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Northeastern Section of the American Urological Association 72nd Annual Meeting Abstracts

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Canadian **U**rological Association
*The Voice of Urology in **C**anada*



Association des **U**rologues du Canada
*La voix de l'urologie au **C**anada*

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Northeastern Section of the AUA 72nd Annual Meeting Abstracts

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A Message from our President



2020 has brought about a complete sea of change in how we live, socialize, operate, interact with patients, and meet together for conferences, continuing professional development, and to catch up with colleagues from across the world.

We are still grappling with COVID-19, and we will be doing so for months (if not years). As a result, the in-person meeting of the Northeastern Section of the AUA was cancelled. Instead, the Northeastern Section will be holding a **free** virtual 72nd Annual Meeting on Thursday, October 1 and Saturday, October 3. Please visit nsaua.org/annual to register and for additional meeting information.

Drs. Rob Hamilton and Yonah Krakowsky are our 2020 Scientific Co-chairs, and they put together an amazing program for the in-person meeting. We can't host the entire meeting online, but please join us for two three-hour sessions that will be held outside clinical hours for a compressed scientific program that includes all the "best of" our original in-person program.

And despite the pandemic (or perhaps because of it!), we had a record number of abstract submissions for the meeting this year. After rigorous peer-review, we are still publishing these abstracts in this issue of *CUAJ* to recognize the work, effort, and science put forth by our section members, residents, and fellows.

Please note that the Section will be in Montreal for our meeting in 2021 and will return to Charlotte for our 2022 meeting. For those *CUAJ* readers who are not aware: the NSAUA is your section for much of Canada. Canadian urologists living in all provinces from Manitoba eastwards are automatically assigned to the NSAUA when you join the AUA.

So until we can meet again in person, enjoy the 2020 Annual Meeting abstracts, and be sure to register at nsaua.org/annual to attend the NSAUA Virtual 72nd Annual Meeting the evening of Thursday, October 1 and the morning of Saturday, October 3.

Stay healthy and stay well!
Kenneth Pace, MD, MSc, FRCSC
President, NSAUA

Poster Session 1: Basic Science, Best Practices, and Benign Disease

Poster #1

Sustained plasminogen activator inhibitor-1 (PAI-1) expression during obstructive uropathy promotes glycolytic reprogramming and renal fibrosis via Rac-GTPase-dependent mechanisms

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Introduction: Some patients with obstructive uropathy develop fibrosis and chronic kidney disease (CKD), which affects more than 850 million people worldwide. PAI-1 is a causative factor in the progression of obstructive uropathy to CKD, but the pathophysiological basis is not well-understood. Metabolic alterations were recently identified as a contributor to the progression of fibrosis, and increased glycolysis has emerged as a key factor in obstructive nephropathies. Glycolysis converts glucose to pyruvate, thereby generating energy. This is orchestrated by three enzymes that catalyze irreversible steps in the glycolytic pathway: hexokinase-1 (HK-1), phosphofructokinase-1 (PFK-1), and pyruvate kinase M2 (PKM2). PAI-1 expression is robustly induced in renal tubules and interstitial cells during various nephropathies in both humans and mice. Involvement of PAI-1 in renal metabolic alterations has not been well-characterized. Therefore, we tested the hypothesis that renal tubular PAI-1 induction promotes glycolytic reprogramming during fibrosis.

Methods: To mimic the sustained renal tubular PAI-1 induction seen in CKD, we stably expressed PAI-1 (driven by a CMV promoter) via lentiviral transduction in HK-2 renal epithelial cells (CMV-PAI-1 cells). We selected with puromycin to ensure stable expression. We used Western blot analysis to confirm PAI-1 expression and compare expression of glycolytic enzymes and fibrotic markers in CMV-PAI cultures and empty vector transduced HK-2 cells (CMV-Control cultures). We used unilateral ureteral obstruction (UUO), a mouse model that mimics obstructive uropathy, to further investigate the relationship between PAI-1 and glycolysis.

Results: PAI-1-expressing renal epithelial cells undergo dedifferentiation (evident by loss of the epithelial marker E-Cadherin and gain of the mesenchymal marker vimentin) and spontaneous fibrogenesis (marked by increased fibronectin and collagen-1 expression) relative to CMV-control cells. Expression of HK-1, PFK-1, and PKM2 is robustly induced in CMV-PAI-1 cultures compared to control transductants. In vivo, PAI-1 induction correlated with increased glycolytic enzyme expression in mice subjected to UUO relative to sham or contralateral kidneys. Mechanistically, sustained PAI-1 expression leads to induction of Rac1b, a constitutively active isoform of Rac1-GTPase. Treatment with a specific Rac-GTPase inhibitor, EHT-1684, not only dramatically decreases Rac1b expression and fibrotic phenotype, but also attenuates glycolytic enzyme induction compared to vehicle-treated CMV-PAI-1 cultures.

Conclusions: PAI-1 stable expression leads to increased glycolytic reprogramming and fibrogenesis via Rac1-dependent pathways. We identified involvement of PAI-1 in metabolic alterations and epithelial maladaptive repair evident during CKD. Targeting Rac1 signaling represents a novel therapeutic target in suppressing PAI-1-driven tubular dysfunction and pathological metabolic shifts leading to CKD.

Funding: National Institute of Health, Capital Region Medical Research Institute

Poster #2

The role of mTOR in differentiation of spermatozoa

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Introduction: Testis development is an important component of male maturation, allowing for both testosterone-induced masculinization and sperm production. The mammalian target of rapamycin (mTOR) is an evolutionarily preserved protein that regulates homeostatic processes, including growth-factor response, cytoskeletal organization, and metabolism. mTOR signaling is indispensable to development and knockout (KO) of mTOR leads to embryonic lethality in mice. Rapamycin, an inhibitor of mTOR, is well-established to extend organisms' lifespan from yeast to mice; however, its application in humans causes male infertility. We envision three possibilities causing infertility: rapamycin 1) triggers a non-specific mTOR-independent reaction; 2) inhibits the mTOR pathways in somatic cells; or 3) directly inhibits the mTOR pathways in germ cells. Because mTOR pathway function in germ cells is not well-understood, the objective of this study was to examine the role of mTOR in germ cell development.

Methods: A testis-specific mTOR-CKO mouse was created using a lox-cre system driven by Neurog3-cre, which is expressed in late spermatogenesis. Testis were examined by H&E, electron, and immunofluorescence microscopy. RNA-seq, small RNA-seq, and ribosome profiling were also used. Metabolomic analysis of testis tissue with mass spectroscopy was performed.

Results: H&E and electron microscopy demonstrated disorganization of the seminiferous tubules in the mTOR-CKO mice with arrest at the round spermatid. RNA-seq demonstrated decreased expression of mature spermatozoa markers in the CKO compared to controls, corroborating the finding of arrest at the round spermatid. Furthermore, analysis of micro-RNAs (miRNAs), demonstrated aberrant miRNA expression, which may play an earlier role in halting spermatid development. Metabolomic analysis demonstrated increased amino acids, such as threonine, cysteine, and isoleucine, in the CKO mouse compared with controls. CKO testis had altered nucleic acid levels, with elevated guanosine but decreased nucleic acid-monophosphate species. Aberrant guanosine likely represents alterations in the guanosine-triphosphate-dependent signaling via the mTORC1 pathway, while decreased nucleotide monophosphates likely represent decreased mRNA production.

Conclusions: This study demonstrates a germ cell-specific CKO of mTOR signaling leads to disorganized seminiferous tubules and arrest of sperm production at round spermatid phase. Metabolomic analysis demonstrated decreased mRNA transcription and protein translation in the CKO, likely representing loss of downstream signaling from the mTORC1 complex and dysregulated miRNA signaling. Our results rule out the possibilities that the rapamycin induces male infertility by an indirect effect on somatic cells or a non-specific response, but instead demonstrate a direct role for mTOR-mediated mRNA and protein regulation in spermatozoa differentiation and metabolism.

Poster #3**Effect of metformin on calcium oxalate stone disease and survival in a *Drosophila melanogaster* model**

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Introduction: Calcium-based urinary stone disease is complex and multifactorial in etiology, and has been linked to obesity, insulin resistance, urinary tract infection, and inflammation. However, the exact mechanisms involved remain poorly understood and there are limited treatment options for patients. Metformin is widely used for the management of type II diabetes mellitus and some studies suggest that it may influence urolithiasis. We aimed to further evaluate this compound, a potent antioxidant on the effect of calcium oxalate stone formation in a *Drosophila melanogaster* (DM) model, and in combination with a uropathogenic *E. coli*, which we have shown previously in our model to increase stone burden.

Methods: Wild-type DM flies were fed either a standard or lithogenic diet with 0.1% sodium oxalate (NaOx). The flies were then treated with a combination of either a non-urease producing *E. coli* strain (UTI89) and/or metformin (5 mM). Lifespan was assessed through survival curve analysis. The influence of metformin on calcium oxalate (CaOx) crystal formation was assessed through an agar plate assay where crystal formation was quantified in the presence of metformin (5 mM). CaOx crystal adherence was examined by exposing 90% confluent MDCK renal epithelial cells to UTI89 (103 CFU) for 20 minutes followed by CaOx crystals (0.5 mg/mL) in artificial urine with or without metformin (5 mM) for an additional 20 minutes. Unattached crystals were then washed free and crystal adherence was determined with birefringence microscopy and quantified with pixel intensity.

Results: Exposure of DM flies with *E. coli* UTI89 did not affect survival; however, there was a significant decrease in the lifespan of flies fed the lithogenic diet containing 0.1% NaOx ($p < 0.0001$). Metformin resulted in a significant increase in lifespan of male but not female DM flies exposed to NaOx, both with ($p = 0.0011$) and without *E. coli* UTI89 ($p = 0.0066$) co-treatment, partially reversing the effect of the NaOx. Metformin had no effect on CaOx crystal formation or adherence, and these results were independent of changes in pH and exposure to *E. coli* UTI89.

Conclusions: These findings suggest that treatment with metformin may partially ameliorate the deleterious effects of CaOx urolithiasis in a DM model, and this may be gender-dependent. Metformin does not appear to influence CaOx crystal formation or adherence. Further investigation is required to confirm these results and to better delineate the potential mechanisms by which metformin may be impacting the pathophysiology of urinary stone disease.

Funding: CUASF

Poster #4**The effect of urinary infection and antibiotics on calcium urolithiasis: A potential novel pathogenic role for *Sinc***

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Introduction: Recent evidence suggests that the formation of calcium-based stone disease may be impacted by both urinary bacteria and antibiotics. Zinc (Zn) may play an integral role in this process given that it serves as both an early nidus for the mineralization of urinary stones and is involved in host immune system function and bacterial pathogenesis. We aimed to further investigate the role of urinary bacteria and antibiotics on the pathogenesis of urolithiasis, potentially through modulating Zn transporters as part of the immune response.

Methods: Wild-type *Drosophila melanogaster* (DM) flies were reared under standard conditions with either a standard or lithogenic diet containing 0.1% sodium oxalate, and then treated with a combination of either a non-urease producing *E. coli* strain (UTI89), ciprofloxacin (0.2 µg/mL) or TMP-SMX (30/10 µg/mL) for 7 or 14 days. Stone burden was assessed through measured pixel intensity of CaOx crystals in dis-

sected Malpighian tubules. To assess Zn transporter gene expression, DM flies were homogenized, and total RNA was isolated and converted to cDNA and quantitative PCT was then performed for each known DM Zn transporter gene [ZnT35C (CG3994), ZnT63C (CG17723), ZnT41F (CG11163)], using α -tubulin as an internal control.

Results: Increased CaOx stone formation at day 7 was observed in the DM flies treated with *E. coli* UTI89 ($p = 0.005$), ciprofloxacin ($p < 0.001$), and TMP-SMX ($p = 0.003$). Preliminary results demonstrated a trend towards increased expression of the Zn transporter gene ZnT41F in DM flies treated with UTI89. However, co-treatment with both *E. coli* UTI89 and either antibiotic reduced the expression of ZnT41F to baseline levels.

Conclusions: These findings suggest that non-urease producing *E. coli* and the antibiotics ciprofloxacin and TMP-SMX impact CaOx stone formation, and that modulation of Zn transport proteins may be involved in this process. Further investigation is required to confirm these results and delineate the exact mechanism involved.

Funding: CUASF

Poster #5**Modulation of a prostate cancer-microbiota axis by MAG-EPA prebiotic**

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Introduction: The microbiota is increasingly connected to human health and disease. A recent study assigned 2.5% of all sequences from The Cancer Genome Atlas (TCGA) to microorganisms after stringent contaminant filtering (Poore et al, *Nature* 2020). Interestingly, machine learning analysis of these cancer-related bacteria signatures was able to discriminate between healthy and cancer patient samples. Since large-scale genomic cancer data were not originally designed to measure non-human DNA, we performed 16sRNA metagenomic to directly measure bacterial DNA sequences in unfixed human prostate cancer tissues and environmental controls. To further test the relevance of these microorganism-derived molecules found in tissue samples, we assessed tissue microbiota in prostate cancer patients supplemented with a specific prebiotic or a placebo and measured the modulation of prostate-derived 16sRNAs.

Methods: Archived tissue from 30 men participating to a phase 2b randomized, double-blind, placebo-controlled trial testing the effects of a prebiotic in men with prostate cancer treated by radical prostatectomy were used. In that trial, participants were randomized to take either 3 g/day of MAG-EPA, a long chain omega-3 fatty acid-derived prebiotic or a placebo for 4–10 weeks before surgery (NCT02333435). Several biological samples were collected at study baseline and at surgery, including blood and prostate tissue. These participants also agreed to provide stool samples. Bacterial composition from optimal cutting temperature (OCT)-embedded prostate tissue at surgery was assessed using 16sRNA metagenomic.

Results: Phylogenetic analysis showed that sequences associated with *Firmicutes* phylum, which is naturally enriched in humans, were significantly higher in prostatic tissues compared to controls ($p = 0.031$). *Oscillibacter* genus was the only signal to be significantly different between normal and tumor samples. We also observed that sequences from *Clostridia* were significantly reduced in patients who received MAG-EPA compared to placebo. In contrast, sequences associated with *Corynebacterium* genus were enriched in the MAG-EPA group with a stronger trend in tumor compared to normal samples. Interestingly, prostate tissue-related 16sRNA profiles were different in patients experiencing prostate cancer pathological downgrade between diagnosis and surgery. Fecal bacteria profiles (gut microbiota) at study baseline were also predictive of cancer downgrading in this population.

Conclusions: Taken together, our results support the idea that bacteria sequences can be modulated at the tumor site by a targeted dietary intervention and that this putative gut-prostate cancer axis could be leveraged to target prostate cancer progression.

Funding: Canadian Cancer Society Research Institute and the Foundation of CHU de Qu ebec funded the RCT; Prostate Cancer Canada funded the gut-related microbiota analysis; SCF Pharma, Ste-Luce, QC funded the tissue-related microbiota analysis

Poster #6
Multi-institutional review of dorsal onlay urethroplasty outcomes for radiation-induced urethral strictures

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Introduction: Radiation-induced urethral stricture disease is particularly difficult to treat. These patients are at risk of high recurrence rates and poor continence outcomes, with many developing stress urinary incontinence (SUI) postoperatively. We hypothesized that dorsal-onlay buccal mucosal urethroplasty (D-BMGU) would have minimal postoperative de novo SUI. In this study, we report outcomes from a large, multi-institutional cohort undergoing with greater than one year of followup.

Methods: Men with a history of radiotherapy for prostate cancer treatment who underwent D-BMGU for posterior urethral strictures from 10 institutions from 2010–2019 were reviewed. Patients with a minimum of 12 months followup were included. Preoperative patient characteristics and continence status were reviewed. Postoperative outcomes, including urethral patency, SUI, uroflowmetry, and patient-reported outcome measures were analyzed.

Results: Of 103 men with post-radiation stenosis treated with D-BMGU, 79 (mean age 70, range 52–82) met inclusion criteria, with a mean length of stenosis 3.8 cm (1.5–18). Radiation modalities included: 36 (45.6%) external beam radiotherapy (EBRT), 13 (16.5%) brachytherapy (BT), 10 (12.7%) combination EBRT and BT, and 18 EBRT and radical prostatectomy (22.8%). At a mean followup of 29.6 months (12–88), 14 patients (17.7%) had urethral stenosis recurrence. Of 37 patients who had no SUI prior to surgery, 3 men (8.1%) developed de novo SUI following dorsal onlay urethroplasty; 28 of 29 patients with SUI prior to surgery remained incontinent, while one patient actually regained continence. Of the 13 men whose baseline continence status was unknown due to complete obstruction, 8/13 (62%) were incontinent postoperatively. Sixteen of the 39 patients with postoperative SUI (41%) underwent delayed AUS placement within 6–12 months. With respect to patient-reported outcomes, improvements in median IPSS (21 to 6, $p \leq 0.001$) and median IPSS QOL score (5 to 1, $p \leq 0.001$) were reported. Thirty-seven patients (47%) completed GRA questionnaires, with 28 patients (77.8%) reporting marked improvement after surgery and 6 (16.7%) reporting moderate improvement.

Conclusions: D-BMGU is a feasible management option in patients with post-radiation urethral strictures. This study demonstrates that the non-transsecting approach of D-BMGU offers both comparable patency rates to previously reported techniques, as well as reduced rates of de novo stress incontinence.

Poster #6. Table 1. Operative, postoperative, and patient-reported outcomes following D-BMGU in radiated patients

Operative outcomes	n (%)		p
	Mean (median) [range] (IQR)		
Length of hospital stay (days) n=79	1.4 (1) [0–6] (1:2)		
Estimated blood loss (cc) n=74	224 (180) [20–1500] (100:300)		
Surgical time (min) n=78	184 (184) [80–464] (135:219)		
Stricture recurrence	14 (17.7%)		
Time to recurrence	7.8 (5) [2–28] (3-12)		
Emergency visits	6 (7.6%)		
Readmissions	2 (2.5%)		
Surgical and patient-reported outcomes (Preop n, Postop n) [Complete pairs]	Preoperative Mean (median) [range] (IQR)	Postoperative Mean (median) [range] (IQR)	p
Uroflow, cc/sec (49,56) [45]	5.2 (4.6) [1.9–19] (3.5:6)	16.2 (15.9) [3.5–34] (11.9:19.8)	0.001
PVR (54,61) [50]	129 (92.5) [0–465] (39:200)	61.6 (26) [0–350] (5:73)	0.001
IPSS (43, 54)	20.5 (21) [0–32] (16:25)	7.6 (6) [0–29] (3:11)	0.001
IPSS QOL (43,56)	4.7 (5) [3–6] (4:5)	1.8 (1) [0–6] (1:3)	0.001
Mean SHIM score (53,60)	6.8 (5) [0–23] (3:7)	6.2 (5) [0–24] (1:6)	0.429
Stress urinary incontinence status	n (%)	n (%)	
Continent	37 (46.8%)	40 (50.6%)	
Incontinent	29 (36.75)	39 (49.4%)	
Unknown	13 (16.5%)	0 (0%)	
GRA (n= 37)			
+3		27 (73%)	
+2		7 (18.9%)	
0		2 (5.4%)	
-3		1 (2.7%)	
Splitting/spraying stream (54,57)	16 (29.6%)	11 (19.3%)	0.001
Post-void dribble (54,59)	28 (52%)	18 (30.5%)	0.035
Penile pain (55,55)	8 (14.5%)	3 (5.5%)	0.056
Weak ejaculations (37,42)	7 (19%)	5 (12%)	1.000

Poster #7
Implementation of a novel cystoscopy survey for adoption of guidelines-based care

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Introduction: There is increasing awareness of deleterious downstream effects of antibiotics, such as antibiotic resistance. The American Urological Association (AUA) released guidelines in June 2019 that recommended oral antibiotics only if there is a break in the mucosal barrier due to biopsy, dilation, or other similar procedures. Urinary tract infection (UTI) rates are approximately 3% in placebo-controlled trials.

Methods: We retrospectively reviewed the urology clinic schedule for three months (November 2018 to January 2019) and identified patients who underwent cystoscopy. We then completed a literature review and designed a cystoscopy survey based on previous protocols/AUA guidelines to identify patients at high risk of infection and target those patients for antibiotics. We then implemented our intervention where we provided a 'formal' grand rounds presentation, focused emails with a summary of the literature, edited the electronic health record cystoscopy order set, educated clinic staff, and started using the cystoscopy survey. We then recorded antibiotics given for prophylaxis at time of procedure, individual patient risk factors for infection, 30-day infection outcomes, and urine culture data both pre-intervention and post-intervention.

Results: We identified 550 cystoscopies pre-intervention and the overall infection rate was 3.6% (n=20). We identified 602 cystoscopies post-intervention and the overall infection rate was 3.5% (n=21). We found that 43% (n=260) of the clinic population were deemed low-risk for infection and did not require antibiotics at cystoscopy using the cystoscopy survey.

Conclusions: We found that implementation of a cystoscopy survey enabled rapid adoption of new AUA guidelines on antibiotic prophylaxis for cystoscopy without any spike in infection rates.

Poster #8
Anastomotic stricture repairs in transgender men following phalloplasty

Jessica Schardein, Matthew Beamer, Dmitriy Nikolavsky
 SUNY Upstate

Introduction: Anastomotic strictures are the most common type of strictures following phalloplasty. The lack of a corpus spongiosum and the non-specific blood supply of the neourethra makes urethroplasty challenging. Our objective is to explain how patient characteristics can influence urethroplasty technique and demonstrate the feasibility of single-stage and staged repairs in properly selected patients to improve quality of life.

Methods: All patients who presented with strictures following phalloplasty and underwent anastomotic stricture repairs were identified. Preoperatively, all patients were determined to have anastomotic strictures via retrograde urethrogram (RUG) and voiding cystourethrogram (VCUG). Patients were grouped preoperatively based on prior failed urethroplasty and intraoperatively based on tissue characteristics. Those who had no prior urethroplasty failure and well-vascularized tissue underwent a single-stage repair using a double-face urethroplasty technique with buccal mucosal graft (BMG) (group 1), while those who had a prior failure or

poorly vascularized tissue underwent a staged urethroplasty with BMG (group 2). Postoperatively, RUG and VCUG were used to assess urethral patency and followup questionnaires were used to assess patient reported outcomes.

Results: A total of 31 post-phalloplasty patients presented for neourethral stricture repairs between December 2014 and December 2019. Of these, 13 had isolated anastomotic strictures. Nine patients underwent a single-stage repair (group 1) and 8 were available for followup. The remaining 4 patients (group 2) underwent a staged repair and 3 were available for followup. In group 1, there were two stricture recurrences at a mean followup of 29 months (3–56). Of the remaining 6 patients, all reported upright voiding, as well as at least a moderate improvement in their condition. Additional patient reported outcomes included a mean IPSS of 3.8 (0–7) with IPSS QOL of 1.2 (0–3) and a mean PROM of 4.5 (1–10) with PROM QOL of 1 (0–4). In group 2, there were no stricture recurrences at a mean followup of 23 months (6–54). All patients who presented for followup reported upright voiding and marked improvement in their condition. Mean IPSS was 5 (3–6) with IPSS QOL of 0.3 (0–1) and mean PROM was 2 (1–3) with PROM QOL of 0.

Conclusions: Anastomotic stricture repairs can be performed in a single-stage or staged manner. A single-stage double-face urethroplasty is a feasible option in patients with no prior urethroplasty failure and well-vascularized tissue. A staged procedure is a feasible option in patients with poor tissue quality. Proper patient selection is important for successful reconstruction.

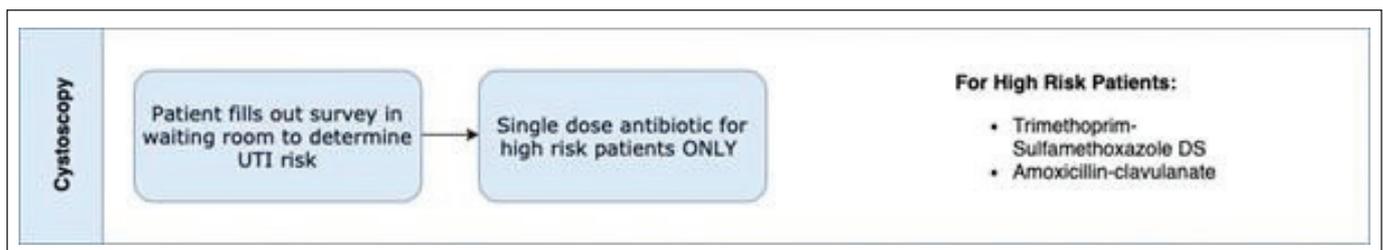
Poster #9
Bleeding risk in transurethral enucleation/resection of the prostate (TUERP) patients on oral anticoagulants (OAC) and platelet aggregation inhibitors (PAI)

Mauro Dispagna, Connor Policastro, Sergey Kravchick
 SUNY Upstate Medical University

Introduction: Many candidates for prostate resection are maintained on oral anticoagulants (OACs) or platelet aggregation inhibitors (PAIs), which is thought to increase their risk of postoperative bleeding. The bipolar resectoscope can be used to enucleate the prostate along the surgical capsule for treatment of benign prostatic hypertrophy, referred to as transurethral enucleation/resection of the prostate (TUERP). We have anecdotally observed no difference in the risk of postop bleeding in patients who underwent TUERP based on preoperative and perioperative use of OACs or PAIs and performed a single-surgeon, retrospective review to test this hypothesis.

Methods: Four groups of patients were assessed: patients on Aspirin (ASA) who continued this medication through the procedure (group 1, n=18), patients who held ASA preop (group 2, n=13), patients who were on OAC and bridged with low-molecular-weight heparin (group 3, n=8), and patients on dual PAIs (ASA/clopidogrel) and only held clopidogrel preoperatively (group 4, n=7). Two patients on combined OAC and PAI were excluded from the analysis. One-way ANOVA was used to assess for differences between the four groups.

Results: Mean tissue resection weight was 53.9 g, with a mean operative time of 104 minutes. Mean postoperative outcomes were hemoglobin drop of 1.28 g/dL, 1.2 days on continuous bladder irrigation, and 2.17 days with an indwelling catheter. Postoperative hemoglobin drop, days on continuous bladder irrigation, and days requiring catheterization did



Poster #7. Fig. 1.

Poster #9. Table 1. Patient demographics and postoperative outcomes

Preoperative	Age	IPSS	Hematuria (%)	Indwelling catheter (%)	Prostate size (cc)	Prostate resected (mean %)	Hb drop	CBI days	Catheter days
ASA continued (group 1)	69.10	16.70	11.00	22.20	97.00	55.00	0.94	1.00	1.67
ASA held (group 2)	78.20	17.60	23.00	61.50	94.60	59.00	1.65	1.60	2.30
Bridged OAC (group 3)	72.10	18.40	25.00	62.50	91.30	54.00	1.30	1.25	2.10
Clopidogrel held, ASA continued (group 4)	70.50	19.60	57.00	85.70	105.6	52.00	1.45	1.30	3.30
p (between groups)	0.03	0.06	0.12	0.01	0.94	0.60	0.36	0.19	0.15

not significantly vary between groups. No patients from group 1 required readmission within 30 days, while one patient from each other group did. The patient in group 2 required blood transfusion and the patients from group 3 and 4 each required re-admission for cystoscopic clot evacuation. **Conclusions:** Our initial cohort's data suggest that TUERP is a safe procedure for patients who continue their PAIs perioperatively, with no significant difference between those who did and did not hold their PAIs or other at-risk patients who bridged OACs or were on dual APIs preoperatively.

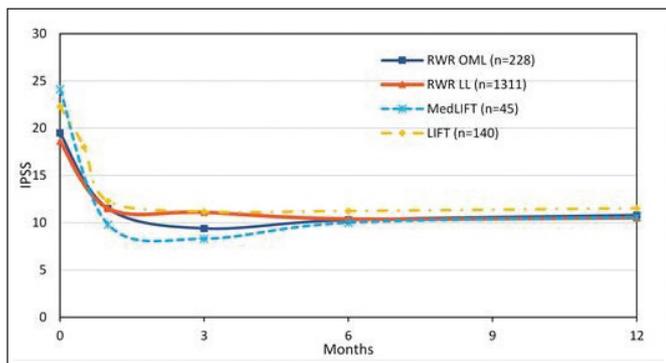
Poster #10
Prostatic urethral lift (PUL) is effective in real-world subjects with obstructive median lobes

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Introduction: Results from the MedLift trial demonstrated that prostates with median lobe obstruction can be treated safely and effectively with the minimally invasive PUL procedure. Here, we assess outcomes of the treatment in subjects with obstructive median lobes (OML) using the PUL real-world retrospective (RWR) study and compare to subjects with obstructive lateral lobes (LL) only and MedLift results.

Methods: A total of 2090 patients who underwent PUL after market clearance through May 2019 across 18 U.S. and Australian sites were included in the RWR database. Non-retention patients at baseline were stratified into OML (n=228) or LL (n=1311) cohorts. Baseline demographics of RWR OML subjects were compared to RWR LL and MedLift subjects. Absolute IPSS, QoL, Qmax, and PVR were evaluated at 1, 3, 6, and 12 months post-PUL. Adverse events of RWR OML subjects were calculated. All outcomes were compared to RWR LL subjects and absolute IPSS was compared to MedLift subjects.

Results: RWR OML subjects were 69.8 years old (±8.5) with larger prostate volumes (53.3±21.3 cc) than RWR LL (45.4±19.6 cc) and MedLift



Poster #10. Fig. 1.

(44.2±11.2) subjects, and with lower baseline IPSS (19.5±6.9) than MedLift subjects (24.2±4.9). Qmax at baseline was also significantly lower in RWR OML subjects than RWR LL and MedLift patients. Following PUL, RWR OML subjects' absolute IPSS and QoL scores were similar to RWR LL subjects throughout followup, and at 3 months the RWR OML cohort had significantly better IPSS and QoL (Fig. 1). Despite differences at baseline in IPSS between RWR OML and MedLift subjects, absolute IPSS scores at followup were equivalent at each timepoint between both groups (Fig. 1). QoL, Qmax, and PVR in RWR OML subjects were also similar to or better than RWR LL subjects throughout followup. The rate of post-procedure catheterization in RWR OML (7.9%) subjects was no different from RWR LL subjects (5.8%) when catheterization was not the standard of care. AEs were not different between RWR OML and LL subjects.

Conclusions: The large, multicenter, real-world study of PUL reveals similar symptom response and safety profile in OML subjects compared with LL patients and confirm results from the controlled MedLift study.

Funding: NeoTract/Teleflex

Poster #11
A simple opioid education session for urologists decreases opioid prescribing following transurethral resection of prostate

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Introduction: Opioid overprescription continues to be a driving force in the opioid crisis worldwide. According to the CDC, there are more than 130 opioid-related deaths every day in the U.S. In patients who undergo urological surgery, 1 in 1000 develop opioid dependence or have an opioid-related adverse event, including death. Factors that contribute to the overall problem include lack of physician training in prescribing opioids and concerns over patient-perceived pain. Our study aims to identify opioid prescriptions trends for a common endourological procedure and assess the efficacy of an educational intervention in reducing opioid prescribing.

Methods: In March 2019, an educational rounds session was held for all staff and resident physicians in the division of urology at our institution. The dangers of opioid overprescription and opioid reduction strategies were discussed. We reviewed all cases of transurethral resection of prostate (TURP) for 1 year prior and 7 months following the educational intervention. Patient age, primary vs. secondary procedure, resection time, resection weight, days in hospital, opioid prescription status, morphine milligram equivalents (MME), and resident vs. staff prescriptions were evaluated in both groups. Multivariate regression analyses were performed to evaluate risk factors for opioid prescription and identify changes in opioid prescription post educational intervention.

Results: A total of 314 TURP procedures were performed during the study period. Of these, 184 were pre-educational intervention and 130 were post-intervention. Demographics were similar between both groups. An average of 28.1 MMEs per patient were prescribed in the pre-intervention group compared to 11.4 MMEs post-intervention. The most commonly prescribed opioid was tramadol, followed by hydromorphone. Patients

in post-intervention group were almost 3 times less likely to receive an opioid prescription (OR 0.23, 95% CI 0.138–0.383, $p < 0.0001$). Overall, there was 60% reduction in opioid prescription post-intervention. Of all variables tested, none of the factors reached statistical significance as independent risk factors for opioid prescription.

Conclusions: Opioid over-prescription continues to be a major factor in opioid dependency, abuse, and adverse events. Our study demonstrates that a simple educational intervention can significantly reduce opioid prescription rates post-TURP. This may have a profound impact on the number of patients unnecessarily exposed to opioids while decreasing opioids in the community.

Poster #12
Poor clinical guideline adherence and inappropriate testing in men with incident lower urinary tract symptoms due to benign prostatic hyperplasia

Charles Welliver¹, Lydia Feinstein², Julia Ward², Kevin Abbott³, Ziya Kirkali³, Erlene Martinez-Miller², Brian Matlaga⁴, Kevin McVary⁵

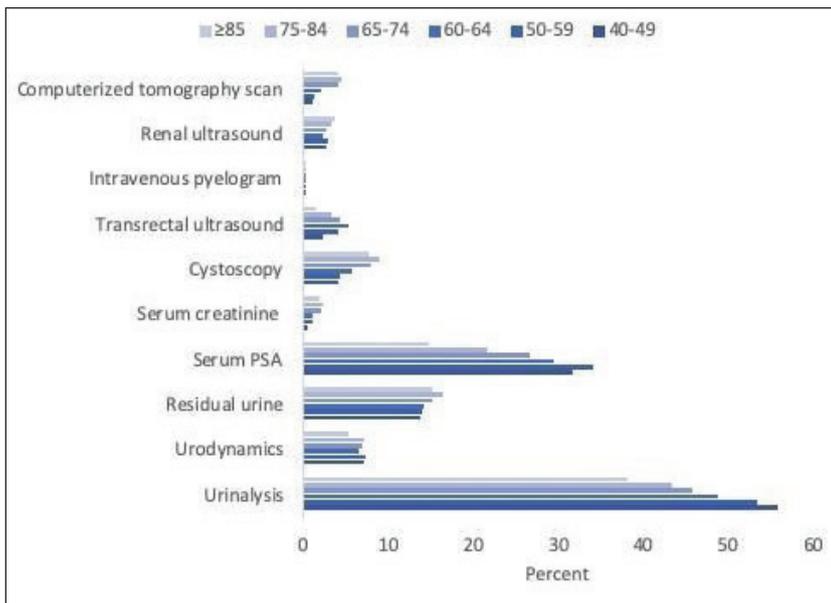
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Introduction: The American Urological Association (AUA) guidelines make testing recommendations for men with lower urinary tract symptoms with benign prostatic hyperplasia (LUTS/BPH) to identify harmful related conditions like urinary retention. However, knowledge of guideline adherence is limited. We assessed guideline adherence trends for LUTS/BPH evaluation testing among a national male population aged ≥ 40 years.

Methods: As part of the Urologic Diseases in America Project, we analyzed two insurance claims databases: the Centers for Medicare & Medicaid Services Medicare 5% Sample (N=546 000 annually) and the Optum[®] de-identified Clinformatics[®] Data Mart Database (N=1 650 900 annually). To examine LUTS/BPH incidence and guideline testing adherence, we constructed a longitudinal cohort of newly diagnosed men in 2009.

Results: Among incident LUTS/BPH patients, 59% underwent evaluation testing. While urinalysis was the most commonly ordered test, it was performed in <60% of men (Fig. 1). Urinalysis and prostate-specific antigen (PSA) were more common among younger patients, while cystoscopy and computerized tomography scan were more common among older patients.

Conclusions: Older men were less likely than younger men to undergo evaluation testing at initial LUTS/BPH diagnosis. Recommended tests



Poster #12. Fig. 1. Percentage of patients undergoing evaluation testing during incident LUTS/BPH year, stratified by age.

(e.g., urinalysis) were not routinely ordered while testing recommended for older men (e.g., PSA) was more common among younger men. Providers should be cognizant of AUA guidelines when assessing LUTS/BPH patients.

Funding: The Urologic Diseases in America project was funded by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) through a contract to Social Scientific Systems (HHSN276201500204U)

Poster #13
Implementation of new guidelines by using a prostate biopsy survey

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Introduction: Urinary tract infection and sepsis are well-described complications after transrectal prostate biopsy and even healthy individuals require antimicrobial prophylaxis. In July 2019, the American Urological Association released updated antimicrobial prophylaxis guidelines for urologic procedures. Current guidelines recommend a single dose of fluoroquinolone for low-risk individuals. For high-risk individuals, an augmented regimen is recommended: single-dose fluoroquinolone and aminoglycoside or cephalosporin or 1st-/2nd-/3rd- generation cephalosporin and aminoglycoside. However, there is limited guidance on identifying “high-risk” patients.

Methods: A retrospective review of outpatient urology clinic visits over three months (November 2018 to January 2019) identified patients who underwent transrectal prostate biopsy. Prophylactic antibiotics administered, patient risk factors, and 30-day infection outcomes were recorded. Using AUA white papers and AUA guidelines, we designed a survey to identify high-risk patients to be targeted for an augmented prophylactic antibiotic regimen. Our intervention was then implemented through a presentation at our weekly departmental grand rounds presentation, targeted emails reviewing literature, altering the clinic prostate biopsy smart set and holding an in-service for all clinic staff. After the intervention period, a three-month retrospective review was performed again for patients undergoing transrectal prostate biopsy to identify patient risk factors, antibiotics administered, and 30-day infection rates.

Results: We identified 113 prostate biopsies in the pre-intervention group with an overall infection rate of 5.3% (n=6) and 0.8% (n=1) sepsis rate. In the post-intervention group, there were a total of 119 prostate biopsies with an overall infection rate of 5.0% (n=6) and 1.6% (n=2) sepsis rate.

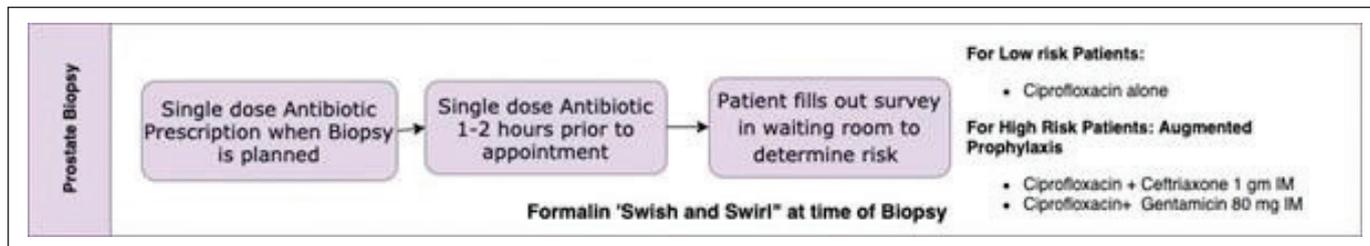
Conclusions: Administering surveys pre-prostate biopsy in the clinic allowed us to identify high-risk patients to receive an augmented antibiotic regimen. Through targeted education, we were able to encourage adherence to the new guidelines without an increase in post-biopsy infection rates.

Poster #14
Reducing traumatic Foley catheterization: System-wide implementation of a Foley catheter placement policy

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Introduction: Difficult Foley placement is one of the most common reasons for urologic consultation. Repeated Foley catheter attempts or improper catheter placement can lead to patient morbidity and increased healthcare costs. Here, we examined our difficult Foley consultations and implemented improved staff training, as well as an algorithm to reduce adverse events related to Foley placement.

Methods: We performed a prospective observational study of consultations for difficult Foley catheter place-



Poster #13. Fig. 1. Protocol design.

ment across 4 tertiary care hospitals from December 2018 to May 2019. Patients were included in the study if a consultation was requested for difficult foley placement in males older than 18. In the second phase, healthcare professionals (medical students, nurses, and residents) were surveyed to assess comfort with Foley catheter placement and familiarity with coude catheter use.

Results: There were 52 consultations for difficult Foley placement during the study period. Half (50%) of patients had two or more attempts at catheter placement prior to urologic consultation. Standard catheter or coude catheter placement was performed in 33 patients. Guide wire placement was used in 7 patients. Cystoscopy was used in 11 patients with findings of urethral stricture in 6 patients and false passage in 5 patients. There were 100 survey responses. Most (97%) received general Foley catheter training and only 19% of responders had received training on how to properly place coude catheters. This data was presented to a hospitalwide quality improvement group, and several interventions will be implemented in order to improve Foley catheter placement, including: universal use of 18 F coude catheter in males over age 18, perminant stocking of 18 F coude catheter kits in the operating rooms and floors, Foley placement algorithm, and nurse/provider level training on coude catheter placement.

Conclusions: The majority (64%) of difficult Foley placement consultations were able to be performed using standard or coude catheters. Most staff were found to be unfamiliar with coude catheters. Using this data, we intend to implement systemwide interventions that we hope will improve Foley catheter education and reduce patient morbidity with traumatic catheterizations.

Poster #15
The dismal state of benign prostatic hyperplasia educational videos on YouTube

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Introduction: Benign prostatic hyperplasia (BPH) affects more than half of men after age 70, and historically patients have relied on their physician for disease education. Now, educational content on the internet is readily available and unregulated, and so may be inaccurate, confusing, or of low quality. This study evaluates the quality of, and engagement with, the top YouTube videos pertaining to BPH.

Methods: A YouTube search for "Benign Prostatic Hyperplasia" and "BPH" revealed that the top 25 results represented >90% of all views. Two-rater-mean scores were taken for the *Journal of the American Medical Association* Benchmark Criteria (JAMA-BC) for quality and Patient Education Materials Assessment Tool (PEMAT) for lay understandability. Video statistics were compared to these scores on univariate and multivariate analysis.

Results: Of 15 (60%) videos intended for patients and 10 (40%) for professionals (Table 1), the number of views and JAMA-BC/PEMAT scores were similar and low. Engagement was low but greater in videos for professionals (p=0.032). PEMAT did not predict views per day (VPD) in videos for patients but did negatively correlate to VPD in videos for professionals (p=0.029). JAMA-BC was not predictive of VPD.

Conclusions: The quality, lay understandability, view count, and engagement level of YouTube videos for BPH was poor overall. The YouTube search algorithm does not preferentially present viewers with understand-

Poster #14. Table 1. Method of catheter placement

Method	n (%)
Standard catheter	15 (29)
Coude catheter	16 (31)
Smaller catheter (12 F or 14 F)	2 (4)
Guidewire placement	7 (13)
Flexible cystoscopy	11 (21)
Wire only	5 (9.6)
Wire + dilation	6 (11.5)
Suprapubic tube placement	1 (1.9)

Poster #14. Table 2. Survey questionnaire results

	Yes	No
Have you received training on how to properly place a Foley catheter?	96%	4%
Do you know what a coude catheter is?	61%	39%
Have you ever placed a coude catheter?	41%	59%
Have you received training on how to properly place a coude catheter?	22%	78%

able or high-quality videos, as these factors do not correlate with view counts. Viewers seeking content targeting professionals engage more with videos and prefer videos with more technical language, whereas those seeking lay material may find it difficult to access high-quality and understandable content.

Poster #16
Maternal and neonatal outcomes for mothers with symptomatic hydronephrosis of pregnancy managed with percutaneous nephrostomy with comparison high-risk pregnancy group

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Introduction: Symptomatic hydronephrosis of pregnancy (SHOP) presents with flank pain but may include fever, bacteremia, or sepsis that are harmful to the mother and fetus. Causes of SHOP are varied and may include physiologic pregnancy changes or urolithiasis. Intervention, such as percutaneous nephrostomy (PCN), may be used to relieve obstruction. The current literature primarily focuses on ureteral stenting (US) in SHOP patients with sparse reporting on PCN outcomes. We set out to assess the safety of PCN for SHOP.

Methods: We used ICD10 and CPT codes to identify women with SHOP who underwent PCN at our institution. Gravid women with maternal kidney infection (identified by ICD10 code) were selected as a comparative high-risk (HR) group. Retrospective analysis was then used to gather data

on initial clinical presentation, along with maternal and fetal outcomes. Data from the initial clinical presentation included body mass index (BMI), temperature, creatinine, white blood cell (WBC) count, platelets, and hematocrit. Outcomes data included gestational age of fetus at birth, birth weight, birth length, APGAR scores, and neonatal intensive care unit (NICU) admission. Multivariable regression analysis was performed to assess significance.

Results: No statistical differences were noted between groups with regards to BMI, temperature, creatinine, WBC count, platelets, and hematocrit. No differences were noted in maternal or fetal outcomes between groups (Table 1).

Conclusions: PCN is a reasonable option for SHOP and can often be done with sedation, removing the need for general anesthesia that is usually required for US. Maternal and fetal outcomes are acceptable with PCN and not worse than a comparative high-risk pregnancy group. Consideration should be given to PCN as a primary treatment option for women with SHOP. Further prospective studies should be done to validate these findings and generate recommendations for the management of SHOP.

Poster #17

Antibiotic practice patterns infectious complications in post-prostatectomy patients

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Introduction: Antibiotic resistance is a major public health concern and providers are encouraged to use antibiotics as judiciously as possible. While there is no specific recommendation from the American Urological Association, a randomized controlled trial found a urinary tract infection (UTI) rate of 6% with either no antibiotics or 24 hours of ciprofloxacin at catheter removal.

Methods: We first evaluated antibiotic practices for post-prostatectomy catheter removal at our institution and examined a 7-month time frame and evaluated 157 patients who underwent radical prostatectomy by 8 surgeons from August 2018 to January 2019. We reviewed discharge prophylactic antibiotics, doses, and durations for each prostatectomy patient and urinary tract infection rate within 30-days of catheter removal. We then designed a protocol based on institutional data and literature review and recommended a single dose of antibiotics (provider-driven) 1–2 hours prior to catheter removal. After our intervention, we again retrospectively identified patients who underwent post-prostatectomy catheter removal and recorded antibiotics given, individual patient risk factors for infection, 30-day infection rates, and urine culture data.

Results: Of the 157 post-prostatectomy patients examined prior to intervention, there was a 6.15% 30-day UTI rate. Patients pre-intervention were discharged on one of four antibiotic prophylaxis regimens depending on the surgeon (no antibiotics, one dose of 500 mg ciprofloxacin, 5 days of 500 mg BID ciprofloxacin, or 21 days of BID trimethoprim-

sulfamethoxazole). On logistic regression analysis, a patient that did not receive antibiotics was 4.3 times more likely to have a UTI to patients receiving a single dose (p=0.025). Post-intervention (in the 3 months after the protocol was initiated) antibiotic prophylaxis regimens observed were either one dose 500 mg ciprofloxacin, one dose 500 mg cephalexin, or 21 days of BID trimethoprim-sulfamethoxazole. There were 73 Foley catheter removals and a 6.8% (n=5) 30-day UTI rate.

Conclusions: We found that there was no significant change in infection rates after post-prostatectomy catheter removal with a single dose of antibiotics of the surgeon's choice.

Poster #18 – WITHDRAWN

Poster #19

Factors associated with non-elective transurethral resection of the prostates: Patients, payors, and hospitals

Zafardjan Dalimov, Nicole Alavi-Dunn, Julia S. Yu, Jordan S. Levine, K. Kent Chevli

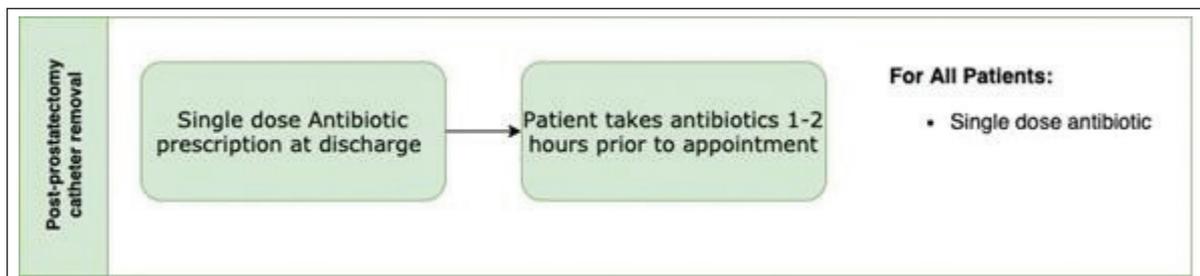
Department of Urology, JSMBS, University at Buffalo

Introduction: Transurethral resection of the prostate (TURP) is the gold standard of treatment for bothersome lower urinary tract symptoms in men with benign prostatic hyperplasia (BPH). TURP surgeries are primarily done as an elective procedure. This study aims to evaluate hospital admissions for BPH that required TURP and identify factors that are associated with non-elective TURP in New York State.

Methods: We used NY Statewide Planning and Research Cooperative System (SPARCS) dataset for hospital inpatient discharges for calendar years 2013–2017. CCS diagnosis code for BPH and CCS procedure code for TURP were used to extract the data. Hospital admissions were further classified based on type of visit codes as emergency (code=1), urgent (code=2), and elective (code 3). Multivariate logistic regression was used to identify factors of emergency and urgent admissions for TURP.

Results: During the 2013–2017 period, there were 9081 hospital admissions for TURP in New York State. The majority of TURP cases were elective admissions (56%, n=5084/9081). However, 30% (n=2715/9081) of TURP cases were emergency admissions and 14% (n=1240/9081) were urgent admissions. Compared to elective admissions, emergency admissions were associated with Medicaid insurance (OR 1.517, 95% CI 1.270–1.813, p<0.01), African American race (OR 1.321, 95% CI 1.144–1.525, p<0.01), and Hispanic ethnicity (OR 1.182, 95% CI 1.017–1.374, p<0.05). Urgent admissions were associated with Blue Cross Blue Shield (OR 1.383, 95% CI 1.113–1.718, p<0.01), private (OR 1.259, 95% CI 1.002–1.552, p<0.05), and Medicaid health insurance (OR 1.356, 95% CI 1.044–1.761, p<0.05), and Hispanic ethnicity (OR 1.358, 95% CI 1.102–1.673, p<0.01). Teaching hospitals were associated with higher number of emergency admissions (OR 1.245, 95% CI 1.023–1.514, p<0.05) and fewer number of urgent admissions (OR 0.386, 95% CI 0.311–0.479, p<0.01). There were no associations between patients age and non-elective TURPs.

Conclusions: Patients who undergo emergency TURP are more likely to be African American, Hispanic, carry Medicaid insurance, and present to the teaching hospital. This study also demonstrates that patients who



Poster #17. Fig. 1.

undergo urgent TURPs are more likely to be Hispanic ethnicity, carry Blue Cross Blue Shield, private, or Medicaid insurance, and present to the non-teaching hospitals. Investigating the factors associated with patient populations prone to urgent and emergent TURPs has demonstrated disparity in care for BPH. Further studies are needed to better understand the gaps in care for BPH.

Poster #20

Avoidable radiation exposure in patients presenting to the emergency department with stent-related complaints

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Introduction: Complications of ureteral stent placement are rare; however, intolerance of stents is common. Patients with stents have a high rate of visits to the emergency department (ED) for stent-related complaints, which raises the odds of avoidable exposure to radiation via computerized tomography (CT) imaging. Instead, renal ultrasound (RUS) can be used to detect stent placement and a variety of renal pathologies, alone or combined with conventional radiography of the kidney, ureter, and bladder (KUB) or abdomen (AXR). The difference in radiation exposure between CT and KUB is 14-fold; ultrasound provides none. Cost is also a factor: CT was 10x the cost of KUB and twice the cost of ultrasound in 2016. We reviewed patients who presented with urologic complaints to our institution's ED

within 30 days of stent placement. Primary outcome was percentage of visits with urologic complaints involving CT as initial imaging.

Methods: After IRB approval, we performed a retrospective chart review of patients of Veterans Health Administration Western New York Healthcare System (VA WNY). Inclusion criteria encompassed patients with stent placement between October 1, 2010 and February 28, 2020, 18+ years of age, presenting to VA WNY ED with urologic complaints within 30 days of stent placement. Urologic complaints included one or more of: flank pain, groin/genital pain, suprapubic discomfort, lower quadrant abdominal pain, hematuria, dysuria, urgency, frequency, AKI (if seen only based on abnormal outpatient labwork). Pain was on same side as stent to qualify. Visits for which imaging modality was unclear, ordered for multiple reasons, or came from an outside facility were excluded. We collected: date and laterality of stent insertion, date of removal vs. exchange, urologic complaint in ED, initial imaging ordered for urologic evaluation.

Results: A total of 290 individual patient visits fit our inclusion criteria; 94 involved urologic complaints as defined above. Initial imaging for that subset included: 48 (51%) CT scans, 5 (5%) formal RUS or bedside US, 6 (6%) KUB/AXR, 35 (37%) no imaging. Seven (7%) of total imaging findings may have prompted secondary CT imaging, if not originally found on CT.

Conclusions: A large percentage of patients presenting with primarily urologic complaints within 30 days of stent placement are exposed to avoidable CT scans in our ED. This comes at a personal health cost, and also accrues a higher financial cost. Due to our findings, we intend to discuss with our ED the initiation of a quality improvement proposal for reducing exposure and cost while providing appropriate care.

Poster Session 2: Pediatrics and Trauma

Poster #21

Government-mandated consent dramatically reduces pediatric urologist opioid use for outpatient and non-major emergent surgeries

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Introduction: Post-surgical opioids are overprescribed in the U.S. In November 2016, our state mandated that an opioid consent is completed for all outpatient prescriptions to minors. Our hypothesis is that this mandate decreased the frequency of post-surgical opioid prescriptions in our department.

Methods: All patients who underwent urologic outpatient surgery or minor emergency surgeries from August 2015 to August 2019 at our institution were identified. Perioperative data, including case type, was retrospectively extracted by a clinical datawarehouse from pre-existing fields within the health record. The frequencies of post-surgical prescriptions, delayed prescriptions, and readmission were assessed. A multivariable logistic regression to identify predictors of opioid prescription at discharge was performed.

Results: A total of 4349 patients were analyzed after eliminating all cases between 0 days and 6 months from mandate implementation. The frequency of postsurgical opioid prescriptions decreased from 45.3% to 2.6% ($p < 0.001$). The average outpatient morphine equivalents decreased by 19.5 mg among children prescribed an opioid ($p < 0.001$). Rates of an emergency department visit (3% vs. 2.7%) or delayed non-opioid prescrip-

tions (0.8% vs. 1.2%) within 30 days from discharge were unchanged ($p > 0.05$). Less patients received a delayed prescription for an opioid after mandate implementation (0.5% vs. 0.03%) ($p < 0.001$). Female patients were less likely (OR 0.66, 0.45–0.96, $p < 0.05$), and patients older than 1 (OR 294.72–1187, $p < 0.001$) or those undergoing emergency surgery (OR 3.94, 2.31–6.7) were more likely to be prescribed opioids at discharge. History of outpatient opioid prescription or personal or family history of a mental health diagnosis were not predictive of post-operative opiate use.

Conclusions: Our state mandate for outpatient opioid consent for minors has reduced post-urologic surgery opioid prescription rates, without increasing rates of readmission or delayed prescriptions.

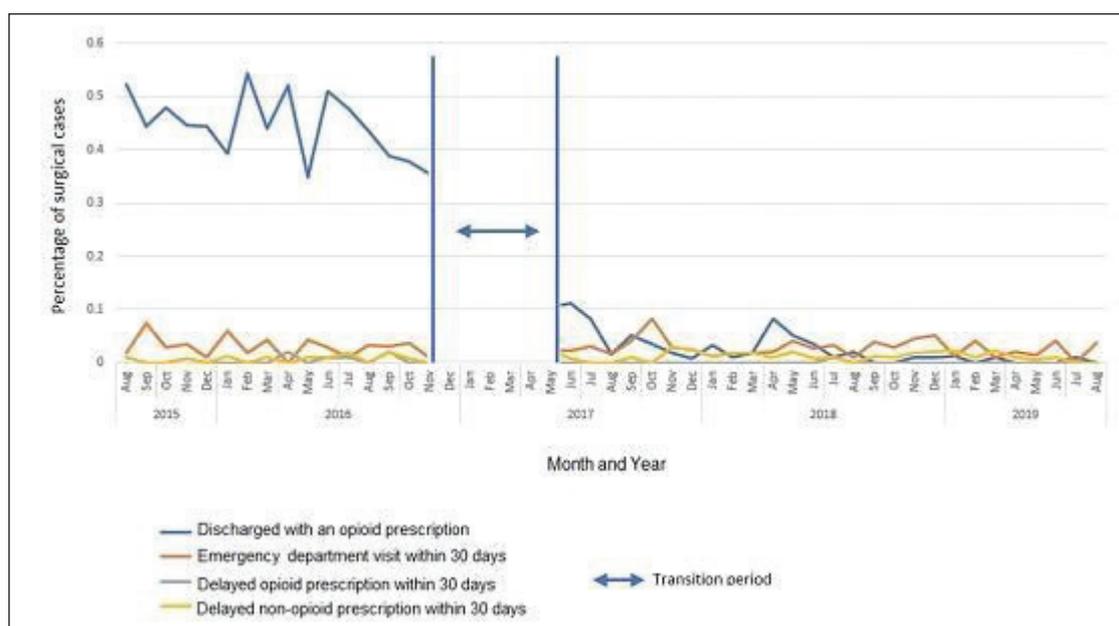
Poster #22

The impact of native nephrectomy on kidney transplantation in pediatric patients: A 16-year institutional experience

lin Kyu (Justin) Kim¹, Armando Lorenzo², Lucshman Raveendran³, Michael Chua², Jessica Ming⁴, Walid Farhat⁵, Martin Koyle²

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Introduction: Pre-transplant native nephrectomies are offered to pediatric patients with end-stage renal disease who have indications for removal, such as those with diagnosed malignancy, hypertension, and proteinuria. However, the associated risks of native nephrectomies remain unclear. This investigation aims to compare the clinical outcomes between pediatric patients who underwent pre-transplant native nephrectomy in a Canadian pediatric kidney transplant center.



Poster #21. Fig. 1. Percentage of surgical cases from August 2015 to August 2019 and select prescription and clinical encounters with polynomial trend lines.

Methods: A retrospective review of renal transplants performed at our institution between 2000 and 2015 was performed. Renal transplant recipients were divided into two groups: those who underwent native nephrectomy and those who did not. Clinical outcomes, measured by estimated glomerular filtration rate (eGFR), Clavien-Dindo classification ≥ 3 complications, graft loss, and number of readmissions, were compared between the groups. Further subgroup analyses were performed for unilateral/synchronous bilateral/staged bilateral nephrectomies.

Results: A total of 324 patients were identified; 267 patients did not undergo native nephrectomy (group 1) and 57 patients underwent native nephrectomy (group 2, 18 unilateral, 27 synchronous bilateral, 12 staged bilateral). Group 2 patients were more likely to be younger (126.5 [IQR 60.1–181.22] vs. 156.1 [84.4–188.5] months, $p=0.04$), receive living donor kidneys (63.2% vs. 43.4%, $p=0.008$), have ≥ 2 donor kidney arteries for anastomosis (36.9% vs. 21.3%, $p=0.034$), and had more patients with nephrotic syndrome, nephritis, and focal sclerosing glomerulosclerosis ($p=0.002$). Other baseline characteristics were similar. The majority of nephrectomy indications were hypertension refractory to medical management (37/95 kidneys) and proteinuria refractory to medical management (27/95 kidneys). In multivariate analysis (controlling for significant baseline characteristics and nephrectomy-specific factors: laparoscopic, nephrectomy at time of transplant, nephrectomy prior to transplant, previous transplant nephrectomy), bilateral nephrectomy was positively associated with higher number of readmissions (OR 5.254, 95% CI 1.711–16.119, $p=0.004$). Patients with native nephrectomies were more likely to be admitted with bacterial infections (29.8% vs. 15.4%, $p=0.013$). There was no association with other clinical outcomes on multivariate analysis.

Conclusions: While limited by the differences in the nature of disease that may subject patients to undergo native nephrectomy, undergoing native nephrectomies, particularly bilateral nephrectomies, may have implications for post-transplant clinical outcomes. Native nephrectomy should be reserved for select patients who will significantly benefit from them.

Poster #23
Reducing Foley catheter use in a pediatric hospital using a behavioral nudge

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Introduction: Catheter-associated urinary tract infections (CAUTI) prolong hospitalizations and increase healthcare costs. The rates of infection are monitored by the Joint Commission and the Centers for Disease Control. As a result, many adult hospitals have instituted policies to reduce their CAUTI rate, but similar efforts have not been well-studied in pediatric hospitals. We sought to investigate whether behavioral modifications, including catheter teaching and a daily rounding checklist could reduce unnecessary catheter usage in a tertiary-care pediatric hospital.

Methods: Prospectively collected data of urinary catheter use at a single pediatric-only hospital from 2015–2019 were analyzed. In May 2017, hospital-wide mandatory workshops were performed and a nursing-driven daily checklist to assess for catheter necessity was implemented. Pre- and post-intervention catheter utilization rates were compared using the standardized utilization ratio, which is a CDC-developed quality measure of catheter usage defined as total catheter days per total patient days. The intervention was implemented during a 7-month run-in period (May to December 2017), which was omitted from analysis.

Results: A total of 365 246 patient-days were available for analysis between January 2015 and August 2019. Catheter-associated UTI rate decreased from 0.13/1000 patient-days to 0.05/1000 patient-days. Hospitalwide urethral catheter utilization decreased from 10.2% (95% CI 9.8–10.6) pre-intervention to 3.9% (3.4–4.4, $p<0.0001$) post-intervention (Fig.

1). These changes were most pronounced in critical care units, where utilization dropped from 36.2% (33.6–38.8) to 12.9% (11.8–14.0, $p<0.0001$). Standardized utilization ratios in the critical care units fell from 2.16 (2.00–2.32) to 0.76 (0.69–0.83, $p<0.0001$).

Conclusions: Catheter teaching and institution of a daily rounding checklist successfully reduced urethral catheter use as measured by catheter usage rates and standardized utilization ratio in a pediatric hospital. Widespread adoption of these protocols may decrease unnecessary catheter usage and catheter-associated morbidity.

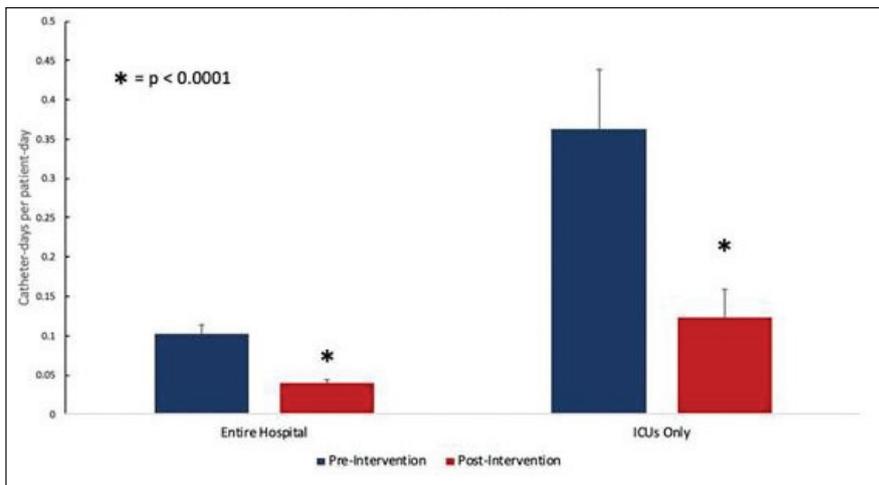
Poster #24
Cost-utility analysis of sacral neuromodulation vs. botulinum toxin A injection for treatment of children with refractory non-neurogenic urinary incontinence: A Canadian tertiary care pediatric hospital perspective

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Introduction: Non-neurogenic urinary incontinence (UI) affects approximately 6% of North American children, with 1% of cases becoming refractory (non-responsive to standard therapies) over the long-term. Approved novel therapies, such as sacral neurostimulation (SNM), may lessen the social and financial implications of refractory UI. The present study is a cost-utility analysis of sacral neuromodulation (SNM) compared to botulinum toxin A injections (BTX) as a first-line strategy in managing non-neurogenic refractory UI.

Methods: We compared the cost per quality-adjusted life-year (QALY) for children diagnosed with refractory UI and FI undergoing either SNM or BTX using an economic model accounting for societal costs. The time horizon covered the lifetime of the patient at our institution, The Hospital for Sick Children. Success was defined as 50% or greater reduction in symptoms of urinary incontinence. Costs for care inputs, including surgical processes at our institution, were calculated using the time-driven, activity-based cost-analysis approach. Community costs included drug therapies, missed work and income, and cost of incontinence supplies. Relevant secondary outcomes included incidence of febrile UTIs, emergency department visits, and family doctor visits. Estimates of clinical effectiveness for the two surgical options were determined from available published literature. Both treatments were assumed to be under general anesthetic. A probabilistic sensitivity analysis was performed to account



Poster #23. Fig. 1. Catheter use.

for global uncertainty in all measurements based on currently available data. We used CAD\$50 000/QALY as a threshold for considering a treatment cost effective.

Results: Over the course of our time horizon, SNM is associated with both decreased costs (\$10 822.92 saved) and increased QALY of life (additional 3.35 QALY) when used as a first-line surgical option. Adjusting for available data and global uncertainty in all measurements, probabilistic sensitivity analysis demonstrated that over 10 000 iterations, SNM therapy was favored absolutely as both cheaper and more effective in 73% of iterations, with 20% of iterations demonstrating that SNM was less costly yet less effective. However, at a willingness-to-pay of CAD\$50 000/QALY, SNM would be the superior therapy in 94% of cases over 10 000 iterations.

Conclusions: SNM is a dominant surgical option from a cost-utility standpoint when compared to recurrent BTX in treating refractory UI. SNM may reduce the long-term medical and financial burden of refractory incontinence in this subset of patients. It should be considered as a publicly funded option for pediatric patients suffering from this condition in our jurisdiction.

Poster #25

Urologist-operated, in-office ultrasound is an efficient, inexpensive, and safe surveillance modality after pyeloplasty

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Introduction: Dismembered pyeloplasty is considered the gold standard treatment for ureteropelvic junction obstruction (UPJO). Although the frequency and timing of followup imaging after pyeloplasty is variable, ultrasound (US) is commonly used. With minimal training, point-of-care ultrasound (POCUS) can be easily performed by a urologist during a post-operative visit. Our hypothesis is that POCUS is an accurate, time-saving, and cost-effective alternative to a complete retroperitoneal ultrasound (CRUS) performed by a radiologist after pyeloplasty.

Methods: The clinical records of all children who underwent pyeloplasty (by any method) over a 12-month period at our institution were retrospectively reviewed. The exact timing and method (POCUS vs. CRUS) of followup imaging was surgeon-dependent. Statistical analysis was performed to compare the time and cost of POCUS vs. CRUS. The clinical course of each patient who had each type of imaging was assessed.

Results: A total of 45 patients were included in this analysis; 33 were performed laparoscopically with robotic assistance and 12 were performed with open surgery. Over a mean followup period of 29 months, a total of 73 CRUS and 67 POCUS were performed. Despite an average increased charge of \$1140 (total \$83 751) and an increased wait time of 122 minutes (total 8906 min) of CRUS over POCUS, there was no difference in the rate of detection of worsening hydronephrosis (HN) or recommended followup time for observed HN (p>0.05). Children with worsening HN on POCUS underwent functional studies without confirmatory CRUS. Interestingly, two

patients had metachronous, contralateral UPJO discovered during postoperative imaging with POCUS. Twenty (43%) patients who had attended at least one postoperative visit were eventually lost to followup. This occurred exclusively in those who did not have a worsening ultrasound (p<0.01). There was no difference in the loss to followup after a followup POCUS (8) or CRUS (12) (p>0.05). There were 2 failed procedures (4%) that required reoperative pyeloplasty, with one detected by POCUS. In this patient, MAG3 showed no deterioration in function

Conclusions: POCUS performed by a urologist is an accurate assessment of HN after pyeloplasty with time and cost savings compared to a CRUS performed by a radiologist. POCUS is not associated with any difference in the rate of detection of worsening HN or rate of loss to followup.

Poster #26

Management of urethral strictures in the pediatric population: A 10-year review

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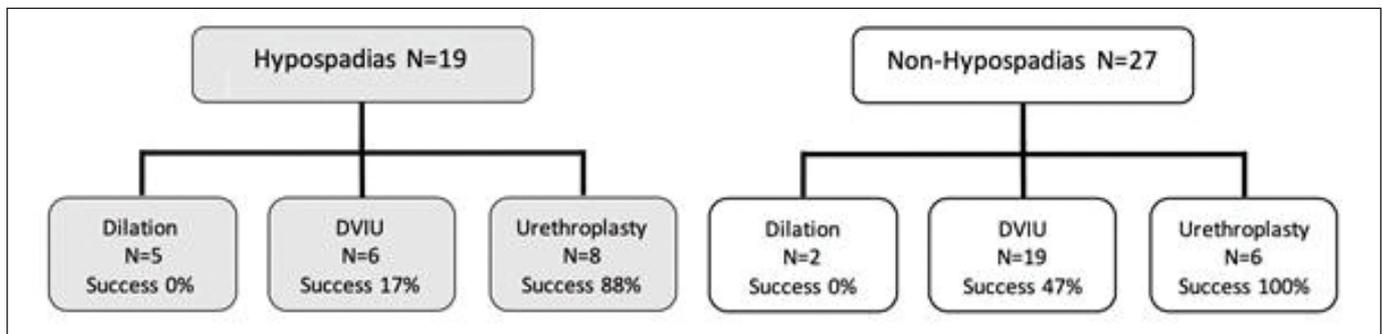
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Introduction: Pediatric urethral stricture disease is uncommon. Unlike the adult population, data is lacking regarding management and long-term followup for pediatric urethral strictures. Here, we evaluate our experience with urethral strictures in pediatric patients.

Methods: We performed a retrospective review of all pediatric patients who underwent surgical treatment of urethral stricture over a 10-year period (2005–2015). Information regarding demographics, surgical technique, location/length of stricture, recurrence rate, and uroflow parameters were recorded.

Results: Forty-six patients met criteria for the study (median age 11.5 years, 6–16 years) with median followup of 25 months. The most common etiology of stricture was hypospadias repair 41%, followed by idiopathic 37%, trauma 15%, and 4% from infection. Median stricture length was 1.5 cm, with a median qMax of 5 ml/sec. The majority of patients (54%) were initially managed with direct visual internal urethrotomy (DVIU), while the rest underwent urethroplasty (31%) or dilation (15%). Of those that underwent DVIU, 60% of patients had recurrence, with median time to recurrence of 10 months. After DVIU failure, 53% of patients underwent urethroplasty and 40% underwent repeat DVIU; 67% of those that underwent repeat DVIU recurred within an average of 9 months. Of those that underwent urethroplasty initially, only one patient had recurrence.

Conclusions: In the management of pediatric urethral stricture disease, DVIU does provide durable cure in some patients, but most patients do recur after one year. Recurrence can be managed by repeat DVIU, but urethroplasty remains more definitive.



Poster #26. Fig. 1. Treatment success rates for each intervention in hypospadias and non-hypospadias populations.

Poster #27

Omission of ambulatory narcotics is safe after the majority of inpatient pediatric urologic surgeries

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Introduction: Opiates are overprescribed after pediatric urologic surgeries, and existing studies aimed at decreasing narcotic use limit inclusion of inpatient procedures. We describe the effect of a state-mandated opioid consent on postoperative narcotic use and multimodal pain control in our inpatient surgeries.

Methods: All patients who underwent an inpatient pediatric urologic surgery at the Children's Hospital of Pittsburgh between August 2015 and February 2020 were identified. A clinical data warehouse retrospectively extracted preexisting demographic, intraoperative, postoperative, and discharge data. The frequencies of ambulatory opioid and regional anesthesia use were assessed. Frequencies of adverse events, like delayed prescriptions or emergency department visits within 30 days, were identified.

Results: After accounting for a 6-month transition period after implementation of the state policy, 459 major pediatric urologic procedures were identified. The frequency of discharge opiate prescriptions decreased from 68.4% prior to the transition period to 10.7% afterward ($p < 0.001$). Mean morphine equivalents for each opioid prescription decreased from 75 (IQR 45–150) to 45 (IQR 22.5–75) ($p < 0.001$). There was no change in the rate of delayed non-opioid analgesic prescriptions (6.6% vs. 7.4%), delayed opioid prescriptions (1.5% vs. 0.3%), or emergency department visits (11.8% vs. 12.6) ($p > 0.05$). While use of local and regional anesthesia did not change (97.1% vs. 96%) ($p > 0.05$), use of regional anesthesia decreased (58% vs. 45%) and surgeon given local anesthesia increased (39% vs. 50%) ($p < 0.05$). The effect of the intervention was durable, where only 1.7% of major pediatric urologic surgeries in the final 12 months of the study were discharged with an opioid.

Conclusions: Omission of ambulatory narcotics is safe for most major pediatric urologic surgeries and does not require an increase in regional anesthesia use.

Poster #28

Assessing the trends and utility of pre-transplant lower urinary tract investigation in pediatric renal transplant population: A 16-yr institutional experience

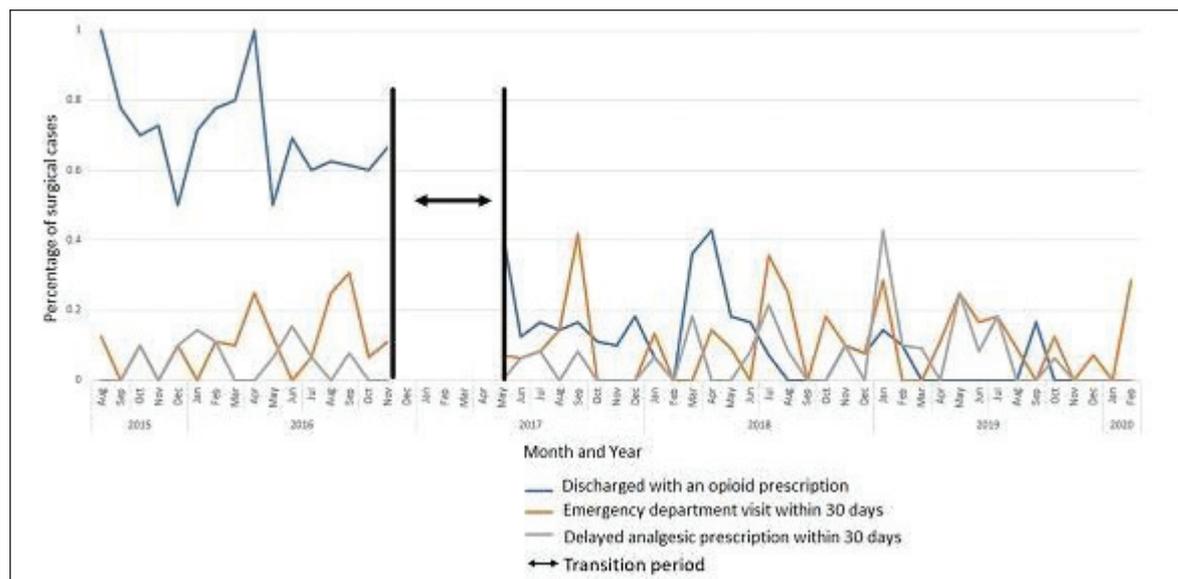
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Introduction: The role of pre-renal transplant (RT) lower urinary investigation (voiding cystourethrogram/VCUG, urodynamics studies/UDS, uroflowmetry) is unclear in the pediatric population. This study aims to investigate the clinical utility of pre-RT urologic investigations in this population focusing on the etiology.

Methods: A retrospective review of RTs performed at our institution between 2000 and 2015 was performed. Transplant recipients were stratified by those with primary non-urologic end-stage renal disease (ESRD) etiology and primary urologic ESRD etiology. Baseline characteristics, pre-transplant investigations (VCUG, UDS, uroflowmetry), pre-transplant urologic interventions, and 1-year post-transplant outcomes (Clavien-Dindo classification ≥ 3 complications, graft loss) were assessed by time period of transplant (2000–2005, 2006–2010, 2011–2015). For patients with posterior urethral valves, only investigations after initial diagnosis and treatment were considered.

Results: A total of 227 patients with primary non-urologic ESRD etiology (group 1) and 97 patients with primary urologic ESRD etiology (group 2) were identified. Over three periods (2000–2005, 2006–2010, 2011–2015), less pre-transplant VCUG was being ordered in group 1: 19.4%, 37.7%, and 7.45%, respectively ($p < 0.001$). For VCUG and UDS ordered ≤ 1 year prior to transplant, most indications were for routine transplant assessment without specific concerns. These had low yields for clinical findings requiring intervention (group 1: VCUG 0%, UDS 0%; group 2: VCUG 0%, UDS 8%). Overall, urologic investigations had minimal predictive value for patients requiring post-transplant urologic interventions (group 1: 0.0–1.1%, group 2: 0.0–7.7%). For both groups, multivariate analysis adjusting for differences in baseline characteristics did not show any difference with regards to graft loss or Clavien-Dindo ≥ 3 complications.



Poster #27. Fig. 1. Percentage of major pediatric urologic surgical cases from August 2015 to February 2020 and select prescription and clinical encounters with polynomial trend lines.

Conclusions: For pediatric RT recipients, ordering a routine pre-transplant lower urinary tract investigation without specific urologic concerns, especially in the setting of previously available urologic investigations, has minimal clinical value.

Poster #29

Bringing Jewish ritual circumcision (Brit Milah) into the operating room: An analysis of surgical outcomes and satisfaction across families and Society of Pediatric Urology members

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Introduction: In Jewish males, circumcision is typically performed on the 8th day of life during a traditional ceremony called a Brit Milah or Bris. For males born prematurely, those born with urogenital abnormalities or severe comorbid medical conditions, or those intending to convert to Judaism (adoptees), Brit Milah is delayed. A tailored program was designed at our institution where patients could undergo a deferred Brit Milah in the operating room (OR) under general anesthesia, combined with other indicated surgical procedures. The objectives of this study were to assess caregiver satisfaction with the program, to assess outcomes of procedures with and without concomitant Brit Milah, and to characterize current experience and practice patterns of intraoperative Brit Milah among Society for Pediatric Urology (SPU) members.

Methods: Medical records of patients undergoing Brit Milah in the OR at our institution between 2013 and 2019 were analyzed to identify age, concomitant procedures, procedure time, and complications. A 4-domain telephone survey was created to assess caregiver satisfaction. A retrospective case-control series was completed to compare complication rates and procedure times for surgical procedures with Brit Milah vs. matched non-Brit Milah controls. Results were cross-referenced with an online survey created to assess Brit Milah practice patterns and trends across SPU members.

Results: Forty-four intraoperative Brit Milah patients were identified, including 40 with hypospadias, 2 for religious conversion, 1 with buried penis, and 1 combined with resection of posterior urethral valves. The mean age at Brit Milah was 7.6 months. The mean procedure time for distal hypospadias repair with Brit Milah was 66.0 minutes, compared to 62.4 minutes without ($p=0.57$). No complications were attributable to the addition of Brit Milah. The caregiver survey had a 100% response rate. The modal response for satisfaction with the perioperative experience was 5/5 (i.e., highly satisfied), with 100% of respondents very likely to recommend the program. One hundred thirty-two active SPU members responded to the online survey (34.1% response rate), with 44% regularly allowing Brit Milah in the OR at their institution; 90.5% received positive caregiver feedback and 64% believe it is important to offer. Only 6.8% of respondents could confirm that their institution had a policy regarding Brit Milah.

Conclusions: This novel program incorporating Brit Milah into the OR yielded high caregiver satisfaction, while resulting in no additional OR time or postoperative complications. This program provides an opportunity to combine patient- and family-centered care with cultural acceptance and advocacy.

Poster #30

Rates of dysfunctional voiding after ureterocele repair

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Introduction: Ureterocele is a common problem in pediatric urology and is seen in 1 in 500 live births. Even after repair, patients often suffer from long-term sequelae and need for further interventions. Voiding dysfunction (VD) is a common problem associated with ureterocele repair. The purpose of this study is to analyze the relationship between the presence of ureterocele and VD.

Methods: We performed a single-institution, retrospective analysis from 2002–2015 in patients with ureterocele whom underwent any type of repair. Demographic information, diagnostic studies, perioperative and postoperative data were examined. Patient records were then reviewed for presence of VD at any followup visit after ureterocele repair. Patients were then stratified by demographic and perioperative factors to assess for any variables associated with postoperative VD.

Results: A total of 55 patients were included in this review. VD was seen in 23.6% of patients. On subgroup analysis, VD was significantly more common in females than males regardless of type of ureterocele (30% vs. 6.6%, $p=0.032$). There was no significant difference in rates of VD between types of ureterocele (ectopic, orthotopic, or ectoureterocele) or type of repair.

Conclusions: VD is common after ureterocele repair, affecting almost 1/4th of patients. In our patient population, female gender is the only predictor of VD after ureterocele. Neither type of ureterocele nor type of repair impacted development of VD.

Poster #31

Initial experience of a 2-attending surgeon model in the management of severe hypospadias

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Introduction: Hypospadias repair is associated with a high complication rate, particularly in proximal cases. Two-surgeon models have been used in an attempt to improve outcomes. Since 2013, our group has adopted a 2-attending surgeon model to treat complex hypospadias cases. Our goal is to describe the postoperative outcomes of this two-surgeon approach.

Methods: A total of 42 patients (31 new cases) who underwent a two-attending surgeon hypospadias repair since 2013 were identified retrospectively. Median age at time of first operation by our group was 12.5 months (IQR 10.5–40.5). The primary outcome of interest was postoperative complications requiring intervention. These were further divided into major (fistula repair or redo surgery) and minor (meatal/urethral dilatation). Perioperative data collected included: age at surgery, use of testosterone, degree of ventral curvature, location of urethral meatus, and type of surgical procedure. Postoperative outcomes assessed were: fistula, meatal stenosis, stricture, recurrent curvature, buried penis, and glans dehiscence. Three patients were excluded due to inadequate followup.

Results: Thirty-nine patients underwent 54 surgeries; 29 new cases and 10 redos. Twelve patients had preoperative testosterone injections. The complication rate requiring surgery was 30.7%, with 7 requiring major additional procedures and 5 patients requiring minor additional procedures. The most common complications were: fistula (10), glans dehiscence (8), and meatal stenosis (6); 23% of patients experienced more than one postoperative complication. The twenty-nine new cases of hypospadias were managed with 39 surgical procedures; 19 patients underwent a one-stage long-TIP repair (no to mild ventral curvature after degloving) and 10 with more severe curvature had a 2-stage preputial graft repair. Complication rate for new cases was 27.5% (5 major, 3 minor). A Chi-squared test was performed comparing one and two-stage repairs. $\chi^2(1, n=39)=0.440, p=0.507$. We found no difference in complication rates between the one- and two-stage groups.

Poster #31. Table 1. Postoperative outcomes

Number of cases, n=39	n (%)
Meatal position	
Perineal	0 (0)
Scrotal	0 (0)
Proximal	2 (5.1)
Midshaft	0 (0)
Coronal	7 (17.9)
Glanular	30 (76.9)
Cosmesis	
Poor	7 (17.9)
Acceptable	5 (12.8)
Good	20 (51.3)
Excellent	7 (17.9)
Complications	
Recurrent curvature	6 (15.4)
Fistula	10 (25.6)
Meatal stenosis	5 (12.8)
Stricture	4 (10.2)
Repair breakdown	1 (2.5)
Buried penis	3 (7.7)
Glans dehiscence	8 (20.5)

Conclusions: Our initial experience with limited numbers demonstrates favorable surgical outcomes for the 2-attending surgeon model of hypospadias repair compared to published complication rates. Complication rates were comparable for one- vs. two-stage repairs irrespective of degree of ventral curvature for new cases.

Poster #32
Survey of applicant experience in the pediatric urology fellowship match

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 University at Buffalo

Introduction: Annual urology residency match statistics are useful to applicants and programs to identify trends in applications, interviews, and match rates. There is a paucity of data describing urologic fellowship matches. The pediatric urology match is especially difficult to analyze due to the lack of a centralized application service. We seek to describe match statistics for pediatric urology and the application experience.

Methods: A 19-item survey was sent to all applicants to the 2019 Pediatric Urology Fellowship Match. Information on demographics, application-related considerations, interviews received and attended, interview-related costs, and overall impression of application and interview process was collected.

Results: Twenty-three out of 31 total applicants responded to survey, including 18 applicants who matched to fellowship. There were matched applicants from every AUA region. Seventeen of these matched applicants trained in North America, and five matched within the same AUA section as they completed residency. The mean number of applications sent was 11.3 (range 5–16), with 76% (13/17) being offered an interview everywhere they applied. The other four applicants were offered an interview at all but one program. The mean number of interviews attended was 9.9 (range 3–13), at an estimated cost of \$4676 (range 2000–7000) per applicant. Nine applicants didn't attend every interview they were offered, with the most common reason being, "too much time away from program," followed by "financial burden." Vacation time was used by 59% (10/17) of applicants to attend interviews. The most common consideration for where to apply was clinical volume, followed by mentor recommendation (Table 1). Lastly, most applicants (11/17) did not find the application easy to complete/submit, and 94% (16/17) would support a centralized application system instead of the current system of emailing applications and letters of recommendation to individual program directors.

Conclusions: Applicants for pediatric urology match come from every AUA region and represent a diverse group of residents. Currently, almost all applicants are receiving interviews at every program they apply to, resulting in a significant cost and time away from program. There appears to be a desire for a streamlined application and interview process.

Poster #33
A cut above the rest: Historic perspectives of circumcision and anesthesia

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Introduction: We aimed to outline the methods used as anesthesia for circumcision throughout history.

Methods: A literature review was performed via PubMed journal articles, texts, and historical discussion detailing the evolution of anesthesia for circumcision throughout history.

Results: Earliest records of circumcision described religious rather than scientific rationale serving to mark a boy's ascension to manhood. Documentation of the earliest practiced anesthesiology are relevant to urology through these traditions. Circumcision is first noted in Egyptian temple hieroglyphics dated to 4000 BCE, depicting young men restrained with a priest performing the cut wielding a knife. As early as 2500 BCE, circumcision in ancient Egypt was the first known surgical procedure using anesthesia. A mixture rendered from calcium carbonate and acetic acid formed carbon dioxide on the prepuce, resulting in the first rendition of cryo-analgesia. Egypt was not the only African culture performing circumcision during this time period. Assyrian records dating back to 400 BCE describe a similar methodology, but also transcribed another primitive method of anesthesia. Assyrians used digital compression of the carotid arteries to produce anesthetic effects of both altered consciousness and decreased procedural pain. Carotid compression as anesthesia was commonplace enough that it influenced the language for which the carotid blood vessels are described in both Greek and Russian, with

Poster #32. Table 1. Considerations on where to apply for pediatric urology resident based on survey results

	Not at all important	A little important	Somewhere important	Very important	N/A	Total	Weighted average
Mentor recommendation	0	2	4	3	0	9	3.11
Financial consideration	11	1	0	0	0	12	1.08
Prestige	0	1	4	1	1	7	3
Geographic location	0	5	1	2	1	9	2.63
Clinical volume	0	0	1	10	0	11	3.91
Research experience	0	3	6	0	1	10	2.67

translation as “the artery of sleep.” As the practice was adopted by the Israelites, infant circumcision was acknowledged on the eighth day of life representative of the covenant between God and Abram. It is considered that this shift may have been related to a pubescent male’s ability to refuse the religious covenant on the basis of the painful procedure, while an infant is unable to object. The Jewish tradition of Brit Milah uses a few drops of wine in the mouth of the infant, both as a form of analgesia and symbolic of the sealed covenant. It is hypothesized that the sugar interacts with the opiate receptors in the brain, which is enhanced by the suckling action providing comfort. As recently as 1998, 1/3 of males worldwide were circumcised, with 55% of physicians performing infant circumcision choosing not to use any form of anesthesia, citing lack of necessity and procedural efficiency.

Conclusions: Since their earliest documented history, anesthetic techniques have contributed to and been intertwined with the ritualistic practices of circumcision.

Poster #34

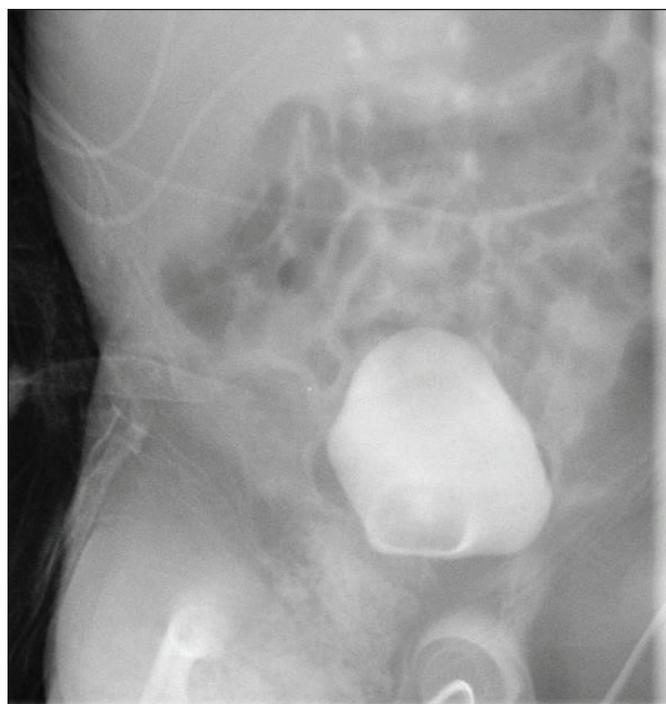
An argument for obstruction: In utero multicystic dysplastic kidney with associated ureterocele

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Introduction: Multicystic dysplastic kidney (MCDK) is the finding of numerous non-communicating renal cysts, which ultimately results in a non-functioning kidney due to lack of normal parenchyma. Two main theories exist as to why this abnormality develops. The ureteric bud theory suggests this is due to an abnormal interaction between the ureteric bud and the metanephric tissue. Alternatively, the obstruction theory proposes that an atretic ureter or renal pelvis induce an extreme form of obstructive hydronephrosis, which ultimately results in development of MCDK. Rarely, MCKD is seen in the setting of hydroureter and more infrequently, with a concurrent ureterocele.

Case description: A 31-year-old female was referred for anomalous renal findings noted on a 24-week prenatal ultrasound. This revealed numer-



Poster #34. Fig. 1.

ous non-communicating cysts of the right kidney, concerning for MCKD. Additionally, a right-sided ureterocele and hydroureter were noted. The mother’s medical diagnoses include depression and she is an active smoker at 1.5 packs per day. She is G0P0, with no family history of congenital renal abnormalities. The pregnancy has been complicated by intrauterine growth restriction, though amniotic fluid levels throughout pregnancy remained normal. A male infant was born at 32 weeks gestation, initially with respiratory issues secondary to immaturity. His Apgar scores at birth were 8/9. VCUg and RBUS demonstrated a right MCDK with an ipsilateral intravesical ureterocele. The left kidney demonstrated compensatory hypertrophy. There was no VUR seen and the course of the urethra was normal. He was discharged home on day of life 12, voiding spontaneously not on antibiotic prophylaxis.

Conclusions: The radiographic findings demonstrate support for the obstructive theory as the cause of MCDK development. Alternatively, there exists the possibly of convergent etiologies, with multiple pathways resulting in this singular abnormality. The different anatomic variations in each case may well be a clue in the underlying mechanism of disease in that specific renal unit.

Poster #35

Pathologic review of cryptorchid testicles in late presentation of undescended testicles

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Introduction: The American Urological Association guidelines recommend orchiectomy for the treatment of undescended testicles (UDT) in post-pubertal children with a normal contralateral testicle. There are no guidelines currently for pre-, and peri-pubertal children, and little is known regarding the spermatogenic potential of this population. Our goal was to evaluate the pathologic findings of testicles in pre-, and peri-pubertal children who underwent orchiectomy for cryptorchidism.

Methods: A retrospective clinical and pathological database review of boys who underwent an orchiectomy in our center between January 2014 and 2019 was conducted. Exclusion criteria were underlying syndromes affecting testicular histology (Klinefelter syndrome), orchiectomy in a descended testicle for testicular torsion, or tumor. Clinical parameters, including age at orchiectomy, preoperative testicular location (inguinal or abdominal), preoperative scrotal ultrasound size of both the affected, and non-affected testicles, were recorded. Pre-, and peri-pubertal children at time of orchiectomy were defined as being aged 1–11 and 11–17 years, respectively. This pathologic review describes findings of nubbins, and non-nubbin orchiectomy specimens.

Results: A total of 131 patients were reviewed in our database. Of these patients, 61 met the inclusion criteria. The median age of included patients was 5.46 years. Forty specimens were nubbins, confirmed by the presence of a vas deferens, fibrous tissue, and hemosiderin. All nubbins had no viable testicular parenchyma and had an average size of 0.24 cc on scrotal ultrasound. There were 21 non-nubbin specimen cases. Of these cases, there were 12 abdominal UDT and 9 inguinal UDT. Four of 12 (33.3%) abdominal UDT were histologically Sertoli cell only (SCO), and of these SCO cases, 75% were in pre-pubertal children. All 9 inguinal UDT were histologically not SCO, and pre-pubertal children made up 73% of these cases. One of 9 (11.1%) inguinal UDT (post-pubertal case) showed histologically normal germ cells that stained positive for SALL-4, and CD117, both being markers of intratubular germ cell neoplasia-unclassified.

Conclusions: Cryptorchid testicles in a pediatric population in a pre- and peri-pubertal age range undergoing orchiectomy demonstrated viable spermatogenic cells in 75% of cases. However, histologically, 75% of abdominal UDT in pre-pubertal children were SCO specimens. Despite the retrospective nature of this study, including only patients where orchiectomy was performed, it demonstrates that the majority of late-presenting UDT can have viable testicles. The choice to perform orchiopexy rather than orchiectomy needs to be carefully weighed against potential risk for malignancy.

Poster #36**Investigation of incidence and evaluation of genitourinary injuries in pelvic trauma**Julia Yu¹, Nicole Alavi-Dunn², Zafardjan Dalimov¹, John Bodkin²¹University at Buffalo Jacobs School of Medicine and Biomedical Sciences;²University at Buffalo Department of Urology

Introduction: Approximately 5% of patients with pelvic fracture are reported to have associated genitourinary injury. Timely diagnosis and management of genitourinary injury usually result in better quality-of-life outcomes for patients. Objectives of this study are to report the incidence of genitourinary injury in pelvic fractures, to characterize patterns of various genitourinary injuries in pelvic trauma, and to evaluate workup of genitourinary injuries in pelvic trauma in terms of adherence to the American Urological Association (AUA) urotrauma guideline.

Methods: A retrospective study of genitourinary injury in pelvic fractures was done from January 2004 to December 2018 at a large academic trauma center in Western New York. Mechanism of injury, minutiae of injuries, and patient demographics were considered. Chi-squared was used for statistical analysis of categorical variables.

Results: The incidence of genitourinary injury in pelvic fractures was 2.8% (n=22/779). The male to female ratio was 1:1.75. The patient age median and range were 39 and 25–89 years, respectively. Incidence of kidney injury was highest (n=8, 36%), followed by urethral (n=6, 27%), bladder (n=5, 23%), male genital (n=2, 9%), and combined bladder and urethral (n=1, 5%). There was no incidence of ureteral injury associated with pelvic trauma. Renal injury was significantly associated with female sex (p=0.004), and also acetabular fracture, though insignificantly (p=0.07). Immediate evaluation of bladder injury with retrograde cystogram was 20% (n=1/5), renal injury with CT with IV contrast was 63% (n=5/8), and male genital injury with scrotal and penile ultrasound was 100% (n=2/2).

Conclusions: Insufficient diagnostic evaluation and examination of patients with genitourinary injury in pelvic trauma may be causing under-reported incidence. We encourage precise and systematic adherence to AUA trauma guidelines in the management of genitourinary injury associated with pelvic trauma. This will help prevent lasting morbidities that commonly occur with missed diagnoses.

Poster #37**Historical management of urethral stricture disease**

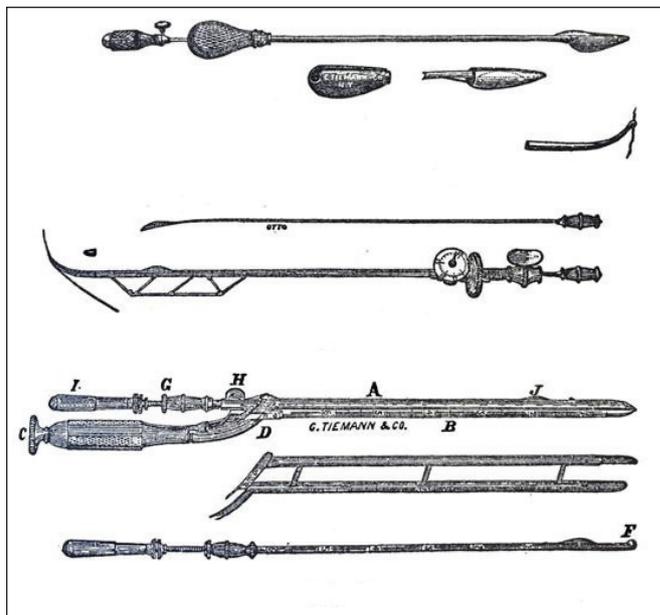
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Introduction: The trials of managing urethral stricture disease date back to the 5th century B.C. Physicians since that time have held unique theories of the pathophysiology of stricture disease and employed management techniques that are unthinkable today. We aim to highlight the ancient history of urethral stricture disease and how it has inspired modern procedures.

Methods: We searched urologic journal articles from the early 20th century and used textbooks chronicling the history of urology, including one published by the AUA in 1933 by Bransford Lewis. We divide our study into four main historical time periods: ancient history, middle ages, renaissance, and the industrial revolution.

Results: In the ancient world, the first documented treatment of urethral stricture occurred in Ayurvedic scripture around 500 B.C., with Hindus using a wide variety of surgical instruments, including graduated dilators made of metal and wood. In 200 B.C., Erasistratus used an S-shaped catheter to treat strictures that remained the standard dilator for over a millennium. In the early middle ages, Rhazes of Baghdad described the first perineal puncture or urethrotomy, but progress through the middle ages relied on superstitions and charms. It wasn't until the renaissance around 1500 A.D. when surgeons de Vega and Diaz performed the first version of internal urethrotomy that wouldn't become a mainstay treatment until over 300 years just prior to the industrial revolution. In 1817, Jean Civiale in France produced an internal urethrotome with a blade on a terminal bulb that was able to traverse the stricture and incise proximal to distal. The first filiform guide was used in 1848 by Maisonneuve, and the introduction of chloroform anesthesia in 1857 allowed for significant advances in managing stricture disease. In the late 19th century, Fessenden Otis introduced many urethral dilators, including a urethrometer that



Poster #37. Fig. 1.

expanded from 10 to 40 Fr, as well as a two-bladed dilated urethrotome that was used for more than a century (Fig. 1).

Conclusions: The management of urethral stricture disease has been bane of many over several millennia. Understanding its history is important to urologists and can serve as an inspiration for modifying current management paradigms.

Poster #38**Postoperative pediatric urology opioid prescriptions**

Laura Donnelly, Feustel Paul, Cango Theodore, Barry Kogan

Albany Medical College

Introduction: Opioid abuse has been deemed a public health emergency, and in many instances this starts postoperatively. Most research has been focused on adult patients, but limited studies have suggested that there is significant variation in prescribing practices among pediatric practitioners. We examined the likelihood of postoperative opioid prescriptions in our practice, as well as the factors associated with opioid usage.

Methods: We retrospectively reviewed charts from pediatric urology patients (aged 0–18 years) who underwent at least one procedure in the operating room between January 1, 2012 and February 1, 2020. We collected data describing incidence of opioid prescribing, as well as gender, age, surgeon, procedure, length of hospital stay, ethnicity, race, and whether opioids had been a home medication. We grouped procedures into five categories: circumcision, cystoscopy with removal of foreign body/stone/stent, scrotal surgery, hypospadias repair/penile surgery, and pyeloplasty/ureteral reimplant. Multivariable logistic regression was used to determine odds ratios of opioid prescriptions.

Results: A total of 1102 children had data available; 14.2% (n=156) of patients received opioid prescriptions. Using circumcision as a baseline, scrotal surgery increased the odds of an opioid by 1.32 and hypospadias, pyeloplasty, and other procedures reduced the odd by 0.45, 0.47, and 0.52, respectively (no patient received opioids for endoscopic procedures). Ambulatory procedures had a lower rate of opioids (0.40), and age was a major factor, increasing the risk of receiving a prescription by a factor of 1.45 per year of age. Since January of 2017, the rate has been reduced by 0.926 per month.

Conclusions: We found a relatively low rate of opioid prescribing in our pediatric patients, and most of it occurred in older children undergoing penile and scrotal procedures. Heightened awareness has led us to reduce our use of opioids in the last three years and to seek other non-narcotic postoperative pain management strategies.

Poster Session 3: Oncology: Bladder, Renal, Testes

Poster #39

Recurrences patterns following neoadjuvant chemotherapy and robot-assisted radical cystectomy: Results from the International Robotic Cystectomy Consortium

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¹Roswell Park Comprehensive Cancer Center; ²Lenox Hill Hospital; ³Beth Israel Deaconess Medical Center; ⁴City of Hope Comprehensive Cancer Center; ⁵Fundació Puigvert; ⁶Washington University School of Medicine; ⁷OLV Hospital; ⁸Metro Health Hospital; ⁹Hôpital Pitié-Salpêtrière; ¹⁰Koç University; ¹¹Rijnstate Hospital; ¹²Yonsei University Medical School; ¹³San Raffaele-Turro; ¹⁴Universität des Saarlandes; ¹⁵Guy's Hospital; ¹⁶Mount Sinai Hospital; ¹⁷Henry Ford Health System; ¹⁸Cleveland Clinic

Introduction: Neoadjuvant chemotherapy (NAC) is associated with improved overall survival in patients with non-metastatic muscle-invasive

bladder cancer (MIBC). We sought to determine the recurrence patterns following NAC for non-metastatic MIBC after robot-assisted radical cystectomy (RARC).

Methods: A retrospective review of the International Robotic Cystectomy Consortium (IRCC) database was performed (3296 patients, 28 institutions, from 15 countries). Patients with MIBC were identified and divided into two groups: those who received NAC vs. those who did not. Data were reviewed for demographics, perioperative, and pathologic outcomes. Kaplan-Meier curves were used to depict recurrence-free (RFS), local recurrence-free (LRFS), and distant recurrence-free survival (DRFS).

Results: A total of 1439 patients were diagnosed with MIBC; 360 (25%) patients received NAC. Patients who received NAC were younger (66 vs. 68 yrs; $p < 0.01$), and more likely to receive an intracorporeal diversion (65% vs. 46%; $p < 0.01$) and continent urinary diversion (22% vs. 17%; $p < 0.01$). Patients who received NAC had a significantly higher pT0 disease (25% vs. 9%; $p < 0.01$), positive margins rates (5% vs. 12%, $p < 0.01$) but similar pN+ve disease (26% vs. 30%; $p = 0.20$). Patients who received NAC had a lower overall (24% vs. 29%; $p = 0.05$) and distant recurrence (16% vs. 22%; $p < 0.01$); however, a similar local recurrence (13% for both; $p = 0.92$). Extranodal (2% vs. 5%; $p < 0.01$) and bone (3% vs. 5%; $p = 0.04$) metastasis were significantly lower in the NAC cohort (Table 1). Kaplan-Meier curves showed a significantly higher RFS (67% vs. 60%; $p = 0.05$) and DRFS (77% vs. 69%; $p < 0.01$) but a similar LRFS (82% vs. 81%; $p = 0.96$) rates for NAC cohort at 5 years (Fig. 1).

Conclusions: NAC use was significantly associated with improved distant but not local recurrence after RARC.

Funding: Roswell Park Alliance Foundation

Poster #40

Reduction in opioid prescriptions following major urologic cancer surgery

Kevin Carnes, Ashar Ata, Theodore Cangero, Badar Mian
Albany Medical College

Introduction: Prescription narcotics have significantly contributed to the opioid abuse crisis in the U.S. Interventions such as educational efforts and early recovery after surgery (ERAS) pathways have reduced the in-hospital opioid use. We wished to evaluate the effect of these opioid reduction efforts on the opioid prescriptions given at discharge following major urologic cancer surgeries.

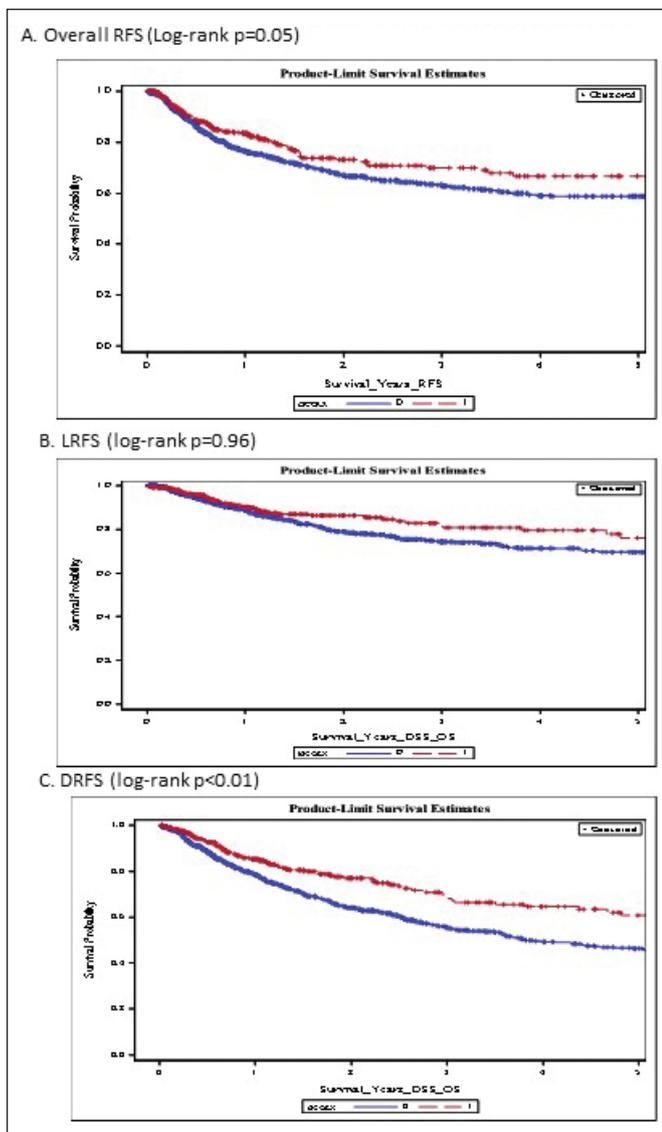
Methods: We reviewed opioid prescription data from patients discharged from our facility after major urologic cancer surgery from 2016–2018, including cystectomy, nephrectomy, and prostatectomy. The prescribed opioids were normalized to hydrocodone 5 mg tablet equivalents. We analyzed the trend of opioid prescriptions over time, and before and after the ERAS pathways.

Results: For the 409 patients meeting the inclusion criteria, there was 33% reduction in opioid prescriptions from 2016–2018. For prostatectomy, cystectomy, and nephrectomy (total or partial), the opioid prescriptions decreased by 39% ($p < 0.001$), 29% ($p = 0.1$), and 32% ($p < 0.001$), respectively. Potent opioid (oxycodone or hydrocodone) use was reduced from 92% to 43% and tramadol increased from 8% to 57% ($p < 0.001$). Following ERAS, we noted a reduction in opioid prescriptions for prostatectomy (28%; $p < 0.001$), cystectomy (26%; $p = 0.1$) and all nephrectomy procedures (33%; $p < 0.001$).

Conclusions: There was a significant reduction in opioid prescriptions given after major urologic cancer surgery. The use of opioids decreased

Poster #39. Table 1. Pathologic outcomes and sites of disease relapse

	NO NAC	NAC	All	p
Any recurrence, n (%)	314 (29)	85 (23)	399 (28)	0.05
Local recurrence, n (%)	138 (13)	47 (13)	182 (13)	0.93
Distant recurrence, n (%)	239 (22)	56 (16)	295 (21)	<0.01
Recurrence site				
Local recurrence, n (%)				
Pelvis	55 (5)	20 (6)	75 (5)	0.78
Vagina	3 (0.3)	0 (0)	3 (0.2)	0.58
Rectum	7 (0.7)	2 (0.6)	9 (0.6)	1
Perineum	6 (0.6)	4 (1)	10 (0.7)	0.28
Urethra	3 (0.3)	0 (0)	3 (0.2)	0.58
Penile	2 (0.2)	0 (0)	2 (0.1)	1
Neobladder/conduit	5 (0.5)	1 (0.3)	6 (0.4)	1
Kidney	2 (0.2)	2 (0.6)	4 (0.3)	0.26
Multiple local	20 (2)	7 (2)	27 (2)	1
Unidentified site	47 (4)	15 (4)	62 (4)	1
Distant recurrence, n (%)				
Nodal	59 (5)	7 (2)	66 (5)	<0.01
Lung	47 (4)	15 (4)	62 (4)	1
Liver	32 (3)	8 (2)	40 (3)	0.58
Bowel	4 (0.4)	0 (0)	4 (0.3)	0.58
Bone	55 (5)	9 (3)	64 (5)	0.04
Brain	8 (0.74)	0 (0)	8 (0.56)	0.21
Abdominal wall	4 (0.4)	2 (0.6)	10 (0.7)	1
Multiple distant	22 (2)	2 (0.6)	24 (2)	0.06



Poster #39. Fig. 1. Kaplan-Meier curves for overall RFS, LRFS, and DRFS.

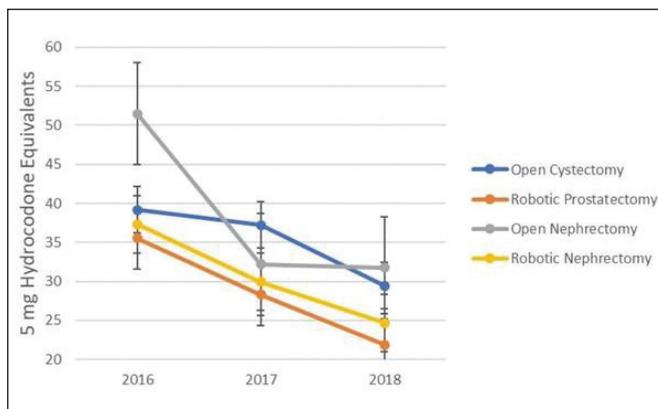
significantly during the study period. This reduction in opioids is likely due to a combination of institutional efforts and general awareness about opioid abuse.

Poster #41
Investigating the association between the urinary microbiome and bladder cancer: An exploratory study

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Introduction: We sought to investigate the association between the urinary microbiome and bladder cancer. Further, we explored the difference in the urinary microbiome profiles between non-muscle-invasive (NMIBC) and muscle-invasive (MIBC) bladder cancer, and between Bacillus Calmette Guerin (BCG)-responsive vs. BCG-refractory NMIBC.

Methods: Urine specimens were collected from consecutive patients with bladder cancer and healthy volunteers. Urine samples from patients with



Poster #40. Fig. 1. Opioid prescription trend.

bladder cancer were collected via cystoscope or a catheter at the time of office cystoscopy TURBT or at cystectomy. Clean catch midstream urine were collected from healthy volunteers. Urine samples were analyzed using 16S rRNA. Analyses were corrected for age, sex, preservation method, and collection method.

Results: Analysis included 53 samples (43 patients with bladder cancer, and 10 healthy controls). For bladder cancer patients, mean age was 70 years (SD 9) and 7 (16%) were females. Twenty-nine patients (67%) had NMIBC. Among patients with NMIBC, 11 (38%) patients received BCG, 6 of which had recurrence or progression. Comparing bladder cancer patients with healthy controls, differential abundance analysis (beta-diversity) was statistically significant, with Actinomyces, Achromobacter, Brevibacterium, and Brucella significantly more abundant in urine samples of bladder cancer patients. Haemophilus and Veillonella were significantly more abundant in MIBC, while Cupriavidus was significantly more abundant in patients who responded to BCG vs. those who did not (Fig. 1).

Conclusions: Urinary microbiome seems to vary between patients with bladder cancer and healthy controls. Moreover, this variation was also noticed among different bladder cancer stages, male and female patients, and also in BCG-responders vs. non-responders.

Funding: Roswell Park Alliance Foundation

Poster #42
Impact of female sex on treatment patterns and outcomes for muscle-invasive bladder cancer

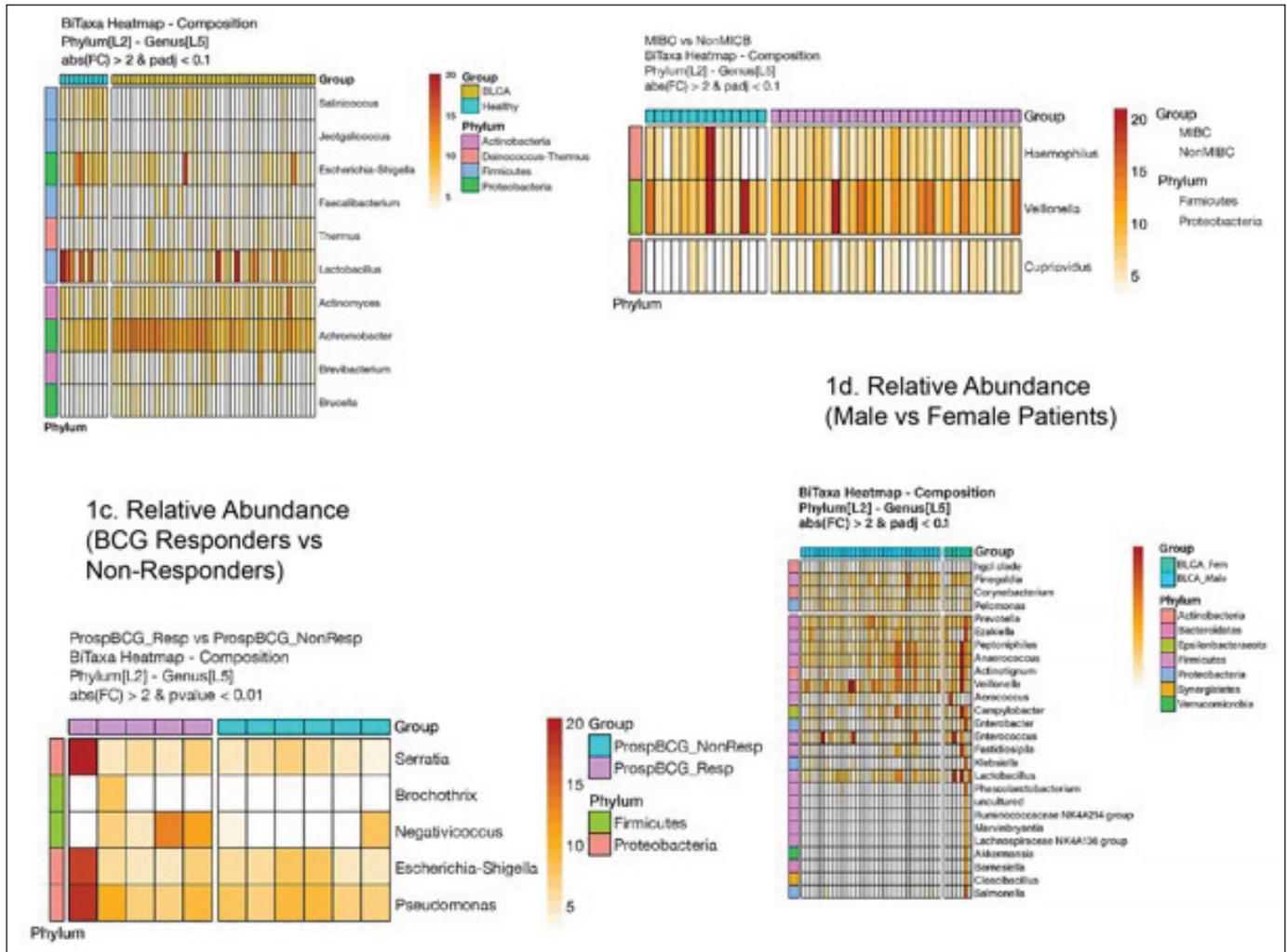
Valentina Grajales¹, Nathan Hale², Jonathan Yabes³, Robert Turner¹, Mina Fam⁴, Lindsay Sabik⁵, Jeffrey Gingrich⁶, Benjamin Davies¹, Bruce Jacobs¹, Jathin Bandari¹

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Introduction: We aimed to investigate the association of sex with the selected treatment for patients with non-metastatic muscle-invasive bladder cancer (MIBC). Sex is a known independent predictor of death from bladder cancer. A potential explanation for this survival disparity is difference in treatment pattern and stage presentation among males and females.

Methods: Using the Surveillance, Epidemiology, and End Results (SEER)-Medicare data set, we identified 6809 patients initially diagnosed with non-metastatic MIBC from 2004–2014. We fit multivariable logistic regression and Cox models to assess the relationship of sex with treatment modality and survival adjusting for differences in patient characteristics.

Results: Of the 6809 patients with non-metastatic MIBS, 2528 (37%)



Poster #41. Fig. 1. Relative abundance: (A) bladder cancer vs. control; (B) NMIBC vs. MIBC.

received a radical cystectomy, while 4281(63%) received an alternative bladder-sparing intervention. Women were significantly more likely to receive a cystectomy (OR 1.39, 95% CI 1.20–1.61), and present at an older age with less comorbidities compared to men (p<0.001). Women were also found to have worse bladder cancer-specific survival (CSS) than men (HR 1.18, 95% CI 1.05–1.32), no difference in overall survival (OS) (female HR 0.93, 0.86–1.01) and lower mortality from other causes (35% vs. 39%, p<0.001). There were no differences in OS and CSS by sex in patients with stage pT4a.

Conclusions: Female sex predicted more aggressive treatment with radical cystectomy yet worse cancer-specific survival than males. This sex disparity in CSS reduced the known OS advantage observed in women.

Funding: Nathan E. Hale was supported in part by the Center of Race and Social Problems, School of Social Work at the University of Pittsburgh. Bruce L. Jacobs is supported in part by the Shadyside Hospital Foundation

Poster #43

Correlation of renal mass size measured by ultrasound compared to CT, MRI, or pathology using the Canadian Kidney Cancer information system

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Introduction: Active surveillance is a well-established treatment modality for small renal masses. Despite its widespread adoption, it is not clear which imaging modality is ideal. Given the risks of ionizing radiation with cross-sectional imaging, the use of ultrasound (US) is gaining popularity. There is a paucity of data comparing correlation of US imaging findings with CT, MRI, or pathological size. The goal of our study was to identify the correlation of US to CT/MRI and pathological size and US to CT/MRI using a multi-institutional, prospectively maintained kidney cancer database, the Canadian Kidney Cancer information system (CKCis).

Methods: Between January 2011 and October 2019, we identified a cohort of patients who had a preoperative US and cross-sectional imaging (CT or MRI) within 8 weeks of each other and within 6 months of surgery. A scatter plot of the largest tumor diameters using US to CT/MRI and to

Poster #43. Table 1. Sensitivity table comparing size differences between ultrasound and CT/MRI

Size difference	Number (%)
≤0.5 cm	792 (58.2%)
>0.5 cm	569 (41.8%)
>1 cm	289 (21.2%)
>1.5 cm	172 (12.6%)
>2 cm	102 (7.5%)

pathological size were analyzed. A Bland-Altman plot of largest tumor diameters for all imaging modalities and a sensitivity plot for imaging modalities were created using the images closest to the date of the surgery. **Results:** A total of 1380 patients from the CKCIs were identified. The mean age was 60.0 years (± 12.1) and BMI was 29.4 (± 6.04). The mean size of the masses as measured by pathology was 5.59 cm. Pearson correlation between CT/MRI or US to pathological size was 0.93 and 0.89, respectively ($p < 0.0001$). Correlation between US to CT/MRI was 0.91 ($p < 0.0001$). In 794 patients (57.5%), US and CT/MRI measurements were within 0.5 cm, with 113 (8.2%) revealing a discordance greater than 2 cm (Table 1). Bland-Altman plots demonstrated a greater agreement for smaller renal masses (Fig. 1).

Conclusions: There is a very strong correlation between US and CT or MRI and pathological size when measuring small renal masses. This study provides support for use of US in active surveillance to help minimize the risk of ionizing radiation in patients.

**Poster #44
Oncologic outcomes after partial cystectomy for urothelial cancer**

Thomas Osinski¹, Timothy Campbell², Jacob Gantz¹, Benjamin Nelson³, Changyong Feng⁴, Edward Messing¹

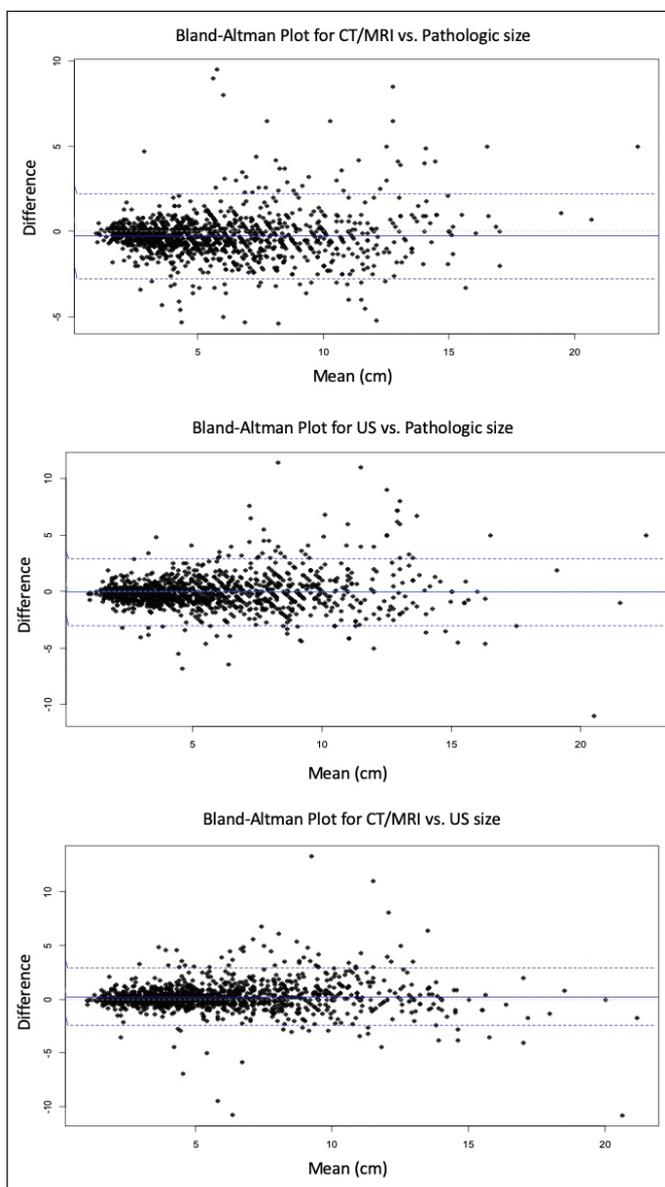
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Introduction: While radical cystectomy (RC) with urinary diversion remains the gold standard for managing muscle-invasive (MI) bladder cancer (BC), partial cystectomy (PC) is a viable option for some patients unwilling or unable to undergo RC.

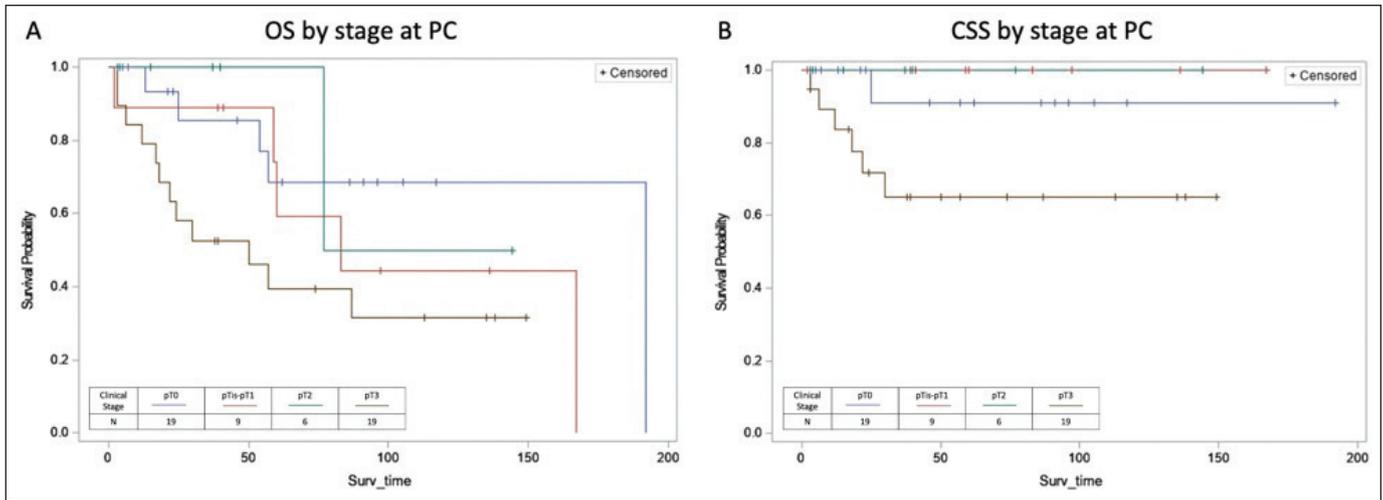
Methods: We performed a retrospective review of consecutive open PCs with lymph node dissection (LND) performed by a single surgeon between 2000 and 2018 for BC. Patients were identified via the surgeon's case logs. Patient data were acquired from all archived records within the institution's electronic medical record. Patients had either a cT2 solitary tumor (n=35), a high-grade (HG) tumor in a diverticulum (n=8), or a HG solitary cT1 cancer concerning for more advanced disease (n=10). Survival analysis was performed by the Biostatistics Department at the University of Rochester.

Results: Fifty-three patients had primarily urothelial carcinoma (UC), including 18 with variant UC histologies on preoperative biopsy. Patients had an average of 55 months (range 2–188 months) of followup. Thirty-seven were male (70%). Median age at the time of PC was 71 years (range 48–90). Four patients (8%) were readmitted within 30 days. Neoadjuvant or adjuvant chemotherapy was given to 15% and 8% of patients, respectively. The number of patients in this cohort by stage at PC, and Kaplan-Meier curves for overall survival (OS) and cancer-specific survival (CSS) stratified by patient stage at PC are shown in Fig. 1. For comparison, we reference the CSS of published SEER outcomes for patients who underwent RC with LND between 1988 and 2006 (Abdollah et al, BJUI 2011: 109). Seven patients died from metastatic BC (1 was pT0 and 6 pT3 at PC), none of whom had an intravesical recurrence. The pT0 patient at PC who died was pN0 at PC but succumbed metastatic micropapillary UC. Twelve patients (23%) had intravesical recurrences of UC; 11/12 had non-MI recurrences managed endoscopically and with intravesical therapies. Two patients ultimately underwent salvage RC: 1 for a positive PC margin on final pathology who was pT0 at RC, and 1 for recurrence of cT2 cancer found to have pT3a disease at RC. Neither of these patients died of metastatic BC.

Conclusions: PC appears to provide oncologically acceptable outcomes in those who present with solitary UC lesions.



Poster #43. Fig. 1. Bland-Altman plot of largest tumor diameters measured by different imaging modalities and to pathological tumor size.



Poster #44. Fig. 1. (A) and (B) show Kaplan-Meier estimates of OS and CSS by stage at PC, respectively. The 5-year OS by pathologic stage was 68.44% (CI 35.72–86.87) for pT0, 59.26% (CI 18.59–84.98) for pTis-T1, 100% (CI 100–100) for pT2, and 39.47% (CI 17.49–60.93) for pT3. The 5-year CSS by pathologic stage was 90.91% (CI 50.81–98.67) for pT0, 100% (CI 100–100) for pTis-pT1, 100% (CI 100–100) for pT2, and 64.14% (CI 37.97–82.71) for pT3.

Poster #45
Developmental and cross-validation of a nomogram for chronic kidney disease following robot-assisted radical cystectomy

Ahmed Elsayed, Zhe Jing, Umar Iqbal, Deniz Demirbas, Mohammad Durrani, Kristopher Atwood, Joseph Cilento, Zafardjan Dalimov, Jennifer Osei, Sean Gibson, Michael Mostow, Amylisa Christophe, Ahmed Hussein, Khurshid Guru

Roswell Park Comprehensive Cancer Center

Introduction: We sought to identify the factors associated with deterioration of renal functions after robot-assisted radical cystectomy (RARC) and to develop a nomogram to detect the probability of progression to chronic kidney disease (CKD).

Methods: We conducted a retrospective review of our prospectively maintained database. eGFR was calculated using the CKD-EPI creatinine formula using all followup creatinine values. CKD was defined as stage 3b (eGFR <45 mL/min/1.73m²) based on the NKF classification. Kaplan-Meier curves were used to depict CKD-free survival. A multivariate Cox regression model was used to determine predictors for CKD and to build the perioperative nomogram.

Results: The data set comprised 442 patients with a median followup of 25 months (12–59). Thirty seven percent developed CKD at a median of 9 months (4–18). CKD-free survival rates at 1, 3, and 5 years were 75%, 58%, and 50%, respectively. CKD was significantly associated with preoperative eGFR (HR 0.96, 95% CI 0.95–0.97, p<0.01), BMI (HR 1.03, 95%

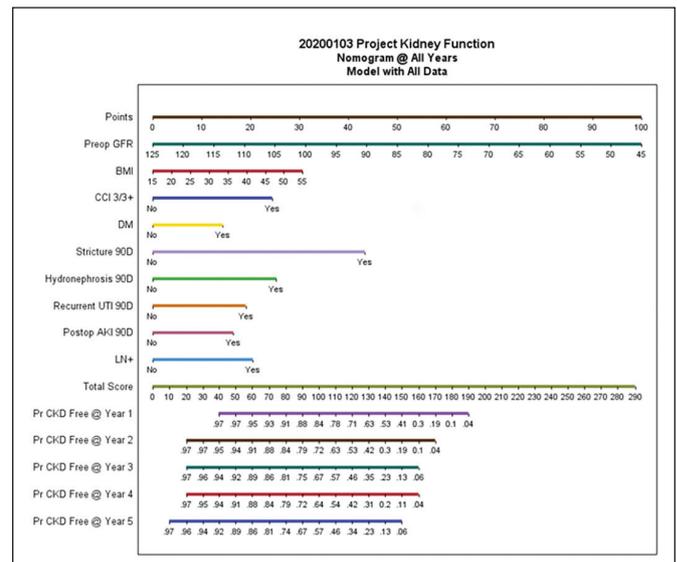
CI 1.01–1.05, p=0.03), CCI ≥3 (HR 2.20, 95% CI 1.35–3.58, p<0.01), diabetes (HR 1.59, 95% CI 1.09–2.31, p=0.02), 90-day postoperative strictures (HR 4.04, 95% CI 1.76–9.30, p<0.01), 90-day postoperative hydronephrosis (HR 2.26, 95% CI 1.34–3.79, p<0.01), 90-day recurrent UTI (HR 1.84, 95% CI 1.08–3.14, p=0.02), 90-day AKI (HR 1.70, 95% CI 1.19–2.43, p<0.01), and pN+ve (HR 1.94, 95% CI 1.31–2.86, p<0.01) (Table 1). A 5-years CKD-free survival nomogram was developed (Fig. 1).

Conclusions: We have developed, and cross-validated a nomogram for detecting CKD-free survival. This nomogram may have a role in counseling and followup of patients.

Funding: Roswell Park Alliance Foundation

Poster #45. Table 1. Multivariate analysis predicting CKD

Variable	Hazard ratio	95% confidence interval	p
Preoperative eGFR	0.96	0.95–0.97	<0.01
BMI	1.03	1.01–1.05	0.03
CCI ≥3	2.20	1.35–3.58	<0.01
Diabetes mellitus	1.59	1.09–2.31	0.02
90 days ureteroileal strictures	4.04	1.76–9.30	<0.01
90 days hydronephrosis	2.26	1.34–3.79	<0.01
90 days recurrent UTI	1.84	1.08–3.14	0.02
90 days AKI	1.70	1.19–2.43	<0.01
pN+ve	1.94	1.31–2.86	<0.01



Poster #45. Fig. 1. Nomogram for prediction of CKD after RARC.

Poster #46. Table 1. Demographics, clinical characteristics, and perioperative outcomes of RARC patients

	No recurrence	Recurrence	All	p
Preoperative parameters				
N of patients (%)	1586 (75)	521 (25)	2107	–
Age at cystectomy, mean (SD) (yr)	67 ± 10	68 ± 11	68 ± 10	0.10
Sex, males n (%)	1203 (76)	394 (76)	1597 (76)	0.95
Body mass index, mean (SD) (kg/m ²)	28 ± 6	27 ± 5	28 ± 6	0.05
ASA score ≥3, mean (%)	675 (50)	192 (42)	867 (10)	<0.01
Prior abdominal/pelvic surgery, n (%)	526 (47)	196 (49)	722 (47)	0.45
Prior irradiation, n (%)	66 (6)	28 (8)	94 (7)	0.33
Clinical T stage, ≥cT3, n (%)	140 (10)	56 (13)	196 (9)	0.19
Neoadjuvant chemotherapy, n (%)	349 (23)	100 (20)	449 (22)	0.17
Type of diversion, ileal conduit, n (%)	1228 (78)	438 (85)	1666 (80)	0.02
Operative time, median (IQR) (min)	368 (305,446)	374 (310,452)	370 (306,448)	0.66
Estimated blood loss, median (IQR) (ml)	300 (150,500)	300 (175,500)	300 (150,500)	0.01
Blood transfusion, n (%)	108 (7)	65 (12)	173 (8)	<0.01
Any complication	855 (62)	306 (68)	1161 (63)	0.02
30-d complications	592 (43)	195 (43)	787 (43)	0.91
0–90 d complications	683 (49)	227 (50)	910 (50)	0.79
Adjuvant treatment, n (%)	101 (8)	217 (45)	318 (18)	<0.01
Inpatient stay, median (IQR) (days)	8 (6,12)	9 (7,14)	8 (6,13)	<0.01
Intensive care unit stay, median (IQR) (days)	0 (0,1)	1 (0, 1)	1 (0,1)	0.26
Urothelial carcinoma, n (%)	925 (76)	374 (81)	1299 (62)	0.06
Pathologic T stage, ≥pT3, n (%)	442 (28)	329 (63)	771 (37)	<0.01
Lymph node yield, mean (SD)	17 (12,25)	18 (13,26)	17 (12,25)	0.46
pN positive, n (%)	218 (14)	208 (40)	426 (20)	<0.01
Positive surgical margins, n (%)	75 (5)	60 (12)	135 (6)	<0.01

Poster #46**Recurrences rates, patterns, and survival after robot-assisted radical cystectomy in 2107 patients: Results from the International Robotic Cystectomy Consortium**

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Introduction: There have been concerns about higher incidence of local recurrence after robot-assisted radical cystectomy (RARC) compared to its open counterpart. We sought to report and detail relapses following RARC using a multinational database.

Methods: A retrospective review of the International Robotic Cystectomy Consortium database was performed. Data were reviewed for demographics, perioperative, pathologic, and oncologic outcomes. Relapse rates and patterns were analyzed. Kaplan-Meier curves were used to depict relapse-free (RFS), local recurrence-free (LRFS), and distant metastases-free survival (DMFS). Kaplan-Meier curves were further stratified by dis-

ease stage, lymph node status, and margins. Multivariate stepwise Cox regression models were used to identify variables associated with RFS, LRFS, and DMFS.

Results: Out of 2107 patients, 521 (25%) relapsed. Mean age was 68±10 years, with a median followup of 26 (IQR 11–55) months. Local recurrences were observed in 11% and distant metastases in 18%. Early oncologic failure (within 3 months) occurred in 4%. The most common sites of local recurrence and distant metastases were the pelvis (5%) and lungs (6%), respectively. Abdominal wall/port-site metastases occurred in 25 patients (1.2%) and peritoneal carcinomatosis in 26 patients (1.2%). The 5-year RFS, LRFS, and DMFS were 66%, 84%, and 74%, respectively. Patients with higher disease stage, pN+ve, and positive soft tissue surgical margins demonstrated worse RFS, DMFS, and LRFS (log-rank p<0.01 for all comparisons). Multivariate regression models identified pN+ve status and ≥pT3 were significantly associated with RFS, LRFS, and DMFS (p<0.01).

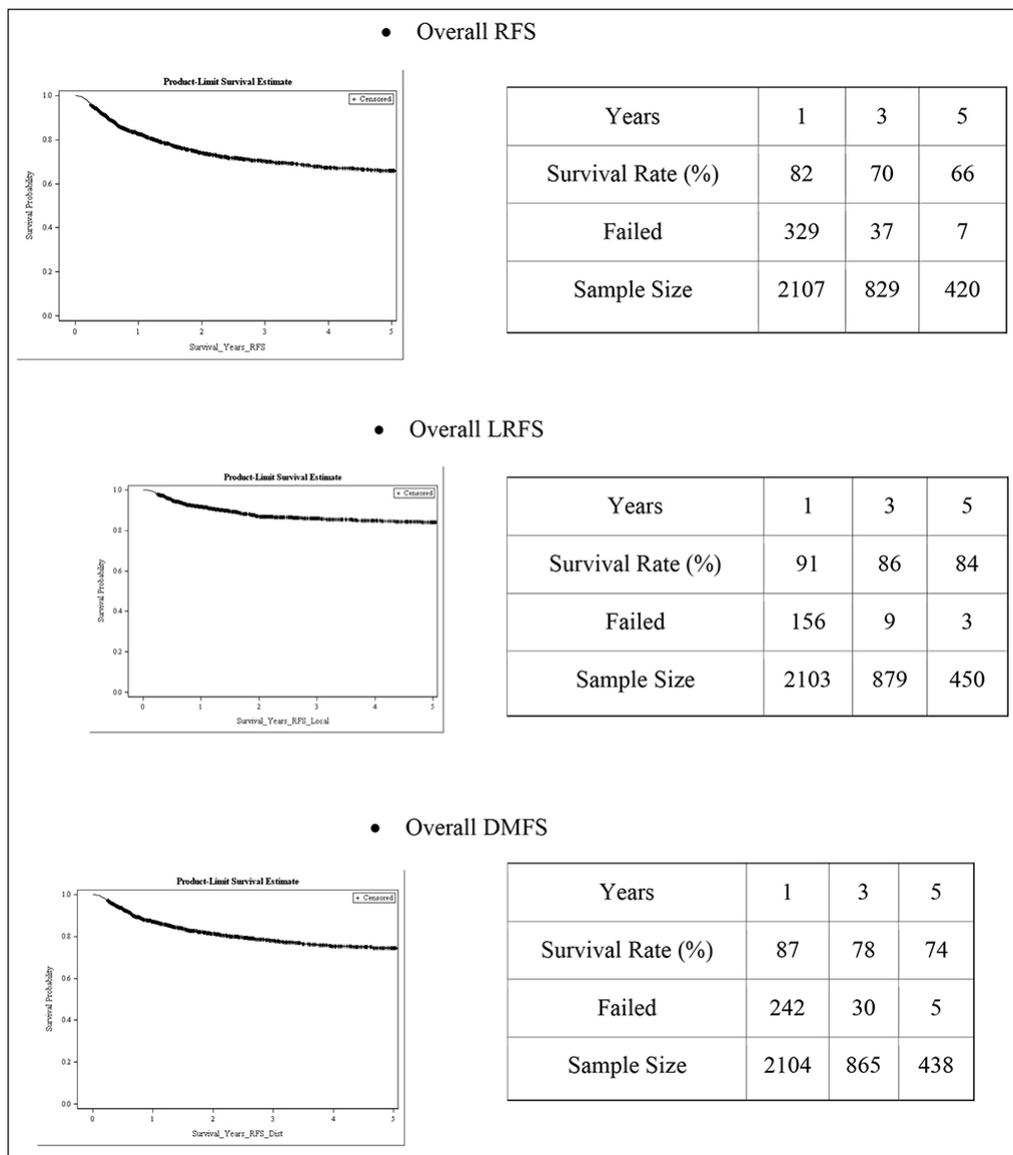
Conclusions: Disease stage remains the main variable associated with disease relapse following RC. Compared to large open radical cystectomy series, RARC was not associated with higher relapse rates or patterns.

Funding: Roswell Park Alliance Foundation

Poster #47**Venous thromboembolism after robot-assisted radical cystectomy**

Michael Mostowjy, Ahmed Elsayed, Sadat Ozair, Mohammad Durrani, Umar Iqbal, Jennifer Osei, Zhe Jing, Alexander Yunke, Joseph Cilento, Blanka Kozma, Shikha Shelat, Lucas Kanestrin, Ahmed Hussein, Khurshid Guru Roswell Park Comprehensive Cancer Center

Introduction: Venous thromboembolic (VTE) complications pose a significant risk for patients undergoing pelvic oncologic procedures, including



Poster #46. Fig. 1. Overall RFS, LRFS, and DMFS.

radical cystectomy. We sought to describe the prevalence of VTE after robot-assisted radical cystectomy (RARC) at our institution, and further describe associated variables.

Methods: A retrospective review of the prospectively maintained departmental database (2005–2019) included 639 patients (Table 1A). Patients were divided into those who developed VTE (deep venous thrombosis [DVT] and pulmonary embolism [PE]) and those who did not. Baseline demographic, disease characteristics, and perioperative outcomes were compared. The Kaplan-Meier method was used to depict overall survival (OS). Multivariate logistic regression analysis was used to identify variables associated with VTE.

Results: A total of 55 patients (9%) developed VTE (23 developed DVT and 31 developed PE). Median time to DVT was 31 days and median time to PE was 37 days. The rate of VTE remained stable between 2005 and 2019 (Fig. 1A). VTE was not fatal in any patient. Patients who developed VTE had significantly higher BMI (31 vs. 29, $p=0.03$), $\geq cT3$ (19% vs. 9%,

$p=0.03$), and $cN+$ (20% vs. 10%, $p=0.05$) more frequently. They had longer inpatient stay (9 vs. 7 days, $p<0.01$), $\geq pT3$ (60% vs. 38%, $p<0.01$), and re-operations within 30 days (13% vs. 4%, $p=0.02$) more frequently (Table 1A). Patients with VTE had significantly higher high-grade complications other than VTE (55% vs. 33%, $p<0.01$) and re-admissions (71% vs. 35%, $p<0.01$). Patients with VTE exhibited similar OS to patients who did not develop VTE ($p=0.20$). Multivariate analysis showed that BMI (OR 1.04, 95% CI 1.01–1.08; $p=0.03$), $\geq pT3$ (OR 2.54, 95% CI 1.42–4.52, $p<0.01$), and length of hospital stay (OR 1.04, 95% CI 1.02–1.07, $p<0.01$) were associated with VTE post-RARC (Table 1B).

Conclusions: VTE remains a major complication after RARC, but incidence remained stable over time. BMI, disease stage, and prolonged inpatient stay were associated with VTE.

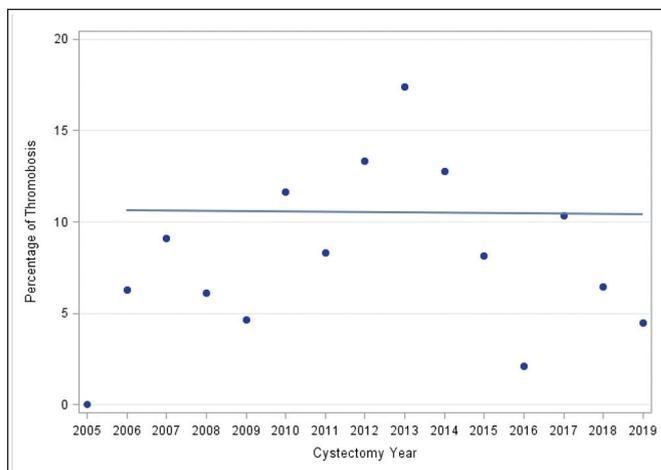
Funding: Roswell Park Alliance Foundation

Poster #47. Table 1A. Demographics, clinical characteristics, and perioperative outcomes of RARC patients

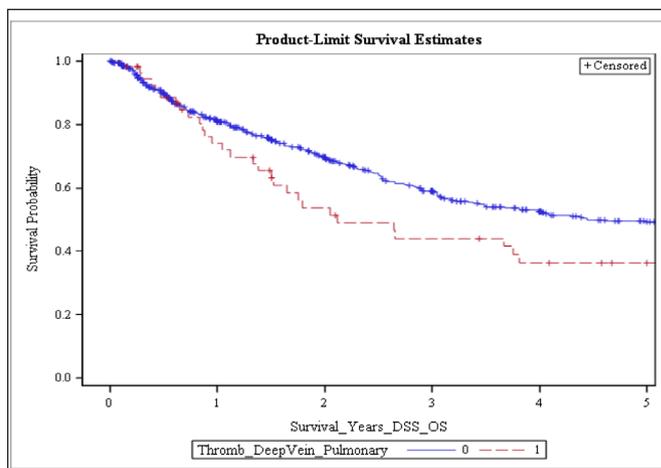
	No VTE	VTE	p
Perioperative parameters			
N of patients (%)	584 (91)	55 (9)	<0.01
Age at cystectomy, mean ± SD (yr)	68.6±10.6	69.6±9.1	0.53
Sex, males n (%)	437 (75)	38 (69)	0.34
Body mass index, mean ± SD (kg/m ²)	28.9±6.3	30.5±6.4	0.03
Chronic obstructive pulmonary disease, n (%)	90 (15)	14 (26)	0.05
Previous or current smoker, n (%)	444 (80)	41 (84)	0.71
Diabetes, n (%)	136 (23)	12 (22)	0.87
ASA score ≥3, mean (%)	303 (55)	32 (60)	0.47
Charlson comorbidity index ≥3, n (%)	477 (82)	45 (82)	1
Prior abdominal/pelvic surgery, n (%)	334 (57)	31 (56)	0.89
Prior pelvic or abdominal XRT, n (%)	37 (6)	7 (13)	0.09
Estimated blood loss in ml, median (IQR)	250 (120,450)	300 (200,450)	0.06
cN+, (%)	49 (10)	9 (20)	0.05
≥cT3, n (%)	49 (9)	10 (19)	0.02
Neoadjuvant chemotherapy, n (%)	154 (26)	14 (25)	1
Intracorporeal urinary diversion, n (%)	422 (74)	44 (81)	0.38
Ileal conduit urinary diversion, n (%)	518 (89)	52 (96)	0.42
Operative time, median (IQR) (min)	358 (297,429)	358 (296,428)	0.92
Blood transfusion, n (%)	26 (5)	5 (9)	0.18
Hospital stay, mean (SD) (days)	7 (6,10)	9 (7,16)	<0.01
Intensive care unit stay, median (IQR) (days)	1 (1,2)	1 (1,2)	0.99
Any high-grade complication, n (%)	193 (33)	30 (55)	<0.01
High-grade complication 0–30d, n (%)	80 (15)	15 (27)	0.02
High-grade complication 0–90d, n (%)	109 (19)	19 (35)	0.01
Any readmissions	205 (35)	39 (71)	<0.01
30-d readmissions	96 (16)	23 (42)	<0.01
0–90 d readmissions	133 (23)	27 (49)	<0.01
Death 0–90d, n (%)	24 (4)	1 (2)	0.71
Return to the OR within 30 days of cystectomy, n (%)	26 (4)	7 (13)	0.02
≥ pT3, n (%)	217 (38)	33 (60)	<0.01
pN+, n (%)	126 (22)	17 (31)	0.13
Positive surgical margins, n (%)	49 (8)	4 (7)	1

Poster #47. Table 1B. Multivariate logistic analysis for VTE

Variable	Odds ratio	95% CI	p
Body mass index	1.04	1.00–1.08	0.03
≥pT3	2.54	1.42–4.53	<0.01
Hospital stay	1.04	1.02–1.07	<0.01



Poster #47. Fig. 1A. Trend of VTE from 2005–2019.



Poster #47. Fig. 1B. Overall survival stratified by VTE (log-rank=0.20).

Poster #48
Expression of programmed death ligand-1 (PD-L1) in metastatic and post-chemotherapy viable testicular germ cell tumors

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Introduction: Response rates to chemotherapy for testicular germ cell tumors are high, but the rare patients that do not respond to chemotherapy have poorer outcomes. However, clinical trials to explore new therapies are challenging given the rarity of these patients. This retrospective study sought to evaluate PD-L1 staining on metastatic and post-chemotherapy viable testicular germ cell tumors to assess the importance of PD-1/PD-L1 checkpoint immunotherapy as a potential treatment.

Methods: Ethics research committee approval and patient informed consent for this retrospective study was obtained as required by each participating institution (CHU de Québec, St. Joseph's Health Care, and Halifax Health Science Centre). Patients with viable metastatic testicular germ cell tumors identified on surgical pathology from 2002–2019 were included. Patients with pure teratoma were excluded. Pathological review of slides was performed, with only samples with >100 viable tumor cells included for PD-L1 staining. Matched orchiectomy specimens were obtained whenever possible. PD-L1 staining with the 22C3 clone was performed in a clinical pathology laboratory and was graded using the combined positive score (CPS).

Results: A total of 33 patients with testicular germ cell tumors were included in the study, with 16 post-chemotherapy viable tumor samples and 17 treatment-naïve metastatic samples. Median followup was 30 (interquartile range 10–150) months; five patients were known to have died of testicular cancer. Comparing all samples, no significant differences in the PD-L1 expression was observed between testicular and metastatic samples, or between post-chemotherapy metastatic tumors vs. chemotherapy-naïve tumors. Among the tumor subtypes, PD-L1 expression was highest in choriocarcinoma, with a CPS of 100 in all three samples. In seven patients with matched specimens pre- and post-chemotherapy, an increase in PD-L1 expression following chemotherapy was seen in one patient with a mixed germ cell tumor and in the only patient with pure seminoma post-chemotherapy.

Conclusions: This study of rare viable post-chemotherapy and metastatic germ cell tumors does not suggest that over-expression of PD-L1 is a mechanism of chemotherapy resistance in mixed germ cell tumors. This suggests there is no role for PD-1/PD-L1 checkpoint immunotherapy trials in this population of patients, though further research is needed for patients with viable seminoma post-chemotherapy.

Funding: Bristol-Myers Squibb

Poster #49

The utility of postoperative serial hemoglobin measurements in patients undergoing radical cystectomy for urothelial carcinoma

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Introduction: Routine serial measurements of serum hemoglobin (sHgb) are common after major abdominal surgery. However, prolonged serial measurements may be associated with patient anxiety and discomfort, increased costs, and prolonged hospitalization without significant clinical benefit. We examined packed red blood cell (pRBC) transfusion rates and timing of transfusion after radical cystectomy (RC) for urothelial carcinoma (UC) to determine the utility of serial sHgb measurements.

Methods: We retrospectively reviewed our institutional records to identify all patients who underwent RC for UC between 2009 and 2019. The number of sHgb measurements for each patient was examined and pRBC transfusion rates were calculated intraoperatively and on postoperative days (POD) 0, 1, 2, and beyond POD 2. Multivariable logistic regression was used to determine factors associated with transfusion beyond POD 2.

Results: The median number of sHgb measurements throughout hospital admission was 9 (IQR 7, 25). Overall, 69 (28.7%) patients received a postoperative transfusion at some point during their hospital stay, with 14 (5.8%), 18 (7.5%), 15 (6.2%), and 46 (19.2%) patients receiving a pRBC transfusion on POD 0, 1, 2, and beyond POD 2, respectively. Among patients with a sHgb level >100 g/L on POD 2, only 7/85 (8.2%) went on to receive a transfusion beyond POD 2 compared with 39/155 (25.2%) patients with sHgb <100 g/L. In multivariable analysis, risk factors associated with transfusion beyond POD 2 included older age, lower sHgb on POD 2, and longer duration of hospitalization.

Conclusions: PRBC transfusion rates after radical cystectomy remain high, with many patients requiring transfusions several days after surgery. However, patients with sHgb >100 g/L on POD 2 are at a low risk of requiring transfusion. Discontinuing further sHgb checks in these patients may serve to decrease patient anxiety, unnecessary investigations, and healthcare costs.

Poster #50

Exploring urologists participation in oncology care model and bladder cancer-related use

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Roswell Park Comprehensive Cancer Center

Introduction: The Oncology Care Model (OCM) is an episode-based payment model by Centers for Medicare and Medicaid Services (CMS). OCM provides traditional fee-for-service, monthly payments for oncology services, and performance-based payments on eligible episodes linked to quality performance and benchmarked costs. OCM is an option for the urologists to participate in the alternative payment models. We sought to assess OCM participation by urologists and identify variation in practice patterns and utilization among OCM and non-OCM urologists for bladder cancer-related procedures.

Methods: We used Centers for Medicare and Medicaid Services Quality Payment Program Participation Eligibility tool to classify urologists based on their participation in OCM. Provider level utilization data were extracted from Medicare Provider Utilization and Payment Data for the 2017 OCM participation year. We used Mann-Whitney tests for statistical analysis of continuous variables.

Results: Among 9055 urologists who received Medicare payments in 2017, 359 (4.0%) participated in OCM. OCM urologists compared to non-OCM urologists provided care to patients with cancer diagnosis more frequently (23% vs. 22%, $p < 0.01$) and dealt with more complex patients evidenced by higher Hierarchical Condition Category (HCC) risk adjustment scores (1.50 vs. 1.40, $p < 0.01$). The number of Medicare beneficiaries did not significantly differ between OCM and non-OCM urologists (504 vs. 518, $p = 0.50$). However, OCM urologists received higher median Medicare payments per beneficiary (\$314 vs. \$281, $p < 0.01$) and per service (\$60 vs. \$50, $p < 0.01$). OCM urologists provided fewer services than non-OCM urologists (2534 vs. 3101, $p = 0.06$). For bladder-cancer-related utilization, OCM urologist performed more bladder biopsies (26 vs. 21, $p = 0.65$), transurethral resection of bladder tumor (31 vs. 27, $p = 0.13$),

Poster #50. Table 1A. Characteristics of urologists participating in oncology care model

	Non-OCM urologists N=8696 (96%)	OCM urologists N=359 (4%)	p
Patient population			
Median HCC risk score of beneficiaries, median (IQR)	1.40 (1.26–1.60)	1.50 (1.32–1.80)	<0.01
Percent of beneficiaries with cancer, median (IQR)	22 (18–26)	23 (19–39)	<0.01
Utilization pattern			
Number of services, median (IQR)	3101 (1017–7927)	2534 (977–6288)	0.06
Number of Medicare beneficiaries, median (IQR)	518 (274–808)	504 (317–736)	0.50
Medicare payment per beneficiary, median (IQR)	281.40 (218.27–362.30)	314.22 (232.71–404.22)	<0.01
Medicare payment per service, median (IQR)	50.70 (30.48–73.05)	60.40 (41.91–85.99)	<0.01

Poster #50. Table 1B. Bladder cancer-related use among OCM participating and non-participating urologists

Procedure/utilization pattern, HCPCS code	Non-OCM urologists	OCM urologists	p
Bladder biopsy, 52204, median (IQR)	20.5 (15–30)	26 (15–38.5)	0.65
TURBT, 52224, 52234, 52235, 52240, median (IQR)	27 (17–44)	31 (22.5–46)	0.13
Intravesical BCG installations, J9031, median (IQR)	55 (38.5–76)	69 (41.5–86.5)	0.35
Intravesical chemotherapy installations, 51720, median (IQR)	57.5 (39–81)	70.5 (50.3–104.3)	0.15
Cystectomy, 51570, 51575, 51580, 51585, 51590, 51595, 51596, 51999, median (IQR)	14 (16–22)	19 (12–25)	0.90

Counts with less than 10 were excluded from the datasets to protect the privacy of beneficiaries.

intravesical Bacillus Calmette-Guerin installations (69 vs. 55, p=0.35), intravesical chemotherapy administration (71 vs. 58, p=0.15), and cystectomies (19 vs. 14, p=0.90) during the 2017 OCM participation year, all did not reach statistical significance (Table 1).

Conclusions: Only a small number of urologists are participating in the OCM. OCM urologists were more likely to provide care to patients with the diagnosis of bladder cancer and higher HCC scores, and to receive higher payment per services provided and beneficiaries seen. Despite variation in practice patterns, no difference in bladder cancer-related utilization were noted among OCM and non-OCM urologists.

Funding: Roswell Park Alliance Foundation

Poster #51 Outcomes of pathological T0 after robot-assisted radical cystectomy: Results from the International Robotic Consortium

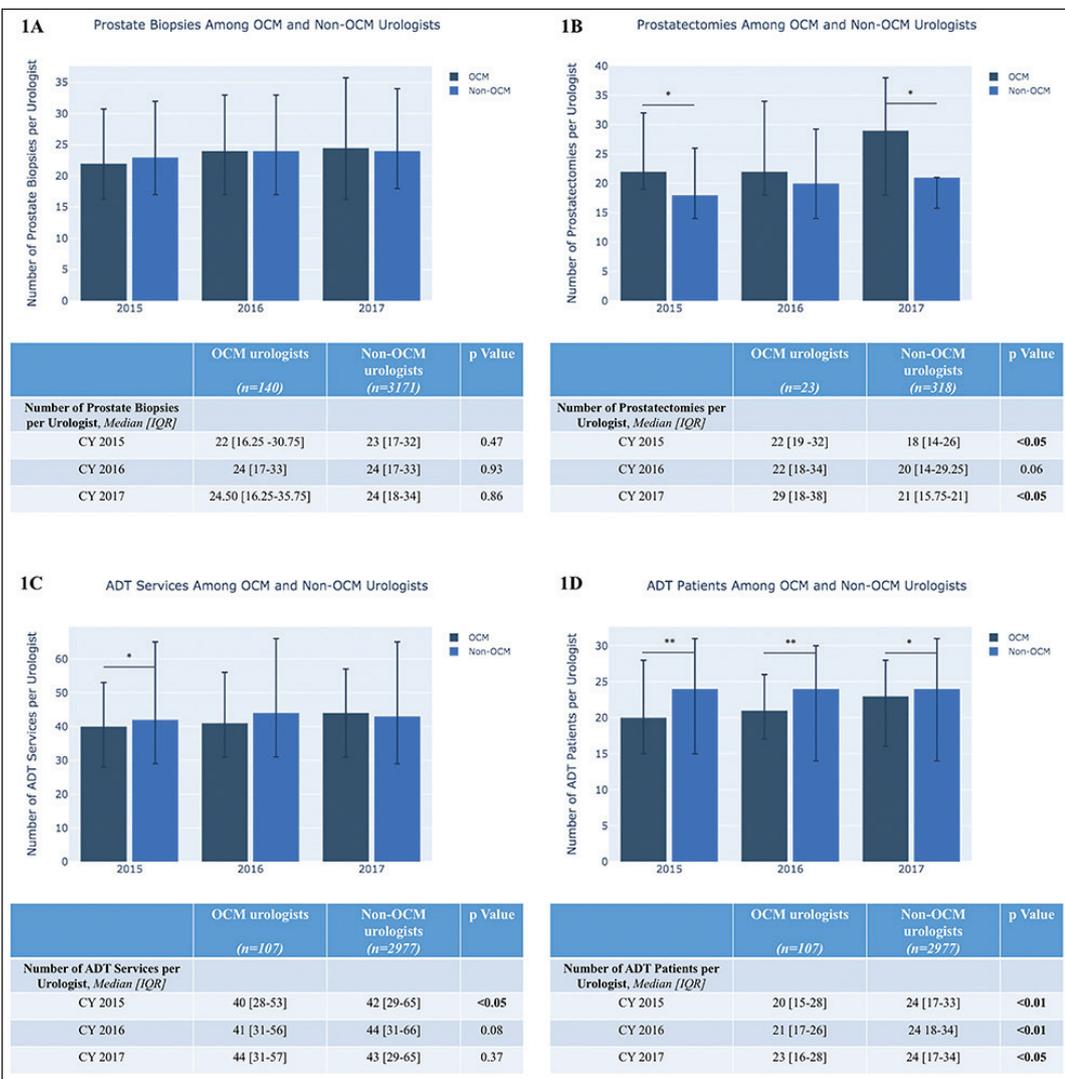
Ahmed Elsayed¹, Umar Iqbal¹, Zhe Jing¹, Jennifer Osei¹, Lee Richstone², Andrew Wagner³, Bertram Yuh⁴, Juan Palou⁵, Eric Kim⁶, Alex Mottrie⁷, Derya Balbay⁸, Carl Wijburg⁹, Morgan Roupret¹⁰, Ketan Badani¹¹, Franco Gaboardi¹², Michael Stockle¹³, Prokar Dasgupta¹⁴, Muhammad Shamim Khan¹⁴, Peter Wiklund¹¹, Jihad Kaouk¹⁵, James Peabody¹⁶, Mani Menon¹⁶, Ahmed Hussein¹, Khurshid Guru¹

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Introduction: Pathological T0 (pT0) at cystectomy has been associated with improved prognosis. Here, we investigated the outcomes of patients with pT0 after robot-assisted radical cystectomy (RARC).

Methods: A retrospective review of the International Robotic Cystectomy Consortium database (3926 patients, 28 institutes, 14 countries) was performed. Patients with pT0 were identified and analyzed. Data were reviewed for demographics and pathologic outcomes. Kaplan-Meier (KM) curves were used to depict recurrence-free survival (RFS) and were further stratified based on NAC and pN status. Multivariate stepwise Cox regression models were used to identify variables associated with RFS.

Results: A total of 408 patients with pT0 were identified. Mean age was 66±11 yrs,



Poster #50. Fig. 1. Prostate biopsy, radical prostatectomy, and ADT use by OCM participating and non-participating urologists.

Poster #51. Table 1. Multivariable stepwise Cox proportional hazards modeling predictors of RFS

	Hazard ratio	95% CI	p
RFS			
pN+ve	5.93	2.21–15.89	<0.01
Reoperations within 30 days	4.77	1.81–12.61	<0.01

with a median followup of 20 months (IQR 6–50); 36% received NAC and 5% had pN positive disease. Eight percent of patients experienced disease recurrence: 3% and 6% local and distant recurrence, respectively. The most common sites of local and distant recurrences were the pelvis (1%) and lungs (2%), respectively. No patient had a port-site or peritoneal recurrence. Patients who received NAC exhibited similar RFS at 5 years when compared to those who did not receive, while those who had pN+ve disease had significantly worse RFS (42% vs. 90%, p<0.01) compared to pN-ve (Fig. 1). Predictors of RFS were pN+ve (HR 5.93, 95% CI 2.21–15.89, p<0.01) and re-operations within 30 days (HR 4.77, 95% CI 1.81–12.61, p<0.01) (Table 1).

Conclusions: Pathologic T0 status was associated with improved survival irrespective of neoadjuvant chemotherapy. Positive nodal disease occurred in 5% of patients despite pathological T0 status. Node status is the main predictor for recurrence in pT0.

Funding: Roswell Park Alliance Foundation and Vattikuti Foundation

Poster #52

Outcomes of robot-assisted radical cystectomy in North America vs. Europe: Results from the International Robotic Cystectomy Consortium

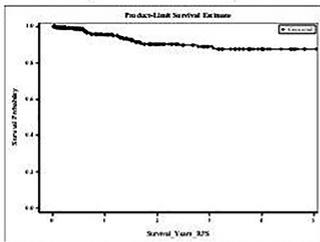
Ahmed Elsayed¹, Amir Khan¹, Zhe Jing¹, Umar Iqbal¹, Jennifer Osei¹, Lee Richstone², Andrew Wagner³, Bertram Yuh⁴, Juan Palou⁵, Eric Kim⁶, Alexandre Mottrie⁷, Thomas Maatman⁸, Morgan Roupret⁹, Ketan Badani¹⁰, Derya Balbay¹¹, Ahmed Aboumohamed¹², Franco Gaboardi¹³, Michael Stockle¹⁴, Prokar Dasgupta¹⁵, Muhammad Shamim Khan¹⁵, Peter Wiklund¹⁰, Jihad Kaouk¹⁶, James Peabody¹⁷, Mani Menon¹⁷, Ahmed Hussein¹, Khurshid Guru¹, Carl Wijburg¹⁸

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Introduction: Use of robot-assisted radical cystectomy (RARC) has significantly increased over the last decade. We sought to compare the outcomes between North American and European institutions.

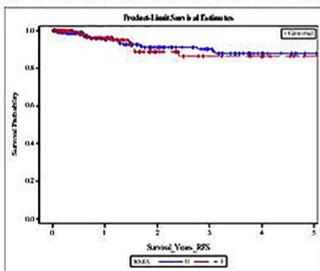
Methods: We reviewed our prospectively maintained International Robotic Cystectomy Consortium database between 2006 and 2019. Patients were divided according to the site of the institution (North America vs. Europe). Data were reviewed. Kaplan-Meier (KM) curves

Figure 1a: Kaplan Meier showing overall RFS



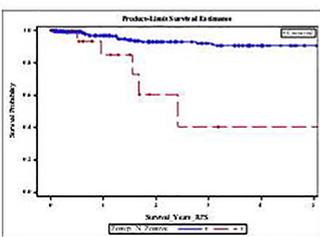
Years	1	3	5
Survival Rate	96	90	88
Failed	13	2	0
Sample Size	408	154	86

Figure 1b: Kaplan Meier showing RFS stratified by utilization of NAC (log rank p=0.63)



Years	1	3	5	
No NAC	Survival Rate	96	91	88
	Failed	9	1	0
	Sample Size	253	111	60
NAC	Survival Rate	97	87	87
	Failed	4	1	0
	Sample Size	140	43	26

Figure 1c: Kaplan Meier showing RFS stratified pN+ve vs pN-ve (log rank p<0.01)

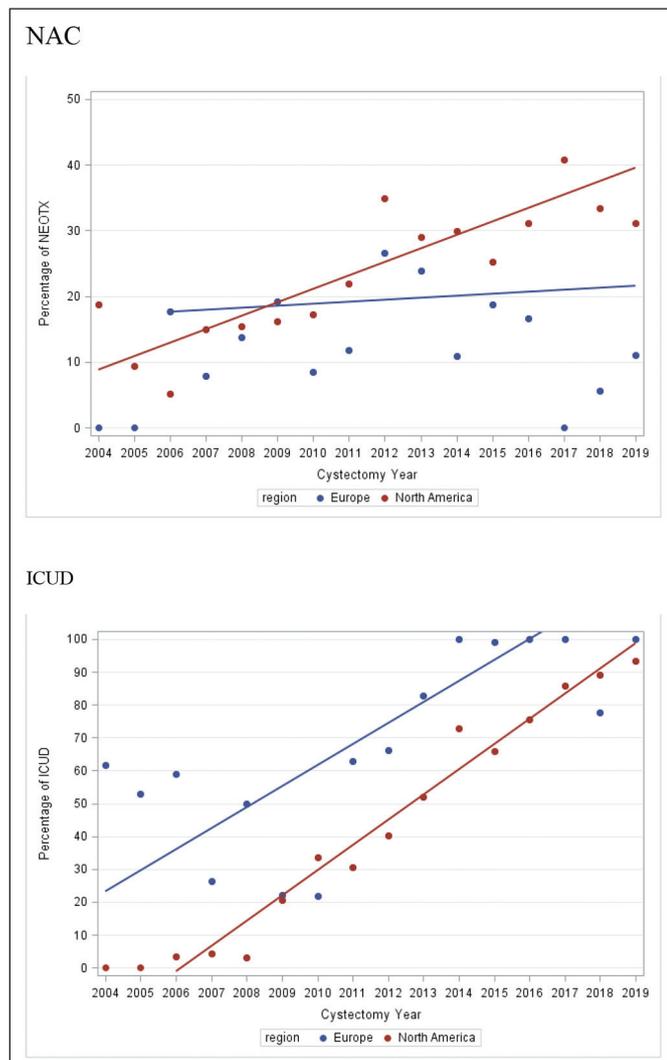


Years	1	3	5	
pN-ve	Survival Rate	97	92	90
	Failed	8	1	0
	Sample Size	347	136	79
pN+ve	Survival Rate	86	42	42
	Failed	2	1	0
	Sample Size	17	3	1

Poster #51. Fig. 1. Kaplan-Meier curves.

were used to depict recurrence-free survival (RFS), disease-specific survival (DSS), and overall survival (OS). Cochran-Armitage trend test was used to investigate the significant trend of NAC and intracorporeal urinary diversion (ICUD) over time.

Results: We identified 2957 patients, of which 1909 (65%) were in North America. North American patients were older (68 vs. 66 years, $p < 0.01$), had higher BMI (28 vs. 27, $p < 0.01$), included more patients with ASA ≥ 3 (63% vs. 27%, $p < 0.01$), and were more likely to receive NAC (23% vs. 17%, $p < 0.01$). European patients were more likely to receive ICUD (67% vs. 44%, $p < 0.01$), continent urinary diversion (26% vs. 19%, $p < 0.01$), had lower lymph node yield (15 vs. 20, $p < 0.01$), shorter operative time (368 vs. 393 mins, $p < 0.01$), and longer hospital stay (12 vs. 7 days, $p < 0.01$). North American patients had more overall complications (60% vs. 55%, $p = 0.02$) and 90-day mortality (4% vs. 2%, $p < 0.01$). North American patients had a higher $\geq pT3$ ($p < 0.01$), positive margins ($p = 0.03$), and pN+ve ($p = 0.05$). North American patients had more recurrences (24% vs. 19%, $p < 0.01$), and distant recurrences (18% vs. 14%, $p = 0.02$) (Table 1). There was a significant increase in NAC use among North American compared with European institutions (from $p < 0.01$), and a significant increase of ICUD among both ($p < 0.01$) (Fig. 1A). KM curves showed a significantly higher RFS ($p = 0.03$) and OS ($p < 0.01$) but similar DSS ($p = 0.59$) rates for European compared to North American patients at 5 years (Fig. 1B).



Poster #52. Fig. 1A. Trend tests.

Conclusions: Use of NAC has significantly increased among North American institutions, but remained stable over time among European institutions.

Funding: Roswell Park Alliance Foundation

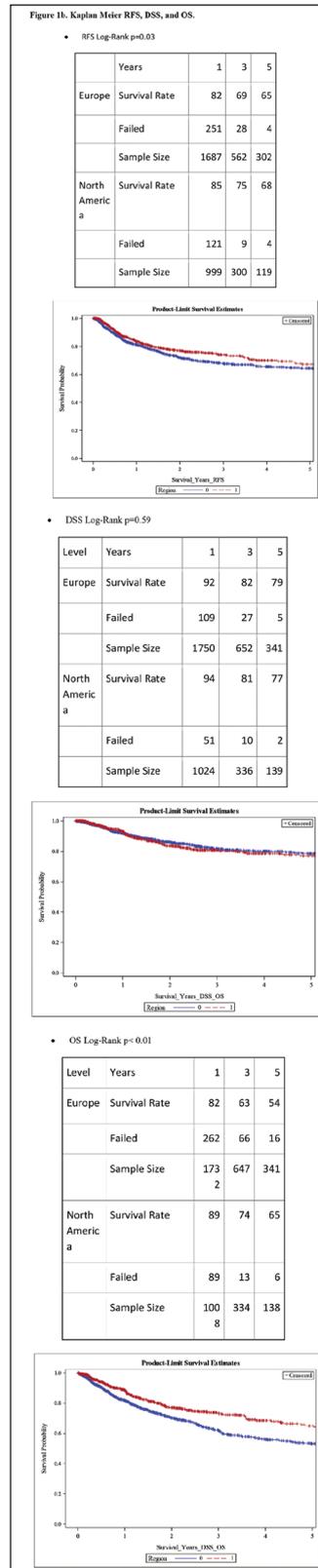
Poster #53
Investigating the association between lifestyle factors and bladder cancer risk and severity: A preliminary retrospective study

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Introduction: Particular lifestyle and occupational factors may increase the risk and/or severity of bladder cancer. We sought to explore how lifestyle factors contribute to bladder cancer risk and severity.

Methods: A retrospective review of our prospectively maintained bladder cancer databases between 2005 and 2019 was performed. Patients were divided into 3 groups based on bladder cancer stage: 1) non-muscle-invasive bladder cancer (NMIBC); 2) muscle-invasive bladder cancer (MIBC); and 3) metastatic bladder cancer (METS). All groups were analyzed for demographics and lifestyle characteristics from self-reported lifestyle survey data. Lifestyle characteristics analyzed were: sources of water, industrial/occupational exposures, residential water pollutants, medication exposures, travel history, social history, and family history of cancer. Exposure duration was categorized. Multivariate logistic regression model was used to study the association of variables with bladder cancer.

Results: We analyzed 321 patients with available lifestyle survey data. The median age was 70 (63, 76) years. Patients with hair dye exposure were more likely to have METS compared to MIBC and NMIBC; (6 ± 15 , 2 ± 8 , 1 ± 5 , $p = 0.04$), respectively. Of note, 18% of the individuals in the hair dye exposure group worked as hairstylists. In addition, lifestyle factors, such as sources of water,



Poster #52. Fig. 1B. Kaplan-Meier RFS, DSS, and OS curves.

Poster #52. Table 1. Baseline and perioperative outcomes of North America vs. Europe for RARC patients

Variable name	North America	Europe	All	p
N of patients (%)	1909 (65)	1048 (35)	2957	–
Age at cystectomy, mean ± SD	68±11	66±11	67±11	<0.01
Sex, males n (%)	1470 (78)	757 (72)	2227 (76)	<0.01
Body mass index, mean ± SD (kg/m ²)	28±6	27±5	28±6	<0.01
ASA ≥3, n (%)	1075 (64)	202 (27)	1277 (52)	<0.01
Operative time min, mean ± SD	393±119	368±94	383±110	<0.01
Intracorporeal urinary diversion, n (%)	728 (44)	697 (67)	1425 (53)	<0.01
Continent urinary diversion, n (%)	361 (19)	272 (26)	633 (22)	<0.01
Inpatient stay in days, median (IQR)	7 (6, 10)	12 (8, 15)	8 (6, 13)	<0.01
≥pT3, n (%)	667 (40)	334 (32)	1001 (37)	<0.01
pN+, n (%)	383 (23)	176 (20)	559 (22)	0.05
Positive surgical margins, n (%)	129 (9)	50 (7)	179 (8)	0.03
Any complications, n (%)	910 (60)	500(55)	1410 (58)	0.02
High-grade complications, n (%)	372 (26)	226 (25)	598 (26)	0.36
Reoperations within 30 days, n (%)	96 (5)	50 (5)	146 (5)	0.79
Death 0–90d, n (%)	71 (4)	20 (2)	91 (3)	<0.01
Any recurrence, n (%)	461 (24)	204 (19)	665 (22)	<0.01
Any distal recurrence, n (%)	337 (18)	150 (14)	487 (16)	0.02
Any local recurrence, n (%)	212 (11)	101 (10)	313 (11)	0.24

residential water pollutants, medication exposures, travel history, social history, and family history of cancer, were not statistically different between the 3 groups (Table 1A). We categorized hair dye into <5 yrs and ≥5yrs based on the distribution of duration of exposure for NMIBC, MIBC, and METS. Multivariate analysis showed age was positively associated with MIBC (OR 1.05, 95% CI 1.03–1.08, p<0.01). History of previous cancer was negatively associated with MIBC (OR 0.43, 95% CI 0.25–0.77, p<0.01). Hair dye exposure was a predictor for METS (OR 4.67, 95% CI 1.45–15.0, p<0.01) (Table 1B).

Conclusions: In our initial study, exposure to hair dye was commonly associated with metastatic bladder cancer. Further population-based studies are needed to validate these findings from this limited cohort.

Funding: Roswell Park Alliance Foundation

Poster #54

Social determinants of health are associated with mortality in muscle-invasive bladder cancer

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Introduction: Social determinants of health can influence an individual's life expectancy. We sought to examine the association of socioeconomic status, rural-urban location, and type of insurance with overall and cancer-specific mortality among patients with muscle-invasive bladder cancer.

Methods: Using the Pennsylvania Cancer Registry, which collects demographic, insurance, and clinical information on every patient with cancer within the state, we identified all patients diagnosed with non-metastatic muscle-invasive bladder cancer from 2010–2016 based on clinical and pathologic staging. We used the Area Deprivation Index (ADI) as a surrogate for socioeconomic status and Rural-Urban Commuting Area (RUCA) codes to classify urban, large town, and rural communities. ADI was reported in quartiles as ADI 1–4, with 4 representing the lowest socioeconomic status. We fit multivariable logistic regression and Cox models to assess the relationship of these social determinants with overall and cancer-specific survival adjusting for age, sex, race, stage, treatment, rural-urban classification, insurance, and ADI.

Results: We identified 3362 patients with non-metastatic muscle-invasive bladder cancer. On multivariable analysis, Medicare (hazards ratio [HR] 1.15), Medicaid (HR 1.38), ADI 3 (HR 1.16), and ADI 4 (HR 1.21) were independent predictors of greater overall mortality (all p<0.05). Medicare (HR 1.31), Medicaid (HR 1.68), and ADI 4 (HR 1.41) were also associated with greater cancer-specific mortality (all p<0.05). Urban vs. rural location was not associated with mortality.

Conclusions: Lower socioeconomic status and Medicare and Medicaid insurance were associated with a greater risk of overall and bladder cancer-specific mortality, while rural residence was not a factor. Implementation of public health programs may help reduce the gap in mortality for these at-risk populations.

Poster #55

Polyomavirus changes in urine cytology and detection of bladder cancer: A retrospective chart review

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SUNY Upstate

Introduction: Carcinoma of the bladder is one of the most common malignancies in the U.S. Polyomaviruses are characterized as small, naked DNA viruses that cause illness in the immunocompromised. Studies have explored the role of polyomaviruses in bladder cancer in immunosuppressed patients, but the association of polyomaviruses and bladder cancer in immunocompetent patients has not yet been characterized. We chose to further investigate the characteristics of immunocompetent patients with polyomavirus changes in urine cytology and the subsequent finding of bladder cancer.

Methods: A retrospective chart review of the medical records at our institution was performed. We retrieved 50 patients with polyomavirus changes on urine cytology. These were compared to 50 sequential patients with atypical cytology and 50 sequential patients with negative cytology. None of the patients had a history of previous organ transplant. Most cases had urine cytologies performed because of a history of hematuria (microscopic or gross) or history of bladder cancer. These cases were evaluated for the subsequent diagnosis of bladder cancer.

Results: Of the patients with polyomavirus changes on urine cytology, 3/50 had a subsequent diagnosis of a low-grade urothelial carcinoma; 2 of these patients had a prior history of recurrent bladder cancer. Of

Poster #53. Table 1A. Bladder cancer lifestyle factors descriptive statistics

Variable name	NMIBC	MIBC	Mets	All	p
Demographics					
Number of patients, n (%)	162 (51)	124 (39)	35 (11)	321	-
Age, median (Q1, Q3)	67 (62, 74)	72 (65, 79)	67 (58, 79)	70 (63, 76)	< 0.01
Race – Black, n (%)	6 (4)	4 (3)	0 (0)	10 (3)	0.81
Race – White, n (%)	155 (96)	119 (96)	35 (100)	309 (96)	0.81
Gender, male, n (%)	120 (75)	93 (76)	23 (68)	236 (74)	0.64
Body mass index (BMI), mean ± SD	30±7	30±9	28±6	30±8	0.21
Previous cancer, n (%)	56 (35)	30 (24)	11 (31)	97 (30)	0.17
Sources of water					
Primary source tap, n (%)	140 (86)	109 (88)	33 (94)	282 (88)	0.43
Primary source bottle, n (%)	23 (14)	12 (10)	4 (11)	39 (12)	0.51
Primary source filtered tap, n (%)	15 (9)	17 (14)	8 (23)	40 (13)	0.08
Any exposure - shallow well water, n (%)	27 (17)	12 (10)	2 (6)	41 (13)	0.09
Any exposure - deep well water, n (%)	28 (17)	23 (19)	2 (6)	53 (17)	0.18
Industrial/occupational exposures (in years)					
Rubber, mean ± SD	1±5	2±10	1±6	1±7	0.53
Paint, mean ± SD	3±10	3±10	3±11	3±10	0.71
Leather, mean ± SD	0±0	0.02±0.3	0.01±0.1	0.01±0.2	0.14
Hair dye, mean ± SD	1±5	2±8	6±15	2±8	0.04
Agent orange, mean ± SD	0.05±0.3	0.03±0.2	0.05±0.3	0.04±0.2	0.78
Radiation (non-medical), mean ± SD	0.54±3	0.57±5	1±6	0.60±4	0.85
Residential water pollutants					
Lead/asbestos, n (%)	38 (23)	36 (29)	7 (20)	81 (25)	0.42
Arsenic, n (%)	2 (1)	1 (1)	0 (0)	3 (1)	0.78
Chlorine, n (%)	5 (3)	2 (2)	3 (9)	10 (3)	0.11
Bacteria, n (%)	1 (1)	0 (0)	0 (0)	1 (0.3)	0.61
Sulfur, n (%)	2 (1)	0 (0)	0 (0)	2 (1)	0.37
Medication exposures					
Phenacetin, n (%)	3 (2)	0 (0)	1 (3)	4 (1)	0.25
Pioglitazone, n (%)	8 (5)	5 (4)	1 (3)	14 (4)	0.84
Metformin, n (%)	10 (6)	12 (10)	4 (11)	26 (8)	0.42
Glimepiride/pioglitazone, n (%)	4 (2)	0 (0)	0 (0)	4 (1)	0.14
Travel history					
Africa, n (%)	6 (4)	5 (4)	2 (6)	13 (4)	0.86
Middle East, n (%)	9 (6)	6 (5)	2 (6)	17 (5)	0.94

the patients with atypical cytology, 12/50 had a subsequent diagnosis of bladder cancer, 3 of which had a prior history of bladder cancer. Of the patients with negative cytology, 5/50 were diagnosed with bladder cancer and zero of these cases had a history of bladder cancer.

Conclusions: In this study, detection of polyomavirus changes in the urine cytology of immunocompetent patients did not result in a higher detection of bladder cancer compared to atypical or negative cytology. This is the largest study of polyomavirus positive cytologies in immunocompetent patients. The study is limited by the small sample size. Larger studies are required to evaluate the role of polyomavirus and bladder cancer in immunocompetent patients.

Poster #53. Table 1B. Multivariate predictors of bladder risk and severity

Variable	Response group	Odds ratio (OR)	95 % confidence interval (CI)	p
Age	MIBC vs. NMIBC	1.05	(1.03–1.08)	<0.01
Previous cancer	MIBC vs. NMIBC	0.43	(0.25–0.77)	<0.01
Hair dye exposure	METS vs. NMIBC	4.67	(1.45–15.0)	<0.01

Poster #56**Ureteric stents for malignant ureteric obstruction – assessing the factors associated with encrustation and inadequate drainage: A cohort study**Shreyas Gandhi¹, Alex Koziarz², Jason Lee¹¹Department of Urology, University of Toronto, Toronto, ON, Canada;²Faculty of Medicine, University of Toronto, Toronto, ON, Canada

Introduction: Malignant ureteric obstruction (MUO) is a challenging clinical entity for urologists.¹ Currently no definitive guidelines exist regarding optimal management of MUO, including the required frequency of stent changes.^{2,3} Therefore, we evaluated the association of clinical factors at initial stent implantation with prognosis and stent management in patients with MUO.

Methods: A single-center, retrospective cohort study was conducted among all patients with MUO managed with a ureteral stent from August 2015 to December 2019. A multivariable regression model was used to evaluate patient factors associated with the following primary outcomes: stent encrustation requiring need for stent change, need for antegrade decompression due to inadequate drainage, and time to first stent change.

Results: A total of 132 patients (73% female) were included with median age of 65 years. Median followup was 239 days. The most common indication for stenting was acute kidney injury (43%), followed by hydronephrosis without creatinine elevation (52%), and pain (3%). Twenty-four patients (18%) required antegrade decompression following first stent check. Median (IQR) time to first stent change was 91 (84–104) days. History of bowel resection ($p=0.007$) was associated with increased frequency of stent change when controlling for stent location, creatinine at stent insertion, DMII, and indication. There was no association of stent location, creatinine at stent insertion, indication, history bowel resection, or diabetes mellitus with risk for future antegrade decompression, risk for encrustation at first check, or time to first change.

Conclusions: History of bowel resection is associated with greater number of stent changes due to encrustation. Patients with this history may require more frequent stent surveillance as encrustation rates may be higher.

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Poster #57**Chronic ureteral stents and nephrostomy tubes in the management of non-GU malignancy ureteral obstruction**

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SUNY Upstate Medical University

Introduction: Chronic indwelling catheters are an established risk factor for the development of bladder cancer. However, the relationship between long-term ureteral stenting and percutaneous nephrostomy tube placement and upper urinary tract malignancy is not well-examined. Chronic upper urinary tract strictures are frequently resolved surgically, and long-term non-surgical management is rare.

Methods: We conducted a retrospective chart review of patients who had indwelling ureteral stents or nephrostomy tubes placed from 2012–2019 at Upstate University Hospital. We included only patients with a chronic stent and/or nephrostomy tube, defined as a total duration greater than or equal to 3 months, and excluded patients with prior genitourinary malignancy. The total time with either was summed into a single risk factor. Multiple variables and potential confounders were also reviewed.

Results: We identified 80 cases, of which none developed a malignancy of the upper urinary tract. When we further divided the cases into those with less than or more than 12 months of stent and nephrostomy tube

management ($n=29$ and $n=51$, respectively); two distinct populations were apparent. The combined mean stent and nephrostomy tube time for these groups was 4.3 months and 48.2 months, respectively. For those with fewer than 12 months ($n=29$), the most common reasons for drainage were recurrent nephrolithiasis (34.5%), iatrogenic injury (13.8%), and ureteral fibrosis (13.8%); 24 of these cases were managed non-surgically, whereas 5 patients eventually had surgery. For those with greater than 12 months ($n=51$), the most common reasons drainage was performed were external compression by tumor (27.5%), iatrogenic complication (25.5%), and ureteral fibrosis (15.7%); 50 of these cases were managed non-surgically and only 1 of these cases eventually had surgery.

Conclusions: We identified two distinct populations requiring chronic stent or nephrostomy tube placement. The first are those requiring shorter-term management generally due to frequent nephrolithiasis. The second group we identified was primarily cancer patients requiring long-term stent and nephrostomy tube management either due to the cancer itself or complications arising from treatment. In our population, no case of subsequent GU malignancy was identified. Larger studies are required to determine the safety of chronic stenting and nephrostomy tube placement.

Poster #58**An analysis of factors influencing muscle-invasive bladder cancer care using the Pennsylvania Cancer Registry**Kelly Pekala¹, Anup Shah¹, Valentina Grajales¹, Zhaojun Sun,² Kirsten Eom², Benjamin Davies¹, Jie Li², Bruce Jacobs¹, Lindsay Sabik²¹University of Pittsburgh Medical Center, Pittsburgh, PA; ²Department of Health Policy and Management, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA

Introduction: The complexity of managing muscle-invasive bladder cancer has led to the centralization of care and can result in health disparities. Using the Pennsylvania Cancer Registry, we sought to examine disparities in care for patients with muscle-invasive bladder cancer based on rurality of residence and insurance provider.

Methods: Using the Pennsylvania Cancer Registry, which collects demographic, insurance, and clinical information of every patient with cancer within the state, we identified all patients diagnosed with non-metastatic muscle-invasive bladder cancer between 2010 and 2016 based on clinical and pathologic TNM staging. We stratified patients based on counties of residence according Rural-Urban Commuting Area (RUCA) classification into urban, large town, and rural. Among all patients with muscle-invasive bladder cancer, we assessed payer status and choice of curative (cystectomy or trimodal therapy) or non-curative therapy. Among all radical cystectomy patients, we assessed the neoadjuvant chemotherapy differences between rural, large town, and urban populations.

Results: We identified 3362 cases of non-metastatic muscle-invasive bladder cancer, of which 2870 cases (85.4%) were urban, 320 cases (9.5%) were large towns, and 172 cases (5.1%) were rural. The median age at diagnosis was 73 years. Only 56% of patients in both the rural and urban groups received definitive therapy with either radical cystectomy or trimodal therapy. Among the 1509 patients undergoing radical cystectomy, 24% of those in urban populations received neoadjuvant chemotherapy, compared to 16% in large towns and 21% in rural populations (Table 1). We fit multilevel linear probability models via generalized estimating equations with robust variance adjusted for patient characteristics (rurality, age, race, gender, insurance, T stage, N stage). Patients who lived in large towns were significantly more likely to receive cystectomy, compared with patients in urban areas, after controlling for Area Deprivation Index and density of urologists.

Conclusions: Based on rurality of residence and payer status, there was not a statistically significant difference in choice of curative therapy for all muscle-invasive bladder patients or for neoadjuvant chemotherapy administration among patients undergoing radical cystectomy. Further investigation into the characteristics of patients who did not receive curative therapy is needed to improve survival outcomes for patients with muscle-invasive bladder cancer.

Poster #58. Table 1. Analysis of patients with muscle-invasive bladder cancer

	Urban (n=2870)	Large town (n=320)	Rural (n=172)	Total (n=3362)	p
Median age (%)					
<60	481 (16.8)	67 (20.9)	20 (11.6)	568 (16.9)	0.061
60–69	683 (23.8)	85 (26.6)	48 (27.9)	816 (24.3)	0.061
70–79	793 (27.8)	81 (25.3)	55 (32.0)	929 (27.6)	0.061
>80	913 (31.8)	87 (27.2)	49 (28.5)	1049 (31.2)	0.061
Race (%)					
Non-Hispanic White	2606 (90.8)	308 (96.3)	170 (98.8)	3084 (91.7)	<0.0001
Non-White	264 (9.2)	12 (3.8)	2 (1.2)	278 (8.3)	<0.0001
Gender					
Male	2025 (70.6)	246 (76.9)	133 (77.3)	2404 (71.5)	0.0132
Female	845 (29.4)	74 (23.1)	39 (22.7)	958 (28.5)	0.0132
Insurance status (%)					
Private	753 (26.2)	83 (25.9)	33 (19.2)	869 (25.8)	0.4439
Medicare	1767 (61.6)	191 (59.7)	116 (67.4)	2074 (61.7)	0.4439
Medicaid	162 (5.6)	21 (6.6)	12 (7.0)	195 (5.8)	0.4439
Other/uninsured/unknown	188 (6.6)	25 (7.8)	11 (6.4)	224 (6.7)	0.4439
Clinical stage at diagnosis (%)					
≤T2	1828 (63.7)	199 (62.2)	114 (66.3)	2141 (63.7)	0.8423
T3	644 (22.4)	78 (24.4)	34 (19.8)	756 (22.5)	0.8423
T4	398 (13.9)	43 (13.4)	24 (14.0)	465 (13.8)	0.8423
N stage at diagnosis					
N0/Nx	2372 (82.6)	252 (78.8)	151 (87.8)	2775 (82.5)	0.0387
≥N1	498 (17.4)	68 (21.3)	21 (12.2)	587 (17.5)	0.0387
Primary treatment (%)					
Radical cystectomy	1278 (44.5)	157 (49.1)	75 (43.6)	1510 (44.9)	0.3734
TURBT + chemoradiation	327 (11.4)	28 (8.8)	21 (12.2)	376 (11.2)	0.3734
TURBT + chemo only	309 (10.8)	27 (8.4)	14 (8.1)	350 (10.4)	0.3734
TURBT + radiation only	134 (4.8)	14 (4.4)	13 (7.6)	161 (4.8)	0.3734
TURBT only	734 (25.6)	81 (25.3)	46 (26.7)	861 (25.6)	0.3734
Other	88 (3.1)	13 (4.1)	3 (1.7)	104 (3.1)	0.3734
No treatment					

Poster Session 4: Female Urology/Incontinence, Infertility/Impotence/General Urology

Poster #59

The impact of lower urinary tract symptoms (LUTS) on depression and depressive symptoms among women 19–69 years

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Introduction: Studies have shown that women with LUTS have higher rates of depression, anxiety, and overall worse health perception. Correlations have been shown between symptom severity and worsened mental health status. The aim of this study was to compare the impact of varying urinary symptoms, such as SUI, UUI, and nocturia, on depression and depressive symptoms among women aged 19–69 years.

Methods: We queried NHANES between the years 2013–2018 for women aged 18–69 years. We defined SUI as “leakage during physical activity,” UUI as “leakage during non-physical activity,” and nocturia as “ ≥ 2 voids/night.” Depression was defined by DSM criteria with cases reporting ≥ 5 symptoms from the patient health questionnaire (PHQ9) depression screening tool. Health perception was based on response to, “How does your health compare with 1 year ago?” We assessed various demographic and clinical variables, such as age, race, education, insurance status, smoking status, hypertension (HTN), hyperlipidemia (HLD), body mass index (BMI), hemoglobin A1c (HbA1c), perceived health status, and visits to mental health providers. We performed univariate analysis and multivariable logistic regression.

Results: Of the 6284 participants, 27% reported nocturia, 42% had SUI, and 9% had UUI. Depression was found in 5% of the cohort. Women with depression were significantly less educated, had less health insurance, more commonly smoked, had HTN and HLD, had higher BMI, and had higher HbA1c. Depressed women were twice as likely to have nocturia (51% vs. 26%, $p < 0.001$); 64% of depressed women had SUI and 21% had UUI ($p < 0.001$). Depressed women were three times more likely to have negative health perception (36% vs. 9%, $p < 0.001$). Multivariate regression revealed increased risk of depression among women with SUI (OR 1.79, $p = 0.004$) and nocturia (OR 1.65, $p = 0.007$), but not UUI. While evaluating the impact of specific PHQ9 elements and SUI, multivariate analysis revealed that depression was correlated with symptoms of “feeling tired” (OR 1.26) and suicidal ideation (OR 1.77). Nocturia and depression were correlated with symptoms of decreased interest (OR 1.39), poor sleep (OR 1.71), “feeling tired” (OR 1.26), and changes in appetite (OR 1.37).

Conclusions: SUI and nocturia appear to be significantly associated with depression and depressive symptoms. Women with SUI have primary complaints of fatigue and suicidal ideation, while women with nocturia have decreased interest, poor sleep, fatigue, and appetite changes. These findings reinforce that LUTS cannot be considered an isolated symptom, but a factor impacting overall mental health wellbeing.

Poster #60

Augment for what? Enterocystoplasty in modern urological practice and 30-day outcomes using a large multicenter database

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Introduction: Enterocystoplasty (ECP) is a surgical procedure that can improve bladder capacity and compliance. Rates of ECP in developed countries have decreased significantly secondary to the uptake of less invasive management options, such as bladder chemodeneration. Nevertheless, ECP remains a viable surgical option that, in certain patients, is paramount. This objective of this study is to provide an overview of ECP in modern urological practice, as well as to analyze short-term postoperative outcomes using a large multicenter database.

Methods: The American College of Surgeons National Surgical Quality Improvement Program database (ACS-NSQIP) was used to examine all patients who underwent ECP with or without appendicovesicostomy between January 2006 and December 2017. Basic demographic and preoperative variables were collected. Operative variables, including number of additional surgical procedures performed at time of ECP, were also collected. Postoperative outcomes within 30-days were analyzed. A composite outcome of any 30-day complication was used as the primary outcome for a univariable and multivariable regression model.

Results: One-hundred and seventy-two patients underwent ECP during the study period. Of these, 19 patients also underwent appendicovesicostomy. Mean age was 54 years and 98 (57%) were male. The most common preoperative diagnosis was neurogenic bladder in 54%. Mean operating time was 380 minutes and mean length of stay in hospital was 8.7 days. Forty-nine percent underwent at least one additional procedure at the time of ECP. Overall complication rate was 40.7%. The most common complications were bleeding requiring transfusion (14.5%), wound infection (13.9%), and urinary tract infection (8.7%). Diabetes, operative time > 300 minutes, > 5 additional surgical procedures at time of ECP, and a diagnosis of neurogenic bladder were associated with increased risk of complication ($p < 0.05$). Appendicovesicostomy at time of ECP was not associated with increase complications. There were no deaths recorded.

Conclusions: Enterocystoplasty is associated with a high rate of postoperative complication. Specific patient factors, including age, BMI, and diabetes, are associated with increased postoperative morbidity. Enterocystoplasty remains part of the urologic surgical armamentarium. Patients must be well-selected and appropriately counselled regarding the high morbidity associated with this operation.

Poster #61**Military sexual trauma and voiding dysfunction in female veterans***Chloe Shenk¹, Fei Lian¹, Darren Gemoets², Gillian Wolff¹*¹AMC; ²VA

Introduction: As of 2009, women made up 14% of active military personnel, and today are the fastest growing segment of new Veterans Health users. Post-deployment health and readjustment issues among female veterans have been identified as a priority toward building a quality improvement research agenda for women. A recent meta-analysis found that 31.2% of military personnel and veterans report military sexual trauma (MST), with 52.5% of women doing so. Cohort analyses of the civilian population have shown that there is an association between sexual abuse history and pelvic pain, interstitial cystitis, gastrointestinal complaints, vulvodynia, and vasomotor symptoms. The purpose of our study is to investigate the relationship between MST and lower urinary tract symptoms (LUTS) in the female VA population.

Methods: This is a retrospective chart review using VA electronic health records. We included all women who answered either yes or no to the standard screening question for MST as of December 31, 2014 and who had complete covariate data. We used logistic regression with LUTS diagnosis between January 1, 2010 and December 31, 2014 coded as the yes response and MST as the predictor, along with possible confounding variables for adjustment (age, BMI, blood pressure, race, ethnicity, diagnosis of PTSD, HTN, diabetes, and history of mental health treatment visits). We used ICD code, medications, and CPT codes to identify patients being treated for LUTS.

Results: In total, we had 311 298 patients, with 31 952 of these screening positive for MST. After further analysis, 10 360 of the 31 952 patients screening positive for MST were also determined to have LUTS. Based on this analysis, patients reporting MST have a 13.3% greater odds of having LUTS (95% CI for OR 1.10, 1.17). PTSD increases odds of LUTS by 21.8% (CI 1.18, 1.26).

Conclusions: After completion of our analysis, we can support our hypothesis that female veterans with a history of MST have an increased likelihood of being diagnosed with LUTS compared to those without MST. This association could potentially guide proper treatment of LUTS in this population, leading providers to consider both medical treatment and psychological treatment. Thus, a greater understanding of MST and its physical manifestations could have a tremendous impact on our understanding of the female veterans' healthcare needs, both at a systems and an individual level.

Poster #62**Ovarian pathology mimicking urinary retention through falsely elevated bladder scan***Kathryn Scott, Alexandr Pinkhasov, Elizabeth Ferry*

SUNY Upstate

Introduction: Urinary retention in females is a relatively rare occurrence and is commonly secondary to neurologic or pharmacologic cause. Outlet obstruction, while common in males, occurs less frequently in females and may, in some cases, be due to a gynecologic-related obstruction. In rare cases, gynecologic pathology may masquerade as urinary retention by creating a falsely elevated post-void residual in patients with normal emptying.

Methods: We performed a retrospective chart review of female patients undergoing urologic evaluation for urinary retention in whom a gynecologic pathology was ultimately implicated. Each patient was noted to have elevated "bladder" volumes by bedside bladder ultrasound and further workup was initiated.

Results: We identified three cases of ovarian pathology masquerading as urinary retention by bedside bladder ultrasound. All patients were found to have elevated bladder scans, which were subsequently evaluated by formal renal bladder ultrasound. One patient required further evaluation with CT to delineate the cause. All patients reported urinary frequency as a symptom, while only one patient reported traditional symptoms of retention, including straining, weak stream, and feelings of incomplete emptying. In all cases, the true cause was found to be an ovarian pathology, which was incorrectly identified as the bladder on bedside ultrasound. Cystic masses of the ovary were ultimately found in each

patient and gynecologic referral resulted in their surgical removal for all cases. Pathologies identified were endometriotic cyst, ovarian cancer, and mature cystic teratoma/dermoid cyst.

Conclusions: Gynecologic pathology, specifically ovarian in nature, should be part of the differential in females noted to have elevated bladder volumes by bedside scan. This diagnosis may be more likely in females presenting with an atypical urinary retention history and/or failure to improve with traditional treatment methods.

Poster #63**Urinary symptoms in patients with indwelling catheters receiving intravesical onabotulinumtoxinA***Chris Bitcon, Ashley Cox*

Dalhousie University

Introduction: Patients with long-term indwelling catheters may suffer from bothersome urinary symptoms, including bladder spasms, urine leakage, and urinary tract infections (UTIs). Patients have described indwelling catheters as debilitating and a source of anxiety and pain that reduces their quality of life. The use of onabotulinumtoxinA (BotA) has been poorly studied as a treatment option for this patient population. This study sought to assess the role of intravesical BotA injections on bothersome urinary symptoms in patients with indwelling catheters.

Methods: We performed a retrospective chart review of patients treated with intravesical BotA injections who also had indwelling catheters between January 2010 and May 2020. Patients with urethral or suprapubic catheters placed for 12 weeks or greater were included. This was carried out at a single academic institution and included a review of the electronic health records of 3 urologists' patient populations. Patient demographics, diagnosis, indications for indwelling catheter, method of catheterization, and control of urinary symptoms were recorded.

Results: A total of 29 catheterized patients were treated with intravesical BotA injections; 28 of 29 had a diagnosis of neurogenic lower urinary tract dysfunction. Sixteen patients had suprapubic catheters, while 13 had urethral catheters. Approximately 50% and 25% of the patients were concurrently on an anticholinergic and a beta-3 agonist medication, respectively. Twenty-seven patients reported significant bladder spasms and 24 reported concerns with urinary incontinence prior to undergoing BotA. Twenty-two (81%) patients reported a decrease in bladder spasms and 17 (71%) reported a decrease in the amount of leakage per urethra after BotA injections. One of 6 patients that reported recurrent urinary tracts infections as a problem reported a benefit. The average number of BotA treatments was 3 per patient (range 1–8). All patients that reported benefit in urinary symptoms were treated with 200 units of BotA. There were no significant complications reported.

Conclusions: Our results suggest that BotA may be beneficial for treating bothersome urinary symptoms, including painful bladder spasms and incontinence, in patients with indwelling catheters. BotA appears to be safe and well-tolerated in this patient population, consisting mainly of patients with neurogenic conditions.

Poster #64**Helicopters, catheters, and the innovators who used them***Kyle Waisanen, Adam Russon, Kevin Pranikoff*

State University of New York at Buffalo, Department of Urology

Introduction: Advances in the care of the neurogenic bladder is a success story of the latter half of the 20th century and the early 21st. Technological advances from the battlefield and the diagnostic laboratory played a part, and we seek to highlight key advances and the innovative physicians who engineered this success.

Methods: A literature review of PubMed and EBSCO databases was performed with differing combinations of key words — spinal cord injury, urology, neurourology, and history — to identify previous published literature. Resultant manuscripts were selectively reviewed to identify persons of interest related to the advent of spinal cord injury and urologic advancement. Personal interviews were then conducted with individuals involved with the landmark studies discussed or who had first-hand experience with those individuals.

Results: At the termination of World War II, it was recognized that "the

majority of patients with spinal cord injuries died within two years of injury, mostly due to urologic complications secondary to neurogenic bladder.¹ Faced with caring for a large number of these patients at Stoke Mandeville Hospital, Dr. Ludwig Guttman introduced the first intermittent catheterization program. His protocol was expensive, using a sterile, no-touch technique, but it was successful. During the Korean War, the introduction of helicopters onto the battlefield led to increased immediate survival with stabilization of spinal cord injuries and increasing interest in their long-term care. Around 1976, Dr. Guttman visited the University of Michigan, where Dr. Ananias Diokno presented to him the clean intermittent catheterization technique that Dr. Lapidès and he had introduced there. "Dr. Guttman shook his head and was horrified; claiming that it was criminal and that he would be waiting for these patients to start dying from infection."² Fortunately, Dr. Lapidès' theory held true.

Conclusions: The fascinating history and evolution of the treatment for the neurogenic bladder is filled with anecdotes of war, innovative scientific studies, and inspiring figures, many of whom have molded the current modern-day practices of urologists worldwide. The study of this history may help us better understand the complex, no longer definitively terminal disease process of neurogenic bladder. We tell this story through the description of some seminal manuscripts and the tales of the creative individuals who accomplished this work.

References:

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2. Personal communication with Dr. Ananias Diokno, October 21, 2019.

Poster #65

Efficacy and safety of a new oral testosterone (TU) formulation in hypogonadal men: Results from the 'inTune' trial

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Introduction: Oral delivery of testosterone (T) replacement therapy (TRT) has several potential advantages over currently available options. A novel formulation of oral TU was studied in two prior phase 3 trials that demonstrated safety and efficacy. However, to further improve pharmacokinetic (PK) efficacy, a new dose titration algorithm was evaluated.

Methods: Hypogonadal men (diagnosis consistent with the Endocrine Society guideline of two morning serum T <300 ng/dL and signs/symptoms with hypogonadism), age 18–65 y/o, were recruited into a 105-day, randomized, open-label, multicenter, dose-titration trial. Patients were randomized 3:1 to oral TU, BID (JATENZO[®]; n=166) or a topical T product QD (Axiron[®]; n=56). Dose titration was based on average T levels (Cavg) calculated from serial 24h pharmacokinetic (PK) samples. T was assayed by LC-MS/MS. Patients had two dose adjustment opportunities (on study day 21 and 56), which were based on plasma T levels (Cavg) calculated from multiple PK samples, prior to final PK visit. Safety was assessed by standard clinical measures, including ambulatory BP.

Results: Most (87%) patients in both groups achieved mean T Cavg in the eugonadal range. NaF-EDTA plasma T Cavg for oral TU group was 403±128 ng/dL (~14±4 nmol/L; mean ± SD) (serum T equivalent ~ 489±155 ng/dL [17 ± 5 nmol/L]) and for topical T (Axiron[®]) was 391±140 ng/dL (~14±5 nmol/L). The overall safety profile of TU was similar to topical T. There were no deaths or T-related serious adverse events. Mean changes in HCT and PSA were similar in both treatment arms, with HCT increase of 2–3% (absolute increase) and PSA increase of 0.2–0.3 ng/mL with no PSA values >4 ng/mL. Final subject mean increase in systolic BP by cuff in the oral TU and topical T groups was 2.8 (±11.84) and 1.8 (±10.76), respectively.

Conclusions: A new oral TU formulation restored T to mid-eugonadal levels in hypogonadal patients. Both groups showed a modest change in HCT and PSA.

Funding: Clarus Therapeutics, Inc.

Poster #66

Suicidality and psychological adverse events associated with finasteride are limited to young men with alopecia

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Introduction: There is ongoing controversy about the adverse events (AEs) of finasteride, a drug used in the management of alopecia and benign prostatic hyperplasia (BPH). In 2012, reports started emerging on men who had used finasteride and either attempted or completed suicide. Our aim was to investigate the association of suicidality (ideation, attempt, and completed suicide) and psychological AEs (depression and anxiety) with finasteride.

Methods: We conducted a pharmacovigilance study using VigiBase, the World Health Organization's global database of individual case safety reports. Outcomes included suicidality and psychological AEs related to finasteride use. To explore the strength of association, we used the reporting odds ratio (ROR), a surrogate measure of association used in disproportionality analysis. Extensive sensitivity analyses included stratifying by indication (BPH and alopecia) and age (<45 and ≥45); comparing finasteride signals to those of drugs with different mechanisms but used for similar indications (minoxidil for alopecia and tamsulosin for BPH); comparing finasteride to a drug with a similar mechanism of action and AE profile (dutasteride); and comparing reports of suicidality before and after 2012.

Results: VigiBase contained 356 reports of suicidality and 2926 reports of psychological AEs in finasteride users. We identified a significant disproportionality signal for suicidality (ROR 1.63, 95% CI 1.47–1.81) and psychological AEs (ROR 4.33, 95% CI 4.17–4.49) in finasteride. In sensitivity analyses, younger patients (ROR 3.47, 95% CI 2.90–4.15) and those with alopecia (ROR 2.06, 95% CI 1.81–2.34) had significant disproportionality signals for increased suicidality; such signals were not detected in older patients with BPH. Sensitivity analyses also showed that the reports of these AEs significantly increased after 2012 (ROR 2.13, 95% CI 1.91–2.39).

Conclusions: We found significantly increased RORs of suicidality and psychological AEs related to finasteride use in patients under 45 years old who were using finasteride for alopecia. These disproportional signals of suicidality and psychological AEs in younger men may either be due to stimulated reporting and/or younger patients being more vulnerable to finasteride's side effects.

Poster #67

A modified preoperative spermatic cord block predicts success following microscopic spermatic cord denervation surgery for chronic scrotal pain

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Introduction: Chronic scrotal pain is both poorly understood and difficult to treat. While medical management is the preferred first-line treatment, a microscopic spermatic cord denervation (MSCD) procedure has been shown to be effective in patients that fail conservative measures. However, choosing the appropriate candidate is essential. A spermatic cord block has been reported as a predictor for postoperative success and is traditionally performed by injecting local anesthetic inferior/medial to the pubic tubercle. This method may miss contributors to scrotal pain that are targeted during the denervation procedure. Here, we use a modified cord block that targets the 3 primary locations of Wallerian degeneration: cremasteric muscles, vasal sheath, and posterior cord fat, and examine its efficacy in predicting postoperative pain.

Methods: All patients presenting with chronic scrotal pain with no obvious anatomical explanation and who had failed previous medical management were offered the modified block. This was performed by injecting 10 mL 0.25% Marcaine circumferentially around the vas deferens and an

additional 10 mL anterior/medial to the external ring. Pain was assessed using the Numeric Rating Scale (NRS). Patients with 50% reduction in pain following the block were offered MSCD. All patients undergoing MSCD between March 2018 and January 2020 were included in the study. Preoperative, post-block, and post-surgical pain was assessed. Laterality, age, prior groin surgery, and post-block pain-free period were also recorded. A multivariate linear regression model was used to determine predictors of surgical success.

Results: Forty-seven patients were tested with the modified block and subsequently underwent MSCD. Mean age was 48 (20–74). Twelve patients (26%) had previously undergone vasectomy and 16 (35%) had undergone hernioplasty. Mean post-block pain-free period was 6.2 hrs (1.5–24). Mean preoperative NRS was 7.3 (5–9). Following the block, mean pain reduction was 85%. All patients saw improvement in pain postoperatively, with an average reduction of 80% (4<50%, 7 50–69%, 35 70%). On multivariate linear regression analysis, reduction in pain following block was an independent predictor of postoperative improvement ($p<0.001$). No other factors, including post-block pain-free period, were statistically significant.

Conclusions: This modified block technique can be used as an effective predictor of success following MSCD. Neither prior groin surgery nor post-block pain-free period were associated with postoperative pain level. A trial comparing this modified approach to traditional spermatic cord block as a method of selecting the optimal surgical candidate is warranted.

Poster #68 – WITHDRAWN

Poster #69 – WITHDRAWN

Poster #70

The impact of marijuana use on nocturia in men aged 19–59: A National Health and Nutrition Examination Survey (NHANES) study

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Introduction: With the legalization of marijuana, use is expected to increase, and it is unclear how this will impact our urology practice. Studies have suggested that there are cannabinoid receptors in the bladder that may influence sensory afferents and micturition. The effect of these receptors is unknown, but a prior report suggested that marijuana use was protective against LUTS in men. The goal of this study is to assess marijuana use trends and the impact in men with nocturia.

Methods: We queried the NHANES database for men aged 19–59 from 2013–2018. We defined nocturia as two times or greater in response to, “Do you urinate at night?” Marijuana use was defined by responding yes to “ever smoke marijuana?” Regular and distant use was defined by “Last smoked marijuana at least once a month for one year?” with regular users answering “days/weeks” and distant users answering “months/years.” We assessed demographic and clinical factors related to nocturia, including age, race, education, insurance status, HbA1c, hypertension, BMI, and smoking status. We used sampling weights to minimize selection bias and used SPSS for our analysis.

Results: Among the 4577 men in this study, 18% reported nocturia; 13% of men were regular users of marijuana, 21% were distant users, and 66% were non-users. Marijuana use appeared relatively stable over the study periods. We found that significantly higher rates of nocturia were seen among older, black, uneducated, overweight, diabetic, hypertensive, and smoker men ($p<0.05$). We also found higher rates of marijuana use among men with nocturia ($p=0.006$). Our multivariate analysis confirmed increased risk of nocturia for older (OR 1.04), black (OR 1.80), and hypertensive (OR 1.45) men ($p<0.05$). Education was protective (OR 0.42, $p<0.05$). Regular marijuana use increased the risk of nocturia (OR 1.35, CI 1.00–1.82). However, marijuana use overall was not found to be a risk factor for nocturia ($p=0.09$).

Conclusions: As opposed to previous reports, marijuana did not correlate significantly with nocturia among regular users. As marijuana use may increase nationally, the clinical implications regarding patient assessment

and counselling among men with nocturia may become more important. Given convergent findings in these early studies, further studies are needed to better understand the possibility of association of men with nocturia who smoke marijuana.

Poster #71 – WITHDRAWN

Poster #72

Factors affecting penile length shortening in patients undergoing plication for Peyronie’s disease

David Sikule, Charles Welliver, MD
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Introduction: Surgical correction of penile curvature due to Peyronie’s disease with tunica albuginea plication (TAP) has the theoretical disadvantage of penile length loss. One previous study in patients undergoing a plication using a modified Nesbit surgical technique demonstrated a loss of penile length is associated with preoperative length, degree of curvature, and direction of curvature. Using the plication technique first described by Gholami and Lue, we evaluate the factors affecting loss of penile length of patients to help improve preoperative patient discussions undergoing TAP with this technique.

Methods: In this pilot study, a total of 7 patients underwent TAP for Peyronie’s disease between September 2019 and March 2020 by a single surgeon. Data was gathered on preoperative and postoperative penile length from pubis to corona (PC) and base of penis to meatus (BM), degree of curvature, direction of curvature, and number of plication sutures used.

Results: The mean age at surgery was 50.9 years (range 35–61). Mean maximal direction of curvature was 50 degrees (range 40–80). Number or sutures used to correct curvature was between 4 and 8 sutures. All curvature was reduced to less than 15 degrees with plication. The mean loss of length after procedure PC was 0.59 cm (range 0.3–1.3). The mean loss of length from BM was 0.43 cm (range 0.2–1.0). Using linear regression analysis, change in length was significantly correlated to preoperative penile length from PC (r^2 97% and $p<0.001$) and BM (r^2 99% and $p<0.001$). Correlation but not statistical significance was seen in the number of sutures used (r^2 65% and $p=0.030$). It did not appear that change in penile length is correlated to direction of curvature or degree of curvature.

Conclusions: TAP is an effective way to correct curvature and results in modest penile shortening. The loss of length is dependent on preoperative penile length and shows correlation to the number of plication sutures. More data is needed to fully evaluate the factors involved in penile shortening in patients undergoing this procedure.

Poster #73

Crowdfunding in urology: Canadian perspective

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Introduction: Crowdfunding is becoming an increasingly used resource for patients to cover costs related to medical care. These costs can be related directly to treatments or indirectly to loss of income or travel related to receive care. Little is known as to the extent of which crowdfunding is used for urologic disease here in Canada. This study offers a first look at the prevalence of crowdfunding for urologic disease and the factors surrounding its use.

Methods: In January 2020, we queried the GoFundMe internal search engine for fundraising campaigns regarding urologic ailments. Results were categorized according to the major organs of urologic disease.

Results: Crowdfunding campaigns are very prevalent within several areas of urology. Prostate cancer and chronic kidney disease represent the most frequent reason for campaigns. Fundraising goals and actual funds raised for malignant disease were significantly more than for benign disease. Interestingly, there was a significant portion of crowdfunding campaigns to cover costs for non-conventional treatments and transplant tourism.

Conclusions: Crowdfunding use to help cover direct and indirect costs of medical care is becoming increasingly apparent through several facets of

medicine. This study shows that this statement holds true when looking at patients with urologic disease in Canada. As urologists, we need to be aware of this trend, as it highlights the often-unforeseen financial burdens experienced by our patients.

Poster #74

Placebo and natural medications (nutraceuticals) improve erectile function: A systematic review and meta-analysis

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Introduction: Nutraceuticals are pharmacological alternatives to conventional medications that can be used to treat a variety of ailments or conditions. This is a largely unregulated and growing field, with substances often used to treat conditions without rigorous study. Our goal was to assess the placebo and nutraceutical effect on erectile function as measured by the change in baseline international index of erectile function-erectile function (IIEF-EF) score.

Methods: The search terms '(erectile dysfunction OR erectile function OR sexual dysfunction) AND (placebo OR sham)' were queried via PubMed. For inclusion, studies had to be blinded, placebo-controlled, and use the IIEF-EF to measure outcomes. Studies were excluded if data was missing, articles could not be retrieved, or if protocol was ambiguous or unblinded. Data was then extracted and analyzed via meta-analysis. Differences between groups were considered statistically significant if $p < 0.05$.

Results: A total of 15 studies were identified that used a natural medication ("nutraceutical") and placebo ("placebo") control group with 602 patients receiving nutraceutical and 559 patients receiving placebo in total. A variety of different compounds were tested. While improvements in IIEF-EF were more pronounced in the nutraceutical group (16.6 increasing to 20.6, $p = 0.0008$), the placebo control group also demonstrated a statistically significant increase (17.0–18.4, $p = 0.0021$).

Conclusions: Studies demonstrate an increase in subjective measures of erectile function both in placebo and nutraceutical groups. Nutraceuticals did have a more pronounced effect despite not containing active drug compounds. The mechanism of response to placebo for erectile function is unclear, however, the increases in both nutraceutical and placebo group points towards a psychological effect of the medications.

Poster #75

The plague doctor, the pandemic doctor, and surgical protective clothing

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Introduction: Infectious diseases have tormented humans for thousands of years, and severe outbreaks have led to the devastation of entire communities. Even before globalization, parasites and pathogens traveled along trade routes along with their human hosts. The protective clothing worn by physicians during epidemics serves as a powerful historical record chronicling accepted theories of disease transmission and treatments. The materials and designs of modern-day protective equipment reflect the contributions of surgeons to the ways doctors protected themselves and their patients during epidemics. We present the history of epidemics and describe how they shaped protective clothing for physicians and surgeons.

Methods: Texts and journal articles were reviewed regarding the history, epidemiology, and pathophysiology of epidemics of plague, influenza, and coronavirus.

Results: The Justinian Plague of the 540s CE was the first pandemic to be fully documented and began the long history of plagues through the Black Death of the Middle Ages. Believing that the etiology was foul-smelling bad air (miasma), the doctors who tended to those stricken with the plague protected themselves by wearing dramatic head-to-toe coverings. Heavy boots, pants, long coats, gloves, and brimmed hats were made of leather sealed with animal fat. Most important was the infamous face mask with glass eye coverings and a long beak filled with aromatics intended to purify disease-causing vapors. An appreciation of droplet theory in the 19th century made beak

masks obsolete, replacing them with cloth face masks. Surgeons continued to pioneer the use and development of gloves and gowns, initially to protect their own hands and clothing and later to protect their patients. Their outfits were worn by healthcare workers during the plague and influenza epidemics of the 20th century. The SARS and H1N1 influenza outbreaks of the early 21st century highlighted the importance of standardization of eyewear and respiratory masks to more effectively prevent transmission. Similar to the plague doctors, present-day physicians treating patients suffering from COVID-19 don themselves in protective outwear from head to toe, although heavy leather and beaked-masks have long since been replaced by disposable fabrics and the N95 respirator.

Conclusions: The evolution of physicians' protective wear from the iconic beaked mask of the 17th century plague doctor to the hazmat-esque suits of the COVID-19 pandemic doctor reflects a century of advancements in the detection, treatment, and containment of communicable diseases. Much of this is due to the dedicated efforts of surgeons to better safeguard their patients.

Poster #76

Variation in practice patterns and regional participation in next-generation accountable care organization among urologists

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Introduction: Under CMS quality incentive payment program (QPP), physicians have an option to participate in advanced alternative payment models (APM), such as next-generation accountable care organization (NGACO) to be eligible for a Medicare part B payment adjustment and shared savings. This study aims to study regional participation of urologists in NGACO and to characterize the variation in practice patterns between NGACO and non-NGACO urologists.

Methods: We used CMS QPP participation eligibility tool to classify urologists based on their participation in APM and NGACO. Additional provider and NGACO level characteristics were extracted from multiple CMS datasets. We used Chi-squared and Mann-Whitney tests for statistical analysis of categorical and continuous variables respectively.

Results: Among 9055 urologists who received Medicare payments in 2017, 1033 (11.4%) were eligible to participate in APM. Among APM eligible urologists, 647 (62.6%) were associated with a NGACO. There was a significant difference in distribution of NGACO participating urologists across all AUA regions ($p < 0.05$), with higher than U.S. average (7.15%) participation within New England (28.7%), North Central (10.2%), and Western (11.9%) regions. NGACO urologists compared to non-NGACO urologists saw less Medicare beneficiaries (median [IQR] 451 [269–701] vs. 523 [277–811]), $p < 0.01$, provided less services (median [IQR], 2519 [1027–5856] vs. 3123 [1014–8050], $p < 0.01$), but received higher median total Medicare payments per beneficiary (median [IQR] \$288.57 [231.77–377.51] vs. \$278.54 [213.55–360.32], $p < 0.01$) and per services (median [IQR] \$54.64 [35.02–80.06] vs. \$50.22 [30.07–72.48], $p < 0.01$). Also, NGACO urologists compared to non-NGACO urologists treated younger (median [IQR] 73 [72–75] vs. 74 [72–75], $p < 0.01$) patients with higher Hierarchical Condition Category (HCC) risk adjustment scores (median [IQR] 1.4311 [1.3014–1.6288] vs. 1.3948 [1.26175–1.6026], $p < 0.01$). There was no significant difference in the quality scores (median [IQR] 100.00% [96.04–100.00] vs. 100.00% [95.15–100.00] $p > 0.05$) between NGACOs with participating urologists and those without. There was 10.6% variance in earned shared savings payments per beneficiary (median [IQR] \$151.22 [-31.87–362.02] vs. \$169.09 [-255.21–533.34], $p = 0.943$) between NGACOs with participating urologists and those without that was not statistically significant.

Conclusions: Marked number of APM eligible urologists were participating in NGACOs. New England had above U.S. average participation of urologists in NGACOs. NGACO urologists were more likely to provide care to patients with higher HCC scores and to receive higher payment per services provided and beneficiaries seen. Despite variation in practice patterns, no difference in quality scores was seen at NGACO level. Additional studies of financial impact of urologists' participation in NGACO is recommended.

Poster #77**Predictors of mortality for patients admitted to the intensive care unit with obstructing septic stones**

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Introduction: Urosepsis with obstructing calculi or septic stone is a urological emergency requiring urgent intervention. These patients are at significant risk of morbidity and mortality should source control through drainage be delayed and are often admitted to intensive care units (ICU) for hemodynamic support. The purpose of this study is to determine patient factors that may predict mortality in patients admitted to ICU with septic stone, particularly whether rural patients at a greater distance from a tertiary care center were at greater risk of mortality given the inherent delay in intervention.

Methods: The Manitoba Intensive Care Unit prospective registry began in 1999 and includes all patients admitted to ICU across Manitoba. Baseline characteristics, such as age, gender, vital signs, creatinine, Charlson comorbidity index (CCI), mortality outcomes, and location of residency, were obtained for those admitted to ICU for septic stone. Comparison of variables between groups was performed using the Mann-Whitney U, Student t-test, Chi-squared, and Fisher's exact test. Association between death and clinical/demographic variable was performed with adjusted multivariable logistical regression analysis. Analysis was performed with SPSS version 24.0 (Chicago, U.S.).

Results: A total of 206 patients with septic stone with location data available were admitted to the ICU (68 urban and 138 rural). Baseline characteristics were similar between groups ($p>0.05$). There was a dif-

ference in HR, GCS, AKI between groups (Table 1). On multivariable adjusted logistical regression, the presence of AKI ($p<0.001$) and intubation ($p<0.001$) was associated with mortality. There was no difference in mortality attributable to location ($p>0.05$), vital signs, or CCI.

Conclusions: Among patients admitted to the ICU for septic stones in Manitoba, we demonstrate an association between AKI and intubation with mortality. Other factors, such as distance from a tertiary care center and baseline patient characteristics, were not predictive of mortality.

Poster #78**The evolution of leaders in urology**

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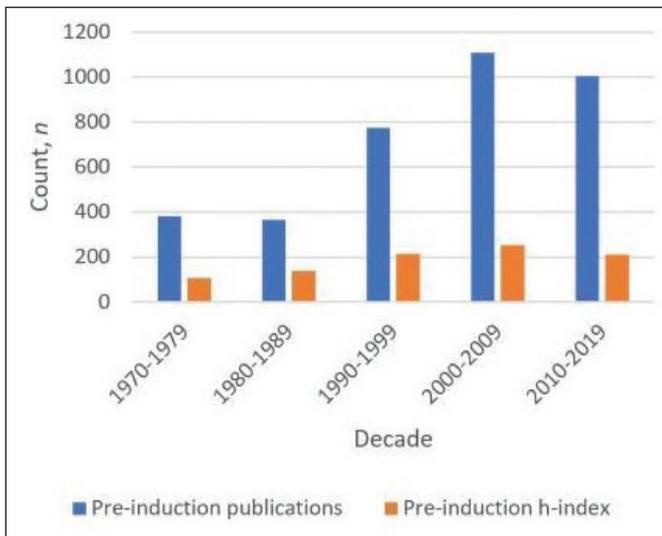
Introduction: Healthcare reform has changed the landscape of urology over the last several decades. However, little is known about the changing characteristics among leaders in urology. In this study, we evaluated the trend in demographic, fellowships, additional degrees pursued, and scientific publication characteristics of the past presidents of the American Urological Association (AUA).

Methods: The *BoardCertifiedDocs.com* database was queried for demographic information of the past presidents of the AUA. The Web of Science database was queried for the quality and quantity of their publications from 1970 to present day. Measures of academic output, including author's personal impact factor (h-index) and number of publications, were compared pre- and post-induction using paired t-tests.

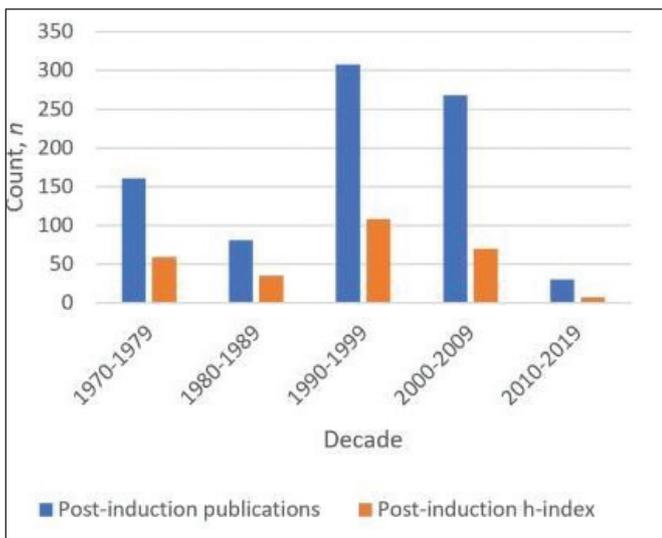
Results: There have been 50 past presidents of the AUA since 1970. No females have been elected president. No past presidents held PhDs or advanced non-PhD equivalents. The proportion of surgical fellowships

Poster #77. Table 1. Univariable and multivariable adjusted logistical regression considering the outcome of mortality

Variable	Univariable			Multivariable		
	OR	95% CI	p	OR	95% CI	p
Age	1.021	0.994–1.049	0.133	1.023	0.987–1.061	0.211
Sex						
Male	1			1		
Female	0.603	0.271–1.342	0.215	0.508	0.174–1.483	0.216
Temperature codified						
36–38 °C	1			1		
<36 or >38 °C	1.967	0.881–4.392	0.099	1.625	0.551–4.792	0.379
SBP	0.989	0.967–1.011	0.316	0.988	0.964–1.012	0.314
HR	1.018	1.003–1.033	0.015	1.012	0.995–1.029	0.163
Intubation status						
Not intubated	1			1		
Intubated	5.404	2.292–12.744	<0.001	4.131	1.386–12.311	0.011
pH						
≥7.35	1			1		
7.35–7.1	2.065	0.640–6.666	0.225	2.504	0.575–10.911	0.221
<7.1	9.500	1.895–47.614	0.006	2.755	0.340–22.315	0.342
WBC	0.978	0.942–1.016	0.256	0.964	0.921–1.010	0.120
AKI						
No AKI	1			1		
AKI	6.210	2.656–14.520	<0.001	4.794	1.544–14.890	0.007
Charlson score	1.132	0.954–1.343	0.155	1.090	0.858–1.385	0.480
LOS	1.008	0.994–1.021	0.269	1.018	0.999–1.038	0.059
Location						
Urban	1			1		
Rural	0.612	0.272–1.379	0.236	0.506	0.172–1.490	0.217



Poster #78. Fig. 1. Pre-induction academic output.



Poster #78. Fig. 2. Post-induction academic output.

has increased throughout the last 50 years, with 60% of past presidents in the last decade having undergone surgical fellowship training. In terms of the productivity and citation impact of the publications, there was a statistical difference between author h-index between pre- and post-induction (18.42 ± 1.92 vs. 5.58 ± 1.29 , $p < 0.01$). There was a significant decrease in number of publications post-induction as compared with pre-induction (72.76 ± 11.90 vs. 16.96 ± 4.15 , $p < 0.01$). The h-index has increased throughout the last 50 years, however, there has been a disproportionately smaller increase in h-index compared to the increase in number of publications (Fig. 1). The proportion of h-index to publication count is lower in the pre-induction period (Fig. 1) as compared to the post-induction period (Fig. 2).

Conclusions: Trending the shift in background may be important in identifying the characteristics valuable for recruitment into leadership roles and addressing gaps in characteristics for more comprehensive representation of an evolving workforce. The lack of gender balancing in leadership roles has poorly reflected the changes observed in the modern urologic workforce. While urologic subspecialty fellowships were seldom pursued, surgical fellowships are becoming more ubiquitous among leaders in urology. The observed increase in academic productivity has been reserved to the pre-induction period, however, the citation impact per publication is consistently greater in the post-induction period.

Poster #79

Comprehensive evaluation of urologists’ participation in Medicare shared savings program accountable care organizations: Five years into the program

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Introduction: Medicare shared savings program (MSSP) promotes accountability for the quality, cost, and experience of care of aligned Medicare beneficiary population. It was previously reported that only 10% of urologists were participating in MSSP accountable care organization (ACO) during the introductory year (2012). This followup study aims to understand urologists’ participation in MSSP ACO five years into the program and characterize MSSP ACOs with participating urologists.

Methods: We used CMS quality payment program participation eligibility tool to classify urologists based on their participation in MSSP ACO. Additional provider and MSSP level characteristics were extracted from multiple CMS datasets. We used Chi-squared and Mann-Whitney tests for statistical analysis of categorical and continuous variables respectively.

Results: Among 9055 urologists who received Medicare payments in 2017, 2948 (32.6%) were eligible to participate in MSSP ACO. Among MSSP ACO eligible urologists, 2553 (86.6%) were associated with a MSSP ACO Track 1, 26 (<0.1%) with a Track 2, and 374 (12.7%) with a Track 3. Also, 9.9% of MSSP ACO participating urologists were female compared to 8.3% of non-participating urologists ($p < 0.01$). In 2017, 267 out of 474 MSSP ACOs had at least one participating urologist with a maximum of 95 urologists per MSSP ACO (median [IQR] 7 [3–15]). MSSP ACOs with participating urologists had more aligned Medicare beneficiaries compared to MSSP ACOs without participating urologists (median [IQR] 16 678 [9711–33 179] vs. 9170 [6804–13 870], $p < 0.01$). There was no significant difference in patient characteristics, such as gender and race, between MSSP ACOs with participating urologists and without. MSSP ACOs with participating urologists had significantly more primary care physicians (PCP) (median [IQR] 11 [7–17] vs. 7.1 [4.5–12], $p < 0.01$), specialists (median [IQR] 18.7 [9.4–31] vs. 3.1 [0.7–11.7], $p < 0.01$), and advanced practice providers (median [IQR] 9.9 [5.3–17.3] vs. 4.7 [2.3–10.4], $p < 0.01$) per 1000 aligned beneficiaries compared to MSSP ACOs without urologists. Despite having more PCPs per 1000 beneficiaries, only 15.5% MSSP ACOs with participating urologists had PCPs in majority within their MSSP ACO structure compared to 69.9% of MSSP ACOs without urologists ($p < 0.01$).

Conclusions: Compared to previous reports, a more significant number of urologists are participating in MSSP ACOs. Most urologists are in the Track 1 MSSP ACO. These MSSP ACOs have more aligned Medicare beneficiaries and providers and are specialty focused. Further studies are necessary to evaluate the impact of urologists’ participation on the quality, cost, and delivery of urological care to Medicare ACO beneficiaries.

Poster Session 5: Education, Laparoscopy, Robotics & Surgical Innovations, and Endourology & Stones

Poster #80

Design and implementation of an emergency undocking curriculum for robotic surgery

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Introduction: The management of crisis events during robotic surgery, specifically emergency (ER) undocking due to a major vascular bleed (MVB), is based on anecdotal experience and thus remains inconsistent and sub-optimal for learning. In response, an interprofessional, standardized curriculum to develop the skills and knowledge necessary to manage crisis events was developed.

Methods: Five robotic teams (surgeon, 1st assist and circulator) completed two full-immersion MVB simulations separated by a self-paced, online module. Participants completed a baseline assessment of confidence and technical knowledge required to safely complete ER undocking. After each simulation, participants repeated the assessment and completed a SURG-TLX survey to assess cognitive load. Elements of the simulation included a perfused, retroperitoneal tumor hydrogel model, a device to replicate MVB, an audible heart rate monitor, and the SimNode (Intuitive) used to simulate robotic faults. The team was instructed to dissect the mass and ligate the vascular pedicle at which point an MVB, along with a non-recoverable fault occurred concurrently, ensuring ER undocking with open conversion. After each simulation, weighted checklists were used to score positive and negative actions related to safety and efficacy of completion of an ER undocking protocol. Surgical metrics including blood loss, time to control bleeding and ER undocking time were collected.

Results: The SURG-TLX assessment demonstrated that, during the scenario, participants experienced cognitive load at levels similar to live surgery. Additionally, each team member experienced high levels of cognitive demand (SURG-TLX score of >50) in at least one subcategory (mental workload, task complexity, and situational stress). Longitudinal survey analysis showed significant changes in knowledge (37.5 pts, $p=0.004$) and confidence (15.3 pts, $p<0.001$) from baseline to completion of the curriculum. Confidence increased significantly during each stage of the study, while knowledge only increased significantly after completing the online module and 2nd simulation. Between simulations, the number of errors were reduced by half (38 to 17), while action scores increased significantly (27 pts, $p=0.008$), while ER undocking time and blood loss decreased by 40 seconds and 500 cc, respectively.

Conclusions: This comprehensive, simulation-based, experiential curriculum can improve the knowledge, confidence, and necessary skills required of operating room staff when encountering an ER undocking procedure.

Funding: Intuitive Research Grant

Poster #81

WATER vs. WATER II: Two-year comparison of aquablation therapy for benign prostatic hyperplasia

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Introduction: Surgical options are limited when treating large (>80 cc) prostates for lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia (BPH), and open simple prostatectomy remains the most common procedure performed for large prostates; there is a need for novel surgical approaches with shorter learning curves and effective treatment. Aquablation (AquaBeam System, PROCEPT BioRobotics, Inc., U.S.), an ultrasound-guided, robotically executed waterjet ablative procedure, could be this novel tool. This analysis compares the outcomes of aquablation in 30–80 cc prostates with the outcomes in 80–150cc prostates.

Methods: WATER (NCT02505919) is a prospective, double-blind, multicenter, international clinical trial comparing the safety and efficacy of aquablation and TURP in the treatment of LUTS/BPH in men 45–80 years old with a prostate 30–80 cc. WATER II (NCT03123250) is a prospective, multicenter, single-arm, international clinical trial of aquablation in men with a prostate 80–150 cc. We compare 24-month outcomes in 116 WATER and 101 WATER II study subjects undergoing aquablation. Student t-test or Wilcoxon tests were used for continuous variables and Fisher's test for binary variables.

Results: IPSS scores improved from 22.9 and 23.2 at baseline in WATER and WATER II, respectively, to 8.4 and 5.1, with 24-month reductions of 14.7 and 18.1 points, respectively ($p=0.0189$ for difference in change scores). At baseline, Qmax was 9.4 and 8.7 cc/sec in WATER and WATER II, improving to 20.5 and 16.6 cc/sec, respectively ($p=0.1236$ for difference in change scores), at 24 months. Improvements in both IPSS and Qmax were immediate and sustained throughout followup. The average annual retreatment occurrence for WATER and WATER II was 2% and 0%, respectively.

Conclusions: Aquablation clinically normalizes outcomes between patients with a 30–80 cc prostate and patients with an 80–150 cc prostate treated for LUTS/BPH with an expected increase in the risk of complication. It is effective in patients with large prostate glands (>80 cc) with acceptable complications to two years.

Funding: PROCEPT BioRobotics funded the trials from which the data were pooled

Poster #82

Objective evaluation of surgeon's distraction level during robot-assisted surgery utilizing deep neural networks and EEG

Somayeh Shafiei, Ahmed Elsayed, Ahmed Hussein, Khurshid Guru Roswell Park Comprehensive Cancer Center

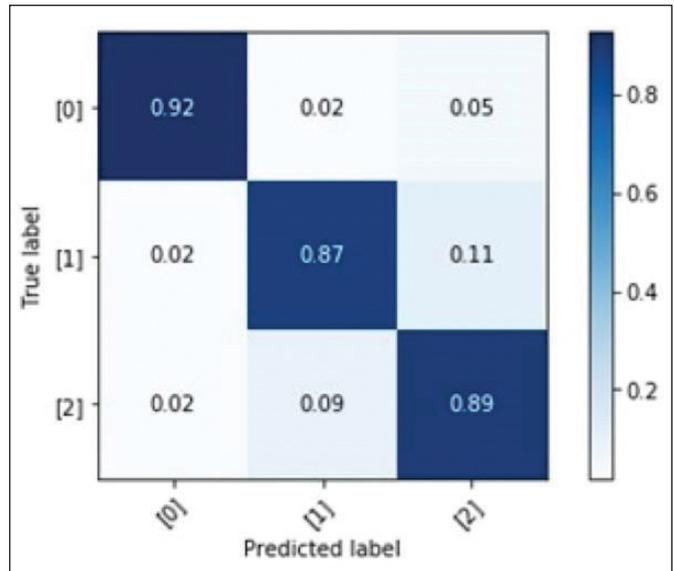
Introduction: Distractions during surgical procedures may result in catastrophic events. Distractions in the operating room (OR) include phone calls from the ward, pages, conversations not pertinent to the surgical procedure, and others. We sought to develop an algorithm to objectively evaluate distraction level of surgeons during robot-assisted surgery (RAS).

Methods: Combination of deep convolutional neural network and "long-short-term memory" algorithms was implemented using Keras library with Tensorflow backend based on Python 3.6 and was trained by Electroencephalogram (EEG) recordings from 22 medical student (total data: 524), and 1 master surgeon (total data: 45). Surgeon's distraction



Poster #80. Fig. 1.

level throughout the surgery was classified into low (class 0), intermediate (class 1), and high (class 2) categories. EEG data were recorded by using a 20-channel EEG headset and were used, through a 10-second running window, as input to the developed algorithm. Medical students performed five key tasks: instrument control, ball placement, spatial control II, fourth



Poster #82. Fig.1. Confusion matrix representing the portion of low, intermediate, and high distraction level data correctly classified (dark blue) and misclassified (light blue).

arm tissue retraction, and hands-on surgical training tasks on simulator. EEG data recording was carried out at the initial session and was followed at one-week, one-month, three-month, six-month, and one-year intervals. One master RAS surgeon performed urethrovesical anastomosis in the OR and EEG was recorded every 2 weeks. The subjects subjectively evaluated level (low, intermediate, and high) of distraction they felt during performance at the end of the recording. The distraction level for every 10-second window of recordings was evaluated by the developed algorithm and was compared with ground truth subjective assessments.

Results: The “five-fold cross-validation” method was used to find the accuracy of the developed model in classification of distraction level. The accuracy of distraction level classification by developed model is shown in the confusion matrix: low, intermediate, and high distraction level cases were classified with 92%, 87%, and 89% accuracy (Fig.1); 11% of intermediate (9% of high) cases were misclassified as high (intermediate), possibly because of non-accurate ground truth data, as each subject subjectively evaluates level of distraction at the end of performance.

Conclusions: The developed distraction evaluation model will lead to a shift in patient safety improvement and surgical risk alleviation in RAS surgeries.

Funding: Roswell Park Alliance Foundation

Poster #83

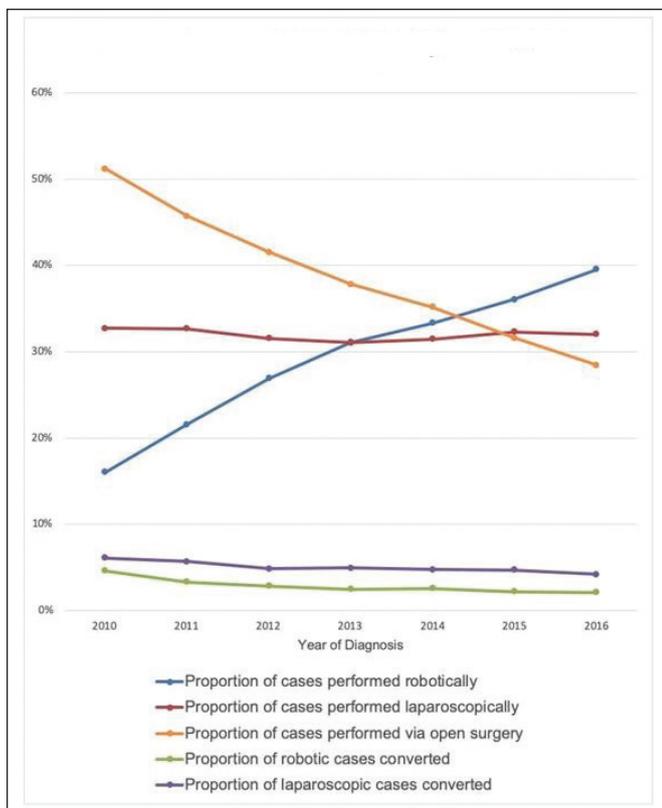
Rates, associations, and perioperative outcomes of conversion to open surgery during laparoscopic or robotic nephrectomy

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Introduction: In the last decades, the role of minimally invasive surgery (MIS) for treating kidney cancer has expanded. Although conversion from MIS to open surgery is one of the main challenges of this approach, very few studies have investigated predictors and outcomes of conversion. Our aim is to assess the trends and frequency of minimally invasive nephrectomy conversion to open surgery, identify factors associated with conversion, and compare perioperative outcomes between converted and non-converted cases.



Poster #83. Fig. 1. Trends of surgical approaches and conversions for nephrectomy between 2010 and 2016 in the NCDB.

Methods: Using the National Cancer Database (NCDB), we identified individuals diagnosed with kidney cancer that underwent partial or radical nephrectomy (PN or RN, respectively) with a known surgical approach from 2010 and 2016. We fitted a facility-clustered multivariable logistic regression to determine which covariates were associated with conversions. We used Pearson Chi-squared and Mann-Whitney U-test to compare perioperative outcomes between converted and non-converted cases. The perioperative outcomes were length of stay (LOS) and unplanned 30-day readmission. PN and RN were evaluated separately.

Results: Between 2010 and 2016, nephrectomy was performed robotically for 67 175 patients (29.8%), laparoscopically for 72 088 (31.9%), and open for 86 346 (38.3%). There were 120 774 RN (53.6%) and 104 607 PN (46.4%). We observed an increase in the percentage of robotic nephrectomies performed (16.1% to 39.5%) and a decline in open nephrectomies (51.2% to 28.5%) from 2010 to 2016. Conversions were uncommon across the study period (7.0% of MIS cases) (Fig. 1). Relevant factors associated with conversions were higher AJCC stage (OR 2.01, 95% CI 1.75, 2.32), later year of diagnosis (OR 0.92, 95% CI 0.90, 0.94), and hospital annual caseload (OR: 0.60, 95% CI 0.48, 0.75). We found that laparoscopic relative to robotic was associated with increased odds of conversion for both RN (OR 1.18, 95% CI 1.04, 1.35) and PN (OR: 1.66, 95% CI 1.34, 2.06). Compared to non-converted MIS, patients undergoing conversion had significantly higher LOS and 30-days readmission ($p < 0.01$).

Conclusions: Growing experience with MIS nephrectomies for kidney cancer over the years is associated with fewer conversions to open surgery despite the increasingly large proportion of surgeries performed robotically and laparoscopically. Patients with lower tumor stage and treated at higher-volume facilities are significantly less likely to undergo conversion.

Poster #84

Predictors of anejaculation after aquablation procedure for BPH

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Introduction: The aquablation procedure is a new, robotically executed resective surgical treatment for lower urinary tract symptoms related to BPH. Postoperative anejaculation occurs less frequently than after TURP, presumably due to precise resection targeting through use of transrectal imaging and precise resection. To what extent does avoidance of key anatomic structures prevent postoperative anejaculation after aquablation?

Methods: Sexually active participants in WATER (NCT02505919), WATER II (NCT03123250), and WATER FRANCAIS (NCT03191734) who had normal preoperative Male Sexual Health Questionnaire (MSHQ-EJd) scores plus marked postoperative decreases in scores were each matched with 1–2 sexually active men from the same trials with similar prostate sizes by TRUS whose postoperative scores were not decreased. Video logs from the procedure were scored by an expert blinded to case/control status regarding the following: veru cut coverage as a percent in the sagittal plane, whether ejaculatory ducts were penetrated, approximate depth of cut below the veru on sagittal images, measured in mm, approximate angle offset of veru to centerline of protection zone, number of passes, and intraprostatic calcifications. Conditional logistic regression was used to calculate univariate and multivariate odds ratios relating anatomic findings to case/control status.

Results: The 24 cases and 27 controls had preoperative mean prostate volumes of 82 and 81 cc, respectively. In univariate analysis, statistically significant predictors of postoperative anejaculation were: penetration of the ejaculatory duct (OR 8.6, 95% CI 1.09–67.5, $p=0.041$) and depth below the veru (OR 1.92, 1.1–3.3, $p=0.015$). Veru cut coverage percent trended lower in cases vs. controls (OR 0.96, 95% CI 0.91–1.00, $p=0.051$), as did number of passes (OR 0.1, 0.01–1.1, $p=0.056$). Multivariate regression showed no independent predictors but veru depth showed an elevated OR (2.92, 0.90–9.45).

Conclusions: Violation of anatomic structures involved in ejaculation during the aquablation procedure increases the risk of postoperative anejaculation. More careful attention to anatomic structures during contour planning may help to reduce the rate of postoperative anejaculation after Aquablation.

Funding: WATER, WATER II, and FRANCAIS WATER clinical studies were funded by PROCEPT BioRobotics

Poster #85

Artificial intelligence approach to segmentation of kidneys on non-contrast CT abdomen: The role of laterality in transfer learning

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Introduction: Transfer learning, the process of transferring weights from a model trained on one structure to another, has allowed for a substantial improvement in the results of artificial intelligence. We sought to evaluate the impact of using weights pre-trained on an organ with laterality on the performance of organ segmentation of an organ with both right and left sides.

Methods: We performed polygon segmentation of the both kidneys (including the collecting system, excluding the renal vasculature) on a slice-by-slice basis and saved the segmentations separately. DICOM files from non-contrast CT scans of the abdomen were then converted to .nifti format and the segmentations were converted to a .nifti mask. All images were resampled to isotropic voxels (1x1x1). We used an AH-NET architecture for the segmentation, which has an encoder and decoder in both 2D and 3D, with transfer learning incorporated in the 2D portion of the model. We applied this architecture to the process of segmentation of kidneys using the Clara platform with no alterations in standard hyperparameters for reproducibility purposes. The weights were pre-trained on a model trained to segment the spleen. Right and left kidney segmentation

models were trained separately for a total of 1250 epochs, and DICE similarity index was used to compare the ground truth and AI-generated segmentations.

Results: Both models were trained three times, with the exact same image parameters. The left kidney model achieved a mean DICE score of 0.83–0.86. The right kidney achieved a mean DICE score of 0.73–0.78.

Conclusions: Transfer learning, the ability to exchange weights from one structure to another, is an important aspect of artificial intelligence. In this study, we demonstrate that laterality of the pretrained weights may be important for the performance of segmentation models.

Poster #86

Hemorrhaging laparoscopic partial nephrectomy — feasibility of a novel simulation model

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Introduction: Intraoperative surgical complications can pose significant potential injury to patients and yet they are infrequently practiced in urology training programs. A patient with uncontrolled bleeding during laparoscopic partial nephrectomy is an infrequent, yet important, scenario that requires excellent communication between the operative team. We aimed to develop a surgical simulation of intraoperative hemorrhage during a laparoscopic partial nephrectomy.

Methods: A simulation scenario using an uncontrolled bleeding partial nephrectomy model was developed. The scenario progressed to a pulseless electrical activity arrest. The multidisciplinary simulation included anaesthesia and urology residents. Urology residents (n=12) from PGY-3, PGY-4, and PGY-5 years were scheduled to participate with 9 simulations completed prior to its unexpected stop secondary to uncontrollable, global events. The bleeding partial nephrectomy, porcine model, had a ~2 cm defect cored from the parenchyma. A 12 Fr Foley catheter was fed through the renal artery and placed, within the parenchyma, adjacent to the tumour defect. A 3 cm styrofoam ball was secured to the base and coloured to mimic a renal cell carcinoma. The Foley catheter was connected to TUR tubing for a confederate to adjust the rate of bleeding during the simulation. The model was secured in a box including fake bowel in the foreground of the laparoscopic camera; bulldog clamps were clamped at the hilum to simulate vascular control and 12 mm laparoscopic ports were placed in the standard laparoscopic nephrectomy configuration in a skin coloured abdominal sheath. The OR simulation consisted of a functioning, intubated mannequin placed in the lateral decubitus position, a laparoscopic tower and laparoscopic instruments, and functioning anaesthesia monitoring. Participants completed a post-simulation survey assessing their evaluation of the simulated scenario.

Results: The model was able to be reproduced weekly for 9 consecutive weeks and was able to simulate minor and major bleeding from a laparoscopic partial nephrectomy site. The bleeding was able to be titrated based on resident progression and excision of the simulated tumor. Good, clear communication between the simulation confederates and control room team allowed coordination of the intraoperative bleeding to the simulated PEA arrest of the patient. All residents believed there was high fidelity to the model and that the scenario was valuable to assess and improve non-technical surgical skills.

Conclusions: Simulating an intraoperative bleeding partial nephrectomy, combined with a subsequent crisis scenario, is a feasible, immersive, and reproducible model to teach non-technical skills.

Poster #87

Cost-effectiveness of penile prosthetic simulation training: A comparison of cadavers and non-biohazardous hydrogel models

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Introduction: The standard for inflatable penile prosthesis (IPP) training uses cadavers, despite the need for specialized facilities and costly disposal requirements. A high-fidelity, non-biohazardous hydrogel model for IPP placement simulation has been demonstrated to provide a similar educational experience to cadavers. Our objective is to evaluate the cost-

effectiveness of implementing a hydrogel IPP simulation model relative to cadaveric training.

Methods: A cost comparison was performed to compare the implementation costs (facilities, setup/cleanup, biohazard fee, and distribution costs) for hydrogel models and cadavers. The 2018 and 2019 Society of Urologic Prosthetic Surgeons (SUPS) training event cadaver costs were obtained, and the University of Rochester Simulation Innovation Lab was queried for the IPP hydrogel model costs. Cadaveric donation, assembly costs, and hydrogel model fabrication costs were not included in the analysis. Distribution costs consisted of shipping and packaging costs and were made with the assumption of training events occurring within the U.S. On average, SUPS provided 8 cadavers per training event, yielding an average participant ratio of 6.6 participants to 1 cadaver. Costs for an equivalent event using eight hydrogel models were calculated and evaluated.

Results: The implementation costs of a simulation event using 8 hydrogel models was \$2580 compared to \$30 622 with 8 cadavers, a 92% (\$28,042) reduction. This was mainly attributed to the \$20 142 biohazard fee for cadavers compared to none required with the hydrogel model. The average implementation cost per cadaver for each event was \$3827 compared to \$322 per hydrogel model, almost a 12-fold cost reduction. If hydrogel models were provided at a 1:1 model to participant ratio, costs would amount to \$5160, a 6-fold cost reduction per event over current cadaver to participant ratio. Additional advantages of the hydrogel model included the ease of overseas transport, ranging from \$100–160/model, extending reach to areas without access to cadavers. Simulation events using the non-biohazardous hydrogel models may occur in clinics and non-medical facilities, further lowering average facility costs (\$2120) to rent a simulation-specific center.

Conclusions: With the increased need for advanced IPP procedural training and limited funds available for surgical education, this cost-effective IPP hydrogel simulation model may facilitate the economical scheduling of both large and small-scale training events.

Poster #88

Assessing performance through gaze patterns and pupillometry during ultrasound-guided percutaneous renal access on a hydrogel model utilizing eye-tracking technology

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Introduction: Increasingly, ultrasound (US) guidance is being recognized as a safer method for percutaneous renal access (PRA). Evaluation of simulation performance often lies on subjective assessments. Gaze and pupil metrics have proven to be a valid objective tool for the assessment of operator task and cognitive load. In this study, we used differences in gaze and pupil metrics to evaluate US-guided PRA performance on a hydrogel kidney model.

Methods: The hydrogel model consisted of a kidney with fluid filled pelvicalyceal system, stented ureter, posterior abdominal wall and 3D printed spine, 12th rib and iliac crest. The upper pole was positioned above the 12th rib to increase access difficulty. Seven novices and 6 experts were tasked to access both the lower and upper pole wearing head-mounted eye trackers (Pupil Labs) using US guidance. Access was repeated five times at each pole; reflux of colored saline indicated success. Time, number of puncture attempts, pupil diameter, gaze patterns, pupil fixations (visual focus >0.3 ms, <1s) on the model and US screen were collected for each task. Participants also completed a 5-point Likert scale survey to rate the model's realism.

Results: Novices spent significantly more time (p=0.000) and required more attempts (p=0.005) to complete each access (Table 1). Additionally, novices displayed higher pupil diameter (p=0.043) and higher gaze entropy (p=0.001), both measures indicate higher cognitive load. Time was significantly correlated to pupil diameter (r=0.263) and gaze entropy

Poster #88. Table 1.

		Novices		Experts		p
		Average	SD	Average	SD	
Simulation metrics	Time per access (s)	147.9	231.1	48.9	62.3	0.000
	Attempts per access (#)	3.3	4.2	1.8	1.2	0.005
Gaze metrics on ultrasound screen	Fixation* rate (#/s)	0.50	0.20	0.60	0.18	0.005
	Time fixated* on surface out of total (%)	38.7	18	48.7	16.9	0.004
	Average duration of fixations* (ms)	723	234	805	185	0.040
Gaze metrics on kidney model	Fixation* rate (#/s)	0.11	0.09	0.15	0.12	0.055
	Time fixated* on surface out of total (%)	7.0	6.4	10.0	9.4	0.062
	Average duration of fixations* (ms)	533	252	531	271	0.934
Overall: Gaze analysis	Average velocity (px/s)	9.6	23.3	4.1	4.8	0.092
	Gaze entropy (bits)	13405	21231	5559	8028	0.001
	Pupil diameter (px)	58.0	50.9	42.9	8.4	0.043

*Maintaining gaze on a single location (<3 deg dispersion, >0.3 ms, <1s).

($r=0.858$), as was attempts ($r=0.300$, $r=0.729$). Experts had higher rates of fixations on both the screen and the model ($p=0.005$ and $p=0.055$, respectively), and also had significantly longer fixations and higher percent of time fixated on the screen ($p=0.040$ and $p=0.004$). During the more difficult upper pole access, novices had higher fixation rates on the model, while experts fixated more on the screen ($p=0.017$ and $p=0.025$). All participants agreed the model is a useful training and teaching tool and gave positive ratings regarding anatomy, tissue texture, and procedural steps.

Conclusions: This model can differentiate novices and experts using both performance and gaze metrics. Furthermore, gaze metrics provide additional information on cognitive load and task complexity, aiding the identification and development of essential cognitive skills required to reach expert performance during US PRA simulations.

Poster #89

Burnout in chief residents among Canadian urology residency programs

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Introduction: Burnout is a hot topic of discussion in medicine, including urology, which has reported higher rates than other fields. Burnout among urologists increased from 41% to 63.6% during the 2011–2014 interval in the AUA census. A recent study assessing burnout in urology trainees in the U.S. and Europe revealed that burntout trainees were less likely to pursue urology again as compared to their non-burntout colleagues (46% vs. 81% and 57% vs. 85%, respectively). Dissatisfaction with work/life balance (WLB), and lack of access to mental health services were associated with increased burnout. In our study, we wanted to assess the state of burnout and services available in Canadian urology residency programs.

Methods: Thirty-seven chief residents among the Canadian urology residency programs attended the Queen's Urology Exam Skills Test (QUEST) on December 13 and 14, 2019. The Maslach Burnout Inventory (MBI) questionnaire was administered to these residents, and answers were collected anonymously. The MBI covers emotional exhaustion, depersonalization, and personal accomplishment. Descriptive statistics were used to analyze the data.

Results: Pertinent findings from the survey were that 94.6% of respondents reported fatigue, 27% are dissatisfied with the balance between their personal and professional lives, 84.8% find it difficult to engage in self-care activities, 54.1% feel emotionally drained a few times a week or more, and 29.7% feel they are burned out from their work a few times a week or more.

Conclusions: This study enabled us to confirm that urology chief residents

are affected by burnout. Fatigue was universal among all trainees, and more than a quarter reported being dissatisfied with their current balance between professional and personal lives. Training programs need to acknowledge, manage, and address burnout. Strategies that have proven beneficial in reducing burnout include taking steps to increase self-wellness and being proactive in one's care; taking personal time; and seeking professional assistance to reflect on goals, stressors, and life/career priorities, as well as establishing structured mentorship programs. These are just some examples of how we can use this data to tailor interventions accordingly.

Poster #90

Video review of preoperative robotic OR time in urology

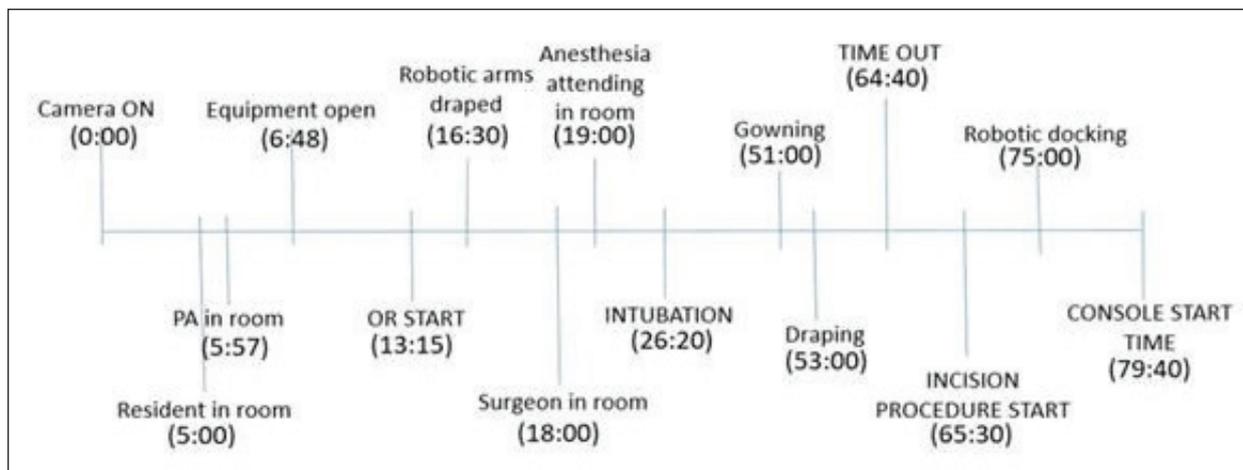
David Kozminski, Barry Kogan
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Introduction: Robotic-assisted surgical techniques are widespread in urology. However, preparation times for robotic cases can prolong non-operative downtime, hinder operating room (OR) efficiency, and frustrate robotic surgeons. In a prior novel analysis, our group demonstrated that robotic-assisted cases at our academic center have the most prolonged and most variable preoperative OR times of any studied case type. Our objective was to further characterize the preoperative times in robotic urology ORs at our institution using video analysis. Our hypothesis was that video review would allow us to identify processes that could account for the marked variability.

Methods: Following IRB approval, robotic urology ORs at our tertiary care institution were video-recorded using in-room camera systems. Video footage was then retrospectively reviewed by IRB-approved personnel. Standard preoperative time landmarks were identified. Entry time and activity of specific OR personnel, including the CRNA, anesthesia attending, surgical PA, surgical resident, surgeon, and room RNs were noted. Comparative qualitative assessment was done between the cases with shortest and longest preoperative times.

Results: Video-recorded time landmarks (OR start time, intubation, surgical timeout, procedure start time/incision, console start time) were consistent with previously published results. New clinically relevant landmarks were identified, including time of surgical PA entry, time of anesthesia staff entry, time of surgeon and resident entry, time robotic equipment opened in room, time robotic arms draped, team gowning, and patient draping (Fig. 1). Qualitative analysis revealed the importance of early entry of anesthesia and surgical staff into the room, collective participation by all OR personnel in case setup, ease of patient prep, including IV access and ET intubation, and timely draping of robotic arms in shortening preoperative OR time.

Conclusions: Video review of robotic urology ORs demonstrates multivariate causes of prolonged (and variable) preoperative times. Our analysis verified that multiple time points are important, but also identified



Poster #90. Fig. 1. Typical schema for video-reviewed time points in robotic urology preoperative OR.

additional setup processes that should be reviewed. Chief among these are early entry of senior personnel into the OR and timely equipment preparedness. Reducing prolonged robotic setup in these cases clearly remains an important area for QI.

Poster #91 Heterogeneity in urology teaching curricula among urology residency programs

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Introduction: Postgraduate education is transitioning to a competency-based curriculum in an effort to standardize the quality of graduating trainees. The learning experiences and opportunities in each institution are likely variable, as no standard exists regarding the teaching curriculum offered through residency. The objective of this study is to examine the various teaching curricula among different urology residency programs and to identify which teaching modalities are prioritized by program directors.

Methods: A 10-question survey was sent electronically to program directors at all 12 urology residency programs across Canada. Questions were designed to quantify the time allotted for teaching and to assess the various teaching session types prioritized by programs to ensure the successful training of their graduates. We assessed each program's perceived value of written exams, oral exams, didactic teaching session, and simulation sessions. Responses were assessed using a Likert-scale and a ranking format. Descriptive statistics were performed.

Results: Overall survey response rate from residency program directors was 75% (9/12); 67% of programs designated one day of teaching per week, whereas 33% split this over two days. Review of chapters directly from Campbell's-Walsh Urology textbook were deemed the most valuable teaching session. Practice oral exams were also prioritized, whereas most programs felt that simulation labs contributed the least to residency education. All programs included review of the core urology textbook in their weekly teaching, while only 67% of programs included faculty-led didactic sessions and case presentations. Forty-four percent of programs included resident-led didactic sessions. Practice oral exams and simulation labs were the least commonly included teaching sessions.

Conclusions: Although most program directors prioritize the review of chapters in the core urology textbook, we found significant heterogeneity in the teaching sessions prioritized and offered in current urology residency curricula. As we move to standardize the quality of graduating trainees, understanding the impact of variable educational opportunities on residency education may become increasingly important.

Poster #92

The gap in urology resident understanding of a robotic prostatectomy — a survey comparing residents vs. urologists

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Introduction: Robotic surgery, and the robotic prostatectomy, has been adopted into urology training programs internationally. With the need for dedicated robotic training programs, we sought to explore the knowledge gap and needs assessment to add to these programs. This study aimed to determine the difference in understanding of a robotic prostatectomy for residents compared to urologists.

Methods: A 16-question survey, composed of both quantitative and qualitative questions, was developed to document the difference in understanding between residents and urologists. The survey contained items pertaining to patient anatomy, procedural steps, and surgical decision-making. Urology residents performing as bedside assistants, were surveyed directly after the robotic prostatectomy. Urologists performing the same procedure were also surveyed directly after the operation. Statistical analysis of the quantitative questions was performed using percent agreement and kappa scores, and coding and thematic analysis was performed to analyze the qualitative responses.

Results: The survey was administered to urology residents and urologists at The Ottawa Hospital. Forty-two surveys were completed over 10 weeks. There was disagreement between urology resident and urologist responses. The most disagreement was noted with the comparison of the following procedural steps: vesicourethral anastomosis (kappa 0.138), apical dissection (kappa 0.149), and seminal vesicle dissection (kappa 0.342). The qualitative responses found discrepancies between resident and urologist understanding as well. When asked to describe challenges during the procedure, urologists tended to describe causal factors leading to difficulties or challenges and how to manage these issues intraoperatively. The residents' responses tended to focus more on readily visible aspects of the procedure, like bleeding or difficulty with exposure, without describing the cause of these challenges.

Conclusions: There is a gap in urology resident knowledge and understanding of a robotic prostatectomy. This information is key to expand the understanding of robotic prostatectomy surgical decision-making and its training.

Funding: DIME grant

Poster #93**Increased risk of new persistent opioid use in pediatric and young adult urolithiasis patients prescribed opioids at presentation**

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Introduction: Pediatric and young adults are a vulnerable patient population for development of addiction after opioid exposure. The incidence of pediatric urolithiasis has been steadily increasing for the past several decades. However, the long-term impact of opioid prescribing in pediatric and young adult patients with urolithiasis is not known. Our objective was to describe rates of opioid prescription and identify risk factors for persistent opioid use in patients.

Methods: Using previously validated linked administrative databases, we performed a population-based, retrospective cohort study of all opioid-

naive patients age 25 years or younger with a diagnosis of urolithiasis between July 1, 2013 and September 30, 2017 in Ontario, Canada. All family practitioner, Emergency department, and specialist visits in the province were captured. Our primary outcome was persistent opioid use defined as filling a prescription for an opioid between 91 and 180 days after initial urolithiasis visit. Secondary outcomes were opioid addiction and opioid overdose. Ontario uses a narcotic monitoring system, which captures all opioids dispensed in the province.

Results: Of the 6962 patients identified, 56% were prescribed an opioid at presentation and 34% of those were dispensed more than 200 oral morphine equivalents (OME). There was persistent opioid use in 313 (8.1%) patients who filled an initial opioid prescription. In adjusted analysis, those prescribed an opioid initially had a significantly higher risk of persistent opioid use (odds ratio [OR] 1.85, 95% confidence interval [CI] 1.50–2.29) and opioid overdose (OR 3.45, 1.08–11.04) compared to those without initial opioid exposure. In adjusted analysis, initial exposure of >300 OME (OR 2.21, 1.49–3.29), history of mental illness (OR 1.32, 1.02–1.71), and need for surgery (OR 1.71, 1.24–2.34) were associated with persistent opioid use (Table 1).

Poster #93. Table 1. Factors associated with persistent opioid use among urolithiasis patients <25 years old initially prescribed opioids in Ontario from 2013–2017 (n=3877)

Characteristic	Rate (%)	Univariate analysis OR (95%CI)		Multivariable analysis OR (95%CI)	p
Patient-related					
Age, years					
0–11	2	0.21 (0.03–1.51)	0.18	0.16 (0.02–1.22)	0.22
12–18	9	1.24 (0.87–1.75)		1.20 (0.83–1.70)	
19–21	7	Ref		Ref	
22–25	9	1.20 (0.91–1.6)		1.06 (0.8–1.4)	
Sex					
Female	9	1.22 (0.97–1.5)	0.09	1.15 (0.90–1.48)	0.26
Male	7	Ref		Ref	
Mental health history					
No	7	Ref	0.0025	Ref	0.0338
Yes	10	1.43 (1.13–1.80)		1.32 (1.02–1.71)	
Care-related	6	0.45 (0.35–0.57)	<0.0001	0.62 (0.47–0.82)	0.0008
Duration urolithiasis episode					
<60 days	6	0.45 (0.35–0.57)	<0.0001	0.62 (0.47–0.82)	0.0008
>60 days	13	Ref		Ref	
# ED visits for urolithiasis after index visit					
0	6	0.24 (0.17–0.35)	<0.0001	0.49 (0.32–0.74)	0.0059
1	8	0.32 (0.21–0.47)		0.5 (0.33–0.79)	
2	13	0.57 (0.36–0.90)		0.68 (0.42–1.09)	
>2	21	Ref		Ref	
Had surgery					
No	7	Ref	<0.0001	Ref	0.0009
Yes	14	2.30 (1.77–2.99)		1.7 (1.24–2.34)	
Opioid-related					
Total oral morphine equivalents during acute stone episode					
1–99	5	Ref	<0.0001	Ref	<0.0001
100–149	6	1.07 (0.71–1.62)		1.0 (0.65–1.52)	
150–199	7	1.29 (0.85–1.95)		1.18 (0.77–1.80)	
200–299	8	1.62 (1.09–2.42)		1.35 (0.90–2.04)	
>300	17	3.79 (2.64–5.44)		2.21 (1.49–3.29)	

Conclusions: Among patients with urolithiasis age 25 years or younger, filling an opioid prescription after presentation is associated with an increased risk of persistent opioid use 3–6 months later and a higher risk of serious long-term complications, such as opioid overdose.

Funding: PSI Foundation

Poster #94

Opioid prescriptions are decreasing in the era of the epidemic
 Chinmayee Katragadda¹, Alexis Steinmetz², Alexander Cranwell², Rajat Jain²

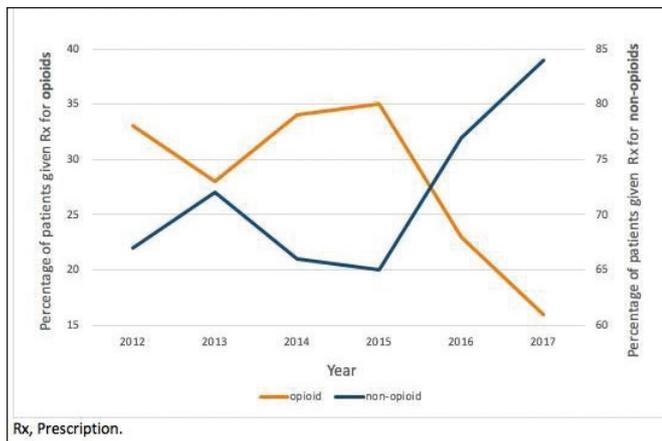
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Introduction: Patients with acute kidney stone disease (KSD) have traditionally received opioid prescriptions for pain control. As the awareness of the opioid epidemic has grown, so has interest in alternative, non-opioid therapies. We investigated whether prescription patterns for acute KSD have changed in this new era.

Methods: The National Hospital Ambulatory Medical Care Survey was queried for emergency department (ED) visits in the U.S. for KSD from 2012–2017. The primary outcomes of interest were rates of opioid and non-opioid prescriptions at discharge per year. Data on prescribing patterns were analyzed related to age, sex, region, episode of care (initial vs. followup), race/ethnicity, and payer type. Survey weighted Chi-squared, survey weighted logistic regression, and adjusted odds ratios were used to analyze associations.

Results: Six million KSD-related ED visits were identified. The percentage of patients receiving opioid prescriptions at ED discharge decreased from 33% to 16% from 2012–2017 (p-trend<0.001). There was a concomitant rise in the percentage of patients receiving non-opioid prescriptions in that same time frame, from 67% in 2012 to 84% in 2017 (p-trend<0.02). Compared to 2012, the odds of receiving an opioid prescription decreased significantly in 2016 and 2017 (OR 0.27, p=0.0; and OR 0.12, p<0.0001, respectively) while the odds of receiving a non-opioid prescription increased significantly in 2016 and 2017 (OR 2.02, p=0.03; and OR 2.63, p=0.01, respectively). Payer type, episode of care, and gender were not significantly associated with the odds of opioids or non-opioids being prescribed at ED discharge for KSD-related visits.

Conclusions: Awareness of the opioid epidemic in the U.S. has increased in recent years. We demonstrate that opioid prescriptions for acute kidney stone disease have sharply declined since 2015. There has been a concomitant rise in patients discharged with non-opioid prescriptions. This represents a fundamental shift in the management of acute kidney stone disease, which is reflective of the nationwide effort to curb the opioid epidemic.



Poster #94. Fig. 1. Percentage of patients given opioid or non-opioid prescriptions at ED discharge for acute kidney stone disease from 2012–2017.

Poster #95

Lack of hydronephrosis and symptom resolution is not enough to determine ureteral stone passage: Analysis from the STONE trial

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Introduction: There is no commonly accepted gold standard for followup of the patient who presents in the emergency department with an obstructing ureteral stone. Prolonged stone impaction in the ureter can lead to stricture and renal functional loss. Resolution of symptoms, together with the lack of hydronephrosis on ultrasound is commonly used for confirmation of stone passage. We searched to see if this approach is accurate to determine stone passage.

Methods: This is a subgroup analysis of the multicenter phase of the STONE trial (Study of Tamsulosin for Urolithiasis in the Emergency Department). In this phase, 403 patients presenting to 6 U.S. emergency departments with computed tomography (CT) scan evidence of a single obstructing ureteral stone <9 mm were randomized to tamsulosin vs. placebo to assess for the success of stone passage as defined by capture or visualization of the stone by patient report. An unselected subgroup of 232 of these participants underwent CT scan 29–36 days after initial presentation. These scans were evaluated for stone passage and the presence of hydronephrosis.

Results: On the initial CT scan, 328/403 (81%) had hydronephrosis. For participants who had a followup CT and did not report stone passage (136), 38 (28%) were confirmed to have a persistent stone, while the rest had in fact passed their stone. Of these 38 patients, 16 (42%) had hydronephrosis. For the 22 without hydronephrosis, 18 (82%) did not report pain or pain medication use.

Conclusions: In our study, use of symptom resolution and lack of hydronephrosis on ultrasound would have missed almost half of patients with persistent ureteral stones (18/38, 47%). This followup strategy may not be adequate.

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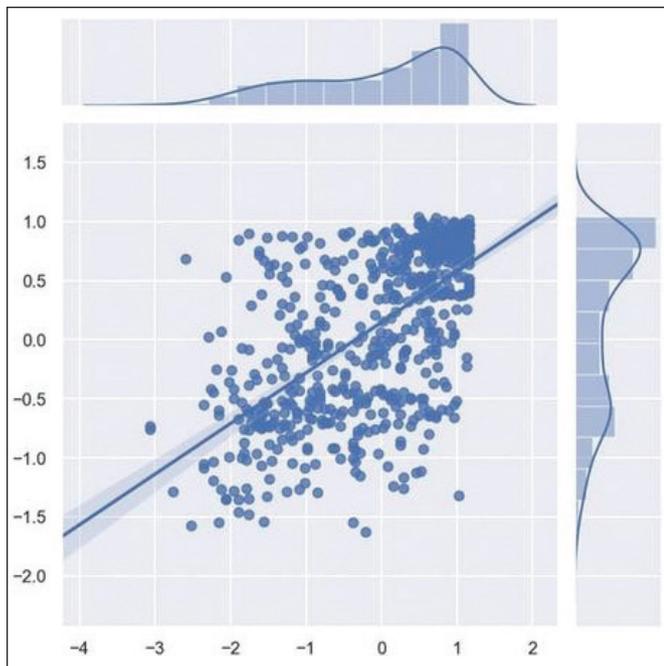
Poster #96

Wisconsin Quality of Life Machine Learning Algorithm for predicting quality of life in kidney stone patients

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Introduction: The Wisconsin Stone Quality of Life (WISQOL) questionnaire, a quality-of-life (QOL) measurement tool designed specifically



Poster #96. Fig. 1. Out-of-sample correlation between QOL estimates and WISQOL ($r=0.622$).

for kidney stone patients, was recently validated. Using the WISQOL score as the gold standard of the model, we built the WISQOL Machine Learning Algorithm (WISQOL-MLA) to predict patients' QOL based on demographic, symptomatic, and clinical data collected for the validation of the WISQOL.

Methods: Using gradient boosting and deep learning models implemented in Python, QOL scores for all 3206 patients were predicted. We also stratified QOL scores by quintiles. The dataset was split using a standard 70/10/20% training/validation/testing ratio. Per usual machine learning practice, categorical variables were numerically discretized. Variables were then standardized to mean of 0 and standard deviation of 1 to aid model convergence. Regression performance was evaluated using Pearson's correlation (r). Classification was evaluated with area under the ROC curve (AUC).

Results: Gradient boosting obtained a test correlation of 0.622 (Fig. 1). Deep learning obtained a correlation of 0.592. Multivariate regression only achieved a correlation of 0.4375. Quintile stratification on all WISQOL patients obtained an average test AUC of 0.70 for the 5 classes. The model performed best in distinguishing between lowest (0.79) and highest quintile (0.83). Feature importance analysis showed that the model correctly weights in symptomatic status, BMI, age, as well as other medical and demographic features to estimate QOL.

Conclusions: Harnessing the power of the WISQOL questionnaire, WISQOL-MLA can accurately predict a stone patient's QOL from readily available clinical information and outperforms linear models. Future endeavors include scaling the tool as an aid to urologists that don't have the resources to collect precise QOL scores via questionnaire.

Poster #97

Understanding the mechanical properties of commercially available urinary catheters

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Introduction: Male urinary catheterization is one of the most common performed medical procedures. Therefore, it is important to frequently evaluate urinary catheter devices. The primary aim of this study is to identify the physical properties of commercially available catheters. Secondly, we hope to use this information to generate weighted decision matrixes to help guide future research in catheter technology.

Methods: We set out to study 4 commercially available catheters for the purpose of this project. These include Rusch 100% Silicone straight Tip (RS), Dover Silicone Coated Latex Straight Tip (DS), Bardex Council Latex straight Tip (BS), and Bardex Latex Coude Tip (BC). All catheters were size 20 F for the purpose of this study. A simulated urethra was created using polyvinyl chloride plastic. The Instron Universal Tester 6965 with Bluehill 3 software and a variety of different load cells and support structures designed in-house were used to study physical properties of the catheters. Catheters were closely assessed to identify wall thicknesses, outside diameters, and cross-sectional area in the body of the catheter. Buckling, gliding, crossing properties and torque response of catheters were identified (Fig. 1). A weighted decision matrix (WDM) was proposed to identify the best catheter for a man with an enlarged prostate giving the most weight to performance on crossing and gliding tests.

Results: All catheters had similar wall thicknesses and cross-sectional area, with exception of RS. This was noted to have a thinner wall, 16 mm² vs. 22–23 mm², yielding a larger inner lumen. The BS catheter consistently required the highest force to buckle. The RS required the least force to glide (5.5 N). The BC catheter required the lowest force to cross followed by RS. Both DS and RS did well in torque testing. Overall, based on sample WDM the straight tip silicone coated latex catheter did the best.

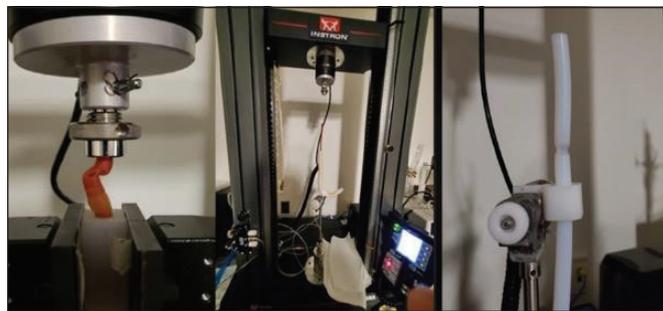
Conclusions: Further material and clinical research are needed to help guide urinary catheter improvement. Weighted decision matrixes may prove helpful in this process to help identify areas of improvement.

Poster #98

Unplanned encounters due to stent-related symptoms following ureteral stent placement for acute renal colic

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Introduction: Patients with indwelling ureteral stents (IUS) often experience urgency, frequency, hematuria, and pain, which impair the patient's well-being. We have anecdotally observed differences in postoperative coping between patients who had IUS placed for acute renal colic (ARC) and those who had IUS placed for other reasons. Therefore, we undertook a retrospective cohort study to determine the frequency and associated factors of unplanned emergency room (ER) and clinical encounters for IUS-related symptoms within 30 days of IUS placement.



Poster #97. Fig. 1. From left to right: buckling test, gliding test, and crossing test setups.

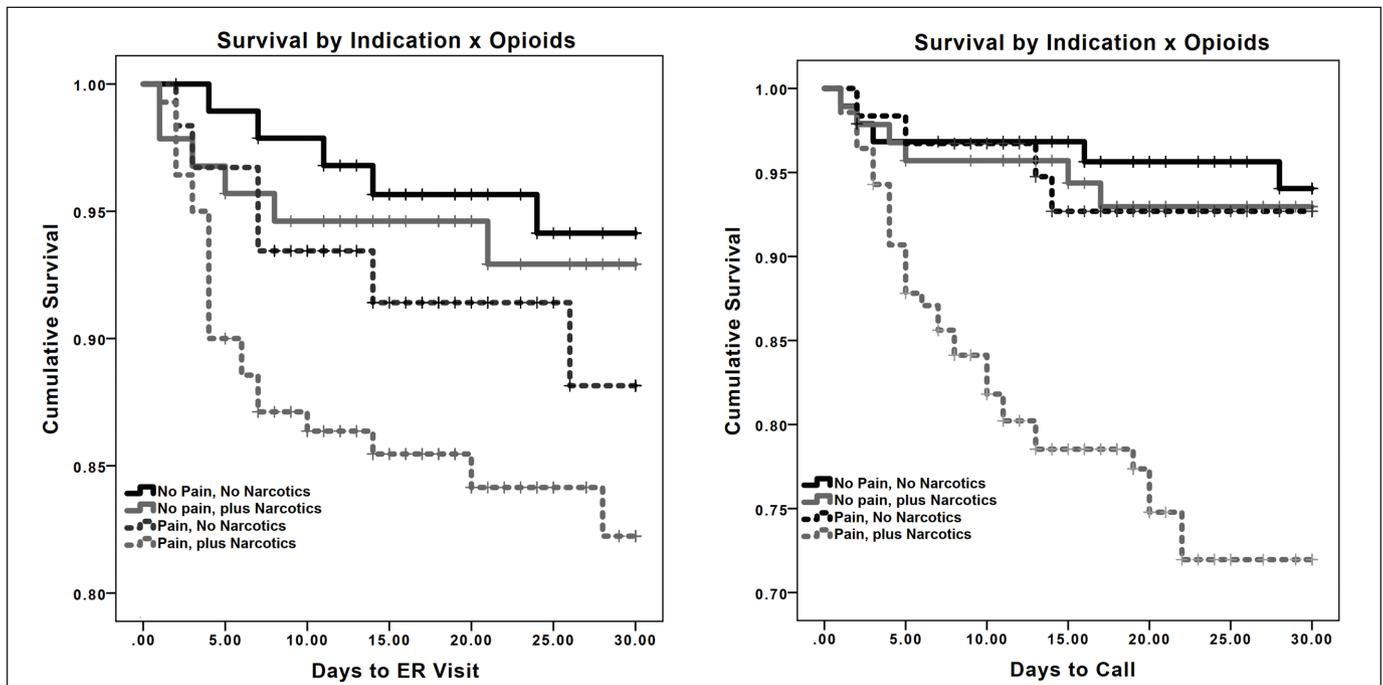
Poster #98. Table 1. Population comparison and logistic regression of predisposing factors for unplanned encounters

	Population characteristics			Logistic regression	
	Pain	No pain	p	Call clinic	Return to ER
				OR (CI) Sig	OR (CI), Sig
Primary indication					
	Pain, 53.2%	No pain, 46.8%		0.31 (0.15–0.67), 0.003	0.39 (0.17–0.88), 0.02
Age	49.1 (±15)	55.5 (±17)	0.004	0.99 (0.97–1.01), 0.51	0.97 (0.95–0.99), 0.02
Caucasian race	178, 86.0%	158, 86.8%	0.741	0.70 (0.25–1.93), 0.49	1.32 (0.36–4.89), 0.68
Male gender	94, 45.4%	72, 39.6%	0.244	1.70 (0.86–3.36), 0.13	1.96 (0.91–4.21), 0.09
Tamsulosin	146, 70.5%	69, 37.9%	0.001	0.76 (0.35–1.62), 0.47	0.82 (0.36–1.85), 0.63
NSAIDs	82, 39.6%	65, 35.7%	0.428	0.78 (0.40–1.53), 0.47	1.73 (0.78–3.84), 0.18
Narcotics	140, 67.6%	88, 48.4%	0.001	0.36 (0.17–0.80), 0.01	0.78 (0.35–1.72), 0.53
Phenazopyridine	47, 22.7%	24, 13.2%	0.015	1.20 (0.54–2.70), 0.65	1.25 (0.50–3.11), 0.64
Anticholinergics	88, 42.5%	58, 31.9%	0.031	0.72 (0.36–1.42), 0.34	1.11 (0.52–2.70), 0.79
Chronic opioids	21, 10.1%	16, 8.8%	0.650	0.63 (0.24–1.62), 0.34	0.34 (0.13–0.90), 0.03

Methods: We retrospectively identified patients by CPT code who underwent IUS placement from 2014–2019 at a single institution, after IRB exemption. Cohort size was based on a pre-study power calculation. The primary indication for IUS (ARC or other), demographics, discharge medications, and history of chronic opioid use were collected. Outcomes were postoperative phone and ER encounters for IUS symptoms. Student -testing, Chi-squared analysis, and binomial logistic regression were used for comparisons. Survival analysis was performed using a Log-rank test. **Results:** Of 389 patients, 207 (53.2%) were stented for ARC and 182 (46.8%) for other indications (Table 1). Patients stented for ARC were younger and received more of nearly all medications on discharge. Patients who called with symptoms were more often stented for ARC (p=0.003) and/or had received narcotics (p=0.01). ER visits were more likely among those stented for ARC, younger patients, and those with a history of chronic opioid use (p=0.02, 0.02, 0.03, respectively). Patients both stented for pain and receiving narcotics called the clinic soonest and most often (p=0.001–0.003) (Fig. 1), as well as returned to the ER sooner

and more often compared to those without pain as a primary indication (p=0.008, 0.029, respectively) (Fig. 1).

Conclusions: Unplanned postoperative ER and telephone encounters for stent colic were most common and occur soonest in patients stented for ARC who were prescribed narcotics. Younger patients and those with chronic opioid use are at particular risk for unplanned ER visits. Urologists must remain vigilant when counselling patients with ARC about postoperative symptoms and the use of opiates after IUS placement, as these patients are at risk for unplanned ER and clinical encounters, which are burdensome to the healthcare system.



Poster #98. Fig. 1.

Poster #99

Can computed tomography characteristics be used to predict outcomes for extracorporeal shockwave lithotripsy?

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Introduction: A recent study by Tran et al demonstrated that tissue density distal to ureteral stones had high sensitivity for predicting stone impaction during ureteroscopy. Using this methodology, we evaluated the effect of stone impaction and other characteristics from computed tomography (CT) on outcomes of extracorporeal shockwave lithotripsy (ESWL).

Methods: Patients who had preoperative CT and underwent ESWL for ureteral stones between January 1, 2017 and December 31, 2017 were identified. Demographic and clinical data were recorded, and CT scans were reviewed to record size, volume, density of the stone, and degree of hydronephrosis (0–3). The ureteral tissue density proximal and distal to the stone was measured and the distal/proximal ratio (DPR) was calculated per the Tran et al protocol. Patients with distal ureteral density >27 HU were classified as impacted. The primary outcome was stone-free status (SFS) on postoperative imaging at 30 and 90 days, and secondary outcome was requirement of repeat ureteroscopy. Demographic data, CT measurements, and intraoperative factors were compared between the impacted and nonimpacted stone groups. Statistical analysis was performed using Student t-tests and multivariate logistic regression to assess associations.

Results: Forty-eight patients met inclusion criteria. Ten patients (20.8%) were identified to have impacted ureteral stones based on the distal ureteral density. The HU distal to stone was significantly higher in the impacted group (33.82±5.55 vs. 18.73±5.65, p<0.001) and DPR was also significantly higher in the impacted group (3.34±1.51 vs. 2.11±0.95, p=0.002). SFS and requirement of secondary procedure was 70% and 10% in the impacted group vs. 74% and 16% in the nonimpacted group, respectively. Distal ureteral density and DPR were not significantly associated with the odds of SFS or requirement of secondary procedure. A higher degree of hydronephrosis was associated with lower odds of SFS at 30 and 90 days (OR 0.12, p=0.03; OR 0.07, p=0.02, respectively).

Conclusions: We assessed whether certain CT characteristics were associated with outcomes of ESWL. Patients classified as impacted had higher ureteral density distal to the stone but there was no association with SFS or need for secondary procedure. Higher degree of hydronephrosis was associated with a lower likelihood of SFS after ESWL.

Poster #99. Table 1. Comparison of clinical and demographic factors between patients with impacted and non-impacted stones

Variable	Non-impacted n=38	Impacted n=10	p
Mean age (years)	53	50	0.686
Female, n	15 (39%)	3 (30%)	0.591
Body mass index (kg/m ²)	30.3	28.9	0.532
Stone size (mm)	7.59	6.83	0.373
Stone volume (mm ³)	131	105	0.394
HU of stone	763	893	0.188
HU distal to stone	18.7	33.8	<0.001*
HU proximal to stone	11.5	12.0	0.810
Proximal/distal ratio	2.11	3.34	0.002*
Degree of hydronephrosis	1.55	1.65	0.700

*Denotes significance

Poster #99. Table 2. Multivariate regression with Hounsfield units distal to stone, PD ratio, and degree of hydronephrosis

Variable	OR (95% CI)	p
Stone-free at 30 days		
HU distal to stone	1.11 (0.96–1.29)	0.15
Proximal/distal ratio	0.43 (0.12–1.49)	0.18
Degree of hydronephrosis	0.115 (0.02–0.77)	0.03*
Stone-free at 90 days		
HU distal to stone	1.13 (0.93–1.36)	0.21
Proximal/distal ratio	0.32 (0.06–1.69)	0.18
Degree of hydronephrosis	0.07 (0.01–0.64)	0.02*
Secondary ureteroscopy		
HU distal to stone	0.89 (0.73–1.08)	0.23
Proximal/distal ratio	2.55 (0.56–11.60)	0.59
Degree of hydronephrosis	3.52 (0.49–25.21)	0.21

*Denotes significance.

Poster #100

Risk of unplanned postoperative re-admissions in children undergoing ureteroscopy: A post-hoc analysis of the Pediatric National Surgical Quality Improvement Program Database

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Introduction: The incidence of pediatric urolithiasis has increased over the last two decades. Ureteroscopy (URS) with laser lithotripsy is currently recommended for the treatment of mid to distal ureteral calculi; however, there is currently no consensus regarding whether URS is appropriate for all pediatric patients. We aimed to examine the risk of unplanned post-operative hospital readmissions in children undergoing URS.

Methods: A post-hoc analysis of data collected from the American College of Surgeons National Surgical Quality Improvement Program® (ACS NSQIP) Pediatric Version. The ACS NSQIP pediatric datasets are validated and risk-adjusted and include 127 institutions across Canada and the U.S. to date. This study examined the outcomes of 299 865 pediatric patients with urolithiasis who underwent URS between 2015 and 2017. These children were identified using the International Statistical Classification of Diseases and Related Health Problems (ICD) codes - 9th and 10th revision and by the Current Procedures Terminology (CPT) codes for URS.

Results: A total of 1122 pediatric URS cases were identified. The median age was 14.4 years (interquartile range [IQR] 10.2–16.5) and 55.4% of these cases were female. Overall, 8.9% of URS cases required a re-admission to hospital within 30 days of the index procedure, and of these 71% were unplanned re-admissions. The two most common reasons for unplanned re-admissions were postoperative urinary tract infections (UTIs, 26.4%) and persistent ureteral calculus (21.8%). On univariate analysis, children with unplanned re-admissions were significantly younger in age (median 11.3 years, IQR 8.3–16.7) compared to those without unplanned re-admissions (median 14.5 years, IQR 10.5–16.5, p=0.028). The relative risk (RR) of an unplanned readmission was 2.4 times higher for children aged 6–11 years (95% confidence interval [CI] 1.51–3.93), and 4.5 times (95% CI 1.80–11.50) for children under 2 years old when compared to children 12–18 years old.

Conclusions: Our study demonstrates that younger children undergoing URS are at a higher risk of unplanned re-admissions secondary to post-operative UTI and persistent calculi. As such, age should be taken into consideration when deciding on the optimal surgical modality or perioperative care for children with urolithiasis. Further prospective studies are

needed to better elucidate the indications of URS for pediatric urolithiasis, as well as the postoperative management and outcomes of these children.

Poster #101

Opioid prescribing after ureteroscopy: The journey to zero

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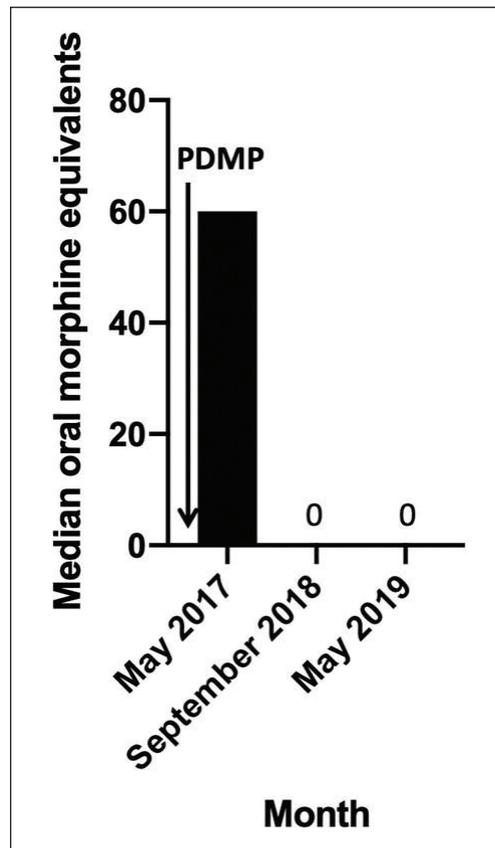
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Introduction: The opioid crisis challenged the doctrine of postoperative pain management with opioids. Interventions on both the state and federal level began to take effect in 2017. In January, the state prescription drug monitoring program was required for all prescribers and in July 2017 opioid training was required for all state medical license renewals. By October 2017, the opioid crisis was deemed a national public health emergency. We sought to evaluate the impact of these changes on postoperative opioid prescribing after a common urologic procedure.

Methods: We conducted a retrospective chart review of all ureteroscopies performed at our institution at three distinct time points: 1) shortly after the prescription drug monitoring program took effect; 2) after increased opioid crisis education and media coverage; and 3) 2 years later. We recorded the type and number of opioid pills prescribed and calculated oral morphine equivalents.

Results: A total of 450 ureteroscopies and 33 attending surgeons were included. The median oral morphine equivalents prescription size per ureteroscopy decreased from 60 OMEs May 2017 to September 2018 0 OMEs after increased awareness of the opioid crisis and new opioid education requirements. At the end of the study period, the median oral morphine equivalents prescribed stayed at 0 OMEs.

Conclusions: Since 2017, opioid prescribing following ureteroscopy has decreased significantly following policy changes at state and federal level. This effect has been durable and suggests a permanent change in opioid prescribing habits.



Poster #101. Fig.1.

Poster Session 6: Oncology: Prostate

Poster #102

A urine-based exosomal gene expression assay to stratify risk of high-grade prostate cancer in prior negative prostate biopsy patients

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Introduction: Initial prostate biopsy often fails to identify prostate cancer, resulting in significant patient anxiety and leading to repeat biopsies. Validated biomarker tests, such as the ExoDx™ Prostate (Intelliscore), or EPI, can stratify clinical risk and support the decision for a repeat prostate biopsy in a prior negative population.

Methods: First-catch, non-DRE urine samples were collected at 22 clinical sites from 1563 men between June 2014 and April 2015. A new subgroup analysis within this study focusing only on men with a prior negative biopsy scheduled for a repeat prostate biopsy was conducted on 229 eligible men, i.e., PCa-free, 50 years or older, scheduled for a repeat biopsy because of either a suspicious DRE and/or PSA level 2–10 ng/mL. Exosomal mRNA was extracted and expression of three genomic markers, PCA3, ERG, and SPDEF, was measured by real-time quantitative polymerase chain reaction. The resulting EPI score was evaluated for correlation with biopsy results.

Results: In this cohort, the EPI algorithm with a prior validated cut point of 15.6 for the initial biopsy setting demonstrated comparable NPV performance in discriminating high-grade PCa from low-grade and benign disease in the initial (91%) (reference) and repeat biopsy (92%) setting. In 229 men undergoing repeat biopsy for a prior negative biopsy, an EPI score less than 15.6 would have avoided biopsy in 24% of men (n=54) and delayed detection of >GG2 disease in 2% of men (n=5). Importantly, only 1% of patients with GG3 or higher would have delayed detection in the repeat biopsy setting. Using an EPI score of 29.6 would have avoided biopsy in 55% of men, thereby reducing anxiety and potential complications associated with an unnecessary biopsy.

Conclusions: This novel, urine exosome-derived molecular signature demonstrated independent clinical value to discriminate high-grade PCa from low-grade PCa and benign disease in men with a prior negative biopsy and serum PSA levels of 2–10 ng/ml undergoing a repeat biopsy. Using either a 15.6 or 29.6 cut-point yielded comparable NPVs of 92% and 94%, respectively, providing additional information for this patient population.

Poster #103

Use of machine learning with local fractal dimension and wavelet decomposition to detect prostate cancer lesions from multiparametric MRI imaging

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Introduction: Multiparametric MRI (mpMRI) has aided in the identification of clinically significant prostate cancer (PCa) lesions while minimizing the detection of low-risk lesions. However, there are lesions not detected by mpMRI. Improved detection of PCa lesions with mpMRI may reduce the number of biopsies needed to obtain a diagnosis. Furthermore, better detection of PCa lesions would help identify patients most suitable for focal therapy and aid in treatment planning. Machine learning (ML) provides a potential path to improve upon the detection of PCa lesions from mpMRI imaging.

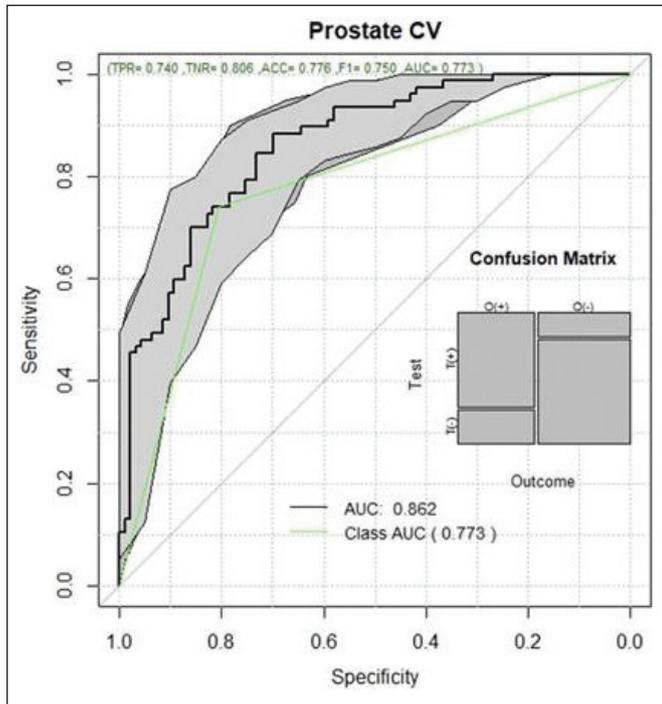
Methods: After obtaining IRB approval, we identified 92 patients who had undergone mpMRI and subsequently underwent radical prostatectomy (RP) within our records. Review of the patients' electronic medical records was performed to obtain pertinent patient demographics. Each prostate specimen was re-examined by GU trained pathologists and PCa lesions were plotted onto prostate maps. The prostate maps and mpMRI images were provided to Qmetrics Technologies in Rochester, NY. Qmetrics Technologies used local fractal dimension and wavelet decomposition signatures from T2 weighted images (T2WI) to develop an AI algorithm using a logistic model.

Results: The average age of the patient at RP was 65 (range 53–79). The average PSA preceding RP was 10.7 ng/mL (range 2–79.6). The average prostate volume was 44 cc (range 19–170). All PCa lesions were adenocarcinoma. Four patients had only Gleason 6 lesions on final pathology. PCa lesions were found to have different contextual properties compared to benign regions on the T2WI. The area under the curve (AUC) receiver operating characteristics (ROC) curve to detect PCa using T2WI is shown in Fig. 1. The AUC using this technique was 0.77.

Conclusions: ML by a logistic model using the local fractal dimension and wavelet decomposition of T2WI images resulted in good detection of prostate cancer lesions. The addition of other pulse sequences routinely performed during mpMRI may increase the sensitivity and specificity of our model.

Poster #102. Table 1. Performance of the EPI test to support the decision to biopsy in a prior negative biopsy cohort of 229 men

EPI risk groups	Biopsies performed	Unnecessary biopsies avoided	Delayed detection (=GG2)	Delayed detection (≥GG3)	NPV	Sensitivity	Specificity
≤15.6	170	54 (24%)	2 (<1%)	3 (1%)	92%	82%	27%
≤20	149	75 (33%)	2 (<1%)	3 (1%)	94%	82%	37%
≤29.6	89	131 (55%)	3 (1%)	6 (3%)	94%	68%	65%



Poster #103. Fig.1. AUC-ROC curve for detecting prostate cancer lesions using local fractal dimension and wavelet decomposition signatures from T2WI.

Poster #104

Clinical utility of ExoDx Prostate in men on initial biopsy

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Introduction: The ExoDx Prostate (EPI) test is a non-invasive, risk-assessment tool for the detection of high-grade prostate cancer (HGPC). We

sought to assess the impact of EPI on the decision to biopsy in a real-world clinical setting.

Methods: We conducted a prospective, randomized, blinded, two-armed clinical utility study (n=1094) with 72 urologists from 24 urology practices. Subjects were enrolled based on standard clinical criteria. All subjects had an EPI test; however, subjects were randomized into an EPI and control arm where only the EPI arm received the results for their biopsy decision.

Results: In the EPI arm (n=458), 93 subjects received a negative EPI score, of which 63% were recommended to defer biopsy by the urologist and 74% ultimately deferred. In contrast, 87% of subjects with a positive EPI score were recommended to undergo biopsy with a 72% compliance rate to the urologist's recommendation. This led to the detection of 18 more HGPCs compared to the control arm. Due to the high deferral of biopsies that occurs in patients evaluated by standard of care (the blinded control arm), it is projected that 94 HGPCs will be missed. In contrast, only 46 HGPCs are projected to be missed among the deferred EPI arm patients. Overall, 68% of urologists reported that the EPI test influenced their biopsy decision. The primary reason not to comply with EPI results was a rising PSA.

Conclusions: To our knowledge, this is the first report on a prostate cancer biomarker utility study with a blinded control arm. The study demonstrates that the EPI test influences the overall decision to defer or proceed with a biopsy and improves patient stratification.

Funding: Exosome Diagnostics

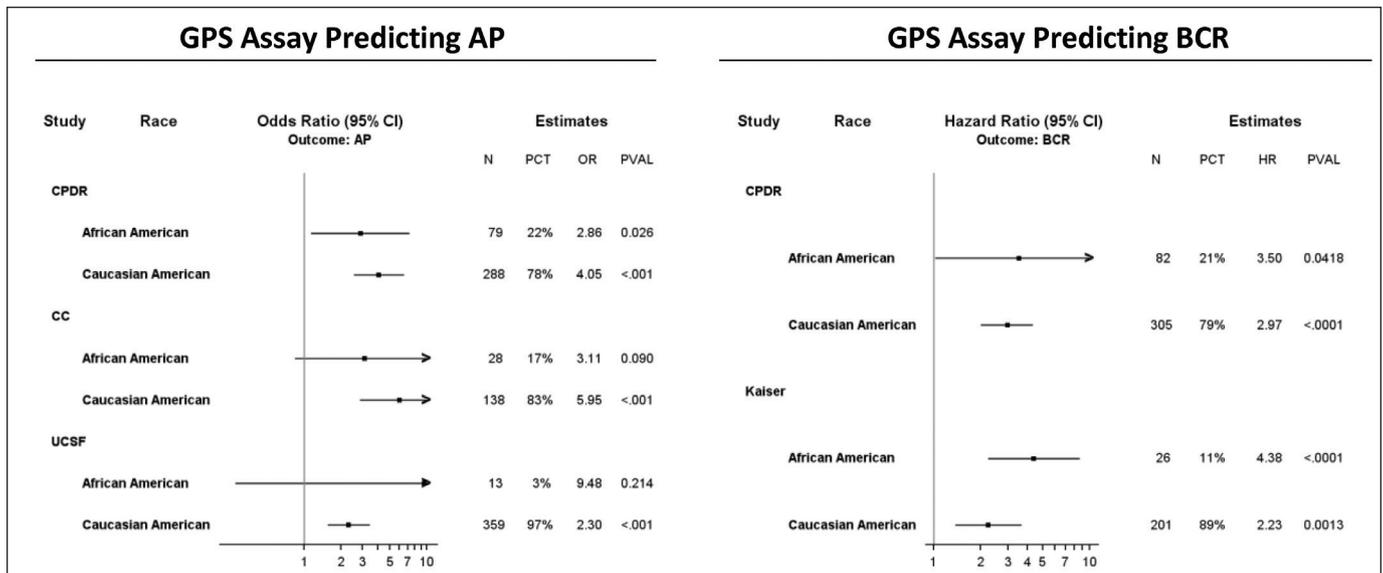
Poster #105

A 17-gene genomic assay as a predictor of outcomes in African Americans with prostate cancer

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Introduction: Adoption of prognostic molecular assays for prostate cancer (PCa) requires evidence of robust performance in different racial groups,



Poster #105. Fig.1.

especially in African Americans (AA), who have worse outcomes than Caucasian Americans (CA). Retrospective analysis was conducted to assess the performance of the Oncotype DX Genomic Prostate Score® (GPS) test in AA vs. CA.

Methods: Compared GPS results (scale 0–100 units [u]) and gene group scores in biopsies from 201 AA and 1144 CA with clinically localized PCa from 6 independent study cohorts (Ctr for Prostate Disease Research [CPDR]; Veteran Healthcare Admin [VA]; Cleveland Clinic [CC]; Kaiser Permanente N. CA [Kaiser]; UC San Francisco [UCSF]; North Carolina-Louisiana Prostate Cancer Project [PCaP]). Four cohorts had outcome data after radical prostatectomy (RP): adverse pathology (AP): CC, CPDR, & UCSF; biochemical recurrence (BCR): CPDR & Kaiser. In cohorts with AP and BCR, the association of GPS test with outcomes were compared. AP was defined as high-grade (Gleason $\geq 4+3$ or any pattern 5) and/or non-organ-confined disease (pT3). Binary logistic regression models were used for AP. BCR was defined as 2 successive PSA levels >0.2 ng/ml or initiation of salvage therapy. Cox proportional hazards models were used to evaluate the association of GPS test and race with time to BCR.

Results: Percent of AA in each cohort ranged from 3–57% (15% overall). Although each cohort had different baseline risk distributions and percentages of AA, median and interquartile ranges of GPS results and gene group expression patterns were similar between AA and CA in each cohort. In univariable analyses, GPS test was predictive of AP and BCR in AA and CA subsets (Fig. 1). In a multivariable model with GPS test and clinical/pathological features, including race, GPS test was significantly associated with AP (UCSF: OR/20 GPS $u=1.93$, 95% CI 1.26–2.98, $p=0.002$; CPDR: OR/20 $u=2.63$, 95% CI 1.69–4.18, $p<0.001$) and BCR (CPDR: HR/20 $u=3.16$, 95% CI 2.05–4.80, $p<0.001$; Kaiser: HR/20 $u=2.13$, 95% CI 1.41–3.22, $p<0.001$). In multivariable models, race was not a statistically significant predictor of either endpoint.

Conclusions: GPS assay is similarly predictive of outcomes in AA and CA PCa and appropriate for improving risk-stratification in AA with newly diagnosed PCa.

Funding: Genomic Health, Inc., an Exact Sciences Corporation, and Department of Defense (for PCaP)

Poster #106

Urine exosomal biomarker (EPI test) performance – a pooled analysis of 1212 men undergoing diagnostic prostate biopsy

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Introduction: ExoDx Prostate (IntelliScore) (EPI) is a validated, non-invasive urine gene expression assay that allows informed initial prostate biopsy decision-making in men with PSA levels in the “gray zone” of 2–10 ng/mL and age ≥ 50 years. It provides an individualized risk assessment for likelihood of having \geq GG2 on prostate biopsy. Performance analysis of pooled data from 1212 men including subgroups from the 2018 USPSTF age and 2019 NCCN PSA early detection guidelines was performed.

Methods: Pooled data (2 validation studies and control arm of a clinical utility trial) was analyzed by (a) total cohort; (b) age 55–69 per USPSTF recommendation; and (c) PSA level greater than 3 ng/ml per NCCN guidelines. Diagnostic needle biopsy outcomes were compared for the EPI score, PSA, and PCPT 2.0 risk calculator. Performance metrics included area under the receiver operating characteristic curve (AUC), negative predictive value (NPV), and sensitivity for discriminating clinically significant \geq GG2 from GG1 and benign disease. Number of clinically significant GG3 PCa <15.6 cutpoint was also assessed.

Results: In the total pooled cohort of 1212 men, EPI showed an AUC of 0.7 vs. PSA AUC 0.56, PCPT2.0 AUC 0.62. Using a cutpoint of 15.6 yielded an NPV 90.1% and sensitivity 92.3% ($p<0.001$) for discriminating \geq GG2 PCa from benign and GG1. Comparable results were identified when both the USPSTF age limits were applied ($n=833$, AUC 0.69, PSA AUC 0.57, PCPT2.0 AUC 0.61; NPV 91.5% and sensitivity 93.3) and NCCN PSA >3 ($n=1097$, AUC 0.7, PSA AUC 0.56, PCPT2.0 AUC 0.61;

NPV 89.1 and sensitivity 91.4%). The % of false negative \geq GG3 (Gleason 4+3) was $<5\%$ across all three groups.

Conclusions: EPI, an independent, non-invasive urine exosome gene expression biomarker, provides discriminant risk-stratification for clinically significant GG2 and higher prostate cancer from GG1 and benign disease across multiple patient profiles and subgroups from the USPSTF and NCCN guidelines.

Poster #107

Does the visibility of grade group 1 prostate cancer on baseline multiparametric magnetic resonance imaging impact oncologic outcomes?

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Introduction: The increasing use of multiparametric (mp) magnetic resonance imaging (MRI) and MRI-targeted biopsy has raised the question of whether patients who have an mpMRI suspicious for clinically significant prostate cancer (PCa) and a targeted biopsy that shows only grade group (GG) 1 disease should be treated differently than those with mpMRI-invisible GG1 PCa. We sought to assess the impact of mpMRI-visibility of GG1 PCa on oncologic outcomes.

Methods: We evaluated 454 men who underwent mpMRI between 2006 and 2018 with maximum GG1 PCa inclusive of MRI-targeted biopsy. MpMRIs were graded as negative, equivocal, or positive. Assessed outcomes were definitive treatment-free survival, biopsy upgrade-free survival, and unfavorable disease at radical prostatectomy (RP) ($pT\geq 3$ and/or $GG\geq 3$). Kaplan-Meier and multivariate proportional hazard analysis were used to estimate the impact of mpMRI results after adjustment for clinicopathologic variables (age, year of mpMRI, prostate-specific antigen density, percent of positive biopsy cores, maximum percent involvement of any biopsy core) on outcomes.

Results: During followup (median 45.2 months), 61 men were upgraded on followup biopsy and 139 men underwent definitive treatment. In men with negative, equivocal, and positive baseline mpMRI, at 5 years, definitive treatment-free survival was 79%, 73%, and 49% ($p<0.0001$), biopsy upgrade-free survival was 89%, 82%, and 70% ($p=0.002$), and survival without unfavorable disease at RP was 98%, 98%, and 86% ($p=0.007$), respectively. At multivariate analysis, both positive (adjusted hazard ratio [HR] 1.93, 95% confidence interval [CI] 1.21–3.09, $p=0.006$) and equivocal mpMRI (adjusted HR 2.02, 95% CI 1.11–3.68, $p=0.02$) were associated with shorter definitive treatment-free survival, and positive mpMRI was a significant prognostic factor for biopsy upgrade-free survival (adjusted HR 2.03, 95% CI 1.06–3.86, $p=0.03$) and unfavorable disease at RP (adjusted HR 4.45, 95% CI 1.39–18.17, $p=0.01$).

Conclusions: Men with a positive mpMRI and GG1 PCa on MRI-targeted biopsy are at increased risk of intervention, upgrading, and unfavorable disease at RP compared to those with mpMRI-invisible GG1 PCa. Patients with an mpMRI suspicious for clinically significant PCa are, therefore, likely to benefit from extra vigilance during surveillance. For the management of men with mpMRI-invisible GG1 cancer, by contrast, a less intensive surveillance regimen and less active intervention may be suitable.

Funding: Deutsche Forschungsgemeinschaft (DFG) fellowship [DE 3207/1-1]; Ontario Institute for Cancer Research

Poster #108**Impact of late dosing on testosterone suppression for in situ gel vs. microsphere delivered leuprolide acetate – an analysis of US clinical data***Judd Moul¹, Stuart Atkinson², Deborah Boldt-Houle², Richard Harris³*¹Duke University Medical Center, Durham, NC; ²Tolmar Pharmaceuticals, Inc., Buffalo Grove, IL; ³UroPartners, Melrose Park, IL

Introduction: Luteinizing hormone-releasing hormone (LHRH) agonists are the most frequently used androgen deprivation therapy (ADT) for prostate cancer (PCa). Achieving and maintaining effective testosterone (T) suppression to the levels attained with surgical castration is the cornerstone of ADT for advanced PCa. However, T may rise above castrate level (50 ng/dL) between injections, especially if a subsequent dose is delayed. Delivery systems should be considered, as ADT therapies are not necessarily interchangeable. When patients demonstrate progression, indicated by an increase in prostate-specific antigen level, it is unclear whether it is a result of late ADT dosing, inadequate T suppression, or disease progression to castration-resistant PCa. Leuprolide acetate (LA) is the most commonly used LHRH agonist in the US. Two FDA approved forms use different extended release systems: an in situ gel technology (Gel-LA, subcutaneous) and microsphere technology (Msphere-LA, intramuscular). This study evaluated the prevalence of late dosing and the comparative impact of late dosing on T suppression for Gel-LA and Msphere-LA.

Methods: A retrospective analysis of US oncology and urology electronic medical records and associated claims data (January 1, 2007 to June 30, 2016) of PCa patients who received Gel-LA or Msphere-LA injections evaluated the frequency of late dosing (defined as occurring after day 32, 97, 128, 194 for 1-, 3-, 4-, 6-month formulations, respectively), mean T, and rate of T tests >50 ng/dL with late dosing.

Results: A total of 10 398 patients were included; 2038 received Gel-LA and 8360 received Msphere-LA; 27% of injections for both drugs were late. When dosing was late, mean T was 48 ng/dL (Gel-LA) vs. 76 ng/dL (Msphere-LA), and 18% (Gel-LA) vs. 25% (Msphere-LA) of T values were >50 ng/dL. Both analyses were statistically significant (p<0.05).

Conclusions: Overall, more than a quarter of injections were administered late. With late dosing, Gel-LA was more effective than Msphere-LA at achieving and maintaining T suppression, as demonstrated by lower mean T levels and lower rates of T breakthrough above 50 ng/dL. Although modifying clinical practice procedures to increase adherence to dosing schedules is recommended, late injections are ubiquitous in real-world practice. As higher levels of T, including T escapes, have potential to adversely impact disease progression and survival, clinicians should reassess their dosing schedule compliance policies and use an ADT that optimizes the goal of effective castrate levels of T suppression.

Funding: Tolmar Pharmaceuticals, Inc.

Poster #109**A phase 2b, randomized, double-blind, placebo-controlled trial of the effects of concentrated long-chain omega-3 fatty acid supplementation (MAG-EPA) before radical prostatectomy on prostate cancer proliferation***Marie-Hélène Guertin^{1,2}, Karine Robitaille¹, Jean-François Pelletier¹, Molière Nguike Makao¹, Helene Hovington¹, Caroline Léger¹, Yves Fradet^{1,3}, Arnaud Marien³, Frederic Pouliot^{1,3}, Louis Lacombe^{1,3}, Rabi Tiguert³, Yves Caumartin³, Thierry Dujardin³, Paul Toren^{1,3}, Michele Lodde³, Étienne Racine^{4,2}, Dominique Trudel⁵, Martine Périgny⁴, Thierry Duchesne⁶, Josée Savard¹, Pierre Julien¹, Isabelle Bairati¹, Vincent Fradet^{1,3}*¹CHU de Québec Research Center - Université Laval, QC; ²Institut National de Santé Publique du Québec, QC; ³Centre de Recherche Clinique et Évaluative en Oncologie de L'Hôtel-Dieu de Québec, QC; ⁴Department of Pathology of CHU de Québec-Université Laval, QC; ⁵Department of Pathology and Cellular Biology, Université de Montréal, QC; ⁶Department of Mathematics and Statistics, Université Laval, QC.

Introduction: An increasing number of prostate cancer patients prefer to avoid or delay aggressive treatments. Some environmental factors, such as a diet rich in long-chain omega-3 polyunsaturated fatty acids (LCn3), are thought to beneficially impact prostate cancer. A randomized controlled

trial (RCT) was carried out to assess whether a short-term supplementation with concentrated monoacylglyceride-conjugated eicosapentaenoic acid (MAG-EPA), an LCn3 subtype, compared to placebo, affects cancer proliferation measured by nuclear Ki-67 expression in the prostate.

Methods: A double-blind, phase II RCT was conducted at the CHU de Québec-Université Laval (NCT02333435). Participants were men diagnosed with prostate cancer grade group ≥ 2 , for which radical prostatectomy was the chosen primary treatment. Participants were randomized to receive either 3g of MAG-EPA (n=65) daily or a similarly looking placebo (n=65) for 4–10 weeks prior to radical prostatectomy. The primary outcome for the study was average Ki-67 at surgery, assessed as a percentage of total tumor cells, from the primary or secondary tumor. Ki-67 was measured by software image analysis (CaloPix, TRIBVN) on standardized tissue microarrays. Patients continued the intervention and were followed up for a year after surgery.

Results: The analyses included 60 patients (92%) in the intervention arm and 62 patients (95%) in the placebo arm. Average Ki-67 expression in tumor sites was not different between the intervention (4.88%) and the placebo (4.18%) group (t-test p=0.16). Average Ki-67 expression in the primary tumor site was also not different for the intervention (4.70%) and placebo (4.10%) group (t-test p=0.21). No differences between the groups were detected in the per-protocol analysis or in analyses adjusted for cancer characteristics at baseline (grade and PSA level). Adherence to the intervention was good, with 77.4% and 76.7% of participants in the placebo and intervention groups, respectively, taking at least 80% of their capsules during the first three months of intervention. Reporting of health or adverse effects were also similar between both groups.

Conclusions: A MAG-EPA intervention for 4–10 weeks before radical prostatectomy did not affect the percentage of total tumor cells in prostate tissue compared to placebo. This trial will also provide information on other important outcomes, such as quality of life and inflammatory biomarkers a year after surgery.

Funding: Canadian Cancer Society Research Institute and Foundation of CHU de Québec

Poster #110**Age-stratified functional, sexual and quality of life outcomes of robotic-assisted radical prostatectomy***Adel Arezki¹, Iman Sadri¹, Ahmed S. Zakaria², Félix Couture³, David-Dan Nguyen¹, Pierre Karakiewicz², Kevin C. Zorn²*¹McGill University, (Faculty of Medicine), Montreal, QC, Canada; ²Centre Hospitalier de l'Université de Montréal, (Division of Urology), Montreal, QC, Canada; ³Centre Hospitalier Universitaire de Sherbrooke, (Division of Urology), Sherbrooke, QC, Canada

Introduction: This study aims to establish trends in age-related QoL, functional and sexual outcomes in Canadian men undergoing RARP.

Methods: A retrospective review was performed on 1737 patients who underwent RARP for prostate cancer at the Centre Hospitalier de l'Université de Montréal and the Hôpital Sacré-Coeur de Montréal between 2007 and 2019. Inclusion criteria consisted of patients having at least 1 month of followup after the procedure. A total of 1387 patients met the selection criteria. Patients were divided into six cohorts based on age: group 1, ≤ 49 years (n=55); group 2, 50–54 years (n=190); group 3, 55–59 years (n=302); group 4, 60–64 years (n=386); group 5, 65–69 years (n=348); and group 6, ≥ 70 years (n=116). Functional and sexual outcomes were measured in patients for up to 36 months.

Results: Changes from baseline in International Prostate Symptom Score (IPSS) were significant and sustained between groups starting at 3 months postoperatively, however, there were no postoperative differences in quality of life score. All groups experienced improvements in IPSS, SHIM and QoL postoperatively. Group 6 had the highest postoperative improvement in IPSS. Fig. 1 demonstrates continence rate with respect to time after surgery. Groups 1, 2, 5, and 6 demonstrated continence rates of 84.6%, 87.4%, 73.1%, and 62% at one-year followup, respectively. After 3 years, more than 90% of patients in groups 2 and 3, and more than 80% of patients in groups 4 and 5 had achieved continence. However, only 72.3% of men over the age of 70 regained full continence 3 years post-

surgery. Furthermore, among men who remained incontinent, group 6 patients consistently required more pads than their younger counterparts. **Conclusions:** This study shows that RARP has good functional and sexual outcomes for benign prostatic hyperplasia, regardless of age. However, we can note multiple differences in outcomes across different age groups in all postoperative outcomes measured, notably men over the age of 70 had significantly inferior continence rates postoperatively compared to younger patients. This data is valuable in prognostic evaluation and patient counselling.

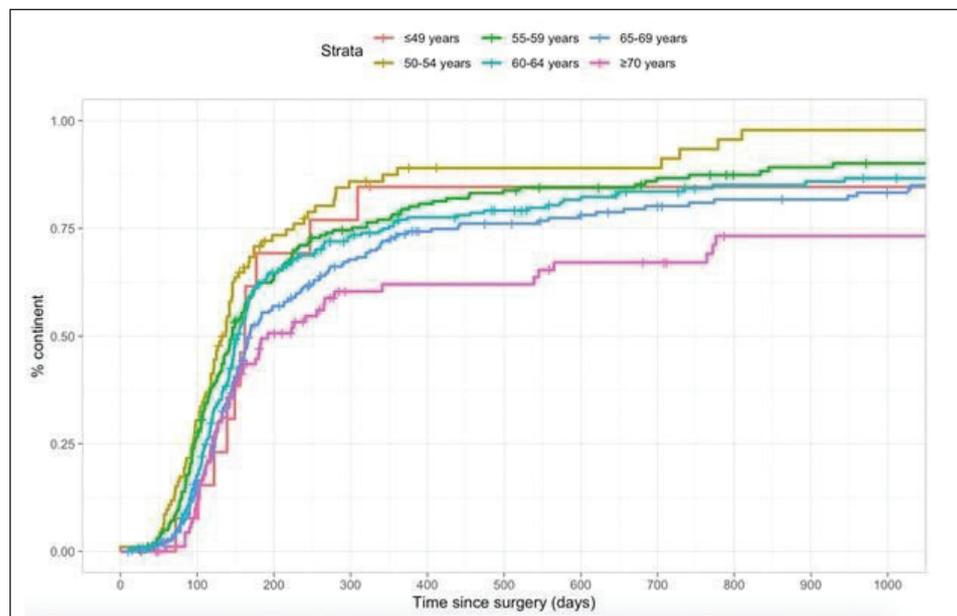
Poster #111
Cesium-131 prostate brachytherapy: A single institution's long-term experience

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Introduction: Prostate brachytherapy is an accepted standard of care for men diagnosed with localized prostate cancer. Almost all men who undergo prostate brachytherapy will experience some degree of bothersome lower urinary tract symptoms, which can greatly impact quality of life. A major benefit of Cesium-131 over Iodine-125 is the shorter duration of bothersome voiding symptoms. We report the PSA outcomes in patients with prostate cancer who underwent prostate brachytherapy with Cesium-131.

Methods: All patients at our institution who underwent prostate brachytherapy with Cesium-131 between 2006 and 2019 with at least 24 months of followup were included in this study. Patients were stratified by NCCN risk group (low, favorable/unfavorable-intermediate, and high), as well as by treatment received (monotherapy, combination external beam radiation plus brachytherapy, or trimodal therapy). Serum PSA was checked every 3 months for the first year, every 6 months until year 5, and then annually thereafter. The Phoenix definition (absolute nadir plus 2.0 ng/mL) was used to define biochemical freedom from disease (BFD). The Kaplan-Meier method was used with the log-rank test to evaluate the difference in BFD for different risk categories. All p-values were 2-sided, with a threshold for significance set at p<0.05.



Poster #110. Fig. 1. Age-stratified incidence plot time to recover continence.

Results: A total of 806 patients underwent prostate brachytherapy with Cesium-131 at our institution and 669 patients were included in the analysis. Median followup was 60.0 months. According to NCCN risk categories, 29.9% of patients were categorized as low-risk, 55.6% intermediate-risk, and 14.5% high-risk. Using the Phoenix criteria, 5/10-year BFD for patients treated with monotherapy implant was 97.1%/95.3% for patients in the low-risk category, 94.0%/90.1% for patients in the intermediate-risk category, and 86.2/56.6% for patients in the high-risk category. The 5/10-year BFD for patients with favorable intermediate-risk disease treated with monotherapy implant was 96.9%/95.8%, and 89.9%/80.8% for patients with unfavorable intermediate-risk disease. PSA ≤ 0.2 ng/dL at 4 years was predictive of 10-year biochemical control: 96.3% vs. 70.4% (p<0.001).

Conclusions: This study supports the continued use of prostate brachytherapy in men with clinically localized prostate cancer. Prostate brachytherapy with Cesium-131 achieves excellent long-term biochemical control at 5/10 years and is consistent with longitudinal studies of Iodine-125 and Palladium-103. The shorter duration of bothersome voiding symptoms, along with excellent long-term biochemical control support our preference for Cesium-131 isotope.

Poster #112
Relationship between omega-3 fatty acid intake and prostate cancer risk: Preliminary result of the BIOCAPPE GRÉPÉC study

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Introduction: Prostate cancer is a major health problem worldwide. Omega-3 fatty acids ($\omega 3$) are among the dietary factors thought to impact prostate cancer risk. Preclinical and clinical studies suggest that a high consumption of $\omega 3$ have protective effects on prostate cancer development and progression. The objective of this work was to explore the associations between prostate cancer incidence and consumption of $\omega 3$ in men at risk of prostate cancer.

Methods: We are conducting a multicenter, prospective cohort study with 2500 men at high risk of prostate cancer. This observational study aims at evaluating the role of lifestyle on five candidate biomarkers and prostate cancer incidence. At study baseline, $\omega 3$ intake was measured using a validated food frequency questionnaire and their levels in red blood cell membranes were measured by gas chromatography. Cancer incidence was evaluated at two years of followup by biopsies. Preliminary associations between $\omega 3$ intake and prostate cancer incidence in the first 256 participants was explored using multivariate logistic regression.

Result: Among the first 256 participants, 33% were diagnosed with prostate cancer at 2 years. We observed an inverse association between prostate cancer incidence and long-chain $\omega 3$ (LC $\omega 3$) intake (OR 0.33, 95% CI 0.11–0.95, p=0.04), DHA intake (OR 0.33, 95% CI 0.11–0.93, p=0.03), and LC $\omega 3$: $\omega 6$ ratio intake (OR 0.35, 95% CI 0.12–0.98, p=0.04), measured in the diet. This inverse association between LC $\omega 3$ and prostate cancer incidence was accompanied by a dose-response relationship (p-trend=0.02).

Conclusions: These preliminary results suggest a potential link between prostate cancer incidence and LC ω 3 consumption in men at risk of prostate cancer. However, these relationships were not translated in the circulating measurement of ω 3. Analyses of the associations between ω 3 intake and prostate cancer incidence in the entire cohort are warranted.

Funding: Cancer Research Society (CRS)

Poster #113

Effects of omega-3 fatty acid supplements on perioperative blood loss during radical prostatectomy

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Introduction: Many dietary supplements, including long-chain omega-3 fatty acids (LC ω 3), are suspected to affect blood coagulation and platelet function. Despite no clinical evidence, discontinuation is recommended before radical prostatectomy (RP). However, LC ω 3 could be beneficial against prostate cancer progression. This study aims to determine the effect of LC ω 3 supplements on perioperative bleeding, hemoglobin, platelets, and postoperative complications at RP.

Methods: This is a planned secondary analysis of all 130 patients diagnosed with prostate cancer grade group 2 or greater enrolled in a randomized controlled trial (NCT02333435) testing the effects of LC ω 3, on prostate cancer biological outcomes at RP as primary outcome. The LC ω 3 intervention (MAG-EPA 3 g/day) or equivalent dose of placebo was given 4–10 weeks prior to RP. Patients taking other dietary supplements were excluded. Patients' charts were reviewed for data extraction. Variables were normalized to preferentially use parametric models (linear regression); otherwise, non-parametric quantile regression models were fitted. All models were adjusted for 7 confounding variables judged clinically relevant (surgical approach, body mass index, waist size, NCCN risk, and preoperative intake of aspirin, vitamin-K-agonists, or direct oral anticoagulants).

Results: We found no effect of LC ω 3 versus placebo on perioperative bleeding (adjusted difference of 30.0 mL, $p=0.75$), lab tests (adjusted hemoglobin difference 2.6, $p=0.48$), or on postoperative complications (adjusted difference of 0.1, $p=0.40$). In contrast, as expected, we found a significant increase in perioperative bleeding in open retropubic RP compared to robot-assisted RP (adjusted difference of 115.8 mL, $p=0.04$).

Conclusions: Our results suggest that omega-3 supplements can be safely taken before RP intervention without increasing the risk of surgical bleeding. These findings are particularly relevant since ω 3 are thought to decrease prostate cancer recurrence after RP.

Funding: CCSRI (Canadian Cancer Society Research Institute) and the Fondation du CHU de Québec

Poster #114

A preliminary descriptive analysis of the quality of life from men at risk of prostate cancer

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Introduction: Prostate cancer is the most common cancer among Canadian men. Men diagnosed with prostate cancer usually live with an indolent disease for many years. Unfortunately, prostate cancer treatments lead to important side effects and have a major impact on quality of life (QoL). Many studies evaluated QoL of men diagnosed with prostate cancer and QoL related to treatments. However, only few studies looked

at the QoL from men at risk of prostate cancer, and none was performed in Canada. The aim of this study was to conduct a preliminary descriptive analysis of QoL in a Canadian cohort of men at risk of prostate cancer.

Methods: General and prostate cancer-related QoL was collected for 2100 men at risk of developing prostate cancer, enrolled in a multicentric, prospective, observational study called BIOCaPPE_GRéPEC. This study aims at evaluating the impact of various biomarkers that are linked to lifestyle habits on prostate cancer incidence. QoL was evaluated with validated questionnaires, e.g., 1) Hospital Anxiety and Depression Scale (HADS); 2) International Prostate Symptoms Score (IPSS); 3) Sexual Health Inventory for Men (SHIM). A first descriptive analysis was conducted with the 1000 participants that filled the online questionnaires.

Results: General and prostate cancer-specific QoL analyses were conducted on 994 and 986 participants, respectively. Among these, 134 (13.5%) were classified as borderline and 63 (6.3%) as abnormal cases of anxiety; 47 (4.7%) were classified as borderline and 19 (1.9%) as abnormal cases of depression; 516 (52.3%) had moderate to severe lower urinary tract symptoms and 256 (26.0%) had severe erectile dysfunction symptoms. On the HADS-Anxiety scale, the mean and median score were 4.81 and 4.00 (SD 3.22), respectively, in which a lower score means fewer symptoms of anxiety. On the HADS-Depression scale, the mean and median score were 2.96 and 2.00 (SD 2.68), respectively, in which a lower score means fewer symptoms of depression. Finally, 566 participants (57.4%) felt delighted to relatively satisfied with their QoL due to urinary symptoms.

Conclusions: Our results suggest that the majority of men at risk of prostate cancer perceive their prostate cancer-related QoL adequate, even if the majority of these men have moderate to severe lower tract urinary symptoms. Anxiety, depression, and erectile dysfunction symptoms are less common. This study is the first description of the QoL in such a large Canadian cohort of men at risk of prostate cancer.

Funding: Cancer Research Society

Poster #115

Report of a large cohort of intermediate-risk prostate cancer patients treated with Cesium-131 brachytherapy

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Introduction: The intermediate-risk (IR) group of prostate cancer patients are extremely heterogeneous and have significant treatment variations. These patients are further subclassified into favorable-IR (FIR) and unfavorable-IR (UIR) based on clinical and pathological features. We sought to evaluate our institutional outcomes utilizing Cesium-131 prostate brachytherapy (PB) for IR patients to determine which factors are important for driving more aggressive treatment.

Methods: We reviewed a prospectively collected database of patients treated with Cesium-131 PB between 2006 and 2019. Patients with less than 24 months of followup were excluded. Patients were classified as IR if they had one of the following factors: Gleason score 7, prostate specific antigen (PSA) >10 but <20 ng/mL, or T2b-c on clinical exam. We defined UIR patients as having either grade group (GG) 3 or >1 IR factors. In general, FIR patients were treated with PB alone and UIR patients were treated with combined external beam radiation therapy (EBRT) plus PB, however, treatment was somewhat variable. Biochemical failure (BF) was defined as a serum PSA at least 2.0 ng/mL greater than post-treatment nadir PSA. COX regression analysis was performed to identify predictors for BF, including GG, UIR subgroup, treatment (PB alone vs. combined modality), ADT use, age (≤ 67 vs. >67), clinical T-stage, PSA (<10 vs. ≥ 10 –20), and >1 IR factors.

Results: A total of 327 patients were classified as IR, with 188 (57.5%) patients classified as FIR. Median age was 67 and median followup was 70.6 months. FIR patients had a 5-year BF rate (BFR) of 2.5%. The 5-year BFRs for FIR patients treated with PB alone (81.4%) vs. combined modality (18.6%) were 1.7% and 5.0%, respectively ($p=0.18$). UIR patients had a 5-year BFR of 10.9%. The 5-year BFRs for UIR patients treated with PB alone (38.1%) vs. combined modality (61.9%) were 14.0% and 10.1%,

respectively (p=0.91). The 5-year BFRs for UIR patients by virtue of GG 3 only (n=68) vs. those who had >1 IR factor (n=71) were 13% and 8.9%, respectively. Six patients had 3 IR factors with a 5-year BFR of 50%. On multivariate analysis, UIR subgroup was the only significant predictor for BF (HR 2.49, 95% CI 1.15–5.41, p=0.02).

Conclusions: The FIR subgroup is a distinct entity from the UIR subgroup with excellent outcomes when treated with Cesium-131 PB alone. UIR patients may benefit from more aggressive treatment.

Poster #116

The 17-gene RT-PCR prostate assay: Clinical experience in 33 000 patients with clinically low-risk prostate cancer

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Introduction: The 17-gene onco-type DX Genomic Prostate Score® (GPS) assay is a biopsy-based gene expression assay specifically developed for clinically low-risk prostate cancer (PCa): NCCN very low (VL), low (L), and favorable intermediate (FIR). When combined with baseline NCCN risk, it has been clinically validated to predict risk of adverse pathology (AP) at time of diagnosis to help guide treatment decisions, including active surveillance. Here, we report the Genomic Health Clinical Laboratory experience for samples submitted after prostate cancer guidelines and the GPS report were updated to include favorable and unfavorable intermediate risk groups.

Methods: We present results based on 32 430 commercial samples from May 2017 through May 2019 that passed pathology review and RT-PCR quality measures and had data on NCCN risk group. GPS result (scale 0–100) was calculated based on validated algorithm with 12 PCa-related genes across four pathways and five reference genes. Physicians provided clinicopathologic characteristics when they ordered the assay, which were descriptively summarized.

Results: In the 32 430 GPS reports, the median GPS result was 23, with median values of 20, 21, and 28 for NCCN VL, L, and intermediate (I), respectively. Overall, 68%, 30%, and 2% of submitted Gleason scores were 3+3, 3+4, and 4+3, respectively; 19% were NCCN VL, 40% L, and 41% I risk. Table 1 shows risk group refinement using 3-category baseline NCCN risk group and 5-category post-GPS risk group. Overall, the post-GPS risk category was different from the submitted NCCN risk category for 40% of patients (12 938 of 32 430). In the NCCN L group, 62% had a different NCCN and post-GPS risk category, with 19% having a higher post-GPS risk group, and 43% a lower post-GPS risk group.

Conclusions: The Genomic Health Clinical Laboratory experience with the GPS test confirms a wide spectrum of individual tumor biology within traditional clinical risk groups. Over 1 in 3 men had a post-GPS risk assignment different from his NCCN risk group. Use of GPS testing provides physicians and patients with personalized information to improve risk assessment and guide better decision-making for initial disease management.

Funding: Genomic Health, Inc., an Exact Sciences Corporation

Poster #117

Urine exosome gene expression assay net benefit analysis in a large pooled cohort

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Introduction: Over-diagnosis of indolent prostate cancer (PCa) supports the need for non-invasive tools that can differentiate low-grade (Gleason score ≤6, GS 6) from high-grade (GS ≥7). We examined the clinical benefit of ExoDx™ Prostate (IntelliScore) (EPI) results in a pooled cohort over a range of probabilities using net benefit analysis.

Methods: A pooled dataset of two prior validation cohorts and additional cases from a large group practice provided a large data set (n=1212) for net benefit analysis. The pooled population consisted of men >50 years, scheduled for initial biopsy and with a PSA measurement. Urine specimens were collected at enrollment using a provided urine collection device and the EPI tests were run at a CLIA-certified central laboratory at Exosome Diagnostics, Waltham, MA. The clinical decision value of the urine exosome gene expression assay (EPI) was assessed using net benefit analysis and compared EPI results with standard of care information across a range of probabilities for which a patient might decide on a prostate biopsy. The net benefit is determined by adding the true positive results and subtracting the false negatives across different biopsy probability thresholds.

Results: The ExoDx™ IntelliScore or EPI assay demonstrated superior clinical benefit when compared to the Prostate Cancer Prevention Trial (PCPT) prostate cancer risk calculator, or PSA.

Conclusions: In this new analysis of a large pooled cohort, the EPI exosome gene expression assay had the highest clinical net benefit across the 10–50% decision threshold compared to decision support methods currently used in the clinic

Funding: Exosome Diagnostics

Poster #118

Psychosocial and functional quality of life indicators of mental health outcomes among men with a history of radical prostatectomy

Ioshua White¹, Gabriela Ilie², Greg Bailly³, David Bell³, Robert Rutledge⁴

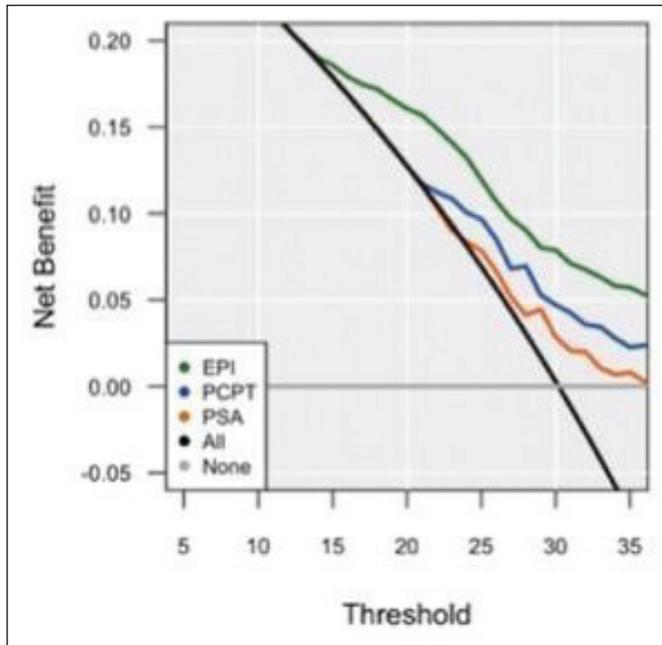
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Introduction: Prostate cancer (PCa) is the most diagnosed cancer among Canadian men. Radical prostatectomy (RP) remains the gold standard treatment for localized disease in men with PCa. Given the high survival rates, a greater emphasis has been placed on understanding biopsychosocial survivorship issues, such as incontinence and mental health issues. We hypothesized that poor urinary function and relationship dissatisfaction would be associated with increased chances of having adverse mental health.

Methods: The study’s analytic sample was based on 144 adult males, residing in Maritimes Canada (ages 48–86, median 68) who completed a PCa quality of life survey online and identified having received RP. Participants were surveyed between May 2017 to December 2018. The primary outcome was assessment of mental health status using the Kessler

Poster #116. Table 1. Risk group refinement comparing submitted NCCN risk group with post-GPS risk group

Submitted NCCN risk group	GPS+NCCN risk group					Overall n
	Very low	Low	Favorable intermediate	Intermediate/unfavorable intermediate	High	
Very low	5787 (92.9%)	356 (5.7%)	70 (1.1%)	5 (0.1%)	12 (0.2%)	6230
Low	5570 (43.4%)	4887 (38.1%)	1994 (15.5%)	329 (2.6%)	59 (0.5%)	12839
Intermediate	0 (0.0%)	2115 (15.8%)	1011 (7.6%)	7807 (58.4%)	2428 (18.2%)	13361



Poster #117. Fig. 1.

Psychological Distress Scale (K10), a well-validated tool for predicting mental distress. Predictors included: (a) urinary function assessed using the International Prostate Symptom Score (I-PSS); relationship satisfaction assessed using the validated Dyadic Adjustment Scale (DAS); age (years); survivorship time since diagnosis (months); number of comorbidities; and additional treatments to RP. The analytical sample was 126 (4.6% missing outcome data). A multiple logistic analysis assessed the association between the stated predictors and current mental health status.

Results: A total of 16.4% men scored positive for current mental health issues notably anxiety and depression. More than half of the sample (60.3%) reported mild urinary problems, while 39.7 reported moderate to severe urinary problems. The multiple logistic model was statistically significant, $C2(6)=25.25$, $p<0.001$, showing an improvement over the baseline model. The Hosmer and Lemeshow analysis of the goodness of fit suggested that the model was a good fit to the data ($p=0.172$). The odds ratio was 3.54 times higher (95% CI 1.04, 12.00) for presenting with clinical mental health issues among survivors with moderate to severe urinary problems. Being satisfied in the relationship was a protective factor 0.2 (95% CI 0.05, 0.86). Survivorship time, the presence of comorbidities, and multiple treatments in addition to RP did not statistically significantly contribute to the fitted model.

Conclusions: Men with PCa undergoing RP are at increased risk of mental health illness when compared to the global prevalence of such disorders. In this study, we show that men with moderate to severe urinary symptoms were found to be more likely to screen positive for mental health issues, as were men that reported relationship dissatisfaction.

Funding: Soillse Prostate Cancer Quality of Life Research Lab

Poster #119

Is index lesion multiplicity and lesion location associated with detection of clinically significant prostate cancer during MRI-US targeted biopsy?

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Introduction: There is growing recommendation for use of magnetic resonance imaging (MRI) and targeted biopsies for detection of prostate cancer (PCa). MRI-ultrasound fusion targeted biopsy (MRI-US Bx) of index lesions has shown increased detection of clinically significant prostate cancer (csPCa) over transrectal ultrasound-guided (TRUS) biopsy alone, and detection of fewer insignificant cancers. Commonly, prostatic MRI identifies multiple suspicious PIRADS lesions within a single prostate. We investigate whether index lesion multiplicity and lesion location are associated with detection of csPCa using MRI-US Bx.

Methods: A total of 142 men were identified retrospectively, from March 2017 to December 2019, after completion of MRI-US Bx. We included biopsy-naive patients, those with previous negative TRUS biopsies, and those on active surveillance for low-risk PCa. All patients received mpMRI with index lesions graded using PIRADS classification system. PIRADS ≥ 3 lesions received MRI-US Bx using bk3000 and MIM software. Detection rate of csPCa (defined as ISUP grade group ≥ 2) was analyzed. Multivariate regression was performed for lesion-specific and patient-specific factors.

Results: We identified 207 lesions with mean 2.6 cores per index lesion. Multiple lesions were found in 59 (41.5%) of patients. CsPCa was detected in 33.8% of patients, with per-lesion detection rate of 27.6%. CsPCa was identified in 8 (11.3%), 19 (23.5%), 23 (41.8%) of PIRADS 3, 4, 5 lesions, respectively. Detection of csPCa was associated with anterior lesions ($p=0.017$), peripheral lesions ($p=0.004$), and higher number of cores per lesion ($p=0.015$), but inversely associated with prostate volume ($p=0.002$). No significant associations were found between csPCa and tumor multiplicity or maximum lesion diameter.

Conclusions: Detection of csPCa within index lesions is associated with number of core biopsies per lesion, anterior location, and smaller prostate volume, but not lesion multiplicity.

Funding: Health Care Foundation Research Grant

Poster #120

Repeat MRI-guided prostate biopsy: Can we predict the men that will benefit?

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Introduction: Multiparametric magnetic resonance imaging (MRI) fusion biopsy of the prostate is a well-established diagnostic tool for the detection of prostate cancer and disease progression. Although data initially supported the role of repeat MRI fusion, more recent reports have shed doubt on the clinical impact. We hypothesized that repeat MRI may be able to help prevent future repeat biopsy.

Methods: Using our consecutively maintained MRI fusion database, we identified men who had undergone a repeat MRI-guided biopsy including targeted and systematic biopsy. All subjects had a confirmatory MRI fusion followed by a second MRI-guided biopsy at a later date. Upgrade was defined as an increase in NCCN Gleason grade group (GG). Univariable and multivariable logistic regression models were used to predict upgrade from confirmatory to subsequent fusion biopsy.

Results: From 2014–2020, our database captured 1070 consecutive MRI fusion biopsies, of which 63 patients had undergone a second MRI-guided fusion biopsy. Of these biopsies, 74.6% were performed for men on active surveillance and 25.4% were performed for rising PSA with prior negative biopsy. There was an upgrade rate of 17% in the entire cohort, of which 2 of 11 patients obtained a new diagnosis of prostate cancer. The remaining nine patients (81.8%) progressed to clinically significant disease. Of

Poster #119. Table 1. Baselines characteristics and CsPCa rates by location of 142 men with clinical suspicion of prostate cancer who underwent MRI-US fusion biopsies

Patient characteristic (n=142)	Value			
Age, years, median (IQR)	66 (61–70)			
PSA, ng/ml, median (IQR)	9.5 (7.6–14.5)			
Prostate volume, ml, median (IQR)	54.3 (37.8–94.5)			
Previous negative Bx	103 (72.5%)			
Active surveillance	26 (18.3%)			
Bx-naive	13 (9.2%)			
Patient characteristic	Value			
Overall PCa (ISUP GG \geq 1)	68 (47.9%)			
Overall csPCa (ISUP GG \geq 2)	48 (33.8%)			
Active surveillance - change in management	8 (30.8%)			
Previous negative bx	32 (31.1%)			
PSA				
<10	21 (43.8%)			
>10	27 (56.3%)			
Age				
<50	0 (0%)			
50–54	2 (4.2%)			
55–59	6 (12.5%)			
60–64	8 (16.7%)			
65–70	11 (22.9%)			
>70	21 (43.8%)			
Characteristic	Overall	PIRADS 3	PIRADS 4	PIRADS 5
n	207	71	81	55
Cores per lesion, mean	2.6 (\pm 1.1)	2.2 (\pm 1.1)	2.7 (\pm 1.1)	3.2 (\pm 1.1)
Overall PCa (GG \geq 1)	86 (41.5%)	15 (21.1%)	34 (42.0%)	30 (54.5%)
CsPCa (GG \geq 2)	55 (26.6%)	8 (11.3%)	19 (23.5%)	23 (41.8%)
CsPCa lesion max diameter, cm, mean	1.5 (\pm 0.7)	0.9 (\pm 0.2)	1.1 (\pm 0.3)	2.1 (\pm 0.6)
CsPCa by lesion zone				n=55
Peripheral	30 (54.5%)	4 (50.0%)	11 (57.9%)	15 (65.2%)
Transition	15 (27.3%)	4 (50.0%)	7 (36.8%)	4 (17.4%)
Central	2 (3.6%)	0 (0%)	0 (0%)	2 (8.7%)
CsPCa by lesion location				n=55
Anterior	18 (32.7%)	1 (12.5%)	6 (31.6%)	11 (47.8%)
Mid-gland	12 (21.8%)	5 (62.5%)	3 (15.8%)	4 (17.4%)
Posterior	8 (14.5%)	0 (0%)	5 (26.3%)	3 (13.0%)

these patients, 8 of 9 had \geq GG2 disease detected on both systematic and targeted biopsy, and targeted biopsy alone detected GG2 disease in the remaining patient. Factors predictive of upgrade on univariate analysis included higher BMI ($p=0.003$) and PSA ($p=0.002$), and there was a trend toward a greater change in PSA density between MRIs ($p=0.06$). On multivariate analysis, only BMI was found to be a statistically significant predictor of upgrade ($p=0.005$). On subset analysis of men on active surveillance, the upgrade rate was 19%. There were similar predictors of upgrade on univariate analysis, with BMI again the only factor significant on the multivariate ($p=0.04$). No specific radiographic features were found to be associated with progression on repeat biopsy.

Conclusions: For men on active surveillance and prior negative biopsy, a repeat MRI-guided biopsy upgraded in 17%. Omitting target biopsy would have missed only one patient in our cohort. Interestingly, BMI was the only predictor of this upgrade and no MRI features were found

to be suggestive of disease progression. Limited by our sample size, more data is needed to determine the value of MRI in the post-confirmatory MRI biopsy setting.

Poster #121 Analysis of exosome genomic results within the PSA gray zone (2–10 ng/mL)

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Introduction: Over-diagnosis of indolent prostate cancer (PCa), supports the need for non-invasive tools that predict low-grade (Gleason score 6, GS 6) from high-grade (GS \geq 7). We examined the ExoDx™ Prostate (IntelliScore) (EPI) distribution and potential impact on decision-making

in men aged 60–70 years old with PSA levels in the gray zone (2–10 ng/mL), as well as artificially binned PSA subgroups within the gray zone in a de-identified dataset from commercial testing.

Methods: First-catch urine samples from men presenting for initial or repeat biopsies were submitted to Exosome Diagnostic Laboratory (Waltham, MA). All men were ≥ 50 years with PSAs in the gray zone. Samples were filtered through a 0.8 μm syringe filter and exosomes were isolated and EPI analysis was conducted as previously described. During the period 2016–2019, PSA measurements, as well as de-identified EPI scores were available for 2892 cases. PSAs in the gray zone were segmented into four groups (2–4, 4–6, 6–8, and 8–10 ng/mL) and EPI distribution was examined in each PSA group. **Results:** Of the EPI results generated, 2892 cases had corresponding PSAs and were from men 60–70 years. The EPI score distribution ranged from 0.59–99.87 and the PSA distribution ranged from 1.89–10.43 (mean 5.80). In the four PSA groups, EPI distribution was remarkably consistent, with EPI low risk ranging from 31–34% regardless of PSA subgroup.

Conclusions: This data, from a large number of cases from routine clinical practice, demonstrates that EPI risk distribution percentage aligns with prior validation studies and reinforces the lack of association between PSA and EPI risk assignment. In addition, in the prior validation studies (n=1022), the risk of HGPCa did not appreciably change regardless of binning PSA (2–10 ng/mL) into discrete groups supporting this analysis, which demonstrates that patients with PSA in the gray zone appear clinically similar and that EPI analysis provides superior discrimination for high-grade disease pre-biopsy.

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Poster #121. Table 1. EPI distribution in PSA binned from 2–10 ng/mL

PSA group (ng/mL)	n (%)	PSA (mean)	EPI low-risk (<15.6)	EPI high-risk (>15.6)
2–10	2892 (100%)	6.00	31%	69%
2–4	441 (15.2%)	3.49	31%	69%
4–6	1304 (45%)	5.05	29%	71%
6–8	759 (26.4%)	7.06	32%	68%
8–10	388 (13.4%)	9.90	34%	66%