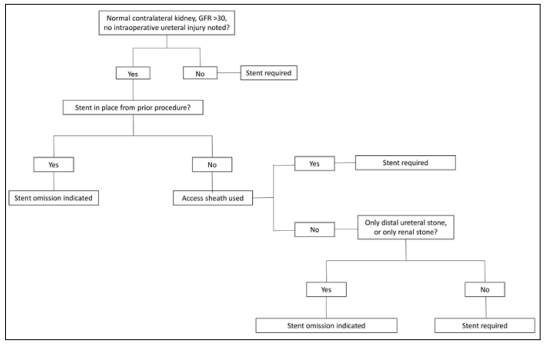
Introduction: Prospective trials have shown that stent placement after ureteroscopic lithotripsy (URSL) is not necessary in all patients. As the Medicare Access and CHIP Reauthorization Act of 2015 ends fee for service payment in exchange for the Merit-based Incentive Payment System (MIPS) and Advanced Alternative Payment Models (APMs) in 2017, financial analysis of URSL procedures is necessary. Specific indications for stent omission (SO) remain elusive, and the lack of clear indications may have a negative impact on cost of care. We sought to define indications for and the cost impact of SO.

Materials & Methods: A retrospective cohort of 126 consecutive patients who had URSL or diagnostic ureteroscopy by fellowship trained endourologists were analyzed. Indications for SO were defined according to Figure 1. Phone calls for symptoms, additional office visits, ED visits or admissions within 30 days of the procedure were recorded as postoperative events. Costs for the stent removal and from events attributable to the stent were calculated using the Medicare Physician Fee Schedule Look-Up Tool. The cost of stent placement was calculated as the cost to purchase the stent. Statistical analysis was performed using Fischer's exact test when comparing postoperative morbidity between groups.

Results: SO was indicated in a total of 67 patients of the 126 analyzed, with SO performed in 9 patients. The average cost of unnecessary stent placement was $372.45 per patient, with the average cost being $540.09 for those with events and $272.92 for those without events. Annualized cost was $29,424 per endourologist. Events occurred in 23 patients with stents that were placed unnecessarily and in no patients in which SO occurred as indicated (p = 0.025). Events included new flank pain, dysuria, hematuria, stent migration, and sedation for cystoscopic stent removal.

Conclusions: We propose evidence based indications for SO after URSL which decrease patient morbidity and generate savings of $372.45 per patient or $29,424 annually per endourologist. These cost savings may prove vital in adjusting to new payment models.



30

Association of Pregnancy with Stone Formation Among US Women: A National Health and Nutrition Examination Survey Analysis 2007-2012

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Introduction: Lithogenic urinary changes occur during pregnancy. Such changes may increase stone proclivity in working and child rearing aged women thereafter. However, such an association has not been previously identified.

Materials & Methods: We analyzed nationally representative data from the 2007-2012 National Health and Nutrition Examination Survey to assess for an association between pregnancy and nephrolithiasis.

Results: The weighted national prevalence of nephrolithiasis among women ≤ 50 was 6.4% (95% Confidence Interval (CI) 5.4%-7.6%). The prevalence of nephrolithiasis was significantly higher among women who had been pregnant compared with those who had never been pregnant (7.5% vs. 3.2%, p = 0.0004). On univariate regression, those who had been pregnant had over twice the odds of having had kidney stones (OR 2.44, 95% CI 1.50-3.98). An increased likelihood of nephrolithiasis among those with history of pregnancy persisted on multivariable logistic regression adjusting for age, ethnicity, obesity, history of diabetes, gout, hormone use, water intake and high sodium diet (OR 2.13, 95% CI 1.31-3.45). Finally, the adjusted prevalence of nephrolithiasis increased significantly with increasing number of pregnancies, from 5.2% in those with 0 reported pregnancies to 12.4% in those with 3 or more pregnancies (p = 0.001).

Conclusions: Nephrolithiasis is strongly associated with prior pregnancies. Among women of reproductive age, the odds of stones are greater than doubled in those who had been pregnant compared with those never pregnant. Nephrolithiasis prevalence also increases with increasing number of pregnancies. Future investigation and identification of modifiable risk factors among pregnant patients may allow reduction in burden of stone disease in women

31

Initial Outcomes of Supine PCNL in the United States: Another Arrow for the Urologist's Quiver

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Introduction: Percutaneous nephrolithotomy (PCNL) is a treatment of choice for complex renal calculi. Traditionally, prone position for PCNL has been the preferred approach. Valdivia was the first to describe the technique and advantages of performing PCNL in supine position so as to minimize the risks associated with the classic prone position. Over time, the supine position has gradually gained traction in Europe, Asia and South America. However, the technique is utilized in only 1.5% of PCNLs performed in North America and to our knowledge has never been reported in the United States. The purpose of this study is to describe technique, outcomes and complications following initial implementation of supine PCNL.

Materials & Methods: Between September 2016 and March 2017, 24 patients underwent PCNL in the supine position at a New England tertiary referral center. Galdakao-modified Valdivia position was utilized for cases where concomitant contralateral ureteroscopy was planned. Bart's flank-free modified supine position was used for all other cases. Renal access was obtained in the operating room with fluoroscopic guidance. Patient demographics, stone characteristics, access time, total operative times, estimated blood loss, fluoroscopy time, radiation dose, stone-free rates, and complications based on the Clavien-Dindo classification system were collected. To assess the effect of the learning curve, perioperative outcomes were compared between the first and last 12 cases.

Results: Patients had a median age of 67.5 years, ASA 3, and Guy's stone score of 3. Lower pole access was used in 14 (58.3%) patients, while upper pole access was obtained in 7 (29.3%) of cases. Two patients required multiple tracts. Median operative time was 119 minutes (IQR: 108, 140) and estimated blood loss was 100 cc. In 4 patients, concomitant contralateral retrograde ureteroscopy with laser lithotripsy was performed as urethral access was readily available. Tubeless PCNL was performed in 12 (50%) cases. No patients required blood transfusions and median length of stay was 1 day. On follow-up imaging 20 out of 24 (83%) patients were considered stone-free after surgery. Minor complications (Clavien ≤ 2) occurred in 2 (8.3%) patients, and 1 patient required stent placement two days after initial procedure (Clavien 3). Over time, there was significant improvement in renal access times and operative times.

Conclusions: Like most surgical procedures, an initial learning curve exists. However, for urologists facile with percutaneous nephrolithotomy, supine position for PCNL can be easily and safely implemented into practice. Supine positioning has the benefit of eliminating risks associated with prone positioning in patients with neuromuscular conditions, high body mass index, and cardiopulmonary disease. Additionally, it provides ease of access to the lower urinary tract as well as retrograde access to the contralateral side without need for repositioning.

32

Bacteria on Urine Microscopy is not associated with Systemic Infection in Patients with Obstructing Urolithiasis

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Introduction: Bacteria are commonly found on urine microscopy in emergency room (ER) patients with obstructing urolithiasis. However, the clinical significance of this finding is unclear. Determining whether or not bacterial presence on urine microscopy represents infection is important as ureteral stent placement is indicated in patients with obstructing urolithiasis and infection. We aim to investigate if the presence of bacteria on urine microscopy is associated with other markers of infection in patients with obstructing urolithiasis presenting to the ER.

Materials & Methods: We performed a cross sectional study of 199 patients presenting to the ER with obstructing urolithiasis and divided patients into two groups according to the presence of bacteria on urine microscopy. The primary outcome was serum white blood cell count (WBC > 10,800/hpf) and secondary outcomes were objective fever, subjective fever, tachycardia (> 100 bpm), pyuria, and final urine culture. Univariate and multivariate analysis were used to assess if the presence of bacteria on microscopy was associated with other markers of infection.

Results: The study included 72 patients in the bacteriuria group and 127 without bacteriuria. On univariate analysis, the presence of bacteria was not associated with leukocytosis, objective fever, or subjective fever (table 1), but was associated with gender (P < 0.001), pyuria (P < 0.001), positive nitrites (P = 0.001), positive leukocyte esterase (P < 0.001), and squamous epithelial cells (P = 0.002). In a multilinear regression model including the presence of squamous cells, age, and sex, the presence of bacteriuria was not related to serum white blood cell count (coefficient -0.47; 95% CI -1.1 - 0.2; P = 0.17), heart rate (coefficient 0.85; 95% CI -2.5 - 4.2; P = 0.62), presence of subjective or objective fever (OR 1.5; 95% CI 0.8 - 3.1; P = 0.18), or the presence of squamous epithelial cells (coefficient -4.4; 95% CI -10 - 1.2; P = 0.12). However, the presence of bacteriuria was related to only the degree of pyuria (coefficient 16.4; 95% CI 9.6 - 23.3; P < 0.001).

Conclusions: Bacteria on urine microscopy was not associated with other markers of systemic infection and may largely represent a contaminant. Renal colic may be a risk factor for providing a contaminated urine specimen.

Parameters	Bacteriuria (n=78)	No bacteriuria (n=136)	P value
Age, mean (SD)	49.4 (16.3)	49.2 (15.3)	0.9
Gender			<0.001
Male, n (%)	25 (34.7)	81 (63.8)	
Female, n (%)	93 (46.7)	46 (36.2)	
BMI, mean (SD)	28.7 (5.2)	29.6 (5.8)	0.36
Diabetes Mellitus, n (%)	10 (13.9)	25 (19.7)	0.30
Urine WBC/hpf, mean (SD)†	32.6 (53.2)	7.8 (19.4)	<0.001
Urine RBC/hpf, mean (SD)†	64.9 (74.1)	50.7 (68.8)	0.18
Leukocyte esterase, n (%)	45 (62.5)	41 (31.5)	<0.001
Positive nitrites, n (%)	13 (18.1)	5 (3.9)	<0.001
Squamous epithelial cells, n (%)	48 (66.7)	63 (48.5)	0.01
Subjective fever, n (%)	5 (7.0)	6 (4.6)	0.49
Objective fever (>38°C) , n (%)	2 (2.7)	1 (0.8)	0.29
Heart rate bpm, mean (SD)	88.2 (16.0)	86.4 (17.0)	0.48
Serum WBC/μL, mean (SD)*	10.2 (3.5)	10.6 (3.2)	0.39
Positive final urine culture (>100,000 CFU), n (%)	13 (18.1)	13 (10.0)	0.10

†Maximum is 182/hpf at our institution.
*10,800/μL is considered the upper limit of normal at our institution.

33

A Retrospective Pilot Study Comparing the Efficacy of Opioids and Diclofenac for Post-Ureteroscopy Pain Control

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Introduction: Despite playing an important part in the palliation of symptoms and treatment of nephrolithiasis, ureteral stents remain a source of significant morbidity for urologic patients. With growing concern regarding narcotic medication prescriptions for the management of postoperative pain, alternative medications have been proposed. Recent basic science and translational research has identified the benefit of prostaglandin inhibition in ureteric smooth muscle for renal colic using non-steroidal anti-inflammatory drugs (NSAIDs) such as diclofenac. In this study, we evaluate the efficacy of diclofenac compared to opioids given postoperatively as determined by frequency of stent symptom-related adverse events.

Materials & Methods: Charts of 101 patients who underwent ureteroscopy with stent placement over a three-month period (November-February) in 2015-2016 and the same interval in 2016-2017 were reviewed retrospectively. All procedures were performed by a single surgeon. In the first interval, routine post-ureteroscopy discharge medications included opiate medications for pain control. During the second interval, diclofenac was substituted for opiate prescriptions upon discharge for appropriately selected patients without history of renal dysfunction or prior opioid tolerance. Study exclusion criteria included ureteroscopy without stent placement, or receiving both an opiate and diclofenac or neither on discharge. Efficacy of the medication was determined by measuring the frequency of adverse events postoperatively including visits to the emergency room for stent symptoms, stent symptom related telephone calls to the urology clinic, unexpected urologic interventions such as early stent removal, and requests for prescription refills for pain medication.

Results: In the first time interval, 37 ureteroscopies with stent placement were performed and 31 patients were discharged with opioid prescriptions (83.7%). In the second time interval, for which an asserted effort was made to avoid opioid medications, 51 ureteroscopies with stent placement were performed. 33 patients were discharged without opioid prescriptions (64.7%). Of these, 27 received diclofenac and 6 patients received neither medication. A similar percentage of patients receiving only opioids in the first interval and only diclofenac in the second had postoperative visits to the emergency room for genitourinary-related concerns (5 patients receiving opioids (16.1%) and 6 patients receiving diclofenac (22.2%); p = 0.556) and to clinic for early stent removal (5 patients receiving opioids (16.1%) and 4 patients receiving diclofenac (14.8%); p = 0.892). Patients in the second interval prescribed diclofenac made a similar number of telephone calls compared to patients in the first interval prescribed opioids (10 patients receiving opioids (32.3%) and 9 patients receiving diclofenac (33.3%); p = .936) and patients given diclofenac at discharge tended to request fewer pain medication refills, although this was not statistically significant (6 patients receiving opioids (19.4%) and 1 patient receiving diclofenac (3.7%); p = 0.073).

Conclusions: This retrospective pilot study demonstrates the feasibility of diclofenac as alternative to opioid pain medications for post-ureteroscopy pain control in appropriately selected patients. In the patient group that received diclofenac, there were no significant differences in the rate of postoperative adverse events. Understandably, this preliminary data is based on small patient numbers. Future larger prospective studies are warranted to better evaluate the efficacy of this medication for post-ureteroscopy and ureteral stent pain.

P1

The Learning Curve for Multi-Parametric MRI/US Fusion Guided Prostate Biopsy: A Single Center Experience

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Introduction: Multi-parametric MRI (mpMRI) with ultrasound fusion targeted biopsy has been increasingly utilized as a diagnostic procedure for patients suspected of having prostate cancer. Several aspects of fusion biopsy require learning, including lesion targeting and the operational knowledge of the various fusion biopsy devices. As targeted biopsy gains further adoption in prostate cancer diagnostics, understanding the learning curve of the procedure will be helpful for institutions considering implementation into their practice.

Materials & Methods: We retrospectively reviewed 112 mpMRI/US fusion targeted biopsies performed at our institution utilizing the Artemis™ (Eigen) fusion biopsy device. Each biopsy was performed by one of four urologic residents with no prior experience performing fusion targeted biopsy. Supervision was available by an attending with experience in the technique. Biopsies are performed under monitored anesthesia care or local anesthesia, with an average of 5 biopsy cores obtained from each region of interest (ROI). This is followed by a 12-core systematic biopsy using a software generated template. Operative records were used to document the primary end point of length of procedure (LOP). Time is started with insertion of ultrasound probe into the rectum and is stopped upon removal. Analysis of variance and chi-square tests were used to compare continuous and categorical variables respectively. Multiple linear regression was utilized to assess independent predictors of LOP.

Results: Overall, LOP decreased with increasing operator experience. Average LOP for the first ten cases was 29.2 minutes, standard deviation (SD 9.4). From the tenth to the twentieth case, LOP significantly decreased to 24.9 minutes, (SD 8.5), $p < 0.01$. There were no significant differences in the number of ROIs detected on mpMRI by our radiologists over time ($p = 0.44$). Lower number of ROIs and increasing biopsy experience were both significant predictors of shorter LOP ($p < 0.01$ for both).

Conclusions: Results of our study demonstrate an improvement in LOP with increasing user experience, independent of number of ROIs. In addition, the number of ROIs were shown to independently influence LOP. Although use of this new technology is associated with a steep learning curve, our study demonstrated a substantial improvement within the first twenty procedures, suggestive of basic proficiency. Additional longitudinal data may further elucidate variables associated with physician learning curve.

Average Time by Case Number

		95% CI	
	Average minutes	SD	Lower	Upper
Cases 1-10	29.22	9.356	26.41	32.03
Cases 11-20	24.88	8.534	22.15	27.6
Cases 21-30	24.9	7.321	21.57	28.24

Multiple Linear Regression

	Coefficients	*Lower 95%*	*Upper 95%*	*P-value*
Biopsy Number	-0.374872364	-0.528112207	-0.221632522	<0.001
Number of targets	3.461796283	2.246615955	4.676976612	<0.001

Figure 1

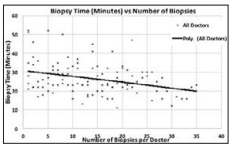


Figure 2

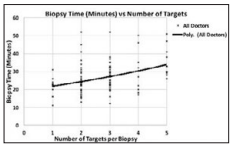
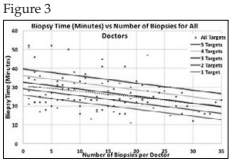


Figure 3



P2

Metformin Inhibits Benign Prostatic Epithelial Cells through Suppression of Insulin-Like Growth Factor 1 Receptor

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Introduction: Benign prostatic hyperplasia (BPH) is the most common proliferative abnormality of the prostate affecting elderly men throughout the world. Epidemiologic studies have shown that diabetes significantly increases the risk of developing BPH, although whether anti-diabetic medications preventing the development of BPH remains to be defined. We have previously found that stromally expressed insulin-like growth factor 1 (IGF-1) promotes benign prostatic epithelial cell proliferation through paracrine mechanisms. Here, we seek to understand if metformin, a first line medication for the treatment of type 2 diabetes, inhibits the proliferation of benign prostatic epithelial cells through reducing the expression of IGF-1 receptor (IGF-1R) and regulating cell cycle.

Materials & Methods: BPE cell lines BPH-1 and P69, murine fibroblasts3T3 and primary human prostatic fibroblasts were cultured and tested in this study. Cell proliferation and the cell cycle were analyzed by MTS assay and flow cytometry, respectively. The expression of IGF-1R was determined by western-blot and immunocytochemistry. The level of IGF-1 secretion in culture medium was measured by ELISA.

Results: Metformin (0.5-10mM, 6-48h) significantly inhibited the proliferation of BPH-1 and P69 cells in a dose-dependent and time-dependent manner. Treatment with metformin for 24 hours lowered the G2/M cell population by 43.24% in P69 cells and 24.22% in BPH-1 cells. On the other hand, IGF-1 (100ng/mL, 24h) stimulated the cell proliferation (increased by 28.81% in P69 cells and 20.95% in BPH-1 cells) and significantly enhanced the expression of IGF-1R in benign prostatic epithelial cells. Metformin (5mM) abrogated the proliferation of benign prostatic epithelial cells induced by IGF-1. In 3T3 cells, the secretion of IGF-1 was significantly inhibited by metformin from 574.31pg/ml to 197.61pg/ml. The conditioned media of 3T3 cells and human prostatic fibroblasts promoted the proliferation of epithelial cells and the expression of IGF-1R in epithelial cells. Metformin abrogated the proliferation of benign prostatic epithelial cells promoted by 3T3 conditioned medium.

Conclusions: Our study demonstrates that metformin inhibits the proliferation of benign prostatic epithelial cells by suppressing the expression of IGF-1R and IGF-1 secretion in stromal cells. Metformin lowers the G2/M cell population and simultaneously increases the G0/G1 population. Findings here might have significant clinical implications in management of BPH patients treated with metformin.

Funding support: NIH/National Institute for Diabetes and Digestive and Kidney Diseases (NIH/R01 DK091353) to AFO.

P3

Urothelial Genes Modulating Micturition Behavior Induced by a Repetitive Lipopolysaccharide (LPS) Exposure in an Ovariectomized (OVX) Mouse Model

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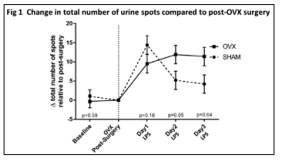
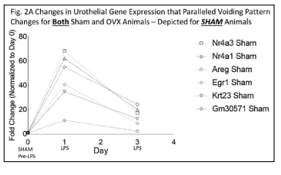
Introduction: Menopause increases risk of recurrent UTI (rUTI) which manifests with chronic lower urinary tract symptoms (LUTS). While treatment focuses on eradicating pathogens (e.g. antibiotics), we lack an understanding of host responses in this scenario which can lead to bladder functional changes, including refractory LUTS. In this study, we sought to measure host responses, including voiding behavior, urothelial gene expression, and bladder morphology. We identified urothelial transcripts influenced by OVX state that regulated voiding behavior after repetitive LPS intravesical exposure.

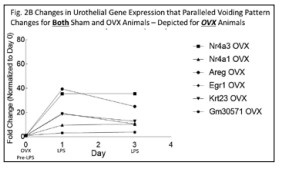
Materials & Methods: Female C57BL6 mice underwent sham (n = 10) or OVX (n = 10) surgery. Micturition behavior was measured using voiding spot assay (VSA) performed pre-surgery, 4 weeks post-surgery (but prior to LPS exposure) and after each of three consecutive days of intravesical inoculation of LPS. At end of experiment, animals were euthanized and bladders harvested for Gomori trichome staining. A separate experiment, following same LPS exposure protocol, was performed in 18 mice (sham = 9, OVX = 9) for microarray analysis of urothelial gene expression (pure urothelial sheet dissections) before LPS, 1d and 3d after LPS exposure, using Affymetrix gene chip for entire mouse transcriptome.

Results: In Fig 1, OVX and sham animals exhibited overactive voiding behavior on day 1. However, OVX and sham animals diverged on days 2 and 3 of LPS treatment with the OVX mice persisting with an overactive voiding phenotype. Gomori trichome staining showed that OVX mice had flattened rugae which was not seen in sham mice. Analysis of microarray data focused on pattern of gene expression changes (cutoff >+10x or <-10x) that mimicked voiding pattern changes for both sham and OVX animals. Only 6 transcripts, out of the entire transcriptome surveyed, were identified using this focused approach: Nr4a3 (nuclear receptor 4a3), Nr4a1 (nerve growth factor IB), Areg (amphoregulin), Egr1 (early growth response 1), Krt23 (keratin type 1 cytoskeletal 23), and Gm30571 (unknown protein). These 6 transcripts followed the pattern seen in Fig. 1 (voiding behavior) for both sham (Fig. 2A) and OVX animals (Fig. 2B). For example, urothelial transcript Nr4a3 in sham animals (Fig. 2A, open box) went up (65x) 1 day after LPS, but came down (20x) 3 days after LPS. However, this same transcript in OVX animals (Fig. 2B, closed box) went up (38x) 1 day after LPS and persisted (38x) 3 days after LPS. Thus changes in Nr4a3 mimicked the VSA data shown in Fig. 1.

Conclusions: Targeted microarray analysis revealed only 6 urothelial gene expression changes that uniquely paralleled voiding changes. These genes involve inflammation, epithelial growth/repair and cytokines. Treating LUTS secondary to inflammation/UTI might target these host reseponse urothelial genes.







P4

A Novel, Integrated Gene Expression and Drug Sensitivity Approach Reveals Unique Sensitivity of Squamous Cell Carcinoma-Like Bladder Cancers to PI3K-Beta Inhibitor AZD6482

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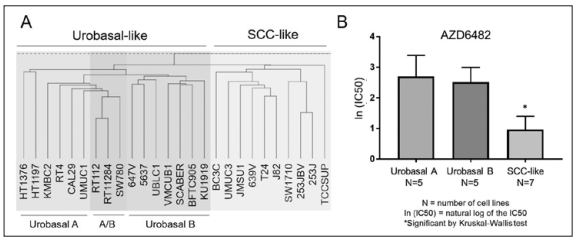
Introduction: The goal of precision medicine is to predict the best treatment strategy from available genomic information, on a patient-by-patient basis. Bladder cancer genomics has emerged as a new area of research, whereby molecular subtypes of bladder cancer based on gene expression models may have selective therapeutic targets. Here we implement a novel bioinformatics approach integrating gene expression and drug sensitivity analyses to determine molecular subtype-specific therapeutic vulnerabilities in bladder cancer.

Materials & Methods: Gene expression profiles for 26 bladder cancer cell lines were obtained from the Cancer Cell Line Encyclopedia (CCLE) and analyzed by unsupervised hierarchical clustering using Morpheus software (Broad Institute, Cambridge, MA). Cell line clusters were classified according to validated genomic classification systems. Drug sensitivity data for 19 bladder cancer cell lines treated with 224 anti-cancer drugs was obtained from the Genomics of Drug Sensitivity in Cancer (GDSC) database (Sanger Institute, Cambridge, UK). Mutational data was obtained from CCLE and GDSC. Differential sensitivity analyses were performed using Graphpad Prism.

Results: Unsupervised hierarchical clustering of gene expression data revealed major subgroups that clustered according to classified molecular subtypes: Squamous cell carcinoma-like (SCC-like), Urobasal A, Urobasal B, and Urobasal A/B (Fig 1A). Differential sensitivity analyses revealed that certain subtypes are preferentially sensitive to specific drugs. The most significant drug/subtype combination was the unique sensitivity of SCC-like cell lines to Phosphatidylinositide 3-kinase beta (PI3Kβ) inhibitor AZD6482, compared to Urobasal A or B lines (Fig 1B; $P < 0.05$ by Kruskal-Wallis test). This unique sensitivity is associated with PTEN loss of function, which was found to be more commonly altered in SCC-like vs. Urobasal cell lines ($p < 0.05$).

Conclusions: Using cell line gene expression profiling and drug sensitivity data, we developed a novel bioinformatics approach and demonstrated a unique sensitivity of SCC-like bladder cancers to the PI3Kβ inhibitor AZD6482, which may represent a novel therapeutic target. Furthermore, PTEN mutational status may represent a potential biomarker for sensitivity to this class of agents.



P5

The Role of Integrins and Exosomes in Sunitinib Resistance in ccRCC Cell Lines

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Introduction: Tyrosine kinase inhibitors (TKIs) are used as first line therapy for stage IV or unresectable clear cell renal cell carcinoma (ccRCC). While the efficacy of TKIs is attributed to downregulation of vascular endothelial growth factor and a decrease in tumor angiogenesis, tumor response is often mitigated by acquired resistance. Integrins, cell surface proteins involved in regulating cell adhesion, have been shown to promote TKI resistance in several tumor types. Exosomes are small extracellular vesicles released by cells and have been shown to horizontally transfer bioactive molecules to recipient cells thereby promoting chemoresistance. In this study we have investigated the role of integrins and exosomes in ccRCC resistance to sunitinib.

Materials & Methods: The ccRCC cell lines Caki-1 and Caki-2 were continuously exposed to increasing concentrations of sunitinib for 6-8 months until acquiring resistance. These cells were termed Caki-1/SR and Caki-2/SR. Cell viability was assessed using MTT assays. Exosomes were harvested and characterized by nanoparticle tracking analysis. Changes in the integrin expression profiles and various signaling pathways were determined using Western blot analysis of cell and exosome lysates. Alterations in adhesion were established using standard in vitro assays. Integrin inside-out signaling pathway array plates were used to compare mRNA expression levels.

Results: Integrin expression levels were found to be variable among parental and resistant ccRCC cell lines. Gene expression analysis revealed reduced levels of COL1A1 and COL1A2, components of type I collagen, in Caki-1/SR cells. Western blot analysis demonstrated a significant decrease in beta-3 integrin protein levels in Caki-1/SR compared to Caki-1 cells. An assessment of adhesion determined Caki-1/SR cells exhibited decreased adhesion to several extracellular matrices, including collagen I, laminin, and fibronectin. On the other hand, Caki-2/SR cells demonstrated an increase in beta-1 and beta-3 integrins compared to Caki-2 cells. Altered levels of beta-1 and beta-3 integrins were observed in exosomes released by both Caki-1/SR and Caki-2/SR cells. Initial protein studies suggest downstream signaling pathways affected by the change in levels of integrin expression include FAK and NF-kB.

Conclusions: Our findings suggest sunitinib resistance in Caki-1 and Caki-2 ccRCC cells is associated with integrin expression. Beta-1 and Beta-3 integrin levels correlated with resistance in Caki-2 cells. Exosomal integrin levels were altered in sunitinib resistant cells. Continued investigation into the role of integrins in sunitinib resistant cell lines, including the effect of variable integrin profiles on downstream signaling pathways and their potential transference via exosomes, will improve understanding of TKI resistance in ccRCC

P6

Genomic Heterogeneity and the Small Renal Mass

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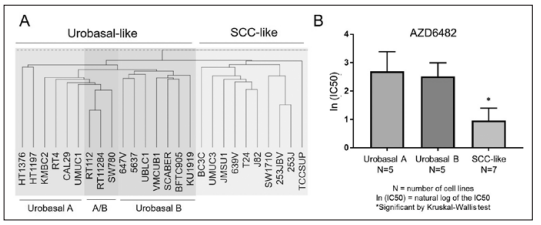
Introduction: Pre-treatment genomic characterization of the small renal mass is now feasible, however extensive tumor heterogeneity in renal cell carcinoma (RCC) may represent a barrier to widespread adoption. This concept emerged from multi-site assessment of large renal masses. We set out to evaluate genomic heterogeneity in resected small and large renal tumors to provide further insight into the limitations of this approach.

Materials & Methods: A consecutive series (n = 100) of nephrectomy specimens had 3+ regions sampled > 1 cm apart at the time of gross pathologic exam. A total of 47 small (cT1a) and large (cT2+) clear cell tumors were selected for evaluation. DNA was extracted for copy number variation (CNV) of common driver alterations from the Cancer Genomic Atlas (TCGA) using an Illumina Human CytoSNP12 array. Gene expression analysis was performed with a custom Nanostring digital RT-PCR array and analyzed with nSolverAnalysis Software to characterize ccA vs ccB profiles as well as the Prolaris Cell Cycle Progression (CCP) score. Total and subclonal CNVs, CCP score, and ccA/B classification was assessed by tumor, size grouping, and individual region.

Results: A total of 23 small (cT1a) and 24 large (cT2+) tumors were analyzed. CNV and RT-PCR analysis was performed on 44 and 42 tumors, respectfully, 36 of which had successful analysis of all three regions with both modalities. Overall CNV profiles were similar to the TCGA with 3p25 loss and 5q35 gain being the most common events. Large tumors more frequently had loss of 14q24 and 9p21 ($p < 0.05$), both known to influence prognosis. Total CNVs were much less frequent in smaller tumors (median 2.5 vs. 6.5, $p = 0.006$). Subclonal CNV events were also less common in small tumors (median 0 vs. 3, $p = 0.002$). Different CNV patterns emerged with specific alterations appearing more truncal and others more branch events in tumor evolution. Significant gene expression heterogeneity was observed for both CCP and ccA/B classifications. Larger tumors had significantly more variance in CCP scores ($p = 0.026$). ccA/B scores differed between small and large tumors with mixed cc A/B tumors being more frequently in the larger cohort (23.8 vs. 4.7%, overall $p = 0.048$). Analysis of 5 mixed tumors that had CNV events demonstrated the more aggressive B phenotype had greater CNV events (median 7 vs. 2, $p = 0.011$).

Conclusions: We present the largest cohort of multiregion sampling in clear cell RCC. Small renal tumors have much less genomic complexity and fewer subclonal events when compared to large tumors. For the first time, we demonstrate that ccA/ccB profiles can vary between tumors however this is much less frequent in small renal tumors. Our findings support an ongoing small renal mass trial where pre-treatment genomic characterization is performed based on a single biopsy.



P7

Protein Expression in Urethral Lichen Sclerosus: Potential for Biochemical Identification and Early Cancer Warning

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Introduction: Lichen sclerosus (LS) is an inflammatory condition that, when expressed in the urethra, can lead to urethral stricture disease (USD). LS is a pathologic diagnosis, but the underlying pathophysiology leading to the disease is poorly understood. Prior biochemical research has focused on cutaneous and vulvar LS, but large-scale analysis of urethral LS has not been performed. Utilizing urethral samples with and without histologically confirmed LS, we sought to identify protein expression associated with LS USD.

Materials & Methods: Urethral tissue samples from patients undergoing urethroplasty for USD at a single institution were histologically evaluated for LS. Tissue from non-LS strictures, clinically suspected but not histologically confirmed LS strictures, and other control tissues (labia, foreskin, urethra) were also identified. A tissue microarray was created with cores from each sample and immunohistochemistry for p53, Ki-67, cyclin D1, and p16 was performed. p53 and Ki-67 were scored semiquantitatively and evaluated only in the basal and parabasal cells. Cyclin D1 was considered positive if > 10% of cells were immunoreactive while p16 was positive if diffuse "block-like" nuclear staining was present in the basal cells. Data were compared by Kruskal-Wallis or Fisher's exact test with significance of alpha = 0.05, as appropriate.

Results: A total of 170 core samples, comprising 118 (69%) pathologic LS, 8 (4.7%) clinical LS, 18 (10.6%) non-LS strictures, and 26 (15.3%) control cores were assessed. p53 expression was significantly higher in pathologic LS compared to clinical LS and non-LS strictures (p = 0.0018). Ki-67, cyclin D1, and p16 expression were not statistically significant (Table 1). The expression of p16, however, was only noted in pathologic LS samples.

Table 1.

Immunostain	Pathologic LS	Clinical LS	Non-LS Stricture	Control	P value
P53					0.0018
Negative	20 (16.9%)	0	4 (22.2%)	7 (26.9%)	
<1%	17 (14.4%)	4 (50%)	6 (33.3%)	10 (38.5%)	
<50%	54 (46.8%)	3 (37.5%)	6 (33.3%)	6 (23.1%)	
>50%	27 (22.9%)	1 (12.5%)	2 (11.1%)	3 (11.5%)	
Ki-67					0.2416
Negative	10 (8.5%)	2 (25%)	0	3 (11.5%)	
<1%	8 (6.8%)	0	2 (11.1%)	2 (7.7%)	
1-10%	24 (20.3%)	2 (25%)	4 (22.2%)	6 (23.1%)	
10-25%	46 (39.0%)	3 (37.5%)	11 (61.1%)	12 (46.2%)	
25-50%	29 (24.6%)	1 (12.5%)	1 (5.6%)	2 (7.7%)	
>50%	1 (0.8%)	0	0	1 (3.8%)	
Cyclin D1					0.919
Negative	21 (17.8%)	1 (12.5%)	3 (16.7%)	3 (11.5%)	
Positive	97 (82.2%)	7 (87.5%)	15 (83.3%)	23 (88.5%)	
P16					
Negative	110 (93.2%)	8 (100%)	18 (100%)	26 (100%)	0.5931
Positive	8 (6.8%)	0	0	0	

Conclusions: Urethral LS is more likely to express p53 compared to clinical LS and non-LS strictures. No difference in Ki-67 was observed among the three groups, which contrasts with increased expression previously reported in cutaneous and vulvar LS studies. Although p16 expression was not statistically significant, its expression was limited to pathological LS samples. Given that p16 is a surrogate marker for high-risk HPV infection, close clinical follow-up for patients with p16 positive LS USD is crucial to monitor for early squamous cell lesions. Molecular analysis of LS, and examination of early and late (or acute and chronic) phases of LS, will further elucidate potential mechanisms for pathologic transitions along the theoretical pathway from normal tissue to LS.

P8

Whole-genome Analysis of Papillary Kidney Cancer Finds Significant Non-Coding Alterations

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Introduction: Papillary renal cell carcinoma (pRCC) is the second most common subtype of renal cell carcinoma (RCC). Previous studies, focusing mostly on the protein-coding regions, have identified several key genomic alterations but have not found key driver mutations in a significant portion of pRCC. We carry out the first whole genome study of pRCC to discover triggering DNA changes explaining these cases.

Materials & Methods: We downloaded whole exome (WES) and whole genome sequencing (WGS) variation calls from 277 tumors included in the Cancer Genome Atlas (TCGA) data pRCC project. Copy number data, protein expression (RPPA), gene expression (RNA-seq), and methylation data was similarly obtained along with clinical and pathologic data. A prognostic *MET* polymorphism in clear cell RCC was evaluated (rs11762213) in the cohort. Evolutionary trees were generated based on mutation allele frequencies and structure variations. Structural variants and non-coding alterations were assessed in novel pipelines developed at Yale from WGS data.

Results: A total of 21 *MET* mutations were identified in the 277 patient cohort (7.6%), with the majority of cases identified in papillary type 1 histology and in the tyrosine kinase domain. We found 14 patients that carried one risk allele of rs11762213 (G>A). Among 96 type II pRCC, 7 patients carried the A allele (allele frequency of 3.7%). Cancer-specific mortality was significantly worse in type II patients carrying the A risk allele of rs11762213 (p = 0.034, Figure 1). We did not observe a statistically significant correlation of the rs11762213 polymorphism with MET RNA expression or c-MET pY1235 levels. (p > 0.1) We discovered several (6/35, 17.1%) potentially impactful noncoding mutations in the *MET* promoter and its first two introns perhaps responsible for an alternate transcript recently found to be a driver alteration. Non-coding mutations that were discovered included a potentially impactful long non-coding RNA (NEAT1) implicated in cancer. Moreover, the NEAT1 mutations were associated with increased expression and unfavorable outcome (Figure 2). We identified high-impact mutations in 6/35 (17.1%) within a 6.5kb region on chromosome 1 located upstream of ERRFI1 (ERBB Receptor Feedback Inhibitor 1), a negative regulator of EGFR family members.

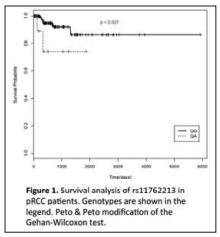

Figure 1. Survival analysis of rs11762213 in pRCC patients. Genotypes are shown in the legend. Peto & Peto modification of the Gehan-Wilcoxon test.

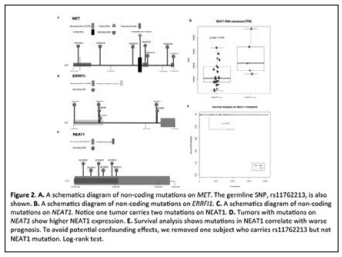

Figure 2. A. A schematics diagram of non-coding mutations on *MET*. The germline SNP, rs11762213, is also shown. **B.** A schematics diagram of non-coding mutations on *ERRFI1*. **C.** A schematics diagram of non-coding mutations on *NEAT2*. Notice one tumor carries two mutations on NEAT1. **D.** Tumors with mutations on *NEAT2* show higher NEAT1 expression. **E.** Survival analysis shows mutations in NEAT1 correlate with worse prognosis. To avoid potential confounding effects, we removed one subject who carries rs11762213 but not NEAT1 mutation. Log-rank test.

Conclusions: We elaborate on previous results on *MET*, discovering more somatic alternations and finding a germline SNP in this gene (rs11762213) that may impact survival for type II pRCC. Non-coding, intronic mutations were discovered including potentially impactful ones in regions associated with *MET* and NEAT1 implicated in cancer. Moreover, the NEAT1 mutations are associated with increased expression and unfavorable outcome. These critical mutations newly identified from scrutinizing the entire genome help complete our understanding of pRCC genomes. Our study provides valuable additional information to facilitate better tumor subtyping, risk stratification, and potentially clinical management.

P9

Urine Expression of TIMP-1, serpinB1 and seminogelin 2 may Differentiate Those Men with Low Risk or No Evidence of Prostate Cancer from Men with High Risk or Metastatic Disease

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Introduction: While serum PSA and other available diagnostic biomarkers can provide valuable guidance for assessing the risk of prostate cancer (PCa), limitations in accuracy persist. Novel biomarkers with improved performance characteristics are needed. Using mass spectrometry-based proteomics, we have identified three urinary proteins with significantly different expression patterns across PCa stages. This study evaluates the expression of these potential biomarkers in urine.

Materials & Methods: Urinary protein concentrations of three proteins, TIMP1, serpinB1, and semenogelin 2, were assessed via Western blot and ELISA for 160 total urine samples. Each patient group (control, Gleason 6 PCa, Gleason ≥ 8 PCa, and metastatic PCa) had 40 samples. Urine protein was isolated using Amicon Ultra-15 Centrifugal Filter Units for Western blotting. ELISAs were performed using untreated raw urine samples. Immunohistochemistry (IHC) was performed on prostate tissue sections for all three proteins of interest.

Results: TIMP1 levels were statistically higher in control and Gleason 6 PCa urine samples than for Gleason ≥ 8 and metastatic disease (2.19 ± 1.7 vs. 1.23 ± 1.13 ng/mL; p = 0.002). Expression of serpinB1 was significantly higher in men with Gleason 6 PCa than those with high-grade Gleason ≥ 8 PCa (0.71 ± 0.49 vs. 0.23 ± 0.33 ng/mL; p = 0.003). Metastatic PCa had significantly higher semenogelin2 concentrations in urine than healthy men (155.68 ± 74.3 vs. 81.55 ± 55.6 pg/mL; p = 0.02), and expression levels seem to rise with disease progression. IHC staining of tissue sections corroborated these findings.

Conclusions: Our results indicate differences in urinary concentrations of TIMP1, serpinB1, and semenogelin 2 across PCa stages. These novel biomarkers allowed distiction between men without prostate cancer or low-risk disease and those with high-risk or metastatic disease. These proteins represent potentially valuable non-invasive prostate cancer biomarkers and warrant further investigation.

P10

Protective Effects of Melittin on Renal Fibrosis in an Animal Model of Unilateral Ureteral Obstruction

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Introduction: Renal fibrosis is the principal pathological process underlying the progression of chronic kidney disease that leads to end-stage renal disease. Renal fibrosis is characterized by the infiltration of inflammatory cell, interstitial fibroblasts accumulation, proliferation of myofibroblasts, deposition of the extracellular matrix, and loss of renal tubule epithelial cells, which collectively lead to end-stage renal failure. Melittin is a major component of bee venom, and it has anti-bacterial, anti-viral, and anti-inflammatory properties in various cell types. Many studies have examined the biological and pharmacological activities of melittin. However, the precise mechanism of melittin in ameliorating the renal fibrosis is not fully understood. Therefore, this study examined the therapeutic effects of melittin on the progression of renal fibrosis using the unilateral ureteral obstruction (UUO) animal model. Furthermore, the effects of melittin on inflammation and fibrosis in renal fibroblast cells were explored using TGF-β1.

Materials & Methods: To investigate the therapeutic effects of melittin against unilateral UUO-induced renal fibrosis, melittin was given intraperitoneally after ureteral ligation. At seven days after UUO surgery, the kidney tissues were collected for protein analysis and histologic examination.

Results: Histological observation revealed that UUO induced a considerable increase in the number of infiltrated inflammatory cells. However, melittin treatment markedly reduced these reactions compared with untreated UUO mice. The expression protein levels of TNF-α and IL-1β were significantly reduced in melittin treated mice compared with UUO mice. In addition, treatment with melittin significantly inhibited TGF-β1 and fibronectin expression in UUO mice. Immunofluorescence staining shows that melittin treatment reduces α-SMA-positive cells in the kidneys after UUO. Besides, melittin effectively inhibited fibrosis-related gene expression in renal fibroblasts NRK-49F cells.

Conclusions: These findings suggest that melttin attenuates renal fibrosis and reduces inflammatory responses by suppression of multiple growth factor-mediated pro-fibrotic genes. In conclusion, melittin may be a useful therapeutic agent for the prevention of fibrosis that characterizes progression of chronic kidney disease.

P11

The Use of Prostate–Specific Antigen Velocity as a Screening Tool for Pre-Biopsy Detection of Prostate Cancer and Differentiation of High-Grade Disease in African American Men

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Introduction: The use of a singular prostate-specific antigen (PSA) value as a screening tool for prostate cancer (PCa) in African American men remains controversial. Meanwhile, African American men are at a higher risk for the development of PCa as compared to Caucasians. PSA velocity (PSAV) has been proposed as an alternative screening method, and has demonstrated statistical significance as a predictive model in African Americans, however, sample sizes have been limited. Here, we assess the use of pre-biopsy PSAV, to be used in conjunction with the current standard practice, for the detection of the presence of PCa in one African American population.

Materials & Methods: Demographic data including age, ethnicity, pre-biopsy PSA dates and values, and pathology results were collected from 578 men who underwent prostate biopsy at one institution between 2010-2014. Patients in this cohort were biopsied on the basis of suprathreshold PSA and/or abnormal DRE finding. Exclusion criteria included non-African American patients and patients with any pre-biopsy PSA value greater than 50 ng/mL. PSAV was calculated as the annualized difference in log PSA using the last two PSA values before biopsy. Logistic regression of the odds of having a positive biopsy was used to examine the addition of PSAV to the standard clinical model (age at biopsy, DRE history, and log PSA). Hazard ratio of PSAV was used to examine an association between PSAV and biopsy results, and ROC curves were developed to compare the impact of discrimination using area under the curve (AUC). These methods were repeated for patients with high-grade prostate cancer (HGPC) detection, defined as Gleason 8 or higher.

Results: PSAV improved the prediction of biopsy-proven prostate cancer (AUC 0.65 vs. 0.62, p = 0.026) in this African American population when combined with singular PSA values, age and DRE, as shown in Figure 1. PSAV reported as annualized difference in log PSA was 0.17 vs. 0.31 (p = 0.002) in the biopsy negative and biopsy positive cohorts, respectively. An additional unit increase in PSAV was associated with an 18% increase in the odds of the biopsy being positive for prostate cancer (multivariable p = 0.02). The HGPC model yielded similar results with hazard ratios of 1.16 for increasing PSAV (multivariable p = 0.05).

Conclusions: PSAV is a significant predictor of the presence of PCa, as well as HGPC, in African American men. In this population, clinicians should consider PSAV, in conjunction with the use of singular PSA values and DRE, when counseling patients regarding prostate cancer risk and the relevance of undergoing prostate biopsy. Future studies should aim to further stratify these results on the basis of Gleason score to establish specific guidelines.

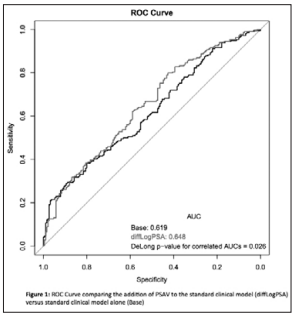

Figure 1: ROC Curve comparing the addition of PSAV to the standard clinical model (diff(LogPSA) versus standard clinical model alone (base)

P12

Leveraging Big Data to Study Bladder Cancer Care

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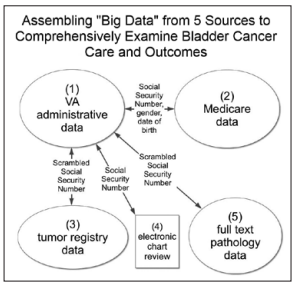
Introduction: Despite the high prevalence of bladder cancer, research on optimal bladder cancer care is limited. One way to advance observational research on care is to use linked data from multiple sources. Such "big data" research can provide real-world details of care and outcomes across a large number of patients. We assembled such data including (1) administrative data from the Department of Veterans Affairs (VA), (2) Medicare claims, (3) data abstracted by tumor registrars, (4) data abstracted via chart review from the national electronic health record, and (5) full text pathology reports. Based on these combined data, we validated the use of administrative data to identify newly diagnosed bladder cancer patients who received care in the VA.

Materials & Methods: We used administrative data to identify patients with newly diagnosed bladder cancer between 2005 and 2011 who received care in the VA. To validate these data, we first compared the diagnosis date from the administrative data to that from the tumor registry (gold standard). Second, we measured accuracy of identifying bladder cancer care in VA administrative data, using a random chart review (n = 100) as gold standard. Lastly, we compared the proportion of patients who received bladder cancer care in VA among those who did versus did not have full text bladder pathology reports available, expecting that those with reports are significantly more likely to receive care in VA.

Results: Out of 26,675 patients, 11,323 (42%) had tumor registry data available. 90% of these patients had a difference ≤ 90 days between the diagnosis dates from administrative and registry data. When comparing administrative data to chart review, 58 out of 59 patients who received bladder cancer care in VA were correctly identified (accuracy 95%, sensitivity 98%, specificity 90%). As expected, receipt of bladder cancer care in VA was substantially more common among those who had bladder pathology reports available versus those who had not (96% vs. 43%, $p < 0.001$).

Conclusions: We successfully combined administrative data with tumor registry, electronic health record, and pathology data (Figure) and validated the resultant data set. This validated data set will now make it possible to better understand how bladder cancer care is currently provided and how intensity of care impacts outcomes such as tumor recurrence and progression.



P13

The Association of Age with Perioperative Morbidity and Mortality among Patients Undergoing Radi cal Cystectomy or Partial Nephrectomy

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Introduction: Bladder cancer affects a predominantly elderly population, for whom radical cystectomy (RC) remains the standard of care in the management of muscle-invasive disease. However, RC is underutilized in the elderly, despite limited data to suggest inferior perioperative outcomes compared to younger patients. We therefore examined the association of age with perioperative complications, hospital readmission, reoperation, and 30-day mortality among patients undergoing RC.

Materials & Methods: We identified 7,625 adult patients aged 18-90 years who underwent RC from 2010-2015 in the National Surgical Quality Improvement Program (NSQIP) database. Thirty-day complications and perioperative outcomes were assessed using a standardized protocol as part of the NSQIP. The associations of age with 30-day complications and perioperative outcomes were evaluated using logistic regression, adjusted for patient features.

Results: Age at surgery was distributed as follows: < 60 years in 1,652 (21.7%) patients, 60-69 years in 2,282 (29.9%) patients, 70-79 years in 2,701 (35.4%) patients, and 80-89 years in 990 (13%) patients. Median operative time was 336 (IQR 259, 423) minutes. There were statistically significant differences in several baseline characteristics across age strata, with higher American Society of Anesthesiology (ASA) class and greater prevalence of diabetes, chronic obstructive pulmonary disease, and hypertension among older patients. Overall, 30-day complications occurred in 2,433 (31.9%) patients, and median time to first complication was 11 (IQR 6, 17) days. On multivariable analysis, patients aged 70-79 and 80-89 were found to have increased risk of blood transfusion ($p < 0.01$), and 30-day mortality ($p < 0.01$) (Table).

Conclusions: Among patients undergoing RC, while increasing age is independently associated with an increased risk of 30-day mortality and perioperative blood transfusion, though not 30-day complications, hospital readmission, or reoperation. These results suggest that patients over age 70 should be carefully counseled on the risks and benefits of proceeding with RC.

Table. Multivariable analysis of the association of age with perioperative outcomes among patients undergoing radical cystectomy. Models adjusted for year of surgery, race, ASA class, smoking status, functional status, steroid use, operative time, and presence of the following comorbidities: chronic obstructive pulmonary disease, congestive heart failure, hypertension, diabetes, renal failure, and bleeding disorder.

Endpoint	Age (years)	OR (95% CI)	p
Any Complication	< 60	--	--
	60 -69	0.84(0.73, 0.97)	0.02
	70-79	1.01 (0.87, 1.16)	0.93
	80-89	0.95 (0.79, 1.14)	0.58
Blood Transfusion	< 60	--	--
	60 -69	1.10 (0.95, 1.26)	0.19
	70-79	1.34 (1.16, 1.54)	<0.01
	80-89	1.60 (1.34, 1.91)	<0.01
Readmission	< 60	--	--
	60 -69	0.94 (0.79, 1.12)	0.48
	70-79	0.88 (0.74, 1.06)	0.17
	80-89	0.98 (0.78, 1.23)	0.83
Reoperation*	< 60	--	--
	60 -69	0.96 (0.72, 1.29)	0.79
	70-79	0.95 (0.70, 1.29)	0.71
	80-89	0.71 (0.47, 1.09)	0.12
30-day mortality*	< 60	--	--
	60 -69	1.50 (0.85, 2.64)	0.17
	70-79	2.53 (1.47, 4.35)	<0.01
	80-89	4.28 (2.38, 7.71)	<0.01

*ASA class 1 and 2 combined on multivariate analysis due to small number of events

P14

Androgenic to Estrogenic Switch in Human Adult Prostate Gland as a Result of Epigenetic Silencing of Steroid 5-alpha Reductase 2

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Introduction: The steroid 5-α reductase type 2 (SRD5A2) is critical for prostatic development and growth. Strategies to block SRD5A2 using 5-alpha reductase inhibitors (5ARI) remain a mainstay in the treatment of benign prostatic hyperplasia (BPH). However, one-third of men are resistant to 5ARI therapies. We previously showed that expression of SRD5A2 is not static, since epigenetic modulations by DNA methyltransferase and pro-inflammatory cytokines somatically silence SRD5A2 during adulthood. Here we wished to identify whether absence of prostatic SRD5A2, when androgenic pathways are blocked, leads to modification of alternate hormonal pathways.

Materials & Methods: Prostatic samples were obtained from patients with symptomatic BPH undergoing transurethral resection of prostate (TURP) surgery. Prostatic protein expression of SRD5A2, androgen receptor (AR), estrogen receptor (ER) subunits, and aromatase were determined by Western blot, immunohistochemistry (IHC), and ELISA assays. Prostatic levels of testosterone (T), dihydrotestosterone (DHT), estradiol (E) were measured by HPLC-MS. In *in vitro* study, primary prostatic stroma cells and epithelial cells BPE and BPH-1 were cultured and treated with TNF-α, and the expression of aromatase were determined by qPCR and ELISA.

Results: In prostate specimens that were methylated at the SRD5A2 promoter locus, estrogen response genes are among the most significantly upregulated genes in prostate samples that are methylated at the SRD5A2 promoter locus. The levels of T, E and aromatase were significantly upregulated, while DHT was significantly decreased. The ratio of T/E was significantly lower. DHT was inversely correlated with T levels, and aromatase was negatively correlated with DHT. Absence of SRD5A2 significantly upregulated the phosphorylation of ERα (pERα), but did not significantly affect the levels of total ERα, total ERβ or pERβ. In primary prostatic stromal cells, the aromatase levels were significantly increased with TNF-α treatment alone or when expression of SRD5A2 was suppressed by siRNA transfection. Treatment of prostatic epithelial BPH-1 cells with TNF-α did not change the androgenic or estrogenic signalling, but the aromatase levels in stromal cells were significantly upregulated when treated with TNF-α and cultured in BPH-1 conditioned media.

Conclusions: Our study demonstrates for the first time that there is an androgenic to estrogenic switch when SRD5A2 is absent in the prostate gland. Somatic epigenetic silencing of SRD5A2 changes the prostatic hormonal milieu, and may modulate prostatic homeostasis and growth. ER modifiers may prove to be better therapeutic options in carefully selected patients who lack SRD5A2 expression for management of prostatic diseases.

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P15

Survival Outcomes for Patients with Localized Upper Tract Urothelial Carcinoma Managed with Watchful Waiting

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Introduction: Often individuals with upper tract urothelial carcinoma (UTUC) are elderly and have comorbidities and may not be candidates for surgical intervention. Currently the outcome with "watchful waiting" in this population is unknown.

Materials & Methods: We utilized the Surveillance, Epidemiology, and End Results (SEER) database to identify individuals with a localized, histologically confirmed kidney/renal pelvis and ureteral urothelial carcinoma. Cases were excluded if surgical status or survival were unknown. Survival analysis using the Kaplan Meier method was performed between groups based on surgical status and tumor grade. A competing risk model was used to evaluate the cumulative incidence of cancer specific mortality (CSM) and predictors of CSM.

Results: There were 8,328 patients included, and 657 (7.9%) did not receive surgery. Patients without surgery were older (median age, 79 vs. 71 p< 0.001) and had smaller tumors (mean size, 2.9 cm vs. 3.5 cm, p < 0.001). The 3-year disease-specific survival (DSS) for patients without surgery was significantly lower compared to those with surgery, (70.8% vs. 90.4%, respectively, p < 0.001). 2-year DSS for patients with high grade tumors was worse than for low grade tumors (65.0% vs. 84.8%, respectively, p < 0.0001). The 5-year cumulative CSM was 58% overall and on multivariable analysis, older age (Hazard ratio (HR), 1.039 p < 0.001) and high tumor grade (HR 2.03, p < 0.0001) were predictors of worse outcome.

Conclusions: A significant number of patients are offered a "watchful waiting approach" for UTUC. These patients are older with smaller disease burden. CSM is over 50% at 5 years. Older age and high grade disease portend worse prognosis.

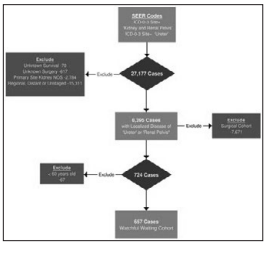

Figure 1

34

Regional Variation in Diagnostic Testing for Overactive Bladder in the Female Medicare Population

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Dartmouth Hitchcock Medical Center, Lebanon, NH

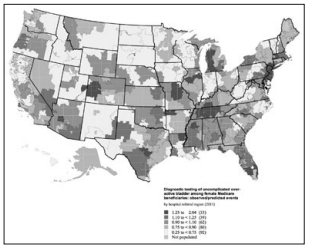
Introduction: Overactive bladder (OAB) remains a common urologic ailment with direct healthcare costs now exceeding billions annually.[1] The American Urology Association (AUA) released the non-neurogenic OAB guideline in 2012 and amended the treatment section in 2014 in order to guide the diagnosis and management of this costly ailment. Per the guidelines, OAB is a clinical diagnosis requiring only a careful history, physical exam, and urinalysis. Further, additional work-up including post-void residual, urodynamics, cytology, and cystoscopy are not necessary in the otherwise uncomplicated patient.[2] The purpose of this study is to determine rates of potentially unnecessary diagnostic testing in patients carrying an OAB diagnosis before and after the OAB guidelines publication.

Materials & Methods: Using the Dartmouth Institute's Atlas Rate Generator exploring a 100% Medicare claims data sample, we identified females with a diagnosis of OAB by ICD-9 codes within 306 hospital referral regions (HRR). The sample includes patients seen by any provider who makes the diagnosis of OAB. Rates of diagnostic tests within HRR were compared to the national average adjusted by age and race. We excluded those beneficiaries who had a CPT code for a third line treatment of OAB.

Results: The national average rate for potentially unnecessary diagnostic procedures performed on patients with OAB was 41% (163,919/399,004) in 2011, and only slightly decreased to 38.2% (169,706/443,512) in 2014. Comparing HRRs to the national rate, use of diagnostic procedures demonstrated almost 8-fold variation even after controlling for age and race for both years (Figure 1, 2). In 2011 the lowest rate was identified in Minot, ND (0.260) and the highest in Fort Myers, FL (2.036). By 2014, following the widespread dissemination of the AUA guidelines, the lowest rate was identified in Rapid City, SD (0.304) and the highest again in Fort Myers, FL (2.37). Rates of additional procedures were typically highest in the southeast for both years.

Conclusions: There is significant regional variation in the work up of OAB. Interestingly, the rates of diagnostic testing did not appear to change significantly after the publication of the AUA OAB guidelines. Further research is needed to identify how much of this diagnostic testing is inappropriate in order to decrease healthcare costs. Additionally more research is needed to explore the relationship of diagnostic testing to management outcomes.

1. Ganz ML et al. Economic costs of overactive bladder in the United States. *Urology*. 2010 Mar;75(3):526-532.
2. Gormley EA. Diagnosis and treatment of overactive bladder (non-neurogenic) in adults: AUA/SUFU guideline et al American Urological Association; Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction. *J Urol*. 2012 Dec;188(6 Suppl):2455-63.



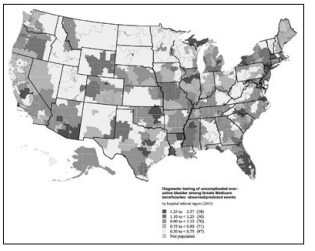
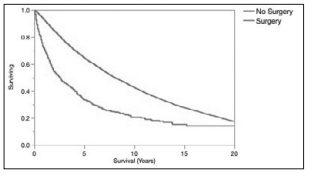


Figure 2



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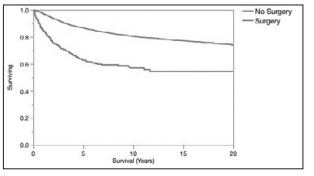

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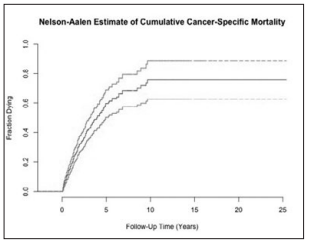

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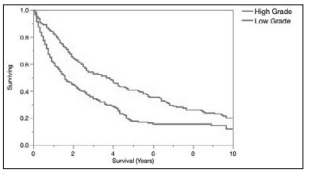

35

Predictors of Macroplastique Success in the Treatment of Incontinent Women

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Introduction: Urethral bulking procedures are commonly performed, both as a primary treatment to address stress urinary incontinence (SUI) in women and as a salvage treatment following failure of other solutions. Success rates vary among patients and little is known about what patient characteristics are associated with bulking success or failure. The purpose of this study is to determine which factors serve as predictors of urethral bulking success in stress incontinent women.

Materials & Methods: This IRB approved retrospective chart review included 94 women with urinary incontinence treated with a Macroplastique® (Cogentix Medical Inc.) urethral bulking procedure between August 2013 and November 2016. All patients had completed an Incontinence Symptom Severity Index[1], a previously validated self-assessment survey of female urinary storage and voiding symptoms, before and after injection of Macroplastique®. Pre-procedural and post-procedural ISS questionnaire responses were used to evaluate the success of the urethral bulking procedure, particularly ISSQ3 and ISSQ4 as these questions focus upon SUI symptoms.

3. Do you experience leakage related to physical activity, coughing or sneezing? How much does this bother you?
4. Do you experience small amounts of urine leakage (drops)? How much does bother you?

Both questions were scored as 0 (no symptoms), 1 (mildly), 2 (moderately), 3 (greatly). Forty-four women were excluded, 3 because they are since deceased and 41 who had only pre-procedural or post-procedural questionnaire data recorded, leaving a cohort of 50 living women with both pre- and post-injection data. Of these 50, 30 of the women previously had mid-ureteral slings. We used a binomial test with exact method to assess whether there was a significant proportion of improvement in pre- to post-procedure scores. Additionally, we applied multivariate logistic model to analyze whether there were certain patient characteristics (age, BMI, smoking status, use of vaginal estrogen, history of hysterectomy, or the presence of mixed urinary incontinence) that may predict improvement or not with Macroplastqiue®.

Results: Of the cohort of 50 women, pre- and post- procedural ISSQ3 averages were 1.84 and 1.36, respectively. Average scores for ISSQ4 were 1.46 and 1.14, respectively. The overall improvement in ISSQ3 responses was significant (p=0.04), however there was no significant difference in ISSQ4 (p=0.13). Of the patient characteristics analyzed, vaginal estrogen use showed a significantly negative association with improvement of Q4, odds ratio of 0.10 (p=0.02, 95% CI 0.02, 0.69). No other patient characteristics were negatively or positively statistically significant predictors of improvement for either Q3 or Q4.

Conclusions: Our results show that Macroplastique® is overall an effective procedure in our population. However, no particular characteristics were shown to predict improvement other than vaginal estrogen use, which is negatively correlated with improvement in ISSQ4 responses alone. Our results validate the efficacy of the Macroplastique® injection procedure as management for SUI in this cohort and support its use in patients in whom other treatment options may not be possible.

[1] Twiss C, Triaca V, Anger J et al. Vaildating the Incontinence symptom severity index: a self-assessment instrument for voiding symptom severity in women. J Urol 2009;182:2384.

36

Factors Associated With Durability of Intravesical Botulinum Toxin A Injection

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Introduction: Patients suffering from overactive bladder (OAB) and neurogenic bladder (NB) without response to behavioral and pharmaceutical intervention may opt for botulinum toxin A injection or sacral nerve stimulation (SNS). Botulinum injections have shown success in treating OAB and NB urinary symptoms, but require repeat injections at an interval of 4-12 months. This study seeks to identify factors associated with the durability of this therapeutic effect.

Materials & Methods: Patients undergoing treatment for OAB and NB at Lahey Hospital and Medical Center between 2004 and 2016 were identified. Demographic, clinical and treatment data were extracted from patient charts. Patients were included if they had at least 1 botulinum injections. Time from initial to second botulinum injection was defined as therapeutic durability; time from initial injection to last clinic follow-up was defined and time to event analyses were employed: univariate analysis via log-rank method and multivariate Cox proportional hazards were used to identify associations with therapeutic durability. The multivariate Cox model comprised univariate factors with p values below 0.1 and a priori clinical variables. Significance was defined at the $\alpha = 0.05$ level.

Results: Of the available patients, 54 patients met inclusion criteria. Median time to repeat injection for those who had a second injection was 259 days. Kaplan-Meier survival estimated that 50% of patients required reinjection at 330 days. On univariate analysis, history of spinal cord injury ($p = 0.041$), prostate cancer ($p < 0.001$), history of stroke/CVA ($p = 0.037$), and history of UTI ($p = 0.013$) were significantly associated with lower therapeutic durability. On multivariate analysis, only prostate cancer (OR 50.2, 95% CI 2.95-854, $p = 0.0068$) and history of UTI (OR 4.11, 95% CI 1.10-15.3, $p = 0.035$) were associated with lower therapeutic durability.

Conclusions: Botulinum injection showed a median durability of roughly 9 months. Patients with prostate cancer or a history of UTI had a statistically significantly higher risk of lower durability of botulinum injection. Further study is warranted to identify further etiologic origins of these connections or elucidate other associated cofactors.

37

A Retrospective Analysis of Risk Factors for IPP Reservoir Entry into the Peritoneum after Posterior to Transversalis Fascia Placement

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Introduction: Placement of an inflatable penile prosthesis (IPP) is the most effective treatment modality for men with erectile dysfunction (ED) refractory to medical management. We have previously demonstrated a protocol for alternative IPP reservoir placement posterior to the abdominal wall musculature, which was shown to be a safe location with extremely low complication rates. This is in contrast to traditional placement in the retropubic space of Retzius, which can result in bowel, bladder and vascular injury. The aim of this study was to review our complications with IPP reservoir entry into the peritoneum after placement posterior to the abdominal wall musculature to further increase the safety of this approach.

Matrials & Methods: We retrospectively reviewed our patients with peritoneal entry of the reservoir after posterior to transversalis fascia (PTF) placement during virgin IPP cases performed by a single surgeon. Our goal was to assess common inherent patient and surgical factors that resulted in this complication in order to develop a management algorithm to prevent future occurrence during alternative reservoir placement. We reviewed preoperative patient health characteristics, history of prior pelvic surgery, intraoperative documentation, postoperative follow-up, complication presentation, and imaging for this group. Follow-up visit data was available for up to 24 months after surgery at regular intervals. We were further able to assess long-term outcomes from this complication, including resolution of peritoneal reservoir entry and eventual IPP replacement.

Results: Peritoneal reservoir entry was identified in two patients out of a total of 2,687. These patients had met the previous criteria. They were distinct in that they were noted to be thin (mean BMI 18.5) current or former smokers, without peritoneal surgical histories. Peritoneal entry was identified early after reservoir placement. Neither patient suffered bowel injury and both subsequently underwent successful reservoir removal and IPP replacement. Both are currently doing well with functional IPPs on follow-up.

Conclusions: PTF reservoir placement is a safe, simple and effective method of avoiding vascular and bladder injury during IPP implantation. Peritoneal entry of the reservoir occurs very rarely, and in our series occurred in two patients with distinct physical and pathological features. We recommend early identification of similar patients, with anterior to transversalis fascia placement to prevent peritoneal entry.

38

Fascia Lata Sling a Viable Alternative for Stress Incontinence

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Introduction: Urinary incontinence is a highly prevalent condition which impacts approximately 50% of women, many have a tress incontinent component, and 10% of these women report a significant impact on quality of life, and thus will undergo surgical treatment. The Synthetic Mid Urethral Sling has largely become the standard of care for surgical management of SUI and is currently favored given its minimal invasiveness and cure rate. Complications involving mesh erosion and extrusion have been reported creating a neo-population of mesh averse patients. In addition, it is unclear what the fate of the mesh sling will be in the future given fewer companies manufacturing the product. In the past, the autologous rectus fascial sling had originally been the gold standard and then later the alternative procedure to a mesh sling. We aim to suggest a similar but less invasive, highly successful, outpatient procedure using fascia lata, in the same or more complicated index SUI patient.

Materials & Methods: A retrospective chart review was done of 11 patients between 2013-2015 who underwent autologous fascia lata sling. Pre and Post UDI 6 and IIQ-7 surveys were completed. The overall costs were analyzed including use of intraoperative time, post-operative narcotic use, inpatient versus outpatient stay; and subjective and objective stress continence outcomes were analyzed.

Results: A total of 11 patients underwent fascia lata slings. The average age of patients in this series is 60 with an age range of 44-86. On post operative assessment 86 % of all patients had no SUI. Median change in UDI-6 was 18 to 6.5; and median change in IIIQ-7 was 21 to 2.5. A cost difference of approximately $1920 was appreciated, with mesh sling and autologous fascial sling costing more due to cost of the material and cost of hospital stay respectively. Few fascia lata patients required IV narcotics for pain control and most used minimal PO narcotics, patients who had a fascia lata sling without concomitant surgery were not admitted unless they had comorbid disease.

Conclusions: The Fascia Lata Sling is a viable clinical option with subjective and objective measures of success. Additionally, it is less morbid than the ARF Sling; and less costly than the PV sling with mesh. The Fascia Lata Sling should be considered in the mesh averse population seeking a less invasive surgery for SUI, as well as potentially those with multiple prior anti-incontinence procedures and/or prior abdominal surgery.

39

Transgender Sperm Cryopreservation: Trends and Findings in the Past Decade

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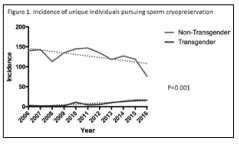
Introduction: Awareness and acceptance of transgenderism has increased in the last two decades. The 2001 World Professional Association for Transgender Health's Standards of Care advocates discussion of reproductive issues with transgender patients prior to initiation of hormonal therapy. To date, there is limited literature regarding the incidence and semen characteristics of transgender individuals banking sperm. We sought to assess transgender sperm cryopreservation compared to the non-transgender population in the last 10 years. We also compared semen parameters between the two populations. We hypothesized that there would be an increased incidence of transgender sperm cryopreservation over the last 10 years, corresponding to increasing awareness, and no difference in semen parameters between the two groups.

Materials & Methods: We performed a retrospective analysis of sperm cryopreservation performed at a single center from 2006 through 2016. We analyzed 194 transgender samples and 2327 non-transgender samples for a total of 84 unique transgender bankers and 1398 unique non-transgender bankers. Bankers who preserved multiple samples had the collective semen parameters averaged and the mean used for statistical analysis. Semen samples were analyzed according to WHO 4th and 5th edition guidelines based on year of sample production. Linear regression was used to compare the annual incidence of cryopreservation from 2006-2016 of transgender versus non-transgender. Semen parameters were compared using Student's T-test.

Results: The number of transgender individuals pursuing sperm cryopreservation increased relative to non-transgender individuals from 2006 to 2016. The trajectory of the two groups was significantly different (Figure 1, $p < 0.001$). There were no significant differences in ejaculatory volume, total sperm count, percent motility, or total motile sperm between the two groups.

Conclusions: This is the largest report to date on the incidence of transgender sperm cryopreservation and comparison of semen characteristics. The incidence of sperm cryopreservation by transgender individuals has increased in the last decade, paralleling the increase in awareness and acceptance, and may reflect increased discussion between transgender individuals and medical professionals. As expected, there were no significant differences in semen parameters.



41

Predictors of Nerve Stimulation Success in Patients with Overactive Bladder

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Introduction: Patients suffering from overactive bladder (OAB) without response to behavioral and pharmaceutical intervention may opt for third-line therapy with sacral nerve stimulation (SNS). SNS is performed in two stages, with a 'trial period' interceding initial lead placement and final device implantation. Patients with a successful trial as defined by a significant reduction in OAB symptoms have permanent implantation while unsuccessful trial leads to explant of the leads. Data predicting which patients will have a successful trial are limited. The present study examines patients undergoing SNS implantation to identify factors associated with successful SNS trial.

Materials & Methods: Patients undergoing treatment for OAB at Lahey Hospital and Medical Center between 2004 and 2016 were identified. Demographic, clinical and treatment data were extracted from patient charts. Univariate analyses were conducted to identify factors associated with SNS treatment success using chi-squared and t-test statistics as appropriate. A multivariate logistic regression model using the significant and a priori clinical factors to predict SNS treatment success was also created. Significance was defined at the $\alpha = 0.05$ level.

Results: Of 268 patients in the OAB database, 123 patients met inclusion criteria. Of these, 95 (77.2%) had treatment success. On univariate analysis, sex, prior diagnosis of prostate cancer, diagnosis of BPH, and lower volume at first urge during urodynamic study (UDS) were associated with an unsuccessful SNS trial (Table 1). On multivariate analysis using age, sex, prostate cancer, BPH, and volume at first urge as covariates, male gender (OR 0.145, 95% CI 0.0360-0.531) and lower volume at first urge on UDS (OR 0.982, 95% CI 0.967-0.995) were associated with unsuccessful SNS trial.

Conclusions: SNS is frequently successful at relieving OAB symptoms. Male patients and those with a lower volume at first urge on UDS are more likely to have an unsuccessful SNS trial. Patients in these groups should be counseled on the lower likelihood of SNS success. Further examination of factors associated with SNS from more diverse patient populations may aid in identification of other factors predictive of unsuccessful SNS trial.

TABLE 1: Univariate Associations with Unsuccessful SNS Trial

Factor	% successful	% unsuccessful	P value
Gender (female)	73.7	28.6	<0.001
Diabetes	22.1	25.0	0.9
Hypertension	54.7	42.9	0.4
Hyperlipidemia	55.8	46.4	0.5
MS	2.11	0	1
CP	1.05	0	1
Spinal Cord Injury	5.26	0	0.5
Peripheral Neuropathy	5.26	3.57	1
Epilepsy	4.21	7.14	0.9
History of UTI	6.32	7.14	1
History of TURP	3.16	7.14	0.7
Prostate Cancer	0	10.7	0.01
Atrophic Vaginitis	10.53	3.57	0.4
History of Hysterectomy	20.0	10.7	0.4
BPH	10.5	28.6	0.04
Erectile Dysfunction	10.5	10.7	1
Depression	40.0	21.4	0.1
Anxiety	14.7	14.3	1
Hypothyroidism	9.47	14.3	0.7
Fibromyalgia	3.16	0	0.8
Stroke/CVA	6.32	10.7	0.7
Fecal Incontinence	8.42	0	0.2
Constipation	13.7	7.14	0.5
IBS	11.6	0	0.1
Interstitial Cystitis	2.11	3.57	1
Antimuscarinic Use	24.2	35.7	0.3
Beta Agonist Use	8.42	7.14	1
Self-Catheterization	3.16	3.57	1

40

The Impact of the FDA Testosterone Supplementation Therapy Safety Advisory on Prescribing Patterns

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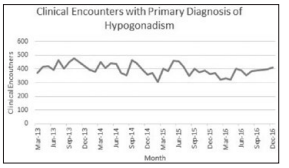
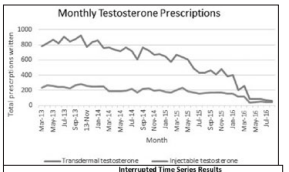
Introduction: On March 3, 2015 the Food and Drug Administration (FDA) released a safety advisory and prescription labeling change which warned of possible cardiovascular side effects of testosterone supplementation therapy (TST). We sought to investigate the effect of the warning on TST prescribing patterns in the Boston metro-area.

Materials & Methods: We utilized the Research Patient Data Registry, which is a de-identified clinical patient data repository pertaining to eight hospitals in the Boston metro area within Partners Healthcare. We queried the database for men age 45 to 84 years old who were prescribed TST with transdermal or injectable formulations from March 2013 until August 2016. A second query was performed of such patients to quantify the monthly instances in which during which primary diagnosis of hypogonadism was recorded (based on ICD9/10 codes). We three performed separate interrupted time series (ITS) analyses for each TST modality type and monthly visits for hypogonadism, all with respect to the March 2015 safety advisory. We calculated estimates of effect and relative effects for 1, 3, 6, 9, 12, 15, 16 months post-safety advisory. All data analyses were performed with SPSS v20. IRB approval was not necessary due to the de-identified nature of the data.

Results: The monthly prescription quantities and clinical encounters are demonstrated in Figures 1 and 2, respectively. The ITS analysis revealed the difference in slope coefficients between pre- and post-safety advisory was -26.5 ($p=0.000$) for transdermal formulations. The difference in coefficients was -7.5 ($p = 0.003$) for injectable formulations. However, the difference in coefficients for clinical encounters was -3.0 ($p = 0.260$). The monthly interval estimate of effect and the monthly interval relative effect on prescription (when compared to expected monthly prescription rates based on the pre-safety advisory coefficient) are listed in Table 1. Limitations of the study were the inability to distinguish between new and renewed prescriptions and the retrospective nature of the database.

Conclusions: While the monthly number of interactions resulting in a primary diagnosis of hypogonadism was unchanged, the amount of monthly prescriptions for both injectable and transdermal testosterone formulations decreased significantly following the FDA safety advisory.





Interrupted Time Series Results			
	Estimate of effect	Standard error	95% Confidence Index
Post 1-month Transdermal (TD)	-38.7	40.5	-120.8, 43.4
Post 3-months (TD)	-91.8	38.6	-170, -13.6
Post 6-months (TD)	-171.4	38.8	-250, -91.4
Post 9-months (TD)	-251.0	42.5	-337.1, -165.0
Post 12-months (TD)	-330.6	48.9	-429.7 to -231.5
Post 15-months (TD)	-410.2	57.1	-525.9 to -295.5
Post 16-months (TD)	-436.7	60.1	-314.9 to -558.5
Post 1-month injectable (INJ)	-7.0	22.5	-52.6, 38.6
Post 3-months (INJ)	-22.1	21.9	-66.5, 22.3
Post 6-months (INJ)	-44.7	22.8	-90.9, 1.5
Post 9-months (INJ)	-67.2	25.8	-14.9, 199.5
Post 12-months (INJ)	-89.8	30.2	-151, -28.6
Post 15-months (INJ)	-112.4	35.5	-184.3, -40.5
Post 16-months (INJ)	-119.9	37.4	-195.7, -44.1

42

The Efficacy of Durasphere as a New Agent for the Treatment of Hypermobile Glans

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Introduction: Despite proper sizing and placement of a penile implant, a subset of patients present postoperatively with glanular hypermobility. This is characterized by sensation of a soft glans penis, pain during intercourse associated with cylinder tip pressure, or the appearance of droopy glans with maximal inflation. Previous studies have discussed the use of PDE5 inhibitors and/or intraurethral alprostadil to treat the hypermobile glans. In this study we present our results of subcoronal Coloplast (Minneapolis, MN) Durasphere® injections as a surgical treatment for the hypermobile glans.

Materials & Methods: Durasphere is a safe, sterile bulking agent composed of carbon-coated zirconium beads suspended in a water based beta-glucan gel. It has long been used as a bulking agent in the treatment of urinary incontinence caused by intrinsic sphincter deficiency (ISD). This is a retrospective review of 17 patients who underwent glanular bulking with Durasphere by a single surgeon from 2014-16. Patient data were compiled after extensive review of operative reports, inpatient notes, consult notes, and follow-up visits.

Results: Seventeen patients underwent a total of 61 subcoronal Durasphere injections (mean 3.6, range 2-8). Twelve of these patients have been seen in follow-up on average 13.5 weeks (range 1-36) since their injections. All patients reported satisfaction with their treatment regimen, reduced or absent pain during intercourse, and subjectively improved appearance of their erect penis. No patients have reported any adverse events.

Conclusions: Durasphere has a safe and effective history in ISD treatment and our initial data suggests that similarly successful results are obtainable for glanular hypermobility treatment in experienced hands. We believe subcoronal Durasphere injections should be a viable option in the armamentarium of treatments for glanular hypermobility due to high patient satisfaction, ease of intervention, and low adverse events. Proper diagnosis requires expert evaluation to ensure that the penile implant is appropriately sized and positioned in order to rule out floppy glans syndrome and SST deformity. As opposed to glanular hypermobility, these conditions are caused by an undersized implant and require surgical revision.

43

Sexual Function in Men After Radical Cystoprostatectomy Differs in Men with Ileal Conduit Compared to Orthotropic Neobladder Urinary Diversion

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Introduction: Men with invasive bladder cancer requiring cystoprostatectomy may choose an orthotopic neobladder (ON) because of self image issues. Self image issues are intimately associated with sexual function. Choosing an ON must be weighed against the increased exposure to complications from complex surgery, and a realization that high-grade bladder cancer is associated with high morbidity and mortality. Are we really helping men by advising them to consider ON if post-op sexual function in these men is unrealistic?

Materials & Methods: 72 men from 2007 to 2016 treated with cystoprostatectomy or total exenteration for bladder cancer were identified. 50 men chose ileal conduit or colon conduit urinary diversion (IC). 22 men chose ON. Post-op complications and overall survival in both groups were retrospectively reviewed. Follow up analysis of sexual functioning in both groups was based on 1) whether interest in treatment for erectile dysfunction (ED) was described in clinic notes, 2) whether a prescription for PDE5 inhibitor medication had ever been prescribed, and 3) whether treatment was ever sought in a referral ED clinic at our institution.

Results: Mean follow up time was 49 months (range 6 to 121 months) for IC patients. Mean follow up time was 18 months (range 4 to 110 months) for ON patients. 38% of IC patients had a complication following surgery (12 Clavien-Dindo grade I, II; 5 grade IIIb; 2 grade IVa). 50% of ON patients had a complication following surgery (2 Clavien-Dindo grade II; 1 grade IIIa; 5 grade IIIb; 1 grade IVa; 2 grade V). 1/50 men in IC group expressed interest in ED treatment postoperatively (2%). 3/13 men in ON group were sexually active with spontaneous erections (with or without PDE5 inhibitors). 5/13 men in ON group sought care at ED clinic and were sexually active using either vacuum device, penile injection therapy, or following penile implant. 61% of men in ON group were sexually active.

Conclusions: Invasive bladder cancer has a high mortality. Cystoprostatectomy and urinary diversion can be associated with significant complications. These complications are increased in ON compared to IC urinary diversion groups. Sexual function appears to be important to men choosing ON. Men undergoing orthotopic neobladder urinary diversion are more likely to proceed with treatment options for sexual function then men undergoing ileal conduit urinary diversion.

44

Factors Affecting Dropout Rate in Patients Undergoing Percutaneous Tibial Nerve Stimulation

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Introduction: Percutaneous tibial nerve stimulation (PTNS) has shown to be an efficacious treatment for overactive bladder, with a standard initial therapy of 12 weekly sessions. Outside of clinical trials, no study to date has characterized compliance with treatment or the etiology of dropout. We sought to identify the common etiologies of dropout and correlate demographic variables with noncompliance.

Materials & Methods: All patients who underwent PTNS from January 2014 to November 2016 were identified by CPT code 64566. Patients who completed all 12 sessions were compared to those who did not. Multiple variables were tested for correlation with dropout, including age, BMI, gender, marital status, employment status, smoking status, distance from clinic, and patient perceived improvement.

Results: A total of 65 patients were identified. 66% (43/65) of patients completed all 12 sessions. Significant differences between those who did not complete 12 sessions versus those who did were found for smoking status ($p = 0.009$) and patient perceived improvement ($p = 0.008$). There was no significant difference between groups in age ($p = 0.48$), BMI ($p = 0.74$), gender ($p = 0.09$), marital status ($p = 0.37$), employment status ($p = 0.94$), or distance from clinic ($p = 0.15$). The patients who dropped out completed a median of 8 sessions (IQR 6-9). The most common reasons for dropout included perceived lack of efficacy (n = 5), required time commitment (n = 5), and other health problems (n = 4). In a multivariable regression model, smoking status ($p = 0.02$) and perceived improvement in symptoms ($p = 0.014$) remained significant predictors of completing all 12 sessions. After dropping out, 23% of patients subsequently underwent other third line overactive bladder therapies (5/23).

Conclusions: Not surprisingly, the most likely predictor of completing all standard initial sessions of PTNS is patient perceived improvement in symptoms. Additionally, smoking status appears to have a significant influence on completing all 12 sessions. The most common cited reasons for dropout are lack of efficacy and time commitment. More research is necessary to further delineate the causes of dropout in order to improve patient compliance.

Variable	Completed 12 Sessions (n=43)	Did not complete 12 sessions (n=22)	Significance (p-value)
Age, mean years (SD)	58.5 (15.9)	61.6 (16.5)	0.48
BMI, mean (SD)	29.7 (7.5)	30.4 (6.4)	0.74
Gender (female %)	79%	59%	0.09
Caucasian (%)	88%	77%	0.24
Current smoker (%)	5%	27%	0.01
Diabetic (%)	16%	9%	0.43
Employed (%)	38%	39%	0.94
Medicare (%)	42%	59%	0.19
Married (%)	65%	76%	0.37
Symptom Improvement (%)	91%	64%	0.01
Distance to clinic, miles (SD)	11.3 (8.3)	12.4 (12.0)	0.65

45

How Much is Just Right? An Evaluation of Post-Operative Opioid Prescribing for Urologic Procedures at a Single Institution

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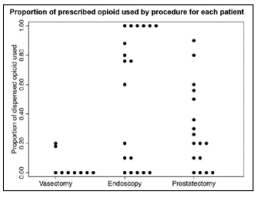
Introduction: Opioids prescribed at hospital discharge after a surgical procedure are a potential source of diversion and misuse. Given the increase in opioid abuse over the past decade, it is critical that surgical specialties, including urology, examine opioid prescribing practices to prevent over-prescribing. The optimal quantity of opioid medication prescribed at hospital discharge after urologic surgery has not been well defined. In this study, we summarize opioid prescription and use patterns among patients undergoing urologic procedures, including vasectomy, common endoscopic procedures, and robotic-assisted laparoscopic prostatectomy (RALP).

Materials & Methods: We recruited patients who underwent vasectomy, endoscopy, or RALP at a single institution between October 2016 and February 2017. The endoscopy group included patients who underwent cystoscopy with cystolithopaxy, ureteroscopy, lithotripsy, or stent placement. Reasons for exclusion included age under 18, underlying malignancy, bilateral procedure (except vasectomy), recent procedure on the same ureter within the past month, additional procedures such as ureteral biopsy, procedural complication, inability to communicate independently over telephone, and refusal to participate. Patients were called 5-7 days post-discharge and given a 26-item telephone survey inquiring about amount of opioid used, patient-perceived pain control, and discharge instructions. Opioid prescription details were confirmed using the electronic medical record with patient permission.

Results: A total of 57 patients (median age = 56) underwent either vasectomy (n = 10), endoscopy (n = 30), or RALP (n = 17) and met inclusionary criteria. Of the enrolled patients within each group, 90% of vasectomy, 67% of endoscopy, and 100% of RALP patients received an opioid prescription (total n = 49). The most commonly prescribed opioid was hydromorphone (54%), followed by oxycodone (26%) and hydrocodone (20%). The median MME prescribed were: 60 (vasectomy), 64 (endoscopy), and 160 (RALP). Median MME used for vasectomy, endoscopy, and RALP were 0, 27, and 32, respectively (Figure). Among the subset of patients who received an opioid prescription, 78% of vasectomy, 26% of endoscopy, and 24% of RALP patients did not use any of their prescription after discharge (Table and Figure). Only 13% of patients used their entire prescription and 3 patients (6.5%) called for a refill—all of whom were in the endoscopy group. Only 11% of patients prescribed an opioid reported that they had received instructions for safe drug disposal.

Conclusions: Most patients received opioids post-operatively and used less than half of their prescription. These results suggest that over-prescription of opioids is common after urologic procedures. Unfortunately, few patients reported receiving instructions for safe disposal of unused opioid. Further studies should determine optimal MME dosing by procedure and evaluate risk factors for higher opioid use post-operatively, especially among patients undergoing endoscopic procedures. In addition, efforts should be made to educate patients on safe opioid disposal.



Opioid prescription and use data based on procedure for patients prescribed opioids

Procedure	MME prescribed, median (range)	MME used, median (range)	Proportion using no opioid	Proportion calling for refill
Vasectomy (N=9)	60 (50-60)	0 (0-10)	78%	0%
Endoscopy (N=20)	64 (21-75)	27 (0-75)	26%	15%
RALP (N=17)	160 (120-160)	32 (0-144)	24%	0%

46

The Difficult Catheter Placement: Can we Protect Hospitalized Patients from Iatrogenic Catheter Injury and Reduce Unnecessary Urology Consults?

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Introduction: Foley catheterization is a necessary and sometimes life-saving procedure for many patients. Factors that lead to perceived difficult foley insertion by hospital staff may be related to patient co-morbidity, prior urologic history or lack of proper insertion technique. Here we examine factors common to patients whose catheters could not be inserted by hospital staff, or who were traumatically catheterized.

Materials & Methods: In a five month period, 52 patients were prospectively identified to have difficult catheter insertion defined as a request for urology consultation. Patient factors assessed included sex, age, BMI, and urologic history with particular attention to BPH, stricture, and/or prostate surgery in men. Non-patient factors assessed included consult reason, number of catheter attempts by staff, and presence of iatrogenic injury. A foley insertion score of 1-3 was assigned based on difficulty of insertion by a junior urology resident or urology PA with: 1-easy insertion, 2- difficult insertion, 3- highly difficult insertion with need for urologic interventions. Statistical analysis with Chi-square was used to characterize and compare the groups.

Results: 11 (21%) female and 41 (79%) male patients were identified. Average age was 73 years. 32/52 (62%) had foley score of 1. 20/52 (38%) had foley score of 2-3, which was significantly associated with male sex ($p = 0.02$), positive urologic history in men ($p = 0.0079$), stricture history ($p=0.0018$), and history of prostate surgery (0.02). There was no significant association between history of BPH and foley difficulty score ($p = 0.5$). In women, the most common reason for foley consult was perceived unusual external anatomy, though only 1/5 had unusual anatomy. Traumatic insertion was the reason for consultation in 6 cases with 2/6 requiring cystoscopic intervention. All traumas had BPH, and 50% of all BPH patients had trauma versus 1/27 (4%) of patients without BPH, $p = 0.0005$. Having urologic history was not associated with trauma ($p = 0.15$), nor was history of stricture ($p = 0.15$), or history of prostate surgery ($p = 0.5$). There was no difference in nursing catheterization attempts of easy insertions (24/32; 75%) versus difficult insertions (15/19; 79%).

Conclusions: Patients with truly difficult foley placement who warranted urologic consultation were men with history of stricture or prostate surgery or men with complex genital anatomy. Medical staff should be wary of this when attempting catheterizations on these patients, and urology consultation should not be delayed. Patients with easy insertions were typically female with perceived unusual external anatomy or limitations of body habitus. A number of unnecessary urology consults may be avoided by targeting education initiatives to address these issues. BPH was significantly associated with iatrogenic catheter injury though was not associated with ease of foley catheter insertion by urology. Additional educational initiatives should target proper foley insertion technique on BPH patients.

47

Using the Lean Model Decreases the Overuse of Perioperative Antibiotics During Endourologic Surgery

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Introduction: Overuse of antibiotics poses numerous health risks to patients, including potential allergic reactions, suppression of normal flora, and development of antibiotic resistant organisms. The AUA has prepared a Best Practice Policy Statement for antibiotic prophylaxis for urologic procedures. Within our institution, we sought to determine whether our Urologists practice evidence based antibiotic administration at the time of urologic surgery. Prophylactic antibiotics should be utilized for the duration of the procedure, with use not to exceed 24 hours. We anecdotally noted that many patients at our institution were receiving antibiotics for longer than 24 hours.

Materials & Methods: As part of an institutional quality initiative, we collected data on patients who underwent an endourological procedure in the operating room cystoscopy suite over a 2 week period of time. The physicians were blind to the data collection and were unaware of this project. Patients were excluded from the collection data if they had positive urine cultures on preoperative testing. All physicians using the cystoscopy suites were surveyed regarding their familiarity with the AUA Best Practice Policy Statement for prophylactic antibiotic administration. The survey results were analyzed to assess factors contributing to overuse of antibiotics. We used the lean management principles for healthcare to remove waste and improve overall outcomes. Lean methodology was used to identify reasons for overuse of perioperative antibiotics at our institution. Countermeasures were introduced to decrease the overuse of prophylactic antibiotics, including physician, patient, and nursing staff education. A copy of the AUA Best Practice Statements was placed in all charts for review. Postoperative nursing staff were educated about overuse of antibiotics and collected data to assess the duration of antibiotic prescribed for patients discharged home. Data was collected for 1 week after implementation of the countermeasures.

Results: Before interventions, 18/48 patients (37.5%) received prolonged durations of antibiotics. This was usually a 3 day course of antibiotics (most commonly fluoroquinolones) following a prophylactic dose of antibiotics at the time of surgery. Survey results showed that all physicians were aware of AUA recommendations for prophylaxis. However, only half of physicians followed the AUA recommendations for prophylactic antibiotic duration for less than 24 hours. After intervention and education, 1/20 (5%) of patients received a prolonged course of antibiotics.

Conclusions: Overuse of perioperative prophylactic antibiotics was common at our institution. Lean methodology was utilized to assess the reasons for overuse, and to design an intervention intended to decrease antibiotic overuse. The intervention consisting of education of physicians and nursing staff resulted in a decrease in antibiotic overuse. Future studies will include mid- and long-term follow-up to determine whether Urologists continue to adhere to the AUA Best Practice Policy Statement recommendation regarding perioperative antibiotic prescribing.

48

Prostate Cancer Screening in Early Medicaid Expansion States

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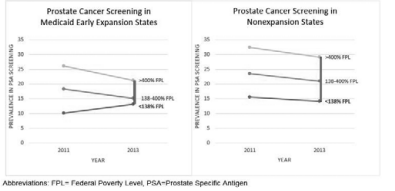
Introduction: The Affordable Care Act of 2010 included a provision to expand Medicaid for low-income individuals, and six states jurisdictions (CA, CT, DC, MN, NJ, WA) elected to expand Medicaid early, before the 2014 implementation. This study aimed to assess whether Medicaid early expansion and the accompanying improved healthcare coverage was associated with increased preventive care utilization, including prostate specific antigen (PSA)-based prostate cancer screening.

Materials & Methods: Data from the 2012 and 2014 Behavioral Risk Factor Surveillance System were used to determine prostate cancer screening rates in men who were aged 40-64, asymptomatic, without prostate cancer, and self-reported a PSA testing in the past 12 months. Sociodemographic and access to care variables were extracted, and income categories were stratified by relationship to Medicaid eligibility and federal poverty level (< 138%, 138-400%, > 400%). Unadjusted weighted PSA prevalence was estimated. After adjustment, multivariable logistic regression models evaluated the odds of PSA screening in early expansion versus non-expansion states. Interaction analyses were performed to determine effect of Medicaid expansion on screening, and sensitivity analysis excluding health access covariates (insurance, access to healthcare provider) was performed.

Results: Among 158,103 survey respondents, individuals in non-expansion states had the highest rates of screening. Nationally, screening decreased between 2011 and 2013 (Odds Ratio = 0.87, 95% Confidence Interval 0.83-0.91) regardless of expansion status. In early expansion states only, there was a 3% absolute increase in screening among men < 138% FPL that was associated with expansion status (Pinteraction = 0.04; Figure). Sensitivity analysis excluding health access variables demonstrated no significant changes. Increased screening in early expansion states was also seen in men who were aged 55-59 (+1.8%), non-Hispanic black (+1.7%) and Hispanic (+1.7%) races, previously married (+1.3%), not high school graduates (+1.7%), and current smokers (+2.1%).

Conclusions: Between 2011 and 2013 there were national declines in prostate cancer screening that have been well-studied in relation to the US Preventive Services Task Force 2012 recommendation against screening. However, PSA screening increased among low-income residents of Medicaid early expansion states, particularly among Hispanic and non-Hispanic black males. This increase may have been attributable to improved access to preventive services among populations with historic barriers to care, as reflected by the significant narrowing of the gap in PSA screening between high- and low-income populations in Medicaid early expansion states. Future research is needed to examine whether Medicaid expansion is associated with changes in additional cancer metrics—e.g. time to diagnosis, time to treatment, morbidity and mortality outcomes— particularly given the uncertain benefit of PSA screening in the broad population.

Figure: Unadjusted PSA Screening by Medicaid Early Expansion Status and Income, Behavioral Risk Factors Surveillance Systems, 2012 and 2014[a]



Abbreviations: FPL= Federal Poverty Level, PSA=Prostate Specific Antigen

Bold denotes statistically significant findings with p<0.05. P values were derived from multivariate interaction analysis testing significance of the relationship between year, Medicaid early expansion status, and income (as %FPL), controlling for these factors as well as race/ ethnicity, marital status, insurance status, smoking status, educational attainment, and access to healthcare provider. P values for each income category are as follows: >400% FPL, p=0.13; 138%-400% FPL, p=0.48; <138% FPL, $p_{interaction}$=0.04

* BRFSS survey responses correspond to the prior year's healthcare behaviors.

49

Nation-Wide Utilization of Chemoprophylaxis for the Prevention of VTE in Radical Cystectomy: How Well Do Urologists Follow the Guidelines?

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Introduction: Venous Thromboembolism (VTE), which comprises deep venous thrombosis (DVT) and pulmonary embolism (PE) is a major preventable source of morbidity and mortality for patients undergoing radical cystectomy. In an effort to decrease the incidence of VTE in patients undergoing urologic surgery, the American Urologic Association (AUA) published guideline in 2008 recommending best practices for the prevention of VTEs in patients undergoing urologic surgery. The guidelines recommend using chemoprophylaxis in patients who are at least at moderate risk unless there is a contraindication to the use of such agents, for which unequivocally all patients undergoing radical cystectomy qualify. We performed a population-based analysis to determine the utilization of chemoprophylaxis and the various factors which contributed to an increased likelihood of physicians not providing prophylaxis.

Materials & Methods: A population-based analysis was performed using the Perspective Database (Premier, Inc, Charlotte, NC), a dataset capturing inpatient billing records for over 400 hospitals in the United States. Our study cohort included all adult patients who underwent radical cystectomy between 2006 and 2015. Patients were identified as having undergone a radical cystectomy for a cancer diagnosis by capturing ICD-9-CM codes. Patients who received chemoprophylaxis were identified by specific hospital charge billing descriptions, including the hospital days for which they received the chemoprophylaxis. Those patients who received chemoprophylaxis for at least 80% of their hospital stay were deemed to have received appropriate chemoprophylaxis. Drawing from a 51,976 patient sample, descriptive statistics and multivariate analysis were performed adjusting for sampling weights.

Results: Utilization rate of appropriate VTE chemoprophylaxis differed by a number of patient characteristics (fig. 1). Appropriate use of chemoprophylaxis was only administered to 31.31% of the cohort on aggregate, although a 34.16 percentage point increase was noted over the study period, with a maximum rate of utilization at 52.02%. Patients with a higher charlson comorbidity index score, increasing age, and rural hospital locations, commercial insurance and an earlier year of surgery were all associated with increased likelihood of not received chemoprophylaxis (fig. 3). Patients who received appropriate VTE chemoprophylaxis compared to those who did not had higher rates of VTE, DVT, PE, length of hospital stay and lower 90 day hospital costs (fig. 2).

Conclusions: We found limited use of chemoprophylaxis in a contemporary series of patients undergoing radical cystectomy, with a large increase in utilization over the study period. Greater compliance may be associated with a decreased risk for VTE, length of hospital stay and overall lower cost of patient care in patients undergoing radical cystectomy.

Figure 1. Demographics. No. (%). Appropriate PPx = > 80% of LOS (Max ppx) 2006-2015

Characteristics	Total (n=51,976)	Appropriate Ppx(n=16,272)
Duration of Ppx	0.1 (0.25)	0.93 (0.23)
Anticoagulation Type		
Heparin	18,602 (35.79)	
Lovenox	16,392 (31.54)	
Charlson CI		
0	20,564 (39.56)	6,482 (31.52)
1	14,032 (27.00)	4,363 (31.09)
>=2	17,380 (33.44)	5,427 (31.23)
Age		
<55	4,320 (8.31)	1,472 (34.09)
>=55-64	10,831 (20.84)	3,538 (32.66)
>=65-74	19,305 (37.14)	5,986 (31.01)
>=75	17,519 (33.71)	5,276 (30.12)
Gender		
Female	8,176 (15.73)	2,508 (30.68)
Male	43,800 (84.27)	13,754 (31.42)
Race		
Black	2,460 (4.73)	788 (32.03)
Hispanic	405 (0.78)	80 (19.75)
White	41,699 (80.23)	13,236 (31.74)
Other	7,412 (14.26)	2,169 (29.26)
Payer		
Commercial	12,754 (24.54)	3,977 (31.18)
Medicaid	1,884 (3.62)	752 (39.94)
Medicare	34,937 (67.22)	10,784 (30.87)
Other	2,400 (4.62)	759 (31.64)
Geography		
Midwest	10,495(20.19)	3,261 (31.07)
Northeast	8,962 (17.24)	4,700 (52.45)
South	21,451 (41.27)	6,102 (28.44)
West	11,068 (21.29)	2,210 (19.97)
Teaching Status		
No	32,913 (63.32)	9,036 (27.45)
Yes	19,063 (36.68)	7,237 (37.96)
Beds		
<300	13,620 (26.20)	4,026 (29.56)
>=300-500	19,612 (37.73)	5,113 (26.07)
>=500	18,744 (36.06)	7,134 (38.06)
Pop. Density		
Rural	1,504 (2.89)	317 (21.06)
Urban	50,472 (97.11)	15,956 (31.61)
Year		
2006-2010	29,092 (55.97)	6,789 (23.34)
2010-2015	22,884 (44.03)	9,483 (41.44)

Figure 2: Outcomes - 2006-2015

Thromboembolism - 90 day	Total (n=51,976)	No Appropriate Ppx(n=33,340)	AppropriatePpx (n=18,636)
VTE	2,862(5.51)	2046(5.73)	816(5.01)
DVT	1992 (3.83)	1320 (3.96)	672 (3.61)
PE	1423 (2.74)	967 (2.90)	457 (2.45)
Bleeding	5283 (10.16)	3,710(10.39)	1,573 (9.66)
LOS	11.92(18.43)	12.02(19.56)	11.70(16.02)
Any Readmission	8,979(17.28)	5,906(16.54)	3,073(18.88)
# Readmissions	0.21 (1.22)	0.21 (1.21)	0.24 (1.26)
90 day cost	34,351.10(71,976.40)	33,893.60(75,842.42)	35,169.50(65,477.85)

Figure 3: Multivariate Model Predicting Likelihood of NOT Receiving Appropriate Ppx. in Patients Undergoing Cystectomy 2006-2015

Characteristics	OR (95% CI)	P-value
Charlson CI		
0	1 (reference)	-
1	1.02 (0.97-1.07)	0.63
>=2	1.06 (1.01-1.11)	0.02*
Age		
<55	1 (reference)	-
>=55-64	1.13 (1.04-1.22)	0.68
>=65-74	1.19 (1.10-1.30)	0.04*
>=75	1.26 (1.15-1.38)	<.0001*
Gender		
Female	1 (reference)	-
Male	0.98 (0.93-	0.51
	1.04)	
Race		
White	1 (reference)	-
Black	1.05 (0.96-1.15)	0.62
Hispanic	1.19 (0.93-1.54)	0.28
Other	1.06 (1.00-1.13)	0.79
Payer		
Medicare	1 (reference)	-
Medicaid	0.87 (0.78-0.98)	0.04*
Commercial	1.044 (0.98-1.11)	<.0001*
Other	0.89 (0.80-0.99)	0.08
Geography		
Midwest	1 (reference)	-
Northeast	0.40 (0.38-0.43)	0.04*
South	1.26 (1.19-1.32)	<.0001*
West	1.89 (1.77-2.01)	<.0001*
Teaching Status		
No	1 (reference)	-
Yes	0.96 (0.92-1.00)	0.07
Pop. Density		
Rural	1 (reference)	-
Urban	0.51 (0.45-0.58)	<.0001*
Year		
2006-2010	1 (reference)	-
2010-2015	0.40 (0.38-0.42)	<.0001*

50

Simulation in Urology Residency: Teaching Technique, Clinical Reasoning and Medical Knowledge in Urinary Incontinence

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Introduction: We identified lower than expected performance by urology residents in urologic incontinence on standardized national in-service examinations and devised an intervention to improve their knowledge through surgical simulation. Surgical simulation as an education intervention has been used to improve trainee performance of technical skills while didactic lecture focus on core knowledge. We used a highly structured and faculty-facilitated session of didactic lecture, hands on simulation and problem base learning to improve resident technique, clinical reasoning and medical knowledge in the field of urinary incontinence management. We hypothesized that surgical simulation training as an educational intervention would improve urology resident's clinical reasoning and medical knowledge and technical skills in urinary incontinence as assessed by a pre and post intervention assessment and direct observation.

Materials & Methods: We devised a 3.5 hour educational intervention consisting of a 20 minute pre intervention multiple choice assessment test; a 60 minute didactic lecture on clinical diagnosis of incontinence, overactive bladder and stress urinary incontinence; 2 hours of rotating surgical simulation sessions guided by facilitators with paired trainees attending hands on stations in urethral sling placement, sacral nerve stimulator placement, intravesical botox injection, intraurethral bulking agent injection and urodynamics interpretation; followed by a 20 minute post intervention multiple choice assessment test. 6 facilitators guided 8 trainees thru the training in September 2016. Endpoints assessed were pre and post intervention assessment examination aggregate resident scores, pre (2016) and post (2017) intervention American Urologic Association In-service Examination results, direct observation of trainee performance by facilitator, and trainee evaluations of the educational intervention.

Results: Pre and post intervention aggregate assessment scores (n=8) were 49.8% and 78.5% respectively, demonstrating a 31.3% improvement in short term core knowledge acquisition. Pre and post intervention aggregate American Urologic Association in-service examination in the subcategory of neurogenic bladder, voiding dysfunction, incontinence were 64% and 66% respectively. Trainee evaluations showed 75% rated the objectives, instruction, facilities and design of the curriculum to be excellent.

Conclusions: Surgical Simulation as an educational intervention to improve medical knowledge and technical skills in urinary incontinence was successful. Short term medical knowledge assessments improved significantly with the training and trainees had a very favorable evaluation of the multiple educational methods that included didactic lecture, hands on simulation and problem base learning. Long term retention of knowledge was harder to demonstrate. Future directions include expanding this format to other areas of urologic training, further developing the competency of the faculty facilitators and refining the assessment tools to measure improvement in trainee's competencies.

51

Breaking Through: Elizabeth Ann Gormley and a History of Firsts for Women in Urology

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Introduction: Since Dr. Mary Louise Gannon became the first female member of the AUA in 1975, women have ascended the ranks and offices of American urology. To date, however, there have yet to be women at one of the highest levels of leadership: the AUA Board of Directors. In 2017, Dr. E. Ann Gormley breaks through this milestone in the storied history of women in urology.

Materials & Methods: Archival research at the AUA, New England Section of the AUA, and Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction (SUFU); review of her contributions to the scientific literature; and her colleagues' narrative accounts.

Results: Dr. Gormley was raised in Saskatchewan, Canada, and earned her medical degree at the University of Saskatchewan. She completed urology residency at the University of Alberta. But it was her fellowship in female urology with Dr. Edward McGuire that ignited her research career on urethral slings. As steering committee chair of the Urinary Incontinence Treatment Network, Dr. Gormley oversaw the landmark Trial of Mid-Urethral Slings and Value of Urodynamic Evaluation trials, both published in the *New England Journal of Medicine*. In 2008, she became the first woman to serve as SUFU president. Dr. Gormley has also achieved a distinguished career as an educator. She joined the faculty at Dartmouth in 1993 and has been residency program director since 2001. A vocal advocate for trainees, she is a past president of the Society of Urology Chairpersons and Program Directors and was named to the Accreditation Council for Graduate Medical Education (ACGME) Residency Review Committee for urology in 2013, now serving as vice-chair. In 2015, for her sustained contributions to resident education, she was honored by the ACGME as one of the nation's 10 most outstanding program directors. Finally, Dr. Gormley has been a passionate leader in the AUA, having served on its Exam Committee, Nominating Committee, and Bylaws Committee. She was a panel member for the AUA stress urinary incontinence guideline and chaired the AUA/SUFU overactive bladder guideline. After six years as New England Section secretary and then vice president, Dr. Gormley ascended to the presidency in 2013, becoming the first woman to lead the New England Section. After a quarter-century of service to the AUA and the specialty, she was elected by her mentors and colleagues to the AUA Board of Directors.

Conclusions: Dr. Gormley has charted a career of "firsts," continuing to the present. In 2017, she becomes the first woman to serve on the AUA Board of Directors in the 115-year history of the AUA.

52

A Study of Resident Sleep Patterns in Relation to Volume and Category of Overnight Pages in a Home Call System

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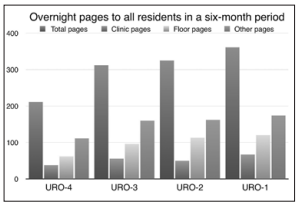
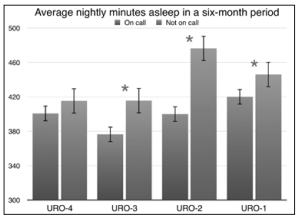
Introduction: Mitigating resident fatigue is central to the design and implementation of residency programs, especially when using a home call system. Existing studies of resident sleep habits and fatigue are mostly limited to in-house call and rely on self-reporting. We quantified time spent asleep for residents in a home call system, and examined how the volume and type of pages received affected sleep.

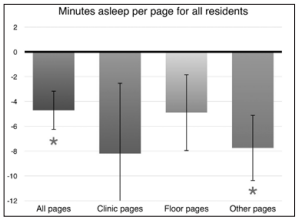
Materials & Methods: Urology residents in a single-institution residency were provided with a FitBit Charge HR device to collect objective sleep data over a six-month period. Each page received during this period after 16:00 and before 08:00 was counted and categorized as either "clinic" (outpatient calls from the after-hours answering service), "floor" (calls from the inpatient urology ward), or "other" (calls regarding off-floor consults). Data analysis was carried out using IBM® SPSS® Statistics 23 and Numbers.

Results: Residents received a total of 1068 overnight pages while on call. The junior (URO-1) resident received 321 (avg. 7.0/night) pages, followed by 288 (avg. 6.0/night), 265 (avg. 6.3/night), and 194 (avg. 5.0/night) for the next three most senior residents (URO-2, -3, and -4), respectively. On average, residents slept 400 minutes while on call, compared to 436 minutes while not on call ($p < 0.05$). Each page was associated with 4.71 fewer minutes asleep per page for all residents ($r = -0.24$, $n = 145$, $p < 0.05$). Pages in the "other" category were associated with 7.74 fewer minutes asleep per page for all residents ($r = -0.24$, $n = 145$, $p < 0.05$). On individual analysis, each page to the junior resident from all categories was associated with 4.23 fewer minutes asleep ($r = -0.33$, $n = 44$, $p < 0.05$), and each page from the "floor" category was associated with 9.02 fewer minutes asleep ($r = -0.35$, $n = 44$, $p < 0.05$).

Conclusions: Call volume decreased steadily with increasing resident seniority, an interesting finding considering that call nights were evenly distributed. This may imply that experience allows senior residents to anticipate problems in order to prevent calls before they happen. Residents slept less on call in general. Time asleep was reduced with increasing page volume, most significantly when pages were from the "other" category, suggesting more time is needed to address pages regarding patients the resident is unfamiliar with. Calls from the floor were more detrimental for the junior resident only, indicating that experience is a factor for efficient overnight call management. Overall, these findings are the first to objectively measure sleep quality in relation to call volume and type within a home call system, and show that efficient call management is a learned skill that improves throughout residency.







53

Multi-Institutional Pilot Evaluation of an Online Feedback Platform for Surgical Skill Acquisition

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Introduction: Duty hour restrictions have led to a need for more efficient methods of surgical training. Post-operative directed feedback provides an effective, evidence-based opportunity to enhance surgical education. However, competing clinical and administrative responsibilities interfere with these educational opportunities immediately following a case. Mobile and web-based platforms can help overcome these challenges by virtually connecting teachers and residents. The aim of this study was to evaluate the role of immediate, directed feedback on surgical skills in the operating room using an online platform to document the interaction.

Materials & Methods: Between November 2016 and March 2017 participating trainees received procedure-focused feedback immediately after endoscopic and robotic cases. The specific feedback was performed in-person and documented using an online feedback platform. For each interaction, resident performance of various steps of the procedure were rated using a Zwisch model. Faculty and residents were then asked to complete a survey assessing impact and utility of the feedback platform on their training.

Results: Over the 5-month pilot evaluation period, 115 evaluations were completed by 9 faculty members and 14 residents from 4 New-England Academic Centers. 57% (8) were Junior Residents (PGY 1-3) and 43% (6) were Senior Residents (PGY 4-6). 45% (6) received feedback with the online platform for >=50% of cases in which they participated. 63% (9) received constructive feedback on what went well during the case. Only 27% (4) received feedback on what skills they could improve upon. 81% (11) of residents thought the feedback provided was constructive and objective. 100% agreed that receiving immediate feedback was beneficial to their training. 89% (8) of the faculty felt that the online platform allowed residents to acquire surgical skills more effectively and is helpful in training surgical residents. 100% faculty felt that completing the online feedback evaluations was easy.

Conclusions: Attending surgeon feedback is an essential aspect of surgical training. An online feedback platform encourages dialogue between attending and resident in the immediate postoperative setting. Both residents and attending surgeons felt that immediate feedback was beneficial to surgical training and in the acquisition of surgical skills.

54

180 W XPS GreenLight Laser Vaporization of the Prostate in High Surgical Risk Patients: 48-month Safety and Efficacy Results for Patients with ASA Score of 3 or Greater

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Introduction: The objective of this study was to compare the safety, efficacy and durability of 180 W XPS GreenLight photoselective vaporization of the prostate (PVP) in high surgical risk patients relative to those with lower risk. Current studies evaluating surgical risk and PVP are limited by smaller cohorts and/or older, low power lasers. The GOLIATH trial established PVP using the 180 W laser as comparable to TURP, however, patients' surgical risk was not included, limiting its validity in deciding who should undergo PVP.

Materials & Methods: All patients who underwent PVP for uncomplicated lower urinary tract symptoms (LUTs) secondary to benign prostatic hypertrophy (BPH) between 2010 and 2014 by a single surgeon at a tertiary referral center were retrospectively reviewed. 496 patients were identified and stratified according to their American Society of Anesthesiologists (ASA) score; 34.3% of patients were classified as "high risk" (ASA score of 3 or greater) and 65.7% of patients were classified as "low risk" (ASA score less than 3).

Results: "High risk" patients were significantly older at baseline and a significantly higher percentage was anticoagulated; no other significant differences in baseline characteristics were noted. The mean age of the cohort was 70.7 years with a mean preoperative prostate volume of 83.4 mL and mean postoperative follow-up time of 17.5 months. There were no significant differences in procedural time, lasing time or laser energy delivered between the surgical risk groups (mean 48.3 ± 33.7 min, 30.8 ± 20.9 min and 251.9 ± 186.3 KJ, respectively). On multivariate analysis, only prostate volume of 80 mL or greater influenced hospital lengths of stay while both prostate volume and the presence of a urinary catheter at the time of surgery impacted duration of catheterization. Significant improvements in Qmax, PVR, IPSS and QoL were seen after PVP in both surgical risk groups relative to baseline at all follow-up time points. "High risk" status was a significant determinant only in postoperative improvement in Qmax at a mean follow-up of 17.5 months and Clavien grade 1 complications within 1 month. No differences were seen in the occurrence of Clavien grade 2 and 3 complications during the follow-up period in either surgical risk group nor were there any Clavien grade 4 or 5 complications in the 1 month period after surgery. The overall rate of operative reintervention was 4.44%.

Conclusions: PVP using the 180 W system is well tolerated in high surgical risk patients and efforts should be made to perform a comprehensive vaporization. This is evidenced by comparable procedure times, lasing time and laser energy delivered and absence of any significant difference in major postoperative complications. Preoperative prostate volume and presence of a urinary catheter at the time of surgery are better predictors of the immediate postoperative outcomes of duration of hospital stay and catheterization. High surgical risk patients benefit significantly from PVP as suggested by similar functional outcomes to patients with less medical comorbidities in up to 48 months of follow-up. Surgical risk classification alone should not be used to bar patients from PVP.

55

PSA screening at the intersection of Politics and Policy

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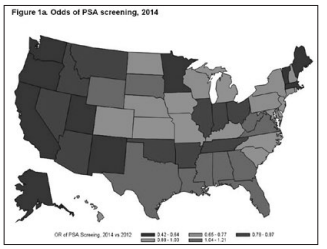
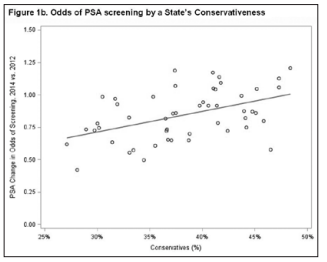
Introduction: The implementation of health care policy in the U.S. may be impacted by conflicting political philosophies. A "conservative" view of health care emphasizes an individual's right to self-determination, while a "liberal" view holds that government can effectively utilize strategies to balance the needs of the community with those of an individual. Federal screening guidelines promoting population health may be perceived to conflict with conservative values. The aim of this study was to assess the inter-relationship of a states percentage of "conservative" men and the impact that the 2012 USPSTF recommendation against PSA-based prostate cancer (PCa) screening on screening probability.

Materials & Methods: Data from the 2012 and 2014 Behavioral Risk Factor Surveillance System was used to identify asymptomatic men (age ≥ 50) without PCa who reported PSA screening in the past 12 months. Odds ratios were determined by multivariate logistic regression analysis, adjusting for age, race, education, income, insurance, healthcare access, and marital status. The change in PSA screening rates were assessed as a function of the percentage of adults in a state describing themselves as "conservative" or "very conservative" in Gallup U.S. Daily (accessed 4/4/16).

Results: Among 222,475 survey respondents, the prevalence of PSA screening decreased between 2012 and 2014 (OR = 0.87, p < 0.001; Fig 1a). In the most conservative states (upper tertile of self-described conservatives) screening prevalence was unchanged (OR = 0.92, CI 0.84-1.00), and in the least conservative states (lowest tertile) there was a significant decline (OR = 0.72, CI 0.64-0.81; Fig 1b). Up to 22% of the variation in PSA screening rates may be ascribed to a state's dominant political leaning (coefficient of determination=0.22), a moderate and significant correlation (ρ = 0.47, P < 0.001).

Conclusions: The changes in PSA screening rates appear to reflect the political divide in the U.S. Despite the 2012 USPSTF guideline and subsequent overall decrease in PSA screening, there was no decline in PSA screening in the most conservative states. This is a hypothesis-generating finding, as it is predicated on observational data that may be affected by other factors. Nonetheless, this finding suggests that a state's dominant political ideology influences the implementation of federal health care screening policy.





P16

Patient Risk Reclassification Based on Combined Clinical Cell Cycle Risk (CCR) Score

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Introduction: Improved prognostic tools for newly diagnosed prostate cancer are needed to more appropriately match treatment to a patient's risk of progression. The CCR score is a validated prognostic tool that estimates 10-year prostate cancer mortality (PCM) based on prognostic information from both molecular (cell cycle progression (CCP) gene expression) and clinical (CAPRA) variables. We evaluate how the CCR score can reclassify PCM-risk for men tested within the AUA New England (NE) section relative to NCCN and AUA risk categories.

Materials & Methods: Prostate biopsy samples from 633 men within the AUA NE section were submitted for commercial testing. The CCR score was previously validated and is calculated as a linear combination of CAPRA and CCP score (0.39 x CAPRA + 0.57 x CCP). Patients were assigned to NCCN and AUA risk categories using clinicopathologic data obtained from test request forms. Interquartile ranges (IQR) for each NCCN/AUA risk category were determined from the full commercial cohort (N=20,958). Patients whose CCR-based PCM risks were outside the IQR of their NCCN/AUA risk category were reclassified according to whether their PCM risk fell within the IQR of another risk category.

Results: Based on NCCN guidelines using clinicopathologic features alone, the commercial cohort was classified as low (n = 386, 61.0%), favorable intermediate (n = 113, 17.9%), intermediate (n = 87, 13.7%), and high risk (n = 47, 7.4%). After calculating PCM-risk based on CCR, 30.0%% of men were reclassified to a different risk category relative to NCCN criteria (9.0% lower, 21.0% higher; see Table). Similarly, men were classified as AUA low (n = 386, 61.0%), intermediate (n = 186, 29.4%), and high risk (n = 61, 9.6%) based on clinical features. PCM-risk based on CCR scores resulted in the reclassification of 27.2% of men relative to AUA criteria (7.3% lower, 19.9% higher; see Table).

Conclusions: The prognostic information in the CCR score results in significant risk reclassification for all patients with localized disease when compared to stratification based only on clinicopathologic criteria.

	Risk Reclassification			
NCCN Risk Category	**Low**	**Favorable Intermediate**	**Intermediate**	**High**
NCCN Very Low/Low (n = 386)	294 (76.2%)	**75 (19.4%)**	**17 (4.4%)**	**0**
NCCN Favorable Intermediate (n = 113)	**26 (23.0%)**	61 (54.0%)	**25 (22.1%)**	**1 (0.9%)**
NCCN Intermediate (n = 87)	**2 (2.3%)**	**23 (26.4%)**	47 (54.0%)	**15 (17.2%)**
NCCN High (n = 47)	**0**	**1 (2.1%)**	**5 (10.6%)**	41 (87.2%)
Total	322 (50.9%)	160 (25.3%)	94 (14.8%)	57 (9.0%)
AUA Risk Category	**Low**	**Intermediate**		**High**
AUA Low (n = 386)	308 (79.8%)	**73 (18.9%)**		**5 (1.3%)**
AUA Intermediate (n = 186)	**34 (18.3%)**	104 (55.9%)		**48 (25.8%)**
AUA High (n = 61)	**4 (6.6%)**	**8 (13.1%)**		49 (80.3%)
Total	346 (54.7%)	185 (29.2%)		102 (16.1%)

P17

New Data Regarding HIV Status as a Predictor of Postoperative IPP Infection

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Introduction: Penile prosthesis infections remain challenging despite advancements in surgical technique, device improvements and adoption of antibiotic prophylaxis guidelines. Previous studies have shown that inherent patient health factors can significantly influence inflatable penile prosthesis (IPP) infection. Among these studies are data that indicate that immunocompromised patients are at higher risk for infectious complications. This study compares IPP infection rates in our HIV positive and HIV negative patients.

Materials & Methods: This study is a retrospective analysis of 952 patients who underwent IPP implantation by ten surgeons at three institutions. HIV status was preoperatively reviewed and no patient had viral loads, CD4 counts, or defining illnesses consistent with AIDS. Patient data were compiled after extensive review of operative reports, inpatient notes, consult notes, and follow-up visits. Age, comorbidities, overall health status, IPP manufacturer, and antibiotic prophylaxis were similar between all patients. We performed univariate statistical analysis to determine if HIV status was a significant predictor of infectious complications.

Results: Of 952 total patients, 25 patients were HIV positive. Twenty-eight patients (3%) in the HIV negative group had postoperative IPP infection. Two of the 25 HIV (4%) positive patients had a post-operative infection. Statistical analysis via Fisher's exact test confirmed the absence of a significant difference in infection rates between HIV positive and negative men (p = 0.19).

Conclusions: HIV status is a not a significant predictor of infectious complications in our series of patients undergoing IPP implantation. To our knowledge this is the largest series of HIV positive patients undergoing IPP implantation in the literature. Our overall infection rate is consistent with previously published large series of implant patients. Further investigation is needed into the role of immune compromise on infection in primary implant and revision implant cases.

P18

Gender-Based Differences in the Durability of Intravesical Botulinum Toxin A Injection

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Introduction: Patients suffering from overactive bladder (OAB) and neurogenic bladder (NB) without response to behavioral and pharmaceutical intervention may opt for third-line therapy with botulinum toxin A injection. Botulinum injections have shown success in treating OAB and NB urinary symptoms, but require repeat injections at an interval of 4-12 months. The effect of these factors may be modified by gender, with differential durability when performed in different genders.

Materials & Methods: Patients undergoing treatment for OAB and NB at Lahey Hospital and Medical Center between 2004 and 2016 were identified. Demographic, clinical and treatment data were extracted from patient charts. Patients were included if they had at least 1 botulinum injection. Time from initial to second botulinum injection was defined as therapeutic durability; time from initial injection to last clinic follow-up was defined and time to event analyses were employed. Patients were stratified by gender, and univariate time-to-event analyses were performed within each group.

Results: Of the available patients, 54 patients met inclusion criteria, of whom 17 were male and 37 were female. Kaplan-Meier estimates of time for 50% of patients to require botulinum reinjection were 328 days for males compared to 385 days for females. On univariate analysis, hypertension ($p = 0.026$), prostate cancer ($p < 0.001$), constipation ($p = 0.03$), and stress incontinence ($p < 0.001$) were associated with lower durability in males. In females, multiple sclerosis ($p = 0.043$) and history of UTI ($p = 0.024$) were associated with lower durability.

Conclusions: Botulinum injection showed a slightly longer durability for female compared to male patients. For males, history of prostate cancer, hypertension, constipation or stress incontinence were associated with lower durability, while for females multiple sclerosis and history of UTI were associated with lower durability. Further study with larger numbers will be needed to confirm and expand on these findings and aid in patient selection and counseling.

P20

Low Incidence of Clean Intermittent Catheterization with OnabotulinumtoxinA in Diverse Age Groups of Overactive Bladder Patients and Substantial Improvements in Urinary Symptoms and Quality of Life

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Introduction: We evaluated the risk of clean intermittent catheterization (CIC) and assessed the efficacy and quality of life (QOL) outcomes after onabotulinumtoxinA treatment in different age groups of overactive bladder (OAB) patients.

Materials & Methods: Pooled data from onabotulinumtoxinA-treated patients in three randomized, controlled trials (N = 1177) were analyzed (post-hoc) by age: < 40, 40-49, 50-59, 60-69 and ≥ 70 years. Assessments at week 12 post-treatment included CIC incidence and duration, mean and percent change from baseline in urinary incontinence (UI) episodes/day, proportions of patients with ≥ 50% UI reduction, positive response (urinary symptoms 'improved'/'greatly improved') on the treatment benefit scale, change from baseline in Kings Health Questionnaire (KHQ) domains and adverse events (AEs).

Results: The < 40 group had the lowest CIC rate (1.1%) after onabotulinumtoxinA treatment, which increased slightly with age (3.2%, 5.3%, 5.3%, 7.2% in 40-49, 50-59, 60-69, and ≥ 70 groups). Mean CIC duration was 3 and 44 days in the < 40 and 40-49 groups and 78-88 days in the other groups. All groups showed substantial reductions in UI episodes/day (-2.4, -2.6,-3.1, -3.6, -2.9) and percent change in UI (range: -46.8% to -64.4%). High proportions of patients achieved ≥ 50%UI reduction (range: 58.2%-71.1%) and positive treatment response (range: 66.2%-73.8%). Improvements in KHQ domain scores were ~3-6 times the minimally important difference. Urinary tract infection was the most common AE in all groups.

Conclusions: CIC risk in onabotulinumtoxinA-treated OAB patients was low in all groups and increased slightly with age. All groups showed substantial UI reductions, QOL improvements and treatment benefit. OnabotulinumtoxinA was well-tolerated.

P19

Separating the Wheat From the Chaff: an Evaluation of Readability, Quality, and Accuracy of Online Health Information for Treatment of Peyronie's Disease

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Introduction: Peyronie's disease affects 3.2-8.9% of the adult male population. In the digital age, it has become commonplace for patients to self-diagnose and explore treatment options online. In the realm of Peyronie's disease specifically, there is significant variability in the quality of information on the web. This study characterizes available information about Peyronie's disease online and evaluates its readability, quality, and accuracy using a set of validated instruments and expert opinion.

Materials & Methods: The search term "Peyronie's disease" was queried on three major search engines (Google, Bing, Yahoo) and the first 50 search results on each search engine were assessed. Paid advertisements, duplicated websites, news articles, review articles, medical dictionaries, videos, and sub-pages of similar parent websites were excluded. All websites were categorized as institutional/reference, commercial, charitable, support, or alternative medicine (Table 1). The first 30 sentences on each website discussing treatment options were analyzed for readability using a three-pronged set of validated algorithms: the Gunning-Fog score, SMOG index, and Dale-Chall readability formula. The quality of each website was assessed with the validated Oxford DISCERN instrument by two trained readers whose scores were then averaged. Each website was also cross-referenced with the Health on the Net Foundation (HoN). Each 30-sentence block was assessed for accuracy by a fellowship-trained urologist on a 1-5 scale, where 1 and 5 correspond with 0% and 100% of the information in the text is accurate, respectively.

Results: Of 150 websites assessed across the three major search engines, 55 websites met inclusionary criteria. The mean readability scores across all websites were 14.53 (Gunning-Fog), 11.35 (SMOG), and 9.07 (Dale-Chall), which correspond to an 11th-12th grade reading level. Readability levels were not statistically different between website categories (Table 1). However, the quality of health information on institutional websites (53.75) was significantly higher than alternative medicine websites (35, $p = 0.016$) and trending higher than commercial (50.48) and support (49.83) websites. Further, 20% of the websites were HoN code-certified, comprised entirely of commercial (63.6%) and institutional (36.4%) websites. Similarly, accuracy of websites varied according to website category. Institutional and charitable websites had highest accuracy scores (3.13 and 4.50, respectively) whereas support (1.50) and alternative medicine websites (1.25) had the lowest accuracy scores ($p = 0.007$ and $p = 0.008$, respectively).

Conclusions: Most health information online regarding treatment of Peyronie's disease is on non-institutional "dotcom" websites not certified by the Health on the Net Foundation, the gold standard for online health information. Despite the fact that most of the information from academic and charitable websites is of adequate quality and accuracy, the readability of websites exceeds the reading ability of most U.S. adults by several grade levels. Urologists should assist patients in navigating digital resources to find accurate, high-quality websites that are written at the recommended 7th-9th grade reading level and work to improve health information online for Peyronie's disease and its treatment.

Table 1

Website category	Sample size	HoN Certified? (percent)	Readability			Quality		Accuracy (out of 5)
			Mean Gunning-Fog Score	Mean SMOG Score	Mean Dale-Chall Score	DISCERN Score (out of 75)	Overall Quality (out of 5)	
Institutional/ reference (e.g. government, hospital, university, WebMD, Medscape, UpToDate)	16	4 (36.4%)	14.98	11.59	9.09	53.75	3.25	3.13
commercial (e.g. private medical site or sponsored	27	7 (63.6%)	14.94	11.70	9.39	50.48	2.89	2.93
charitable (e.g. recognized medical society)	2	0 (0.0%)	12.60	9.75	8.45	57.00	3.00	4.50
support (e.g. patient support group, personal web page)	6	0 (0.0%)	13.33	10.43	8.55	49.83	2.67	1.50*
alternative medicine (e.g. nonorthodox medicine)	4	0 (0.0%)	13.55	10.8	8.25	35.00*	1.50*	1.25*
TOTAL	55	11	14.53	11.35	9.07	50.47	2.87	2.78

*p<0.05, versus institutional/reference

P21

New Data Regarding Penile Length Preservation after IPP Implantation

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Introduction: The inflatable penile prosthesis (IPP) is the gold standard for the treatment of erectile dysfunction refractory to medical management. Loss of penile length after IPP implantation is a concern for many patients with ED who choose surgical treatment. Evidence of preservation of penile length in the postoperative setting would enhance functional outcomes and could remove a potential barrier to intervention. The purpose of the study was to evaluate the effectiveness of the Coloplast (Minneapolis, MN) Titan® cylinders in maintaining penile length post-IPP implantation in patients treated for ED.

Materials & Methods: A single-armed, multi-center, multi-surgeon, prospective study was conducted with 117 patients. These surgeries were performed via both an infrapubic and a penoscrotal approach. Each penis was measured via flaccid stretch using a Furlow device from the dorsal penile base (pressed against pubic bone) to the tip of the glans. The corpora were engorged intra-operatively with an artificial saline erection (ASE). Corporal cylinders were selected based on measured corporal length without upsizing. Erect measurements were taken during both the ASE and after inflating the implanted device, in both instances from the same positions as preoperatively. Statistical difference and correlation coefficients between the preoperative penile stretch test (PST), intra-operative artificial saline erection (ASE) and erect prosthetic length (EPL) were calculated.

Results: The mean patient age was 65.42 +/- 7.8 years. The average preoperative penile stretch was 15.03 cm, artificial erection 14.76 cm, and average erect prosthetic length was 15.28 cm. The differences between all three of these measurements reached statistical significance based on the 95% confidence intervals. On average the EPL was 0.25 cm greater than the PST.

Conclusions: Preoperative penile length was preserved and exceeded in our series, which challenges the conventional wisdom that loss of penile length is a foregone conclusion after IPP placement. This suggests that chronic hypoxia due to lack of neurovascular inputs, or scarring from Peyronie's disease, radiation, previous surgery, or medical conditions, are the main culprits of loss of penile length as males age. We recommend early intervention in patients that fail conservative therapy for erectile dysfunction to preserve maximal length.

P22

Gender Based Effect Modification of Nerve Stimulator Success in Patients with Overactive Bladder

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Introduction: Patients suffering from overactive bladder (OAB) may be offered sacral nerve stimulation (SNS). Successful SNS implantation may rely on factors at baseline that differ according to gender. The purpose of the present study is to identify factors within male or female gender which are associated with successful SNS implantation and to identify possible effect modification associated with gender.

Materials & Methods: Patients undergoing treatment for OAB at Lahey Hospital and Medical Center between 2004 and 2016 were identified. Demographic, clinical and treatment data were extracted from patient charts. Patients were stratified by gender into groups. Within groups, univariate analyses were conducted to identify factors associated with SNS treatment success using chi-squared and t-test statistics as appropriate. A multivariate logistic regression model to predict SNS treatment success was also created within each group. Significance was defined at the $\alpha = 0.05$ level. The factors significantly associated with SNS treatment success were compared between groups to assess for effect modification.

Results: Of 268 patients in the OAB database, 128 patients met inclusion criteria. Within the male subgroup, 26 of 47 men (44.7%) had successful treatment, compared to 73 of 81 women (90.1%). Within the male group, the factors significantly associated with SNS failure were mean volume at first urge on UDS (80.5ml in SNS failure compared to 126.5 ml in SNS success) and smoking (SNS failure more likely to be current smokers, p = 0.039). Similarly, on multivariate analysis only lower volume at first urge was statistically significantly associated with SNS failure (OR = .97, 95%CI 0.94-0.99). Within the female group, there were no statistically significant associations between measured variables and SNS success. Notably, mean volume at first urge on UDS was not statistically significantly associated with SNS failure, though there was a similarly large difference between groups (97.5 ml in SNS failure compared to 136.0 ml in SNS success). On multivariate analysis in the female group, there were no significant factors associated with SNS success.

Conclusions: SNS is frequently successful at relieving OAB symptoms. The rate of success in men is significantly lower than in women, suggesting that SNS implantation is more effective in woman than men. The best predictor of success for male patients in this study was higher volume at first urge on UDS. Further study is needed to evaluate other predictors of SNS success and to further characterize differentiating characteristics between male and female patients with respect to overactive bladder treatment.

P23

The Effect of Marital Status on Post-Operative Outcomes After PCNL

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Introduction: Married patients with cancer have been shown to have improved overall survival, earlier stage at diagnosis, and improved adherence to treatment compared to their unmarried counterparts. Proposed reasons for this include that married patients have better support systems and easier access to care. Patients with nephrolithiasis who are recovering from a surgical procedure may see a similar benefit by being married. The aim of this study is to evaluate if marital status is associated with improved outcomes including complications, costs, and length of stay for a percutaneous nephrolithotomy (PCNL), a common non-oncologic urologic procedure.

Materials & Methods: We utilized the Premier Healthcare Database, a national hospital discharge database, which collects data from over 700 non-federal US hospitals, representing approximately 20% of all hospitalizations, to identify patients who underwent PCNL between 2003-2015. Patients were stratified as either married or not married. We examined patient demographics, Charlson comorbidity index, postoperative complications, length of stay (LOS), and direct hospital costs, as well as hospital and surgeon characteristics. Univariate logistic regression analysis and a median regression of costs were done in addition to a multivariable regression analysis adjusting for potential confounders.

Results: Between 2003 and 2015, we identified 19,976 patients who underwent PCNL. Of the examined cohort, 50.7% of patients were categorized as married. On univariate analysis, we found a 38.8% shorter LOS, 35% decrease in major complications, and $425.93 decrease in total direct costs of admission for married patients compared to unmarried patients. On multivariate analysis, married men were noted to have the shortest LOS, with married women, unmarried men, and unmarried women staying longer (OR 1.35, 1.45, and 1.65, respectively, all $p < 0.0001$). Married patients were also less likely to have a major complication (OR 0.82, $p = 0.025$).

Conclusions: While marital status is known to be associated with improved survival in cancer patients, it also appears to be associated with improved post-operative outcomes including a shorter LOS in married men and lower rate of major complications in married patients undergoing PCNL. Reasons for this require further investigation but may be related to better familial support in the postoperative period.

P24

Trends in Imaging Use for the Evaluation and Follow-Up of Kidney Stone Disease: A Single Center Experience

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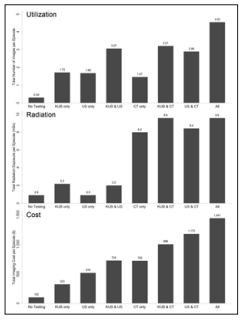
Introduction: Recent reports support the use of renal ultrasonography (US) as the initial imaging study for the evaluation of patients with suspected renal colic. Urologists, however, often advocate for computed tomography (CT) to better define stone size and location, especially prior to proceeding with endourologic intervention. One concern with using US as the initial imaging study is that CT may be required at a later time, obviating the reduction in costs and radiation gained by using US.

Materials & Methods: Retrospective review of electronic health records of 10,680 episodes of stone disease in 7,659 patients who presented to the emergency department or walk-in-clinic with a chief complaint or visit diagnosis of urolithiasis from 2009-2015 at a single institution. Images obtained during the index encounter and in the following 90 days were recorded.

Results: The index encounter included CT in 47% of episodes, US in 20%, KUB in 12%, and no imaging in 29%. 49% of index visits included multiple testing. If no CT was obtained during the index visit, 10% received one later in the episode. Total imaging costs and radiation exposure over 90 days were significantly higher when CT was utilized during the index visit. If the initial image obtained during an episode was an US, 20% obtained a CT within 90 days.

Conclusions: Patients who received an initial US avoided CT imaging in 80% of the cases. Avoiding the use of CT at the index visit was associated with substantial reductions in radiation exposure and imaging cost.



Poster Session II: Other

P25

Impact of Prior Ureteral Stent on Future Treatment Decisions: EDGE Multi–Institutional Survey

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Introduction: While well recognized that ureteral stents cause significant postoperative discomfort, implications of their impact on quality of life have not been fully evaluated. In particular, it is unknown whether prior stent experience affects subsequent treatment decisions. We previously developed and validated a survey to assess the effect of prior experience on willingness to undergo future stone therapy in general, and willingness to accept higher postoperative risks in order to forgo stent placement in particular.

Materials & Methods: The survey assessing the impact of decreased quality of life on subsequent treatment decisions was distributed to patients with a history of ureteral stent at four geographically disparate academic centers between July and October 2016. Responses were encoded in duplicate to ensure accuracy. Statistical analysis was performed using Chi square analyses.

Results: A total of 155 surveys were completed. Assessing prior stent experience, those reporting more pain with the stent were less likely to accept surgery for an asymptomatic stone ($p = 0.001$). When informed that ureteroscopy with stent omission would have a small increased risk of unplanned return visit compared with ureteroscopy with a stent, 26% chose surgery without a stent. Although not statistically significant, the percentage increased to 34% when assessing only those who reported worse pain with the stent than the stone. Conversely, of those that reported worse pain with the stone, only 19% chose surgery without a stent. When assessing impact of quality of life changes, only decreased interest in socializing ($p = 0.011$) was associated with a higher likelihood to choose stent omission understanding this may entail greater risk of unplanned hospital return. Other consequences of stent placement (e.g. missed work, inability to care for family, exercising less, and decrease sexual activity) were not associated with a higher likelihood of choosing surgery without a stent.

Conclusions: Patients experiencing more pain with their stent than the inciting stone are less willing to treat asymptomatic renal stones. The impact of the stent on decreased socializing was noted to increase likelihood to accept greater perioperative risks in order to omit stent placement. With increased emphasis on shared medical decision making, an enhanced understanding of factors affecting these decisions is important in order to appropriately counsel patients.

P26

EPIC 26 Identifies Men Likely to Benefit from Surgical Interventions for Male Stress Incontinence after Radical Prostatectomy

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Introduction: Despite advances in surgical techniques, radical prostatectomy continues to be associated with significant rates of postoperative urinary incontinence (UI). Based on the success rates of surgical intervention for female incontinence, male urethral slings are being used more frequently to treat post-prostatectomy incontinence, and artificial urinary sphincters (AUS) continue to play a significant role. Utilizing the UI subscale of the EPIC 26 questionnaire, we examined our success rates treating post-prostatectomy UI through postoperative surgical interventions. We further documented the number of patients who have similar rates of UI but have not had an intervention as this cohort may benefit from pro-intervention counseling after radical prostatectomy.

Materials & Methods: Cross-referencing our IRB-approved, prospective prostate cancer database with hospital billing records, we identified patients who had undergone post-prostatectomy interventions to treat UI. A Wilcoxon Signed-Rank test was used to compare EPIC 26 UI scores obtained after prostatectomy but before UI intervention to those obtained after prostatectomy and after UI intervention, and a Wilcoxon Ranked Sum test was used to evaluate pre- and post-intervention differences between sling and AUS subgroups. Using the median UI score as a cut-off point, we identified men who demonstrated a level of post-prostatectomy incontinence similar to those who had undergone a sling procedure, yet did not undergo a UI intervention.

Results: A total of 2965 patients underwent a robotic prostatectomy between July 2004 and July 2016. 48 patients had post-prostatectomy surgical interventions for UI: 39 received a sling and 9 received an AUS. EPIC 26 questionnaires for pre- and post- intervention time periods were available for 24 patients (19 sling, 5 AUS). The mean age was 63 years (range 43-75) with a median (IQR) interval between prostatectomy and UI procedure of 26 months (18, 41). Prior to undergoing a UI intervention, the median (IQR) UI score for all patients who had a UI intervention was 29.0 (22.3,43.8); 31.3 (25.0,44.3) for sling and 22.8 (4.1,41.8) for AUS ($p = .111$). Significant ($p < .001$) improvement was observed overall in UI scores pre- vs. post-intervention. The median (IQR) post-intervention UI score was 67.8 (58.5,85.5) for men receiving slings and 52.3 (19.8, 64.9) for men receiving an AUS ($p = .025$). For men not having a UI intervention, the median (IQR) post-prostatectomy UI score was 79.3 (62.5,100.0). This group included 53 men with post-prostatectomy UI scores ≤ 29.0.

Conclusions: A total of 48 out of 2965 men underwent an intervention for UI; significant improvements in UI were noted in those for whom data were available. Using the EPIC 26, we identified a similar number of patients (53) who had comparable post-prostatectomy UI scores but did not receive a UI intervention. Although UI interventions were associated with improvements in UI scores, UI scores for those receiving interventions remained poor relative to the large percentage of men for whom, presumably, such interventions were not needed. Clearly, considerable opportunity exists to improve continence rates in all cohorts. EPIC 26 UI scores may help clinicians identify patients who may benefit from UI interventions after radical prostatectomy.

P27

Using Electronic Health Records Data in Practice Audit: Ureteroscopy – Stent or No Stent?

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Introduction: Ureteroscopy is commonly used in the management of stone and other diseases of the ureter. The use of stent before and after ureteroscopic lithotripsy remains controversial. Electronic Health Records (EHR), a software platform that contains data captured during patient-health care professional encounter has become ubiquitous. It is useful for billing but other applications in research, data analysis, practice audit and quality improvement are gaining momentum. In 2013, we adopted the use of Electronic Health Record (EHR) as recommended and supported by the Ontario MD in collaboration with the Ministry of Health and Long-Term Care. The purpose of this study is to understand the basic ways of manipulating EHR data to identify "hot spots" in ureteral stone management and describe the treatment outcomes in a community urology practice.

Materials & Methods: Data recorded in the physician's clinical notes, operative room records including details of procedure and fluoroscopy times and follow up were reviewed and extracted. Tracking of the procedures were verified using the OHIP/MOHLTC Diagnostic and Billing codes. For question formation and sequencing, a literature search (English) was completed through PUBMED, Medline, Cochrane Data base using such words and phrases as EHR Ureteroscopy Stent or No Stent, EHR Ureterosopy, EHR Data analysis. Data collection was between 2001 and 2004 and these included patient's age, sex, stone features, stent or no stent , operating and fluoroscopy times, whether booked electively or admitted through the ER. Data extracted were then transferred into a random number spreadsheet function to assist with analysis.

Results: There were 192 procedures - 149 'Stent' and 43 'No Stent', ratio 3:1.These two groups were comparable regarding patients, stone characteristics, stone free rates, infections and complications. The mean stone size was 8.5+/-2 mm. Stone free rates at 6 weeks was 100% in each group. There was relief of renal colic in all patients immediately. After 2 days, lower urinary tract symptoms (LUTS) were significantly less in patients with 'no stent' compared to those who were stented. Our findings appear to be similar with published data in the literature.

Conclusions: Data extraction and manipulation from the EHR was successful. In addition to billing purposes, EHR application in research, chronic disease management, quality improvement and practice audit is attractive and will grow.

P28

Renal Malignancy and Peritumor Fat: Is It Necessary to Send Perinephric Fat for Pathology During Partial Nephrectomy?

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Introduction: Nephron-sparing surgery is being used increasingly for renal malignancy. Peri-nephric fat is routinely sent as a separate specimen for staging purposes by the surgeon. Our aim is to determine the prevalence of peritumor fat involvement per tumor stage.

Materials & Methods: We retrospectively reviewed partial nephrectomies, performed open, laparoscopic, or robotically between 2011 and 2015.

Results: Of 157 partial nephrectomies performed by two surgeons, 127 (80.9%) resulted with malignancy as final pathology, of which 98 (77.2%) had perinephric fat sent for pathology. Of these cases with fat sent, the majority were clear cell with 69 patients (70.4%), second most common being papillary with 22 patients (22.4%). Tumor grade ranged from T1a with 59 patients (60.2%), T1b with 34 (34.7%), and 5 patients with T2 grade (5.1%). Of those, no patients were found to have involvement of peritumor fat. There were no cases of perinephric fat being positive for renal cell carcinoma.

Conclusions: In the case when nephron-sparing surgery is used for renal malignancy, peritumor fat is often sent. In our series of patients, with pathology ranging from T1a-T2a, peritumor fat pathology has been routinely negative. Though surgeons often send this fat for pathological analysis, this study suggests that this is unnecessary.

P29

Comparative Effectiveness of Neoadjuvant Chemotherapy vs. Surgery Alone for Upper Tract Urothelial Carcinoma

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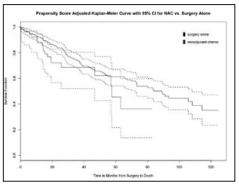
Introduction: Upper tract urothelial carcinoma (UTUC) is an understudied disease with limited large-scale studies providing evidence for treatments. Through analogy to bladder cancer, neoadjuvant chemotherapy (NAC) has been purported to have a potential survival benefit for patients with UTUC. Few studies and no randomized trials explore this issue. We present a case matched comparative effectiveness analysis of NAC compared to surgery alone for patients with UTUC undergoing nephroureterectomy.

Materials & Methods: The National Cancer Database was queried for patients with transitional cell carcinoma of the ureter or renal pelvis, clinical TanyN0M0, without receipt of radiation or adjuvant chemotherapy. NAC patients were propensity score matched 1:5 with surgery alone patients using age, sex, clinical T stage, Charlson comorbidity score, and tumor site; an acceptable covariate balance between groups was assured. Overall survival (OS) was assessed using Kaplan-Meier and multivariate Cox-regression methods were applied to test predictors of OS. A subanalysis additionally matched for pathologic stage.

Results: Of 48,845 cases of upper tract cancer, 13,973 cases met inclusion criteria. On Cox regression of the entire included cohort, NAC, age, male gender, ureteral site and advanced T stage were associated with lower OS ($p = 0.017$). The matched sample comprised 112 NAC and 552 surgery alone cases; OS with NAC was lower compared to surgery alone at 5 years but did not reach statistical significance (42.0% vs. 53.3% $p = 0.08$) (Figure 1). On subanalysis, a cohort matched for similar variables with the addition of pathologic stage similarly found no difference in OS.

Conclusions: In this large hospital-based cohort analysis, NAC did not have show a statistically significant difference in OS compared to a case-matched surgery-alone group. While NAC may have no true OS benefit, these results may be affected by unmeasured covariates, as patients thought to have clinically more advanced disease may be selected for NAC, but there is little evidence available for comparison. Notably we could not determine if NAC improves cancer specific survival, as CSS is not recorded in the NCDB. Further study is required to clarify the possible benefits or harms of NAC in this rare disease.



P30

Examining the Association between Biopsy and Clinical Staging in Upper Tract Urothelial Cancer

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Introduction: Ureteroscopic biopsy of upper tract urothelial carcinoma (UTUC) continues to be debated with advocates using it for additional diagnostic information and detractors wishing to minimize instrumentation of upper tract tumors. Nevertheless, trends have shown increasing use of ureteroscopy and biopsy over the past thirty years. Of note, biopsy is limited by small instruments and confined working space and small studies have shown modest accuracy for predicting tumor pathology. Here we used the National Cancer Database (NCDB) to investigate whether concordance between clinical and pathologic tumor stage differs based on whether a biopsy has been performed. The NCDB captures 70% of all cancer diagnoses in the US and allows large-scale analysis of pathologic outcomes for this rare disease.

Materials & Methods: Using the NCDB, we identified all patients diagnosed with urothelial carcinoma of the renal pelvis or ureter who underwent nephroureterectomy or segmental ureterectomy between 2004-2013. Patients were included if they had both clinical and pathological T stage data. Exclusion criteria included positive lymph nodes or metastatic disease, one or more procedures (e.g. laser ablation) prior to definitive surgery, or administration of neoadjuvant chemotherapy.

Results: Between 2004-2013, 12,652 patients met the inclusion criteria of whom 6,221 underwent biopsy and 6,431 did not have biopsy. Clinical T staging corresponded with pathological staging in 75.9% of patients who had a biopsy compared with 82.8% of patients who did not ($p = 0.0001$). Upstaging occurred in 21.8% of patients after biopsy and 14.4% of patients without biopsy ($p=0.0001$). Stratified by clinical stage, cTa/cTis tumors were upstaged in 22.3% of patients after biopsy and 11.1% without biopsy ($p < 0.001$). Clinical T1 tumors were most likely to be upstaged, occurring in 30.7% of biopsied patients and 21.9% without biopsy ($p < 0.001$). Downstaging at final pathology occurred in 2% of each group. Biopsy caused a delay from diagnosis to definitive treatment, with an interval of 44 days for biopsied patients compared with 18 days for patients who did not undergo biopsy ($p < 0.001$). However, multivariate logistic regression showed that when controlling for delay, biopsy still conferred an odds ratio for upstaging of 1.3.

Conclusions: Biopsy in UTUC typically provides only grade, not stage, information and should not impact stage concordance. However, upstaging on final pathology occurs more frequently in patients for whom ureteroscopic biopsy has been performed. This is not fully explained simply by treatment delay, as controlling for delay does not diminish the effect of biopsy. This finding warrants exploration. Selection bias may exist, whereby biopsy may be done more often for patients in whom clinical staging by visual examination or axial imaging is less certain.

56

Impact of Adequate Pelvic Lymph Node Dissection on Overall Survival after Radical Cystectomy: A Stratified Analysis by Stage and Receipt of Neoadjuvant Chemotherapy

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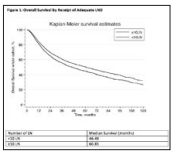
Introduction: The benefit of pelvic lymph node dissection (PLND) at the time of radical cystectomy (RC) for bladder cancer is well-documented. In addition to providing information on nodal stage, an adequate PLND—with many studies using a cutoff of ten or more nodes—provides a survival benefit even when cancer is confined to the bladder. Neoadjuvant, platinum-based chemotherapy (NAC) also confers a survival benefit—possibly by treating occult or "micro" metastatic disease prior to cystectomy. Given that NAC may perform a similar function, the benefit of PLND may differ depending on receipt of NAC. This has not previously been assessed. Therefore, we designed a study to assess the stage-specific benefit of an extended PLND depending on whether a patient receives NAC.

Materials & Methods: Using the National Cancer DataBase (2004-2012), we identified 14,139 patients with clinically localized bladder cancer (Ta-T4 and N0M0) who received RC. For each patient, we extracted data on (1) whether the patient received neoadjuvant chemotherapy and (2) whether the patient received adequate pelvic lymph node dissection (defined as at least 10 nodes removed). Inverse probability of treatment weighting (IPTW) -adjusted Kaplan-Meier curves were used to compare overall survival (OS) between men and women who received extended PLND, and those who did not. We then performed a stratified analysis of overall survival by clinical T-Stage and NAC.

Results: Overall, 5,466 (38.66%) and 8,673 (61.34%) patients underwent RC for localized or locally advanced bladder cancer. Median time to last follow-up was 54.24 months [IQR, 33.64-74.41 months]. IPTW-adjusted Kaplan-Meier curves showed that median OS was improved in men who received an extended PLND (46.49 vs. 60.85 months). In stage-specific sub-analyses of men and women who did *not* receive NAC, an adequate PLND was associated with a OS benefit for cT2 ($HR = 0.86$; $p < 0.001$) Among men and women who received NAC, appropriate LND was associated with significant OS benefit among men with cT2 ($HR = 0.76$; $p = 0.005$), but not cT3/4 ($HR = 0.82$; $p = 0.188$).

Conclusions: These data suggest the survival benefit of an adequate pelvic node dissection is preserved in men with T1 and T2 disease regardless of whether they receive NAC. In men with T3 and T4 disease who have received NAC, the benefit seems to be attenuated -perhaps due to the already poor prognostic category in which these patients find themselves or due to the ability of T3/T4 tumors to spread through alternate lymphatic drainage routes.



57

Harnessing Full Text Pathology Data from the Electronic Health Record to Advance Bladder Cancer Care – Development of a Natural Language Processing System to Generate Longitudinal Pathology Data

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Introduction: Population-based studies to advance bladder cancer care require longitudinal pathology data that allow for measurement of disease recurrence and progression. The prime data source for population-based studies has been SEER-Medicare, but SEER data is limited because pathologic information is only abstracted at time of diagnosis. We set out to obtain longitudinal pathology data by developing a natural language processing (NLP) engine to automate abstraction of important details from full text pathology reports.

Materials & Methods: We selected a national random sample of 600 bladder pathology reports from the Department of Veterans Affairs (VA) Corporate Data Warehouse. These reports were independently annotated by two reviewers with discrepancies resolved by a third to develop a gold standard. We used Cohen's kappa to evaluate inter-rater reliability for histology, invasion (presence versus absence and depth), grade, and statements regarding presence of muscularis propria and of carcinoma in situ. Next, we iteratively trained, developed, and tested the NLP engine's ability to abstract these variables from the reports. We assessed NLP performance by calculating accuracy, positive predictive value (PPV, precision), and sensitivity (recall) and then applied the NLP engine to pathology reports from 10,725 bladder cancer patients.

Results: The validated engine was capable of abstracting pathologic characteristics for 99% of bladder cancer patients. Inter-rater reliability was excellent between the two reviewers (kappa ranging from 0.82 to 0.90). When comparing the NLP output to the gold standard, NLP achieved the highest accuracy (0.98) for presence of carcinoma in situ. Accuracy for histology, invasion (presence versus absence), grade, and presence of muscularis propria ranged from 0.83 to 0.96. The most challenging variable was depth of invasion (accuracy 0.68; sensitivity 0.65), likely due to the high variability in the language used to describe findings. Nevertheless, we achieved acceptable PPV (0.82; table).

Conclusions: We developed an NLP engine to accurately abstract important pathologic details from full text bladder cancer pathology reports. This engine allowed for abstraction of data from the vast majority of the 10,725 patients included, enabling us to develop a population-based cohort of patients with longitudinal pathology data. The resulting unique dataset will be used to examine the extent to which bladder cancer care impacts recurrence and progression of disease.

Variable	Accuracy	PPV (Precision)	Sensitivity (Recall)
Histology	0.96	0.97	0.96
Invasion Presence Depth	 0.87 0.68	 0.86 0.82	 0.89 0.65
Grade	0.93	0.96	0.92
Muscularis present	0.83	0.89	0.79
Carcinoma in situ	0.98	0.95	0.91

58

Characterizing the Costs of Complications After Cystectomy

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Introduction: Radical cystectomy (RC) is subject to substantial morbidity and mortality. Understanding costs of different categories of complications may be valuable in guiding efforts to improve care. We studied the cost of different categories of complications in RC to identify drivers of expenditures.

Materials & Methods: Using the Premier Hospital Database we identified patients who underwent RC for BC (BC). Ninety-day complications were captured using ICD9 codes. Complications were categorized according to Agency for Healthcare Research and Quality Clinical Classification Software. The primary outcome was cost of complication and secondary outcomes were mortality, length of stay (LOS), and discharge disposition. A generalized liner model conforming to a gamma distribution was used to evaluate cost data and all models were adjusted for patient, hospital, and surgery characteristics.

Results: We identified 9,137 RC patients, representing a weighted population of 57,553 patients from 600 hospitals across the US between 2003-2013. Venous thromboembolism (VTE) was the costliest index complication costing over $10,000 and pulmonary complications were the most expensive readmission complication costing over $30,000. After room and board, pharmacy and laboratory costs were the primary sources behind VTE costs. The three most costly index complications were VTE, infectious, and wound and soft tissue and pulmonary ($p < 0.001$, compared to no complication). A complication increased the length of stay by 4 days. Nearly 1 in 3 RC patients were readmitted within 90 days and the top three costliest readmission complications were pulmonary, VTE, and neurological. Being married, fewer comorbidities, shorter operations, lack of transfusions, teaching hospitals, high volume hospitals, and high volume surgeons were associated with statistically significantly lower costs of complications after RC.

Conclusions: Complications after RC can be cost stratified. VTE is one of the most expensive complications after RC during index stay and readmission. This work highlights potential candidates for future quality improvement initiatives in BC care.

59

Determinants of Active Surveillance in Patients with Small Renal Masses: A National Cancer Database (NCDB) Study

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Introduction: Active surveillance (AS) has been increasingly recognized as a viable management strategy for patients with small renal masses, that affords the delay or avoidance of definitive treatment. However, little is known about national utilization trends for AS, or the factors that influence initial expectant management.

Materials & Methods: We identified patients with clinical T1a renal masses within the National Cancer Database (NCDB) between 2010 to 2014. Patients were excluded based on the following criteria: metastatic or locally advanced disease, unknown management, or those who were offered but refused treatment outside of surveillance. Patients were dichotomized according to receipt of AS versus definitive treatment. Chi square test and t-test were used to evaluate differences in clinical, demographic, socioeconomic, and treatment-related characteristics differences between the two groups. We examined determinants of AS versus definitive treatment among patients with small renal masses using multivariate logistic regression models.

Results: We identified 69,573 patients that satisfied the inclusion criteria. Of the total cohort, 1,953 (2.8) individuals received initial management with AS, while 67,620 (97.2%) received definitive treatment. Treatment modality received included: partial nephrectomy in 37,257 (55.1%); radical nephrectomy in 19,668 (29.1%), cryo-ablation in 6,636 (9.8%), thermal ablation in 2,096 (3.1%), and other definitive therapy in 1,963 (2.9%) . On multivariate analysis, increasing patient age (OR: 1.10, 95% CI: 1.09-1.10, $p < 0.0001$), smaller tumor size (OR: 0.952, 95% CI: 0.946-0.957, $p < 0.0001$), treatment at an academic center vs. community center (OR: 2.10, 95% CI: 1.86-2.36, $p < 0.0001$), treatment region (OR: 1.55, 95% CI: 1.21-1.98, $p = 0.0006$), African American race (OR: 1.53, 95% CI: 1.35-1.76, $p < 0.0001$), insurance status (OR: 1.15, 95% CI: 1.05-1.42, $p = 0.031$), and higher Charlson-Deyo comorbidity index (2 vs. 1) (OR: 1.64, 95% CI: 1.38-1.96, $p < 0.0001$) were significantly associated with increased use of active surveillance as opposed to definitive treatment.

Conclusions: We observed a clinical, regional, and facility-level differences in the utilization of active surveillance in patients with T1a renal masses. Further investigation is warranted to better understand the forces underlying initial management decisions for patients with small renal masses.

60

Perioperative Outcomes of Aspirin Use in Partial Nephrectomy

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Introduction: As the incidence of cardiovascular disease continues to increase, so too does the patient population on anti-platelet therapy who requires urologic surgical intervention. We sought to address the perioperative outcomes for those undergoing partial nephrectomy (PN) while taking or not taking perioperative aspirin (ASA).

Materials & Methods: A retrospective review of patients undergoing PN (ICD9 55.4) from 2003 to 2015 was performed on the Premier Hospital Database (Premier Inc, Charlotte NC, USA), a nationally representative hospital discharge dataset. We restricted the study to elective procedures with a diagnosis of an indeterminate or malignant renal mass, and excluded patients with a possible cardiovascular or cerebrovascular event on the day of surgery. To reduce unmeasured confounders, we limited the cohort to hospitals that - during the course of study - had at least one patient that received perioperative aspirin yielding a total cohort of 10,807 patients. The cohort was dichotomized into two groups: those receiving perioperative ASA (7.2%, n = 774) and those with no perioperative ASA (92.8%, n = 10,033). In terms of outcomes, we assessed in-hospital rates of: major bleeding, overall transfusion, day-of-surgery transfusion, prolonged (> 4 days) length of stay (LOS), and prolonged (> 285 minutes) operative time. We also assessed 90-day rates of: cardiovascular catastrophe (myocardial infarction and/or cerebrovascular accident), readmission, major complication (Clavien-Dindo ≥ 3), and deep vein thrombosis/pulmonary embolism. The statistical analysis was based on crude and adjusted logistic regression models, which accounted for patient, hospital, and surgical characteristics.

Results: Patients receiving perioperative ASA tended to be older (58% vs. 38% ≥ 65 years, $p < 0.0001$), predominantly male (73.1% vs. 58.7%, $p = 0.001$), and less healthy (34.8% vs. 18.4% with a Charlson Comorbidity Index score ≥ 2, $p = 0.003$). Our analysis showed that perioperative ASA was not associated with increased in-hospital morbidity overall and, only for minimally invasive PN, there was a slightly reduced day-of-surgery transfusion rate (OR 0.29, CI [0.05-0.99], $p < 0.05$). With regards to 90-day outcomes, perioperative ASA use was associated with a significantly elevated odds for a cardiovascular catastrophe (OR 7.56, CI [3.38-16.92], $p < 0.001$); in contrast, specifically for minimally invasive PN, there was a lower likelihood for readmission (OR 0.48, CI [0.24-0.94], $p < 0.05$).

Conclusions: The current study, which represents the largest study on the impact of perioperative ASA on surgical morbidity of PN, suggests that perioperative ASA can be safely continued among patients undergoing PN.

61

Diagnosis and Management of Urachal Remnants in a Tertiary Care Center

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Introduction: Urachal remnants are classically taught as potential causes of clinical symptoms, such as umbilical drainage, infections, or hematuria; there is also a theoretical risk of transition to urachal adenocarcinoma. To date, the incidence of urachal remnants, patterns of management, and malignant transitions have not been quantified. We queried our institution's radiology database to establish and investigate a cohort of patients with an identified urachal remnant.

Materials & Methods: Under institutional IRB protocol, all radiology reports from 2012-2015 at a single tertiary care center were queried for the term "urach*", and radiographic, clinical, and surgical/pathologic information on identified patients was then extracted by hand from the EMR. Symptomatic urachal remnants were defined by the symptoms given in the reason for the radiology scan. Patients with an already identified urachal remnant prior to the scan were excluded. Descriptive statistics, chi-squared and t-tests for comparisons were used as appropriate and statistical analysis was performed in R.

Results: A total of 406 patients had urachal abnormalities on radiology scans. Characteristics of the patients, along with radiologic and clinical findings and surgical management, are in Table 1. Of the 406 patients identified, 97 (23.9%) had symptoms related to a urachal remnant cited as a reason for the scan, the most common reason being hematuria (84 patients, 20.7% of total cohort). A total of 185 patients (45.6%) were referred to urology, and 20 (4.9%) had excision of the urachal remnant. Path data were available for 19 cases; of these, only one was positive for urachal adenocarcinoma.

Conclusions: Urachal remnants are a rare entity, with a majority incidentally discovered. Less than half of identified cases are referred to urology, and excision is uncommon. Malignant transformation is rare. In the future, exact classification of urachal remnants and guidelines for referral to urology, as well as further clinical and pathologic follow-up, are needed to refine recommendations for treatment of this rare condition.

Table 1. Cohort Characteristics

n	406
age_dx (mean (sd))	55.57 (17.51)
male (%)	308 (75.9)
symptomatic (%)	97 (23.9)
umbilical_drainage = Y (%)	3 (0.7)
pain = Y (%)	5 (1.2)
hematuria_binary = 1 (%)	84 (20.7)
gross_hematuria = 1 (%)	39 (9.6)
micro_hematuria = 1 (%)	36 (8.9)
uti = Y (%)	10 (2.5)
umbilical_hernia = 1 (%)	1 (100.0)
congenital_anomalies (%)	
bi/l duplicated collecting systems	1 (0.2)
bicornuate uterus or uterus didelphys	1 (0.2)
bipfid ureter	2 (0.4)
horseshoe kidney	1 (0.2)
other_presentation (%)	
hx/o CIS	1 (0.2)
hx/o TCC	1 (0.2)
mgmt:treatment of infected UR	1 (0.2)
mgmt:non-swelling	1 (0.2)
staging for muscle invasive bladder TCC	1 (0.2)
urethral stricture	2 (0.5)
weight loss	1 (0.2)
scan_type (%)	
CT	390 (97.7)
MRI	8 (2.0)
US	1 (0.3)
saw_gu (%)	185 (45.6)
excision (%)	20 (4.9)
path (%)	
benign urachal remnant	14 (73.7)
carcinoma	1 (5.3)
cpdf	4 (21.1)
Radiologic Findings	
extravesical _ process = 1 (%)	3 (0.7)
rpct = 1 (%)	8 (2.0)
dome_thickening = 1 (%)	22 (5.4)
calcified = 1 (%)	25 (6.2)
patent_urachus = 1 (%)	13 (3.2)
ur_cyst = 1 (%)	15 (3.7)
ur_diverticulum = 1 (%)	25 (6.2)
repeat_imaging = 1 (%)	24 (5.9)

62

IMP3 Positivity Predicts Metastatic–Free Survival in a Contemporary Cohort of Patients with Renal Cell Cancer

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Introduction: Prognostic markers in renal cell cancer (RCC) can be clinically useful to risk stratify patients in regards to both overall and cancer specific survival. IMP3 staining has been shown to correlate with adverse outcomes in patients diagnosed with renal cell cancer. In this study, we sought to validate IMP3 staining as a predictor of development of metastatic disease in a contemporary cohort of patients treated surgically for RCC.

Materials & Methods: After obtaining IRB approval, pathology records were reviewed at our institution to identify patients undergoing either partial or radical nephrectomy between November 2008 and September 2014. A total of 302 patients were included in the study. The medical records of these patients were retrospectively reviewed to identify pertinent variables, including gender, age, medical comorbidities, treatment modality, imaging results before and after treatment (i.e. staging and surveillance), RCC subtype and Fuhrman grade, and IMP3 staining. Multivariate analysis was utilized to assess whether IMP3 positivity correlated with development of metastatic disease and overall survival.

Results: A total of 302 patients were included in the study, including 30% female and 70% male patients. Of the 302 renal masses (302 patients), 60 (19.9%) stained positive for IMP3, while 242 (80.1%) stained negative for IMP3. On multivariate analysis, IMP3 staining correlated with metastatic-free survival ($p = 0.014$), but did not correlate with overall survival.

Conclusions: Assessing a patient's risk for developing metastatic disease after treatment for renal cell cancer has potential implications for patient counseling and surveillance protocols. In addition, as targeted agents are being evaluated for use in the adjuvant setting, risk stratification of patients would help identify those patients who may benefit most from adjuvant therapy. In this study, IMP3 staining predicted the development of metastatic disease. Overall survival was not related to IMP3 staining, but this may be related to duration of follow-up. Further evaluation of this cohort of patients will include long-term cancer specific survival and overall survival, as well as identification of other factors that may correlate with IMP3 positivity.

64

Adjuvant Chemotherapy in the Treatment of Lymph Node Positive Squamous Cell Carcinoma of the Penis: Analysis of the National Cancer Database

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Introduction: While the use of neoadjuvant TIP (paclitaxel, ifosfamide, and cisplatinin) has been well described, the use of adjuvant chemotherapy (ACT) in the treatment of node positive squamous cell carcinoma (SCC) of the penis is controversial and there has been few large studies looking at utilization and outcomes. We sought to describe the use of adjuvant chemotherapy in patients with lymph node positive disease (N+) penile cancer using a large nationwide U.S. cancer database.

Materials & Methods: The National Cancer Data Base (NCDB) (2004-2014) was used to extract all patient with non-metastatic SCC of the penis who underwent partial or total/radical penectomy with inguinal lymph node dissection. Only patients found to have N+ were included in our cohort. Patients were categorized according to receipt of ACT. Descriptive statistics were used to compare patients according to receipt of ACT. Multivariable logistic regressions were performed to determine patient, tumor or facility characteristics associated with use of ACT. Finally, multivariable Cox regression analysis was used to determine the impact of ACT on overall survival (OS).

Results: A total of 661 patients with N+M0 penile SCC were identified. Of these, 253 (38.3%) patients underwent ACT. Median age at diagnosis was 59 in those who received ACT and 65 in those who did not ($p < 0.001$). After adjusting for all variables, ACT was more likely to be administered to patients with a lower Charlson-Deyo Score ($p = 0.04$), lower education level ($p = 0.02$), patients treated at a community cancer center ($p = 0.03$) or in the New England / Mid-Atlantic regions ($p < 0.001$), and patients with higher clinical or pathologic N stage ($p < 0.001$; $p < 0.001$). Median survival was 23.5 months for patients who received ACT and 24.3 months for those who did not, which approached significance statistically ($p = 0.05$). After adjusting for all available covariates, there was no statistically significant difference in median survival ($p = 0.224$, HR 1.16, 95% CI 0.91).

Conclusions: More the a third of patients with N+ SCC of the penis receive ACT. Other than more advanced disease, many patient and facility characteristics are associated with receipt of ACT. We did not find significant differences in overall survival according to receipt of ACT. Further studies are needed to better define the role of ACT in advanced SCC of the penis.

63

The Association between Mortality and Distance to Treatment Facility in Patients with Muscle Invasive Bladder Cancer

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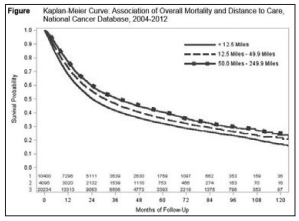
Introduction: Regionalization of bladder cancer treatment is suggested to improve quality of care. As an unintended consequence, patients are faced with increased distance between home and treatment facility, with unknown implications on outcomes. We characterize the effect of distance on overall mortality in patients with muscle invasive bladder cancer (MIBC) and those who undergo radical cystectomy (RC).

Materials & Methods: We used the National Cancer Database (2004-2012) to identify patients with clinically localized, muscle invasive bladder cancer (cT2a-T4,N0M0); subgroup analysis of RC patients was performed. Multivariate Cox Proportional Hazard and multinomial logistic regression analyses were performed to evaluate the relationship between mortality and distance from treatment facility. Subgroup analysis of treatment type and clinical stage at diagnosis were performed. Models were adjusted for demographic, clinical, hospital, and geographic factors.

Results: For 34,729 patients with MIBC, traveling farther for treatment was associated with lower probability of mortality (referent < 12.5 miles: 12.5-49.9 miles hazard ratio (HR) = 0.96, 95% confidence interval (CI) 0.92-0.99; 50-250 miles HR = 0.91, 95% CI 0.86-0.96; Figure). This was significant for patients with cT2 disease, as well as for those who were treated at academic centers (all $p < 0.05$). Patient factors associated with receiving care close to home- older age, non-Hispanic black race, female gender, more comorbidities, Medicaid or no insurance, lower educational attainment - were also associated with increased probability of overall mortality (all $p < 0.05$). For the 11,059 patients who underwent radical cystectomy, the distance-mortality trend did not reach significance (referent < 12.5 miles: 12.5-49.9 miles HR = 0.96, 95% CI 0.90-1.03; 50-250 miles HR = 0.94, 95% CI 0.86-1.03). However, longer distance to care was associated with surgery at a high-volume institution and receipt of neoadjuvant chemotherapy (all $p < 0.001$). There was no significant association between distance and stage at diagnosis of MIBC in either the full or subgroup samples.

Conclusions: Although regionalization has resulted in increased distance to care, this study suggests that there is no direct negative impact on survival. Patients who travel for care of muscle invasive bladder cancer have a lower risk of overall mortality compared to those who live closer to their treatment facility, particularly if traveling for treatment at academic facilities. In patients who underwent RC, the association between distance and mortality was equivocal. However, traveling farther was associated with higher receipt of neoadjuvant chemotherapy and treatment at a higher volume facility. The reasons for this greater travel distance-decreased mortality finding are difficult to ascertain, though we believe it may be related to a complex association between regionalization of MIBC and RC care and healthcare seeking behaviors. Future research should evaluate patient preferences regarding distance to treatment, as well as the effect of distance and access to care in vulnerable sociodemographic populations.



65

Survival Analysis of Cytoreductive Nephrectomy in the Elderly

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Introduction: Renal cell carcinoma has shown to be one of the few cancers responsive to resection of the primary lesion in the setting of metastatic disease. Cytoreductive nephrectomy has been previously evaluated in the population as a whole, but the aging of the population and increasing health status in older patients necessitates evaluation in an explicit cohort. Using the National Cancer Database, the effect of cytoreductive nephrectomy was explored specifically in the elderly population.

Materials & Methods: The National Cancer Database was used to identify patients >=65 years of age with renal cell carcinoma (clear cell, papillary, chromophobe, collecting duct or sarcomatoid histology) presenting with clinical M1 disease. Analysis was limited to patients with known clinical T1-4 and known clinical N0-2 status. Chemotherapy use, including targeted therapies, was defined as receipt of any (single or multiagent) chemotherapy. The study was limited to years 2006-2013 to reflect the "targeted therapy" era of RCC management. Included patient characteristics were compared using chi-squared or t-tests as appropriate. Cox proportional hazards modeling was used to assess survival. All analyses were performed in Stata.

Results: The majority (86.3%) of adults over 65 with metastatic RCC received cytoreductive nephrectomy, while less than half (46.5%) received chemotherapy including targeted therapy (Table 1). On multivariate Cox regression analysis controlling for other factors, cytoreductive nephrectomy was associated with a hazard ratio of 0.746 [95%CI 0.65-0.85, p < 0.001], corresponding to a roughly 25% risk reduction of death from any cause secondary to surgery (Table 2). Receipt of chemotherapy was not associated with significant risk reduction. Increasing age was associated with greater risk of death, with patients in the 75-79, 80-84, and 85+ age groups demonstrating risk increases of 21-34% (Table 2). Other characteristics independently associated with risk of death included papillary, collecting duct or sarcomatoid histology; higher clinical T or N stage; or treatment at a non-academic center (Table 2).

Conclusions: Performance of cytoreductive nephrectomy is significantly independently associated with survival in patients over 65 years of age. Patients in this population should be counseled on the benefits of cytoreductive nephrectomy, but care should be taken to evaluate surgical risk in the setting of performance status in addition to clinical and oncologic factors.

Table 1: Population Characteristics

N (total)	3,090
Chemotherapy	1,437 (46.5)
Nephrectomy	2,666 (86.3)
Age	
65-69	1,286 (41.6)
70-75	901 (29.2)
80-84	278 (9.0)
85+	78 (2.5)
Male	2,011 (65.1)
Race	
White	2,807 (90.8)
Black	177 (5.7)
Asian	53 (1.7)
Other	53 (1.7)
Charlson-Deyo Score	
0	2,110 (68.3)
1	778 (25.2)
2	202 (6.5)
Year of Diagnosis	
2006	170 (6.1)
2007	200 (7.2)
2008	308 (11.1)
2009	358 (12.9)
2010	383 (13.8)
2011	442 (16.0)
2012	444 (16.0)
2013	465 (16.8)
Histology	
Clear cell	2,610 (84.5)
Papillary	178 (5.8)
Chromophobe	47 (1.5)
Collecting Duct	30 (1.0)
Sarcomatoid	225 (7.3)
Clinical T Stage	
cT1	732 (23.8)
cT2	858 (28.0)
cT3	1,239 (40.4)
cT4	241 (7.9)
Clinical N Stage	
cN0	2,289 (74.6)
cN1	586 (19.1)
cN2	193 (6.3)

Table 2: Cox proportional hazards model (Efron for ties) of survival with RCC

_t	Haz. Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
surgtype						
no total nephrect..	1	(base)				
nephrectomy	.7463192	.051364	-4.25	0.000	.6521422	.8540966
chemo						
no chemo	1	(base)				
chemo	.9628466	.0453547	-0.80	0.422	.877933	1.055973
agecat						
65-69	1	(base)				
70-75	1.03767	.0573595	0.67	0.504	.9311236	1.156409
75-79	1.213165	.0768827	3.05	0.002	1.071461	1.373611
80-84	1.339396	.1095475	3.57	0.000	1.141012	1.572272
85+	1.337892	.1921867	2.03	0.043	1.009594	1.772945
SEX						
1: Male	1	(base)				
2: Female	1.058668	.0504414	1.20	0.231	.9642882	1.162294
racerc						
white	1	(base)				
black	1.038518	.1047093	0.37	0.708	.8522973	1.265427
asian	.9218798	.1568359	-0.48	0.633	.6604844	1.286726
other	.9963244	.1747622	-0.02	0.983	.7064984	1.405045
CDCC_TOTAL						
0	1	(base)				
1	1.088042	.0575418	1.60	0.111	.9809187	1.206874
2	1.049674	.0936535	0.54	0.587	.8812697	1.250258
clint_ord						
cT1	1	(base)				
cT2	1.201361	.0798263	2.76	0.006	1.054664	1.368463
cT3	1.305594	.0822625	4.23	0.000	1.153955	1.47716
cT4	1.618858	.1520953	5.13	0.000	1.346691	1.94603
clinn						
0	1	(base)				
1	1.645925	.0949479	8.64	0.000	1.469965	1.842948
2	1.505485	.1474705	4.16	0.000	1.240533	1.822175
FACILITY_TYPE_CD						
1: Community Canc..	1	(base)				
2: Comprehensive ..	.8655452	.0686631	-1.82	0.069	.7409083	1.011140
3: Academic/Resea..	.7282637	.0584276	-3.95	0.000	.6222974	.8522742
4: Integrated Net..	.9092415	.0891519	-0.97	0.332	.7502712	1.101895
YEAR_OF_DIAGNOSIS						
2006	1	(base)				
2007	1.14252	.1297761	1.17	0.241	.9144879	1.427414
2008	1.085827	.1142023	0.78	0.434	.8835586	1.334401
2009	1.060531	.1105398	0.56	0.573	.8645736	1.300982
2010	1.067608	.1125811	0.62	0.535	.868263	1.312721
2011	1.024015	.1077363	0.23	0.822	.8332048	1.258523
2012	1.07615	.1152735	0.68	0.493	.8723387	1.327529
2013	.944364	.1051005	-0.51	0.607	.7592891	1.17455
histgroups						
clear cell	1	(base)				
papillary	1.400871	.1313353	3.66	0.000	1.171635	1.689337
chromophobe	.6626527	.146704	-1.86	0.063	.4293776	1.022663
collecting duct	3.023927	.5959376	5.61	0.000	2.055046	4.449601
sarcomatoid	2.784654	.226478	12.59	0.000	2.374337	3.265879

66

Implementation of a Perioperative Venous Thromboembolism Prophylaxis Program for Patients Undergoing Radical Cystectomy

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Introduction: Patients who undergo radical cystectomy are at high risk for venous thromboembolism (VTE). Prophylactic anticoagulation is routinely used post-operatively following radical cystectomy; however, the rate of deep venous thrombosis and pulmonary embolism remains high. Our enhanced recovery after surgery (ERAS) protocol includes more extensive measures for VTE prevention, including preoperative and post-discharge pharmacologic prophylaxis and early ambulation coupled with mechanical prophylaxis.

Materials & Methods: We utilized the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) to perform a single-institution, retrospective, pre- and post-intervention analysis of a systematic VTE prophylaxis program. The primary end point was 30-day post-operative symptomatic DVT or PE. Our pre-intervention cohort received post-operative pharmacologic and mechanical prophylaxis while our post-intervention ERAS cohort also underwent pre-operative pharmacologic prophylaxis, early ambulation, and—for a majority of the patients—post-discharge prophylaxis for 30 days.

Results: Among 310 patients who underwent radical cystectomy from July 2011 to January 2017, 219 (71%) were in the pre-intervention cohort and 91 (29%) were in the post-intervention cohort, which began in June 2015. Compared with the pre-intervention cohort, patients in the post-intervention cohort demonstrated a significantly lower post-operative VTE rate (6.4%, n = 14 pre-intervention vs 1.1%, n = 1 post-intervention; p = 0.048). The one VTE event in the post-intervention cohort occurred prior to initiation of 30-day post-discharge prophylaxis. There was no increase in bleeding events among the post-intervention cohort.

Conclusions: VTE prophylaxis should consist of preoperative, post-operative, and post-discharge prophylaxis. A systematic VTE prophylaxis program, including local guideline adaptation, bedside medication delivery, and patient education, was associated with significantly fewer post-operative VTE events among patients undergoing radical cystectomy.

67

Urethroplasty Outcomes for an Algorithmic Approach for Fossa Navicularis Urethral Strictures

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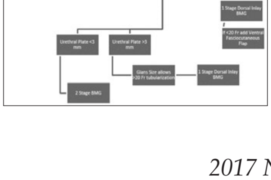
Introduction: Reconstruction of fossa navicularis (FN) strictures is difficult, requiring a multitude of reconstructive techniques to achieve both a normal cosmetic appearance and patent urethra. A combination of both 1 and 2 stage procedures using both buccal mucosa grafts (BMG) and fasciocutaneous flaps have been reported. Although there is no universally accepted technique, many prefer a 2 stage approach for FN urethral reconstruction. We have implemented a standardized algorithm for FN stricture reconstruction based on etiology, lumen size, and glans size to maximize the number of 1 stage reconstructions performed. The objective of our study was to evaluate the outcomes of this standardized approach.

Materials & Methods: A retrospective review of a prospectively maintained urethral reconstruction database from 2011-2017 was performed. Patient demographics, stricture etiology and outcomes were recorded. Patients with isolated FN strictures undergoing urethroplasty via standardized operative algorithm were included for analysis (Figure 1). Patients with an isolated meatal stenosis, those undergoing a meatotomy or meatoplasty, or a penile stricture involving the fossa navicularis were excluded. Pre and postoperative assessment included questionnaires to assess sexual function and patient perception of genital function. Stricture recurrence was defined as the need for subsequent procedure.

Results: A total of 460 patients were identified in the anterior urethroplasty database. 34 patients met inclusion criteria for analysis. 29% patients had LS, 6% had hypospadias, 44% were iatrogenic, and 9% were idiopathic. 18 (53%) patients underwent a one stage dorsal inlay BMG, 10 (29%) underwent a two stage repair with BMG, and 6 (18%) underwent a combined dorsal inlay and fasciocutaneous flap repair. 2 stage BMG repairs were performed in all hypospadias strictures, and in 50% of LS strictures. At an average follow-up of 6.8 months there was one stricture recurrence. Changes in average SHIM score were recorded with improvements seen in the dorsal inlay group (ΔSHIM = +0.67), no change was noted in those undergoing two-stage repair (ΔSHIM = 0), and a decreased average score was reported for those undergoing dorsal inlay and fasciocutaneous flap repair (ΔSHIM = -3.5). All patients completing a postoperative satisfaction questionnaire were either "very satisfied" (67%) or "satisfied" (33%). 2 patients reported increased penile sensitivity following surgery (dorsal inlay, dorsal inlay + flap), while 3 patients reported a decreased penile sensitivity following surgery (dorsal inlay). All patients state they would undergo the repair again given the chance. All but one dorsal inlay patient stated they would recommend urethroplasty to others with urethral stricture disease.

Conclusions: An algorithmic approach to reconstruction of FN strictures demonstrates that the majority can be successfully reconstructed with a 1 stage procedure. 2 Stage procedures should be reserved for patients who are hypospadias repair failures or with obliterative lichen sclerosus strictures. Postoperative sexual function complaints are rare regardless of reconstruction technique.



68

Change in Stricture Length Following Urethral Rest

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Introduction: The 2017 AUA guidelines on male urethral strictures state surgeons may place suprapubic cystotomies (SPC) prior to urethroplasties to permit the full length of the urethral stricture to develop. To our knowledge, there are no studies looking at the evolution of urethral stricture after urethral rest with SPCs in place. Our goal was to document the change in stricture length before and after SPC placement.

Materials & Methods: Charts of patients undergoing urethroplasty by a single surgeon (KM) between 1/2007 and 3/2017 were reviewed. Patients who had retrograde urethrograms (RUG) prior to and at least 3 weeks post SPC were included in the study. Statistics were completed use Microsoft Excel.

Results: 16 patients with 18 strictures were identified who had pre- and post-SPC RUG. The mean stricture length pre-SPC was 3.0 cm (range 0-8 cm) [Table 1]. The mean stricture length post-SPC was 2.7 cm (range 1-4.5 cm). The mean time of urethral rest prior to repeat RUG was 48 days (range 24-120 days). 33% (6) of the strictures had no change in length, 33% (6) increased in length and 28% (5) decreased in length. Two of the strictures became obliterative after urethral rest. All of the strictures that increased in length were in the bulbar urethra. The mean increase in length was 0.7 cm (range 0.5-1.5) and the mean decrease in length was 1.8 cm (0.5-4.5).

Conclusions: The length of urethral strictures changes after SPC placed for urethral rest. Bulbar urethral strictures were they only type that increased in size after SPC. This is an important distinction as an increase in bulbar stricture length could change operative technique from an excision and primary anastomosis to a tissue transfer repair. Pre-operative SPC should be considered to allow the stricture to declare itself as stricture length is essential to choice of urethroplasty type.

Table 1: Descriptive Statistics

	Overall	Increase** in stricture length	No change** in stricture length	Decrease** in stricture length
Age (years)	53	58	52	48
% Bulbar strictures*	63%	100%	66%	40%
Pre-SPC length (cm)	3.0	2.2	2.6	4.2
% Excision primary anastomosis†	22%	33%	0%	40%
% Emergent SPC‡	5%	0%	17%	0%

*Compared to penile or fossa navicularis location
†Compared to tissue transfer
‡Compared to planned SPC for urethral rest
**As measured from before to after SPC placement

69

Optimizing Waiting Duration for Renal Transplants in the Setting of Renal Malignancy: Is Two Years Too Long to Wait?

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Introduction: For potential renal transplant recipients, waiting duration is a significant, modifiable risk factor affecting survival. For patients with end-stage renal disease (ESRD) also affected by cancer, a waiting period is commonly imposed prior to transplant. However, no evidence based universal recommendations currently exist to guide clinicians. We aim to improve decision making by evaluating the impact of waiting duration on cancer-specific mortality (CSM), non-cancer-specific mortality (NCSM), and overall survival (OS) in kidney cancer patients awaiting renal transplant.

Materials & Methods: The United States Renal Data System (USRDS) was used to identify patients with a known cause of ESRD from the period 1983 to 2007. Evaluation of OS was performed with Kaplan-Meier estimates and Cox Proportional Hazards models. Fine-Gray competing risk models were used to assess CSM and NCSM.

Results: Of 1,374,175 patients with known causes of ESRD, 228,984 (16.7%) received a transplant. Transplant recipients with renal malignancy associated ESRD (RM-ESRD) had longer waiting durations than those with other known causes of ESRD (2.4 vs. 1.3 years, $p < 0.0001$). RM-ESRD patients who had shorter waiting durations (0-2 years) had better overall survival than those who waited longer (2+ years) (10-year OS 69.0% vs. 46.7% respectively, $p < 0.0001$); with similar CSM (10-year CSM of 10.3% vs. 10.2% respectively, $p < 0.883$), while NCSM was worse for those with longer waiting durations (10-year NCSM of 20.7% vs. 44.3% respectively, $p < 0.0001$). RM-ESRD with shorter wait time to transplantation had similar OS to other causes of ESRD, while those who waited longer had worse OS due to worse NCSM (see figure). On Cox modeling, the status of RM-ESRD was not a significant predictor ($p = 0.07$), while longer waiting duration remained significant ($p < 0.0001$).

Conclusions: We found that longer waiting durations were associated with worse outcomes for patients with RM-ESRD. We found that CSM was not affected by waiting duration, while NCSM significantly improved with shorter wait time. These findings suggest that the overall survival of potential transplant recipients with RM-ESRD may be improved by reducing waiting duration. Further prospective trials evaluating this are warranted.

70

Effect of Urethroplasty on Anxiety and Depression

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Introduction: To our knowledge, anxiety and depression (AD) in patients with urethral stricture disease (USD) and the impact of urethroplasty has never been explored. We hypothesize that patients with USD undergoing urethroplasty will have an improvement in their AD.

Materials & Methods: Patients undergoing anterior urethroplasty were retrospectively reviewed from a multi-institutional reconstructive urology database. Patient demographics and stricture characteristics were recorded. Pre- and postoperative AD was recorded using the validated Eq-5d Questionnaire. Patient evaluation of overall health (scale of 1-100 with 100 representing perfect health) and sexual function (International Index of Erectile Function: IIEF) was performed. Stricture recurrence was defined as the need for subsequent procedure. Patients were excluded if they were missing pre- or post-operative data. Outcomes were analyzed with chi-square, Fisher's exact, and Student's t-tests or ANOVA as appropriate.

Results: 298 patients met inclusion criteria with median post-op survey completion follow-up time of 4.2 months. Of the 298 patients, 86 (29%) reported preoperative AD. This group was found to have a higher rate of marijuana use, worse preop IIEF score (17.5 vs. 19.6, $p = 0.01$), and lower image of overall health (66 vs. 79, $p =< 0.001$). USD etiology was not a risk factor for pre-operative AD. Improvement or resolution of AD was experienced by 48 out of 86 patients (56%). These patients reported a significantly more optimistic preop image of overall health compared to those who had new or worsened AD (72 vs. 58, $p = 0.001$). New-onset AD was reported in 21 patients (10%). New-onset AD patients were older (54 vs. 46 years, $p = 0.03$) and had a lower preop image of overall health compared to patients with existing AD (64 vs. 80, $p = 0.002$). New-onset AD patients had a decreased postop max flow rate compared to patients who did not have new onset AD (16 ml/sec vs. 25 ml/sec; $p = 0.01$). Three patients with AD (4%) had a worsening of their AD. Stricture recurrence occurred in 8 patients (2.7%) and had no effect on the development, improvement, or resolution of AD.

Conclusions: 56% of patients with preoperative AD reported improvement or resolution after urethroplasty. Although new onset AD was rare, these patients had a significantly lower postoperative max flow rate, possibly representing a group with a perceived suboptimal surgical outcome. Items within a USD specific questionnaire that assess AD will further enable surgeons to better understand the interplay between USD and AD.

71

Retrograde Urethrogram Findings and Urethral Stricture Recurrence

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Introduction: Retrograde urethrograms (RUG) have been utilized 2-3 weeks after urethroplasty to help guide management of indwelling urethral catheters. To our knowledge, there is no published data to guide RUG interpretation. Our goal was to classify post-operative RUG findings and determine if they predicted restricturing of the urethra.

Materials & Methods: All available post-urethroplasty RUGs between 4/1/2005 to 6/1/2016 were reviewed by one author (KSM). Results were classified into four categories: normal, contour irregularity, contained extravasation and frank extravasation (figure 1). Stricture recurrence was defined as symptoms with inability to pass a 16 French flexible cystoscope or evidence of stricture on subsequent RUG. Basic diagnostics were examined looking at sensitivity, specificity and association using SAS.

Results: 105 patients were included (table 1). Median follow up from time of post-operative RUG to last known follow up was 35 months [range 6-130 months]. Findings of contour irregularity or contained extravasation on RUG were not associated with an increased risk of subsequent stricture. Frank extravasation had 50% positive predictive value (PPV) for subsequently developing a recurrent stricture at location of surgery. The sensitivity was 27% and specificity was 93%, with an increased odds ratio of 7 for developing a subsequent restricture.

Conclusions: Frank extravasation on post-operative RUG had a high specificity for predicting recurrence of urethral stricture and a PPV of 50%. In these patients, it has been our practice to replace the catheter until RUG findings resolve. The catheter was not replaced for intermediate RUG findings of contour irregularity and contained extravasation. As these data show intermediate RUG findings were not predictive of recurrent stricture, there is no indication that prolonged catheterization in this population could improve restructure rates.

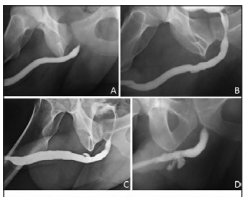

Figure 1: Classification of post-operative RUG findings A) Normal B) Contour irregularity C) Contained Extravasation D) Frank Extravasation

		No Restricture (83)	Restricture (22)	P value
Age (years)		50	54	0.28
BMI		28	29	0.25
Smoker		31%	18%	0.11
DM		11%	27%	0.03
Prior Urethroplasty		11%	14%	0.36
EPA		46%	18%	0.01
Stricture Length (cm)		3.1	4.7	0.03
Post Operative RUG findings	N	51	7	
	CI	12	5	
	CE	14	4	
	FE	6	6	

Table 1: Patient Characteristics

BMI: Body Mass Index
DM: Diabetes Mellitus
EPA: Excision Primary Anastomosis
RUG: Retrograde Urethrogram
N: Normal
CI: Contour Irregularity
CE: Contained Extravasation
FE: Frank Extravasation