

CUA 2023 Annual Meeting Abstracts – Poster Session 11: Endourology, BPH (Part 2)

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MP 11.1

Safety and efficacy of ambulatory tubeless mini-percutaneous nephrolithotomy (mini-PCNL) in the management of 10–25-mm renal calculi: A retrospective study

Parsa Nikoufar¹, Amr Hodhod¹, Moustafa Fathy¹, Sai K. Vangala¹, Ahmed S. Zakaria¹, Ruba Abdul Hadi¹, Loay Abbas¹, Husain Alaradi¹, Waleed Shabana¹, Ahmed Kotb¹, Walid Shahrour¹, Hazem Elmansy¹

¹Department of Urology, Northern Ontario School of Medicine, Thunder Bay, Canada

Introduction: We aimed to study the safety and efficacy of ambulatory tubeless mini-percutaneous nephrolithotomy (mini-PCNL) in the management of 10–25 mm renal stones.

Methods: We conducted a retrospective study of patients who underwent mini-PCNL at our institution from September 2018 to September 2022. Ninety-five patients with 10–25 mm renal calculi were included in the study. All participants underwent a CT renal colic scan preoperatively, on postoperative day one (POD 1), and at three months followup. Patient demographics and outcome measures were recorded, including stone characteristics, operative time, hospital stay, stone-free rate (SFR), complication rates, and subsequent emergency room (ER) visits. Patients were deemed stone-free if they had no fragments or residual fragments <4 mm.

Results: The median maximum stone diameter was 16 (10–25) mm. Twenty-nine patients (30.5%) had multiple renal calculi. The median operative time was 64 (38–135) minutes. Ninety percent of patients had a totally tubeless procedure. All patients were discharged home on the same operative day, with a median hospitalization time of six hours. Seven (7.4%) postoperative ER visits were recorded, and one (1.1%) led to hospital readmission. The frequency of grade I, II, and III Clavien–Dindo complications were 14 (14.7%), 2 (2.1%), and 1 (1.1%), respectively. The SFR on POD 1 and three-month followup was 73.6% and 92.6%, respectively. None of the patients in the study required retreatment (Table 1).

Conclusions: Ambulatory tubeless mini-PCNL is a safe and effective treatment option for 10–25 mm renal calculi with a reasonable SFR, low morbidity, and short hospital stay. Patients may benefit from decreased postoperative analgesic use.

MP 11.2

First-in-seal – Kidney stone treatment in the harbour seal: Results from combined novel break wave lithotripsy and ureteroscopy

Ben H. Chew¹, Jean Buckley⁴, Victor K.F. Wong¹, Abdulghafour Halawani², Kyochul Koo³, Doug Corb⁶, Martin Haulena⁵, Oren Levy⁶

¹Department of Urological Sciences, University of British Columbia, Vancouver, Canada; ²Department of Urology, King Abdulaziz University, Jeddah, Saudi Arabia; ³Department of Urology, Yonsei University College of Medicine, Seoul, Korea; ⁴Department of Radiology, University of British Columbia, Vancouver, Canada; ⁵Department of Clinical Sciences, College of Veterinary Medicine, North Carolina State University, North Carolina, United States; ⁶Sonomotion, San Mateo, United States

Introduction: Harbour seals (*Phoca vitulina*) are desert-like mammals that obtain hydration from their food sources. Dehydration and diet can lead to development of kidney stones, especially in captivity. Harbour seals have a unique multilobed, reniculated kidney anatomy consisting of numerous collection systems that funnel into a common renal pelvis and ureter. Two rescue harbour seals reside at the Vancouver Aquarium and one died from renal failure. Post-mortem revealed extensive renal calculi and renal damage. The surviving harbour seal, named Hermes, underwent ultrasound and CT scan showing similar extensive calcification (Figure 1). We describe a multi-team approach to dealing with stones in the harbour seal.

MP 11.1. Table 1. Patient demographics, perioperative and postoperative outcomes

Parameter	Values
Total number of participants, n (%)	95 (100)
Gender	Male, n (%) Female, n (%)
	60 (63.2) 35 (36.8)
Age, median, years (range)	61 (27–79)
BMI, median, kg/m ² (range)	22 (18–41)
ASA (functional status)	I, n (%) II, n (%) III, n (%)
	53 (55.8) 37 (38.9) 5 (5.3)
Stone diameter, median, mm (range)	16 (10–25)
Stone density, median, HU (range)	914 (350–1417)
Number of stones	Single, n (%) Multiple, n (%)
	66 (69.5) 29 (30.5)
Operative time minutes	64 (38–135)
Postoperative ureteral stent insertion (by indication)	Total Ureteral injury, n (%) UPJ edema, n (%) Migrated stone, n (%)
	9 (9.5) 2 (2.1) 3 (3.2) 4 (4.2)
Totally tubeless, n (%)	86 (90.5)
Intraoperative hemoglobin drop, median, g/L (range)	14 (4–45)
Blood transfusion, n (%)	0 (0)
Pain score in the recovery room, median (range)	1 (0–7)
Use of opioids in recovery, n (%)	8 (8.4)
Hospital length of stay, median, hours (range)	6 (4–7)
ER visit postoperative, n (%)	7 (7.4)
Readmission, n (%)	1 (1.1)
Retreatment, n (%)	0 (0)
Perioperative complications	Grade I, n (%) Grade II, n (%) Grade III, n (%)
	14 (14.7) 2 (2.1) 1 (1.1)

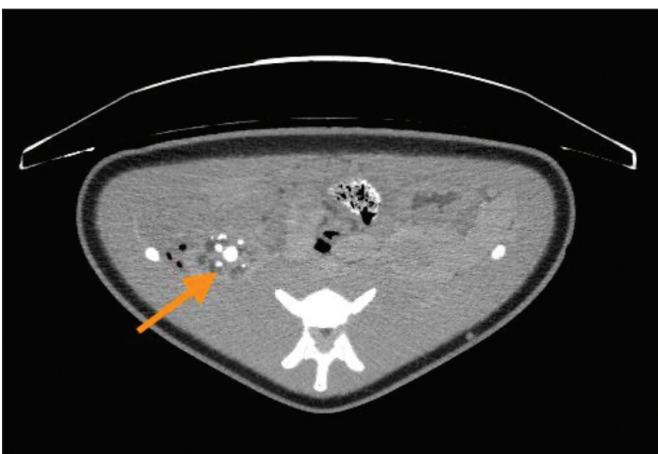
MP 11.1. Table 1 (cont'd). Patient demographics, perioperative and postoperative outcomes

Parameter		Values	
Postoperative day 1 CT	Stone-free rate	Cutoff 0 mm, n (%)	54 (56.8)
		Cutoff <4 mm, n (%)	70 (73.7)
	Presence of residual stone >4 mm, n (%)	25 (26.3)	
	Residual stone size, median, mm (range)	0 (0-10)	
3-month postoperative CT	Stone-free rate	Cutoff 0 mm, n (%)	83 (87.4)
		Cutoff <4 mm, n (%)	88 (92.6)
	Presence of residual stone >4 mm, n (%)	7 (7.4)	
	Residual stone size, median, mm (range)	0 (0-9)	

Methods: The 71 kg male seal was given a general anesthetic and placed in the right lateral decubitus position to allow simultaneous access to the flank and penile urethra. Break wave lithotripsy (Sonotion Inc, San Mateo, CA, U.S.) was performed. Ureteroscopy was carried out using a single-use digital ureteroscope (LithoVue, Boston Scientific, Marlborough, MA, U.S.) through an 11/13Fr 46 cm ureteral access sheath. A degradable ureteral stent (URIPRENE, ADVA-Tec, SC, U.S.) was prepared for postoperative drainage and would not require subsequent removal.

Results: Break wave lithotripsy was performed non-invasively on several stones in the left kidney at 8 MPa, the pressure dose level used in humans. Real-time ultrasound image guidance from the SonoMotion break wave system showed complete fragmentation of the primary targeted 1 cm stone, which was confirmed on postoperative CT scan. In addition, numerous stones in the vicinity of the main stone targeted were also reduced substantially or were not observed in the postoperative CT scan. The seal had gross hematuria and an uneventful recovery. Simultaneously, retrograde ureteral access took a prolonged time due to the tortuous urethra and ureter. After 90 minutes, the ureteroscope finally reached the renal pelvis but the seal became unstable under anesthesia so the ureteroscopic procedure was abandoned.

Conclusions: Non-invasive break wave therapy is an effective tool to treat nephrolithiasis in sea mammals under general anesthesia. The tortuosity of the urethra and ureter make endoscopic access difficult (but not impossible).



MP 11.2. Figure 1.

MP 11.3

Cumulative thulium fiber laser energy and stone-free rates: Outcomes from the Team of Worldwide Endourological Researchers' (T.O.W.E.R.) Thulium Fiber Laser Registry

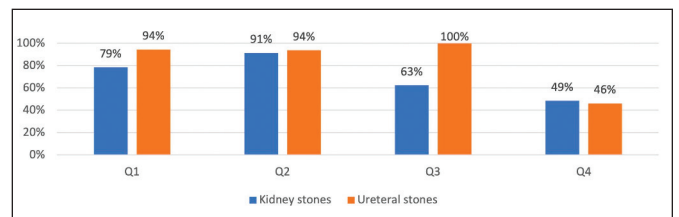
Ben H. Chew¹, Kyochul Koo³, Mitchell R. Humphreys⁴, Wilson Molina⁵, Bodo Knudsen⁶, Mantu Gupta⁷, Victor K.F. Wong¹, Abdulghafour Halawani², Peter Kroneberg⁸, Palle Ooster⁹, Olivier Traxer¹⁰

¹Urological Sciences, University of British Columbia, Vancouver, Canada; ²Department of Urology, King Abdulaziz University, Jeddah, Saudi Arabia; ³Department of Urology, Yonsei University College of Medicine, Seoul, Korea; ⁴Department of Urology, Mayo Clinic, Phoenix, United States; ⁵Department of Urology, University of Kansas Health System, Kansas, United States; ⁶Urology, Ohio State University, Columbus, United States; ⁷Urology, Icahn School of Medicine at Mount Sinai, New York, United States; ⁸Urology, Hospital CUF Descobertas Portugal, Lisbon, Portugal; ⁹Urology, University of Southern Denmark, Odense, Denmark; ¹⁰Urology, Hôpital Tenon Paris, Paris, France

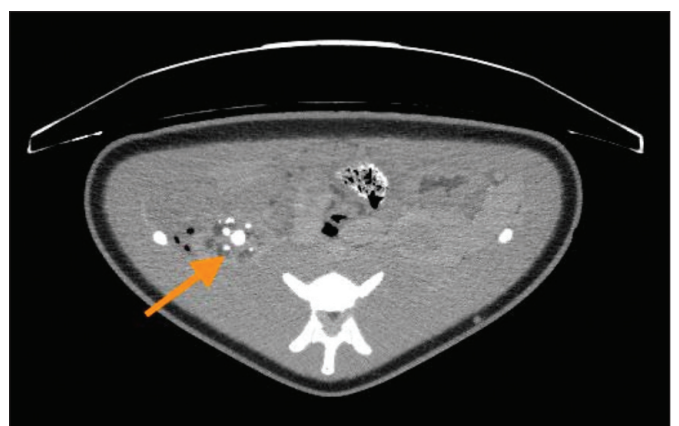
Introduction: The thulium fiber laser (TFL) is an effective tool for endoscopic lithotripsy. The Endourological Society's T.O.W.E.R. registry sought to evaluate the stone-free rate (SFR) at one month following ureteroscopy. This subset of the study sought to determine the association between cumulative TFL energy and SFRs.

Methods: A retrospective analysis was performed on 309 patients from eight international sites who received ureteroscopic lithotripsy with TFL (SOLITIME™, Olympus, Southborough, MA) between December 2021 and September 2022. Baseline clinical characteristics and SFR data for kidney and ureteral stones were separately analyzed according to quartile cumulative TFL energy ranges.

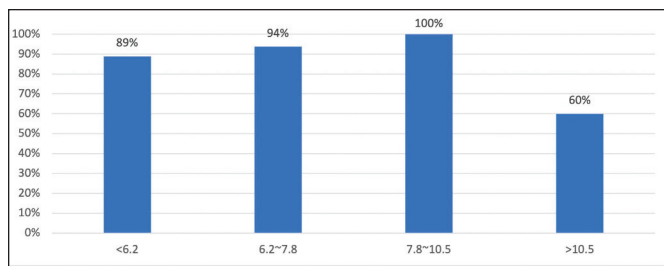
Results: Median patient age was 57.0 (IQR 44.0–67.0) years and maximal stone diameters were 10.0 (IQR 7.0–13.0) mm and 7.8 (IQR 6.2–10.5) mm for kidney and ureteral stones, respectively. Lithotripsy was performed by dusting, fragmentation, and by combination in 69.9%, 5.8%, and 24.3% of all cases, respectively. The overall SFR for kidney and ureteral stones were 70.1% and 86.4%, respectively, at one month. We divided the cumulative energy levels into quartiles and lower SFRs were observed with the highest quartile in both kidney and ureter (p<0.001) (Figure 1). This correlated with stone size as larger stones required more energy (Figures 2, 3). Kidney stones >9.7 mm and ureteral



MP 11.3. Figure 1. Stone-free rate by cumulative energy quartiles.



MP 11.3. Figure 2. Kidney stone size (mm) correlation to stone-free rate.



MP 11.3. Figure 3. Ureteral stone size (mm) correlation to stone-free rate.

stones >12.1 mm resulted in lower SFR (all $p < 0.001$). Energy levels ≥ 17.2 kJ in the kidney and ≥ 3.39 kJ in the ureter resulted in lower SFR (all $p = 0.001$).

Conclusions: Higher stone burdens had lower SFR and required more cumulative energy delivery. The TFL is effective in endoscopic lithotripsy. SFR demonstrates the TFL to be an effective tool for endoscopic laser lithotripsy.

Acknowledgements: Funding was provided by Olympus America Inc.

MP 11.4

A novel prone positioning technique during percutaneous nephrolithotomy (PCNL) using single transverse chest roll

Jenny N. Guo¹, Nicholas S. Dean¹, Mark A. Assmus¹, Sai Kumar¹, Xinlei Mi¹, Amanda Knutson², Jessica Helon¹, Amy E. Krambeck¹, Matthew S. Lee²

¹Department of Urology, Northwestern University, Chicago, United States; ²Department of Urology, Ohio State University, Columbus, United States; ³Department of Anesthesiology, Northwestern University, Chicago, United States; ⁴Division of Urology, University of Calgary, Calgary, Canada

Introduction: Traditionally, prone positioning during PCNL has involved usage of two supports located at the chest and the pelvis. Currently, there are no studies in the literature describing the benefits of using two supports, which can be time-intensive and physically demanding to position. In this study, we compared anesthetic parameters using a novel single transverse chest roll (STR) technique to the double transverse roll technique (DTR).

Methods: A retrospective review of 441 patients who underwent PCNL at our institution from 2018–2022 was performed. A total of four surgeons were included: surgeon 1 used the STR technique, while surgeons 2, 3, and 4 used the DTR technique. Anesthetic parameters, including end-tidal CO₂ (ETCO₂), mean arterial pressure (MAP), peak airway pressure (Ppeak), plateau airway pressure (Pplat), positive end-expiratory pressure (PEEP), oxygen saturation (SpO₂), and tidal volume (TV), were compared between both groups at 0 (supine), 15, 30, and 60 minutes (min) post-intubation intervals. Mixed-effects regression models with interaction were created and pairwise comparisons were made between both groups. P-values were adjusted using Tukey's method for multiple comparisons ($p < 0.05$).

Results: A total of 581 PCNLs were performed with 199 using STR and 382 using DTR. Surgery duration (122 vs. 127, $p = 0.3$), ASA class ($p = 0.5$), and age (57.7 vs. 55.8, $p = 0.13$) were similar among the STR and DTR groups, respectively. Estimated blood loss (59 cc vs. 83 cc, $p = 0.007$) and length of stay (77 hrs vs. 163 hrs, $p < 0.001$) were significantly lower in the STR group. There were no statistical differences in ETCO₂ and PEEP at all time intervals. There was a significantly lower Ppeak, Pplat, and TV in the STR compared to DTR group at 0, 15, 30, and 60 min ($p < 0.001$). There was a statistical difference in MAP noted at baseline (mean STR 96 vs. DTR 86.4, $p < 0.001$). Similarly, for SpO₂, there was a statistical difference at 15 (STR 99.5% vs. DTR 99.2%, $p = 0.03$), 30 (99.4% vs. 99%, $p = 0.002$), and 60 min post-intubation (99.3% vs. 99%, $p = 0.02$).

Conclusions: Use of a single transverse chest roll during prone PCNL appears to be a safe and effective positioning method. PCNL patients positioned using the STR technique showed no differences in ETCO₂ or PEEP at 0–60-min time intervals compared to the DTR technique. STR patients had lower Ppeak and Pplat at all timepoints, which has been shown to be predictive of lower blood loss. Although there was a statistically significant difference in MAP at baseline and SpO₂ at 15, 30, and 60 min post-intubation, these values do not appear to be clinically significant.

MP 11.5

Machine learning-based decision support system to distinguish uric acid stones in patients with kidney stones of 'grey zone' Hounsfield units: International, multicenter development, and external validation study

Abdulghafour Halawani^{1,2}, Kyo Chul Koo³, Victor K.F. Wong¹, Sujin Lee⁴, Sangyeop Baek⁴, Hoyong Kang⁴, Ben H. Chew¹

¹Department of Urological Sciences, University of British Columbia, Vancouver, Canada; ²Department of Urology, King Abdulaziz University, Jeddah, Saudi Arabia; ³Department of Urology, Yonsei University College of Medicine, Seoul, Korea; ⁴Infinyx, AI research team, Daegu, Korea

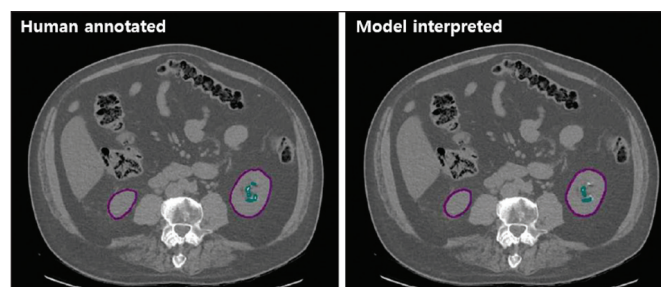
Introduction: Correct differential diagnosis of uric acid (UA) stones has important clinical implications since patients with a high risk of perioperative morbidity may be spared surgical intervention and be offered alkalinization therapy. We developed and validated a machine learning-based autonomous decision support system (DSS) to distinguish UA stones in patients with kidney stones of Hounsfield units (HU) <800.

Methods: An international, multicenter, cross-sectional study was performed on 176 patients who received percutaneous nephrolithotomy for kidney stones with HU <800. Data from 136 (77.3%) patients were used for model training, validation, and testing (ratio 8:1:1), while data from 40 (22.7%) patients from a transnational institution with distinct ethnic backgrounds were used for external validation. Demographic and clinical data consisted of 30 features that were potentially associated with stone components. A total of 14 843 kidney and stone contour-annotated computed tomography (CT) images were trained with the ResNet-18 Detectron2 Mask R-convolutional neural network algorithm to delineate renal anatomy and kidney stones and to measure stone features. Finally, the model was interpreted using the SHAP algorithm to enable visual interpretation of the association between the variables and model output.

Results: There were no significant differences in demographic and clinical features between the development and external validation cohorts. Our model was 100% sensitive in detecting kidney stones in each patient. The delineation of kidney and stone contours was precise within clinically acceptable ranges (Figure 1). The development model provided an excellent predictive performance of 95.9%, with 92.9% sensitivity and 97.1% specificity. On external validation, the model's prediction accuracy remained within a clinically acceptable range of 87.9%, with 66.7% sensitivity and 92.6% specificity. SHAP plots revealed stone density, diabetes mellitus, and urinary pH to be the important features for distinguishing UA stones.

Conclusions: Our development and external validation study show that an automated DSS can conveniently identify and delineate kidney stones and distinguish UA stones from other component stones within the 'grey zone' Hounsfield units. Our DSS can be reliably used to select candidates for an earlier-directed alkalinization therapy.

Acknowledgements: This abstract was submitted to AUA 2023.



MP 11.5. Figure 1. Human-annotated and model-interpreted kidney and stone contour segment of a sample patient.

MP 11.6**Incomplete distal tubular renal acidosis in stone formers: An overlooked risk factor**

Mario Basulto-Martinez¹, Fernanda Gabrigna Berto¹, Hassan Razvi¹, Nabil Sultan², Jennifer Bjazevic¹, Elie Gharib², Eduardo Gonzalez-Cuenca¹, Linda Nott¹

¹Division of Urology, Western University, London, ON, Canada; ²Division of Nephrology, Western University, London, ON, Canada

Introduction: Distal tubular renal acidosis (dTRA) is characterized by the distal nephron's inability to acidify urine and is associated with calcium phosphate (CaP) urinary stones, nephrocalcinosis, and bone disease; however, in the incomplete form of dTRA (idTRA), the biochemical traits are often less conspicuous, unrelated to systemic acidosis, and usually unrecognized.¹ Therefore, this study aimed to evaluate stone formers (SF) with features of idTRA to identify the prevalence and better characterize their clinical features compared to SFs without dTRA/idTRA.

Methods: A prospectively collected metabolic stone clinic database was reviewed. Patients with incomplete data or incorrectly collected 24-h urine studies were excluded. SF with urinary pH ≥ 6 , hypocitraturia (<1.6 mmol/d), and serum potassium <3.8 mmol/L were considered as suggestive for idTRA and compared to SF without evidence of dTRA.

Results: A total of 1170 SF were included, and 5.2% had suggestive features of idTRA. Sex was similar between groups ($p=0.428$); however, median age ($p=0.003$) and body mass index (BMI, $p=0.032$) were significantly lower in patients with idTRA. Stone composition was available in 682 SF, of which 12% had predominantly CaP stones, but no association between CaP and idTRA was observed ($p=0.574$). Moreover, idTRA was associated with lower vitamin D ($p=0.023$), urinary phosphate ($p=0.001$), and calcium ($p=0.02$). Furthermore, 6.6% of patients with idTRA had nephrocalcinosis and seven subjects (11.5%) had bone mineral densitometry performed, with four (57%) showing below-normal bone mass.

Conclusions: idTRA is an underdiagnosed risk factor for urinary stone disease and may be found in up to 5% of SF. Patients with idTRA may present at a younger age, with lower BMI, low vitamin D levels, and lower urinary calcium compared to SF without features of idTRA. Recognition of idTRA is essential to providing optimized care for SF.

Reference:

1. Fuster DG, Moe OW. Incomplete distal renal tubular acidosis and kidney stones. *Adv Chronic Kidney Dis* 2018;25:366-74. <https://doi.org/10.1053/j.ackd.2018.05.007>

MP 11.7**The impact of timing of definitive intervention for patients with acute renal colic: A population-based study**

Michael Ordon¹, Sarah Bota², Yuguang Kang², Blayne Welk²

¹Surgery, University of Toronto, Toronto, Canada; ²Lawson Health Research Institute, London Health Sciences Centre, London, Canada

Introduction: Little data exists on the optimal timing for intervention for symptomatic kidney stones. As such, our objective was to determine the impact of early intervention (EI) for patients presenting to the emergency department (ED) with renal colic.

Methods: We conducted a population-based cohort study in Ontario using administrative health data. Patients who presented to an ED with renal colic between April 1, 2010, and June 30, 2020, were included. Patients were divided into two groups. The EI group underwent shockwave lithotripsy, ureteroscopy, or percutaneous nephrolithotomy within two weeks of presentation. The delayed intervention/expectant management (non-EI) group represented all other patients. Patients were followed for three months in the EI group and for four weeks post-intervention or three months (whichever was longer) in the non-EI group to assess our outcomes. The outcomes included additional ED visits, hospitalizations or imaging studies, stent/nephrostomy insertion, and urologist/primary care visits. These outcomes were compared across the two groups using matched propensity score modeling.

Results: There were 397 185 renal colic events (EI=28 910, non-EI=368 275). The EI group was slightly older and more likely to have a history of stones, hypertension, and diabetes (Table 1). The EI group had a lower risk for additional ED visits (RR 0.70, 95% CI 0.68–0.72) and hospital admissions (RR 0.52, 95% CI 0.50–0.55), as well as stent (RR 0.62, 95% CI 0.54–0.71) or nephrostomy insertion (RR 0.49, 95% CI 0.42–0.57). The EI group had a slightly increased

MP 11.7. Table 1. Characteristics of study cohort (N=397 185)

	Early intervention N=28 910	Delayed intervention/ expectant management N=368 275	Standardized difference
Demographics			
Age at index date			
Mean (SD)	53.67 (15.11)	48.8 (15.64)	0.32
Median (IQR)	54 (43–64)	49 (37–60)	0.32
Sex, n (%)			
Male	17354 (60)	218488 (59.3)	0.01
Income quintile, n (%)			
Quintile 1 (low-est)	5130 (17.7)	73 705 (20)	0.06
Quintile 2	5778 (20)	74 183 (20.1)	0
Quintile 3	5794 (20)	74 801 (20.3)	0.01
Quintile 4	6034 (20.9)	75 658 (20.5)	0.01
Quintile 5 (high-est)	6098 (21.1)	68 821 (18.7)	0.06
Missing	76 (0.3)	1107 (0.3)	0
Region of residence, n (%)			
Rural, yes	3338 (11.5)	47 741 (13)	0.05
Missing	41 (0.1)	563 (0.2)	0.03
Year of cohort entry, n (%)			
2010	1764 (6.1)	25 217 (6.8)	0.03
2011	2455 (8.5)	33 683 (9.1)	0.02
2012	2695 (9.3)	34 717 (9.4)	0
2013	2770 (9.6)	34 996 (9.5)	0
2014	2754 (9.5)	35 779 (9.7)	0.01
2015	2868 (9.9)	36 768 (10)	0
2016	2932 (10.1)	37 841 (10.3)	0.01
2017	2906 (10.1)	36 852 (10)	0
2018	3126 (10.8)	37 814 (10.3)	0.02
2019	3148 (10.9)	38 108 (10.3)	0.02
2020	1492 (5.2)	16 500 (4.5)	0.03

*Mean and median values are calculated for non-missing values.

risk for urologist/primary care visit (RR 1.02, 95% CI 1.02–1.03); however, there was no difference in additional imaging. In the non-EI group, 17% underwent eventual intervention.

Conclusions: Our study suggests a benefit to EI for those presenting with renal colic to the ED, but with the potential risk of exposing some to unneeded treatment. These findings could influence practice patterns and guideline recommendations moving forward.

Acknowledgements: This study was supported by the Young Investigator Research Award from the Northeastern Section of the AUA.

MP 11.7. Table 1 (cont'd). Characteristics of study cohort (N=397 185)

	Early intervention N=28 910	Delayed intervention/ expectant management N=368 275	Standardized difference
Demographics (cont'd)			
Comorbidities in the previous 2 years, n (%)			
Kidney stones	6731 (23.3)	60 046 (16.3)	0.18
Hypertension	11 062 (38.3)	110 351 (30)	0.18
Diabetes	6184 (21.4)	57 326 (15.6)	0.15
Inflammatory bowel disease	730 (2.5)	6140 (1.7)	0.06
Gout	1228 (4.2)	13 063 (3.5)	0.04
Aggregated diagnosis groups (ADGs)			
0-4	2449 (8.5)	43 908 (11.9)	0.11
09-May	8901 (30.8)	123 246 (33.5)	0.06
14-Oct	11 911 (41.2)	137 482 (37.3)	0.08
15-19	5074 (17.6)	56 518 (15.3)	0.06
20+	575 (2)	7121 (1.9)	0.01
Institutional characteristics			
Academic hospital, n (%)			
Yes	4807 (16.6)	68 945 (18.7)	0.06
Number of hospital beds (total)*			
Median (IQR)	225 (117-325)	232 (92-352)	0.03
<200	11 780 (40.7)	155 783 (42.3)	0.03
200-399	12 856 (44.5)	140 676 (38.2)	0.13
400-599	2832 (9.8)	36 090 (9.8)	0
600-799	96 (0.3)	4318 (1.2)	0.1
≥800	365 (1.3)	13 120 (3.6)	0.15
Missing	981 (3.4)	18 288 (5)	0.08
Average ED visit volume (2019)*			
Median (IQR)	57 247 (44 855-82 674)	57247 (39 228-84 958)	0.08

*Mean and median values are calculated for non-missing values.

MP 11.8

Assessing the utility of urine cultures and microscopic urinalysis in patients with septic stones: A retrospective review

Fraser Osiowy^{1,2}, Nik Nik Mookerji^{1,3}, Shubha De^{1,3}

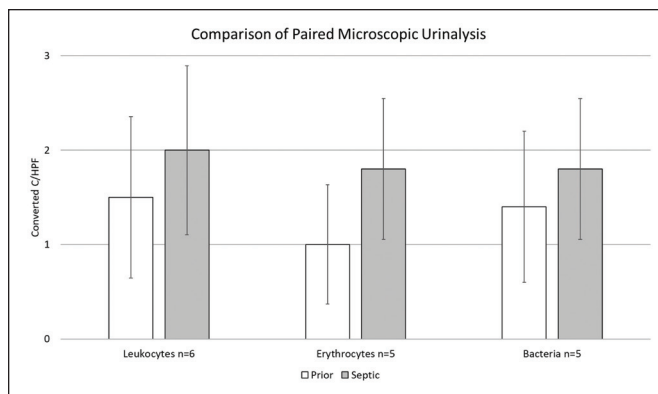
¹Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Canada; ²Faculty of Graduate Studies and Research, University of Alberta, Edmonton, Canada; ³Division of Urology, Department of Surgery, University of Alberta, Edmonton, Canada

Introduction: Urosepsis is a rare but severe complication of ureteral calculi. Therefore, the objective of this study was to assess whether the urinalyses of those presenting with sepsis and ureteral stones could be a predictor of deterioration.

Methods: Results of urine culture (UC) and microscopic urinalysis (MUA) from 31 patients with obstructing ureteral calculi presenting with a diagnosis of urosepsis were reviewed in this study. Any UC and MUA four weeks prior to presentation were also reviewed. MUA counts per high-powered field were converted to a score from 0-3 (0=none/0-2, 1=few/1-10, 2=moderate/11-50, 3=many/>50).

Results: Upon presentation with urosepsis, 28 patients had a UC (18 positive) and 24 patients had MUA. Mean leukocytes=2.35±0.39 95% CI, erythrocytes=1.75±0.38 95%CI, and bacteria=2.48±0.36 95%CI. Within the preceding four weeks, 25.8% of patients had a prior presentation for renal colic (n=8), three patients had a UC (one positive) and six patients had MUA (leukocytes=1.50±0.86 95%CI; erythrocytes=1.17±0.61 95%CI; bacteria=1.67±0.84 95% CI). A comparison of paired data from patients with MUA at pre- and septic presentations showed no significant differences (leukocytes, p=0.0756; erythrocytes, p=0.0993; bacteria, p=0.374) (Figure 1).

Conclusions: This study highlights most septic stone patients (74%) do not have 'prodromal' presentations, where prediction and proactive measures may be employed. Once identified, however, most received the appropriate workup. Of the 26% of patients presenting within four weeks prior to their septic event, urinalysis was not a clear predictor of future deterioration. Further work is required to predict who is at risk of urosepsis.



MP 11.8. Figure 1. Comparison of microscopic urinalysis prior to and during septic stone events from patients with repeat presentations (n=6).

MP 11.9**Thulium fiber laser vs. holmium MOSES laser in flexible ureteroscopy for the management of kidney stones: Preliminary single-center results**

Parsa Nikoufar¹, Amr Hodhod¹, Moustafa Fathy¹, Ahmed S Zakaria¹, Ruba Abdul Hadi¹, Loay Abbas¹, Husain Alaradi¹, Waleed Shabana¹, Ahmed Kotb¹, Walid Shahrouf¹, Sai K Vangala¹, Hazem Elmansy¹

¹Department of Urology, Northern Ontario School of Medicine, Thunder Bay, Canada

Introduction: The primary objective of the study was to compare the laser efficiency of two widely used systems, the holmium MOSES laser and the thulium fiber laser (TFL), in the management of kidney stones. The secondary outcomes were to evaluate the impact of stone composition on laser efficacy.

Methods: We conducted a retrospective review of patients that underwent flexible ureteroscopy (F-URS) for renal calculi and had a three-month postoperative CT scan between 2020 and 2022 at our institution. Patient demographics and stone parameters, including stone site, size, volume, and density, were recorded. Intraoperative data, including total operative time, lasing time, lasing technique, and total energy delivered, as well as stone composition, were collected and analyzed. All patients underwent a CT scan at three months followup. We recorded the presence of residual stones and the percentage of stone volume reduction. Laser efficacy was calculated by dividing the energy utilized (J) by the stone volume (mm³). The ablation speed was calculated by dividing the stone volume (mm³) by the lasing time (sec). Patients with a stone size <4 mm were deemed stone-free.

Results: The MOSES and TFL groups consisted of 62 and 49 patients, respectively. Patient characteristics, perioperative, and postoperative data are presented in Table 1. There were no significant differences between groups for baseline patient demographics or stone characteristics. The two modalities had comparable total energy used, laser time, laser efficacy and laser ablation speeds. Subanalysis of the impact of stone composition on laser efficacy is presented in Table 2. We observed that the lasing time was significantly shorter with MOSES than TFL in calcium phosphate stones (7.95 vs. 10.85 min, respectively, p=0.01).

Conclusions: MOSES and TFL laser systems were comparable in terms of efficacy for lithotripsy of renal calculi during F-URS; however, calcium phosphate stones had a longer lasing time with TFL.

MP 11.10**Efficacy of GreenLight laser prostatectomy in the management of acute and chronic urinary retention: A retrospective study**

Parsa Nikoufar¹, Amr Hodhod¹, Moustafa Fathy¹, Sai K Vangala¹, Ahmed S Zakaria¹, Ruba Abdul Hadi¹, Wahid Mehmouh¹, Loay Abbas¹, Husain Alaradi¹, Waleed Shabana¹, Owen Prowse¹, Ahmed Kotb¹, Walid Shahrouf¹, Hazem Elmansy¹

¹Urology Department, Northern Ontario School of Medicine, Thunder Bay, Canada

Introduction: The objective of our study was to evaluate the efficacy and durability of GreenLight laser prostatectomy for the management of acute urinary retention (AUR) and chronic urinary retention (CUR) and to determine outcomes compared to patients without preoperative urinary retention.

Methods: We conducted a retrospective study of prospectively collected data from individuals who underwent GreenLight laser prostatectomy at our institution from May 2018 to July 2022. Patient demographics and outcome measures were recorded, including indications for the procedure, median urinary volume drained, or median postvoid residual urine volume (PVR) before catheterization or GreenLight laser prostatectomy. Chronic urinary retention (CUR) was defined as PVR of 300 mL in males able to void and initial catheter drainage >1000 mL in males unable to void, in the absence of pain. All patients had postoperative followup visits at one, three, six, and 12 months. Our evaluation included the International Prostate Symptom Score (IPSS), quality-of-life (QoL) assessment, maximum urinary flow rate (Qmax), PVR, and catheter-free status.

Results: One hundred sixty-eight males who underwent GreenLight laser prostatectomy were included in our study. The urinary retention (UR) group consisted of 88 patients (50 AUR and 38 CUR), and the lower urinary tract symptoms (LUTS) group was comprised of 80 individuals. There were no statistically significant differences between the AUR and CUR subgroups regarding demographics. The CUR group had a significantly higher PVR at one, three, and six months than the AUR group. Other outcome measures were similar between

MP 11.9. Table 1. Patient characteristics, perioperative, and postoperative data

Parameter	MOSESTM (62 pa-tients)	TFL (49 patients)	p	
Gender	Male n (%)	35 (56.5)	25 (51.0)	0.57
	Female n (%)	27 (43.5)	24 (49.0)	
Age, median, yrs (range)		65 (25–94)	63 (24–80)	0.22
Anticoagulant, n (%)		11 (17.7)	8 (16.3)	0.84
Side	Right, n (%)	24 (38.7)	20 (40.8)	0.19
	Left, n (%)	38 (61.3)	29 (51.3)	
Stone site	UP, n (%)	7 (11.3)	5 (10.2)	0.16
	MP, n (%)	6 (9.7)	2 (4.1)	
	IP, n (%)	27 (43.5)	16 (32.7)	
	UPJ, n (%)	18 (29.0)	25 (51.0)	
	Staghorn, n (%)	4 (6.5)	1 (2.0)	
Stone size, median, mm (range)		11.7 (4–39)	10.9 (5–31)	0.13
Stone volume, median, mm ³ range		436.5 (19–4795)	529(52–4326)	0.57
Stone density, median, HU (range)		667 (211–1287)	668 (218–1604)	0.48
Technique	Fragmentation, n (%)	19 (30.6)	9 (18.4)	0.26
	Dusting, n (%)	29 (46.8)	24 (49.0)	
	Combined, n (%)	14 (22.6)	16 (32.6)	
Energy, median, kJ (range)		10.9 (0.1–39.2)	9.8 (0.3–28.2)	0.43
Lasing time median, min (range)		6.1 (0.2–21)	6.2 (0.1–21)	0.47
OR time, median, min (range)		55.5 (18–135)	60 (25–121)	0.56
Laser efficacy, median, J/mm ³ (range)		17 (0.5–171.5)	17.2 (1.92–147.4)	0.36
Ablation speed median, mm ³ /sec (range)		1.4 (0.15–23.4)	1.6 (0.23–9.8)	0.17
% stone reduction, median (range)		99 (29–100)	97 (13–100)	0.91
Stone composition	COM, n (%)	34 (54.8)	22 (44.9)	0.35
	COD, n (%)	8 (12.9)	6 (12.2)	
	CP, n (%)	10 (16.1)	10 (20.4)	
	Urate, n (%)	4 (6.5)	9 (18.4)	
	Cystine, n (%)	5 (8.1)	2 (4.1)	
	Struvite, n (%)	1 (1.6)	0 (0)	
Stone-free rate, n (%)		53 (85.5)	43 (87.8)	0.73
Stone-free size	0 mm, n (%)	26 (42)	18 (36.7)	0.58
	>0–3.9 mm, n (%)	27 (43.5)	25 (51.1)	0.43

the two groups. The UR group had a significantly higher age and duration of postoperative catheterization (p=0.000 and p=0.000, respectively) than the LUTS cohort. During the three- and six-month followup visits, the UR group had a significantly higher PVR than the LUTS cohort. At 12-month followups, the LUTS group had a higher catheter-free rate than the UR group (p=0.008), and other outcome variables were comparable between the two cohorts. The

MP 11.9. Table 2. Comparison of both laser types according to stone composition

Parameter	Moses	TFL	p
COM	Even rows, no notes		
Stone volume, median, mm ³ (range)	376.5 (42–4795)	353 (52–3633)	0.73
Stone density, median, HU (range)	726.5 (215–1179)	714.5 (302–1384)	0.48
OR time, median, min (range)	56.5 (18–135)	57.5 (26–110)	0.93
Energy, median, kJ (range)	8.6 (0.1–39.2)	6.47 (0.3–28.2)	0.42
% stone reduction, median (range)	97.5 (29–100)	99 (13–100)	0.58
Laser efficacy, median, J/mm ³ (range)	17.6 (0.5–172.5)	18.9 (2.03–551.5)	0.68
Lasing time, median, min (range)	4.6 (0.2–21)	4.4 (0.1–12)	0.39
Ablation speed, median, mm ³ /sec (range)	1.4 (0.21–22.9)	1.53 (0.05–9.46)	0.29
COD			
Stone volume median, mm ³ (range)	595 (19–1118)	552.5 (113–3239)	0.85
Stone density, median, HU (range)	843 (211–1275)	581.5 (401–1044)	0.49
OR time, median, min (range)	50.5 (32–91)	59 (38–106)	0.57
Energy, median, kJ (range)	10.3 (1.8–32.44)	15.7 (4.3–18.8)	0.66
% stone reduction, median (range)	98.5 (62–100)	95 (79–100)	0.85
Laser efficacy, median, J/mm ³ (range)	25.6 (12.9–95.8)	20.1 (4.7–147.4)	0.49
Lasing time, median, min (range)	6.4 (1–15.8)	6.15 (2–7)	0.85
Ablation speed median, mm ³ /sec (range)	1.19 (0.32–2.59)	1.33 (0.31–8.4)	0.66
Ca phosphate			
Stone volume median, mm ³ (range)	881 (53–4365)	740 (271–3978)	0.99
Stone density, median, HU (range)	730 (420–1287)	837 (271–1604)	0.68
OR time, median, min (range)	46.5 (28–64)	60 (25–69)	0.22
Energy, median, kJ (range)	11.9 (6.8–18.8)	16.3 (8.7–24.98)	0.11
% stone reduction, median (range)	100 (78–100)	93 (25–100)	0.48
Laser efficacy, median, J/mm ³ (range)	13.2 (4.3–71.5)	22.2 (5–56.38)	0.85
Lasing time, median, min (range)	7.95 (4–11)	10.85 (6.3–21)	0.01
Ablation speed, median, mm ³ /sec (range)	1.47 (0.15–6.6)	1 (0.23–6.65)	0.58

MP 11.9. Table 2 (cont'd). Comparison of both laser types according to stone composition

Parameter	Moses	TFL	p
Uric acid			
Stone volume, median, mm ³ (range)	570 (227–948)	444 (256–1472)	0.71
Stone density, median, HU (range)	316.5 (256–533)	363 (218–835)	0.5
OR time, median, min (range)	70 (38–85)	63 (218–835)	1
Energy, median, kJ (range)	11.95 (9.9–31)	7.23 (4.9–19.79)	0.2
% stone reduction, median (range)	94.5 (49–100)	94 (65–100)	0.94
Laser efficacy median, J/mm ³ (range)	28.8 (10.41–46.34)	21 (10.4–42.78)	0.5
Lasing time, median, min (range)	5.7 (4.8–15)	3.8 (2.3–12.2)	0.11
Ablation speed, median, mm ³ /sec (range)	1.1 (0.35–2.9)	1.95 (0.98–4.16)	0.41

MP 11.11 Postoperative outcomes of kidney stone surgery in patients with spinal cord injury: A systematic review and meta-analysis

John Kim¹, Veronica Stewart², Gaurav Talwar², Michael Uy¹, Jennifer Hoogenes³, Edward D. Matsumoto³

¹Division of Urology, Department of Surgery, McMaster University, Hamilton, Canada; ²Department of Surgery, McMaster University, Hamilton, Canada; ³McMaster Institute of Urology, St. Joseph's Healthcare, Hamilton, Canada

Introduction: Spinal cord injury (SCI) is associated with an increased risk of nephrolithiasis. Surgical treatment in this population may be associated with a greater risk of complications and suboptimal stone clearance. We conducted a systematic review examining surgical treatment of kidney stones in SCI patients and performed a meta-analysis of four comparative studies to compare outcomes of percutaneous nephrolithotomy (PCNL) in SCI and non-SCI patients with nephrolithiasis

Methods: The MEDLINE, Embase, CENTRAL, and Web of Science databases were searched for studies examining outcomes of kidney stone procedures in SCI patients. Primary outcomes were stone-free rate (SFR) and complication rate, as categorized by Clavien-Dindo classification. A meta-analysis was performed to assess differences in SFR and complication rates between SCI and non-SCI patients following PCNL.

Results: A total of 27 retrospective and observational articles were included. Interventions for kidney stones included PCNL, shockwave lithotripsy (SWL), and ureteroscopy. Pooled SFR in SCI patients undergoing surgery for kidney stones was 54.1%, for SWL, 73.6% for PCNL, and 36.2% for ureteroscopy. Four studies compared outcomes following PCNL in SCI and non-SCI patients. Meta-analyses found that there was no difference in post-PCNL SFR (OR 0.64, 95% CI 0.15–2.64) when comparing SCI patients to non-SCI patients (Figure 1); however, there were higher rates of grades I (OR 9.54, 95% CI 3.06–29.79), II (OR 3.38, 95% CI 1.85–6.18), and III-V (OR 2.38, 95% CI 1.35–4.19) complications in SCI patients compared to non-SCI patients following PCNL (Figures 2A-C). The rate of infectious complications was also higher in patients with SCI (OR 6.15, 95% CI 1.86–20.39) (Figure 2D); 21.1% of procedures involved treatment of bilateral kidney stones and 33.8% of procedures involved staghorn stones. The median reported stone size was 16.1 mm (IQR 15.6–33.1 mm). Almost half (48.1%) of SCI patients had bacteriuria prior to treatment and 68.1% of analyzed stones were composed of struvite.

Conclusions: Patients with SCI are at higher risk of minor, major, and infectious complications following PCNL compared to non-SCI patients. There was no significant difference between groups in SFR following PCNL, suggesting that PCNL is an effective surgery for kidney stones in SCI patients. Nephrolithiasis in SCI patients is associated with bilateral stone disease, large (>10 mm) stones, staghorn stones, and struvite stones.

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successful first trial of void (TOV) rates for the UR and LUTS groups were 83% and 80%, respectively. At 12 months postoperative, the catheter-free rates for the UR and LUTS cohorts were 87.5% and 100%, respectively (Table 1).

Conclusions: GreenLight laser prostatectomy is an effective and durable treatment for urinary retention with a high catheter-free rate and comparable outcomes when performed to manage LUTS.

MP 11.10. Table 1. Patient demographics, perioperative, and postoperative outcomes of GreenLight laser prostatectomy in urinary retention

Parameters	AUR	CUR	p	UR	LUTS	p	
Number of participants	50	38	–	88	80	–	
Years, age, median (range)	78 (59–100)	77 (64–87)	0.163	78 (59–100)	74 (55–92)	0.000	
Initial urinary volume drained or PVR, mL, median (range)	915 (400–1000)	1000 (500–1250)	0.663	964 (400–1250)	–	–	
Preoperative catheter duration, months, median (range)	7.5 (1–84)	4.5 (1–48)	0.248	6.5 (1–84)	–	–	
Preoperative prostate size by TRUS, cc, median (range)	49.5 (12–68)	44 (19–80)	0.480	49 (12–80)	50 (20–113)	0.069	
OR time, min, median (range)	56 (18–127)	52.5 (18–103)	0.486	54 (18–127)	54 (21–240)	0.535	
Vaporization time, min, median (range)	44.5 (12–106)	37 (12–74)	0.292	42 (12–106)	40 (13–210)	0.504	
Energy, kJ, median (range)	169 (39–374)	188 (38–337)	0.258	173 (38–374)	181 (40–539)	0.306	
Length of hospital stay, days, median (range)	1 (0.25–1)	1 (0.25–1)	0.622	1 (0.25–1)	1 (0.25–14)	0.109	
Postoperative catheterization time, days, median (range)	2.5 (1–7)	1 (1–7)	0.741	1.5 (1–7)	1 (1–30)	0.000	
Successful first TOV, n (%)	44 (88)	29 (76.3)	0.148	73 (83)	64 (80)	0.764	
Recurrent retention after TOV n (%)	6 (12)	5 (13.2)	0.87	11 (12.5)	0	0.008	
1 month postoperative	IPSS, median (range)	7 (2–19)	7.5 (3–11)	0.119	7 (2–19)	10.5 (1–24)	0.101
	QoL, median (range)	2 (0–5)	1 (0–3)	0.103	2 (0–5)	2 (0–6)	0.208
	Qmax, mL/s, median (range)	9 (8–34)	17 (10–29)	0.112	18 (8–35)	16 (5–48)	0.777
	PVR, mL, median (range)	45 (0–700)	200 (0–400)	0.049	49 (0–700)	63 (0–500)	0.777
3 months postoperative	IPSS, median (range)	8 (1–25)	4.5 (2–7)	0.06	7 (1–25)	7 (1–29)	0.428
	QoL, median (range)	1 (0–6)	1.5 (0–3)	0.35	1 (0–6)	1 (0–6)	0.246
	Qmax, mL/s, median (range)	15 (7–54)	9 (7–11)	0.878	14 (7–54)	20.5 (4–57)	0.084
	PVR, mL, median (range)	100 (0–700)	158 (0–300)	0.001	100 (0–700)	40 (0–360)	0.005
6 months postoperative	IPSS, median (range)	7 (1–16)	3 (0–11)	0.156	7 (0–16)	6 (0–26)	0.592
	QoL, median (range)	1 (0–3)	1 (0–1)	0.561	1 (0–3)	2 (0–6)	0.104
	Qmax, mL/s, median (range)	21 (6–52)	16 (8–20)	0.425	20 (6–52)	20 (6–67)	0.11
	PVR, mL, median (range)	72 (0–390)	290 (180–500)	0.001	98 (0–500)	32 (0–250)	0.000
12 months postoperative	IPSS, median (range)	5 (1–10)	2 (1–14)	0.797	4.5 (1–14)	5 (0–25)	0.506
	QoL, median (range)	1 (0–3)	1 (0–2)	0.921	1 (0–3)	1 (0–4)	0.47
	Qmax, mL/s, median (range)	17 (3–41)	18 (8–29)	0.717	17 (3–41)	21 (7–61)	0.303
	PVR, mL, median (range)	60 (0–370)	341 (0–770)	0.193	107 (0–770)	57 (0–260)	0.106
	Catheter-free, n (%)	44 (88)	33 (86.8)	0.87	77 (87.5)	80 (100)	0.008

MP 11.12**Percutaneous nephrostomy tube vs. retrograde ureteric stenting in systemic inflammatory response (SIRS) criteria-positive patients with obstructing stones**

Abdullah Alrumaih¹, Braden Millan¹, Tina Yu³, Victoria Turnbull², Edward D. Matsumoto¹, Oleg Mironov⁴

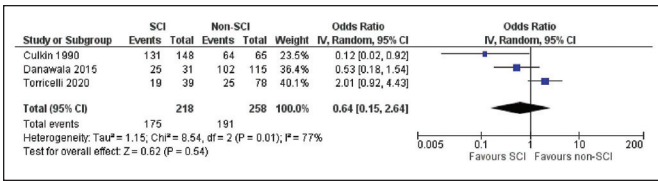
¹Division of Urology, McMaster Institute of Urology, McMaster University, Hamilton, Canada; ²Division of Urology, London Health Sciences, Western University, London, Canada; ³Department of Medicine, McMaster University, Hamilton, Canada; ⁴Department of Interventional Radiology, McMaster University, Hamilton, Canada

Introduction: Significant technological advances have occurred in urology necessitating a more modern comparison of percutaneous nephrostomy tube (PCN)

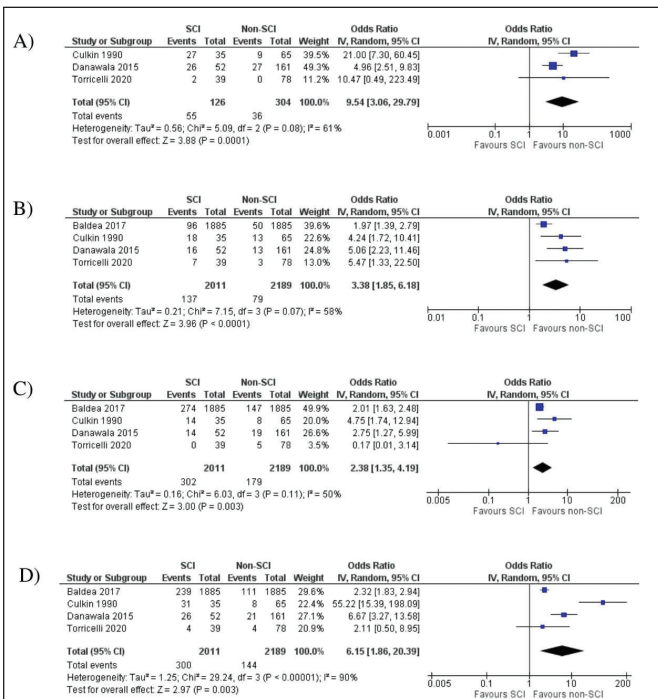
to retrograde ureteric stenting (RUS) for renal decompression in patients with obstructing stones and suspected infection. Our objective was to elucidate predictive factors that may contribute to procedure selection, as well as to compare procedural and clinical outcomes between PCN and RUS.

Methods: A retrospective chart review was performed from January 2019 to January 2022 at a single center to identify patients who had undergone emergent PCN or RUS with imaging-confirmed ureteric obstruction and suspected sepsis. Suspected sepsis was determined by positive systemic inflammatory response syndrome (SIRS) criteria. Clinical characteristics, outcome measures, and procedure details were summarized and compared to historically reported values.

Results: In total, 247 patients underwent emergent RUS or PCN for ureteric obstruction over the study period. One hundred and eight patients were excluded for having another cause other than stone for the obstruction, while another 25 patients did not meet SIRS criteria. A total of 114 patients met the



MP 11.11. Figure 1. Forest plot comparing stone-free rate following PCNL between SCI patients and non-SCI patients.



MP 11.11. Figure 2. Forest plots comparing complications following PCNL between SCI patients and non-SCI patients. (A) Clavian-Dindo grade 1 complications; (B) Clavian-Dindo grade 2 complications; (C) Clavian-Dindo grades 3-4 complications; (D) infectious complications, including fever, UTI, pneumonia, abscesses, wound infection, and sepsis.

inclusion criteria and were included in the final analysis. Patients who underwent PCNL were more likely to have larger stone sizes (13 mm vs. 7 mm, $p < 0.0004$). Shorter fluoroscopy time (20 s vs. 50s, $p = 0.06$) was observed in those undergoing PCNL despite a longer procedure time (40 vs. 18 min, $p < 0.0001$). The majority of patients who underwent PCNL had conscious sedation, while most RUS patients had general anesthesia (91% vs. 13%, $p < 0.0001$). Duration of hospital stay was shorter for those who underwent RUS in comparison to PCNL (4 vs. 6 days, $p < 0.04$) despite having higher rates of bacteremia (65% vs. 44%, $p = 0.04$). Logistic regression revealed that a larger stone size was the sole measured factor that increased the odds of a patient undergoing PCNL (OR 1.14, 95% CI 1.07–1.25) (Tables 1–3).

Conclusions: Our study adds to existing literature showing similar outcomes, with high success rates for both PCNL and RUS, and shows that technological advances have resulted in less use of fluoroscopy for these procedures. Larger stones increase the odds of clinicians selecting PCNL over RUS.

MP 11.12. Table 1. Characteristics of patients undergoing RUS vs. PCNL placements

Feature	PCNL		RUS		p-value
	N = 32		N = 82		
Stone characteristics					
Median stone size, mm [IQR]	13 [7-22]		7 [5-11]		<0.0004
Stone location					
Proximal ureteric [%]	23 [71.8%]		49 [59.7%]		
Mid ureteric [%]	3 [9.37%]		4 [4.8%]		
Distal ureteric [%]	5 [15.6%]		29 [35.3%]		0.2
Side					
Left [%]	13 [40.6%]		35 [42.6%]		
Right [%]	17 [53.1%]		43 [52.4%]		
Bilateral [%]	1 [3.12%]		4 [4.8%]		1.0
Procedure success	30 [93.75%]		77 [93.9%]		0.7
Procedure time [IQR]	40 [31-49]		18 [14-25]		<0.0001
Fluoroscopy time [IQR]	21 [6-77]		50 [21-79]		0.06
Anesthesia					
General	2 [6.25%]		70 [85.3%]		
Conscious sedation	29 [90.6%]		11 [13.4%]		<0.0001
Clinical characteristics					
Sex					
Male [%]	11 [34.3%]		23 [28%]		
Female [%]	20 [62.5%]		59 [71.9%]		0.4
Median age [IQR]	67 [40-76]		61 [47-74]		0.6
Speciated urine culture [%]	11 [34.3%]		37 [45.1%]		0.3
Speciated blood culture(s) [%]	14 [43.75%]		53 [64.6%]		0.04

PCNL = percutaneous nephrostomy tube; RUS = retrograde ureteral stenting; IQR = interquartile range; Continuous variables are reported as median [IQR]; P-values determined using Mann-Whitney U-test; approximate P-values are reported.

MP 11.12. Table 2. Comparative outcomes of RUS vs. PCNL

Feature	PCNL		RUS		p-value
	N = 31		N = 82		
Duration of hospital stay (days)	6 [3-15]		4 [3-6]		0.04
Duration of antibiotics (days)	14 [9-14]		14 [10-18]		0.2
ICU admission [%]	12 [38.7%]		18 [21.9%]		0.1
All cause 30-day mortality	2 [6.45%]		1 [1.2%]		0.2

PCNL = percutaneous nephrostomy tube; RUS = retrograde ureteral stenting; IQR = interquartile range; Continuous variables are reported as median [IQR]; P-values determined using Mann-Whitney U-test; approximate P-values are reported.

MP 11.12. Table 3. Predictive factors for patients undergoing RUS or PCNL

Feature	OR		p-value
	OR	95% CI	
Stone location	0.96	0.54 - 1.65	0.9
Laterality	0.76	0.32 - 1.71	0.5
Stone size	1.14	1.07 - 1.25	0.0005
Gender	0.69	0.26 - 1.89	0.5
Age	1.00	0.97 - 1.02	0.7

PCNL = percutaneous nephrostomy tube; RUS = retrograde ureteral stenting; IQR = interquartile range; Continuous variables are reported as median [IQR]; P-values determined using Mann-Whitney U-test; approximate P-values are reported.

UP 11.1

Obstetric and neonatal outcomes in pregnant women prescribed tamsulosin for medical expulsive therapy

Louisa Ho¹, Madison Lyon¹, Alec Sun³, Anup Shah¹, Natalia Llarena², Carrie Bennett², Sri Sivalingam¹, Juan Calle¹, Anna Zampini¹, Smita De¹

¹Glickman Urological and Kidney Institute, Cleveland Clinic Foundation, Cleveland, United States; ²Obstetrics and Gynecology and Women's Health Institute, Cleveland Clinic Foundation, Cleveland, United States; ³Case Western Reserve University, Cleveland, United States

Introduction: Tamsulosin is commonly used for medical expulsive therapy (MET) in non-pregnant patients with ureteral stones. The off-label use of tamsulosin in pregnant women with symptomatic urolithiasis is controversial. We aimed

to evaluate obstetric and neonatal outcomes for pregnant women prescribed tamsulosin as MET for suspected renal colic.

Methods: We completed a retrospective review of pregnant patients requiring surgical intervention (stent, nephrostomy tube, or ureteroscopy) for clinically suspected symptomatic urolithiasis from 2009–2021 at our academic tertiary care center. Patients were included if they had symptoms of renal colic, imaging showed hydronephrosis, and one of the following additional criteria: microscopic or gross hematuria, stone crystals on urinalysis, pyuria, absent ureteral jets, or stone clearly noted on imaging. Obstetric outcomes included preterm labor and time from initial presentation to first intervention. Neonatal outcomes included birthweight, APGAR scores, and 30-day adverse conditions.

Results: We identified 96 women who underwent surgical intervention for suspected urolithiasis during pregnancy, of which 39 patients received tamsulosin and 57 did not (control). Mean maternal body mass index was higher in the tamsulosin group compared to the controls ($p=0.04$). There was no significant difference in mean gestational age at initial presentation between groups. The mean duration of tamsulosin therapy was 21.6 days (range 1–72), occurring during the first, second, and third trimesters in four (10.3%), 22 (56.4%), and 13 (33.3%) patients, respectively. The mean duration from initial presentation to first intervention was 7.9 days (SD 16.7) in the tamsulosin group, compared to 2.0 days (SD 2.9) in the control group ($p=0.01$). There was no difference in rate of preterm labor between groups. No significant differences in neonatal outcomes were identified between groups, including gestational age at delivery, birthweight, APGAR scores, neonatal intensive care unit admission rate, and respiratory distress syndrome.

Conclusions: The short-term use of tamsulosin during pregnancy does not appear to be associated with higher rates of adverse maternal or fetal outcomes. For patients on tamsulosin therapy, there was a significantly longer duration from time of presentation to time of surgical intervention.

UP 11.2

Reducing the use of stone baskets with thulium fiber laser lithotripsy

Riley M. Lockhart², Thomas Whelan¹, Andrew J. Flewelling³

¹Urology, Dalhousie University, Saint John, Canada; ²Medicine, Dalhousie University, Saint John, Canada; ³Research Services, Horizon Health Network, Saint John, Canada

Introduction: The thulium fiber laser (TFL) has emerged as a treatment of upper urinary tract (UUT) stones, with early evidence demonstrating it creates finer dust particles, allows for better irrigation and maximal ureteroscope deflection, while producing less stone retropulsion compared to the gold-standard holmium laser (Ho:YAG) lithotripsy. Stone baskets may be required to remove larger stone fragments or for stone analysis to limit stone recurrence but come at increased cost and risk to patients. This study looked at stone basket use between the two lasers.

Methods: A retrospective chart review was approved by the research ethics board and completed on patients treated with laser lithotripsy over three years by one surgeon at a Canadian tertiary care center. The key variable of interest was the laser used (Ho:YAG vs. TFL) with the use of a stone basket for fragment removal as the main outcome.

Results: Preliminary analysis indicates 179 patients had lithotripsy performed within the study window. Ho:YAG was used in 48.6% ($n=87$; M age=61.6 years) of patients, with TFL used in 51.4% ($n=92$; M age=56.5 years). M stone size was 8.2 mm for Ho:YAG and 7.5 mm for TFL. Baskets were used in 85.1% of cases of Ho:YAG lithotripsy ($n=74$) and 41.3% of TFL lithotripsy ($n=38$).

Conclusions: This research contributes to the growing body of evidence demonstrating the benefits of TFL over Ho:YAG. Approximately 40% of TFL stone lithotripsy cases required a stone basket compared to 85% with Ho:YAG, improving patient safety by introducing fewer baskets. On top of the TFL reducing operating times by approximately 20%, additional savings are provided by the reduced basket use, which individually cost \$250. This is relevant to hospital administrators, considering the introduction of this technology in terms of cost and patient safety. We anticipate that with increased surgeon experience with the TFL, basket use will continue to decline. Further investigations into our preliminary observations are ongoing.

UP 11.3

Analysis of the top-down HoLEP learning curve: A single-center experience of two clinical fellows

Hazem Elmansy¹, Abdulrahman Ahmad¹, Moustafa Fathy¹, Parsa Nikoufar¹, Loay Abbas¹, Husain Alaradi¹, Amr Hodhod¹, Walid Shahrouf¹

¹Department of Urology, Northern Ontario School of Medicine, Thunder Bay, Canada

Introduction: Holmium laser enucleation of the prostate (HoLEP) is known to have a steep learning curve. The top-down technique was introduced to lessen the number of procedures required to master HoLEP. The objective of our study was to present the experiences of two successive clinical fellows with the top-down HoLEP learning curve and to compare the fellows' performance with their supervisor.

Methods: We conducted a prospective study of 40 patients that underwent top-down HoLEP performed by two successive clinical fellows at our institution from September 2020 to July 2022. Prior to data collection, each fellow observed three top-down HoLEP procedures and assisted with seven additional cases before independently performing top-down HoLEP under supervision. We collected data from each fellow's first 20 consecutive top-down HoLEP procedures. All patients included in the study had a prostate size >80 g. The learners' cases were grouped according to chronological order (cases 1–10 and 11–20). The primary outcome was defined as the number of cases before the clinical fellow could independently complete all steps of top-down HoLEP without any major intraoperative complications. The secondary outcomes included the intraoperative and postoperative outcomes of both groups. The 40 cumulative cases of the clinical fellows were then compared to 148 procedures performed by their supervisor in terms of efficiency, outcomes, and complications.

Results: There were no significant differences in baseline patient demographics for both clinical fellows. Each learner performed the first 20 cases independently without needing the supervisor to intervene. There were no major intraoperative complications recorded and no statistically significant differences in intraoperative and postoperative outcomes between fellows' cases (Table 1). There was a statistically significant difference between the fellows and their supervisor in terms of operative efficiency and enucleation efficiency ($p=0.000$) (Table 2). We did not find a significant difference between the fellows and the supervisor regarding intraoperative complications, major postoperative complications, or postoperative subjective and objective parameters.

Conclusions: Top-down HoLEP shows promising and reproducible results in shortening the HoLEP learning curve. Further comparative and multi-institutional studies with additional learners are needed to verify our preliminary findings.

UP 11.4

The impact of SARS-CoV-2 on kidney stone disease and management in Ontario

Adam Bobrowski¹, Simon Czajkowski², Katherine Lajkosz³, Michael Ordon⁴, Jason Y. Lee²

¹Division of Urology, Department of Surgery, University of Toronto, Toronto, Canada; ²Division of Urology, Department of Surgery, University Health Network, Toronto, Canada; ³Department of Biostatistics, University Health Network, Toronto, Canada; ⁴Division of Urology, Department of Surgery, St. Michael's Hospital, Toronto, Canada

Introduction: The SARS-CoV-2 pandemic has posed significant challenges to healthcare and resource allocation. Our objective was to examine the effects of the pandemic on the incidence and management of kidney stone disease in Ontario, Canada.

Methods: We conducted a retrospective cohort study using linked administrative healthcare data. We included patients presenting to an emergency department (ED) or admitted to a hospital with renal colic (RC), as well as patients undergoing shockwave lithotripsy (SWL), ureteroscopy (URS), percutaneous nephrolithotomy (PCNL), or temporizing treatments (stenting or nephrostomy tube [NT]), between March 1, 2019, and February 28, 2021. Using univariate and multivariate analyses, rates of ED visits, hospital admissions, and stone interventions were compared between the year prior and subsequent to the pandemic onset. Time from temporizing to definitive intervention was also compared using interrupted time series models.

Results: Our cohort included 169 061 patients (74 994 pre- and 94 067 peri-pandemic). RC incidence declined early in the pandemic (March–May 2020); however, the impact on overall incidence over the study periods was

UP 11.3. Table 1. Comparison of patient demographics, perioperative, and postoperative outcomes of top-down HoLEP between the clinical fellows' cases

Parameters	Fellow 1 Cases 1–10	Fellow 1 Cases 11–20	p	Fellow 2 Cases 1–10	Fellow 2 Cases 11–20	p	Fellow 1 20 Cases	Fellow 2 20 Cases	p
Number of participants, n	10	10	–	10	10	–	20	20	–
Age, years, median (range)	69 (52–88)	70 (64–78)	0.971	70 (59–87)	71 (62–77)	0.075	70 (52–88)	70 (59–87)	0.947
Preoperative prostate size by TRUS, cc, median (range)	93 (70–210)	90 (56–114)	0.631	115 (80–153)	111 (80–206)	0.353	91 (56–180)	115 (80–206)	0.108
Enucleated tissue weight, g, median (range)	71 (37–140)	71 (35–135)	0.739	84 (33–240)	66 (36–133)	0.971	71 (35–140)	78 (33–240)	0.495
Operative efficiency, g/min, median (range)	0.74 (0.42–1.27)	0.91 (0.4–1.2)	0.739	0.87 (0.48–1.17)	0.71 (0.48–1.29)	0.247	0.83 (0.4–1.27)	0.81 (0.48–1.29)	0.947
Enucleation time, min, median (range)	77 (54–85)	63 (50–92)	0.143	73 (45–159)	71 (57–101)	0.436	70 (50–92)	71 (45–159)	0.327
Enucleation efficiency, g/min, median (range)	0.94 (0.5–1.61)	1.12 (0.5–1.72)	0.739	1.11 (0.52–1.51)	0.85 (0.63–1.72)	0.436	1.02 (0.5–1.72)	1.07 (0.52–1.72)	0.947
Blood transfusion, n (%)	0	0	–	0	0	–	0	0	–
Success of first TOV, n (%)	9 (90)	10 (100)	0.5	9 (90)	10 (100)	0.5	19 (95)	19 (95)	0.756
Intraoperative complications, n (%)	0	0	–	0	0	–	0	0	–
Postoperative complications, n (%)									
Clavien I	1 (10)	2 (20)	0.589	3 (30)	1 (10)	0.236	3 (15)	4 (20)	0.553
Clavien II	0	0	–	0	0	–	0	0	–
Clavien III	0	0	–	0	0	–	0	0	–
Prostate weight reduction, %, median (range)	75.5 (66–88)	82 (62–95)	0.673	81 (35–93)	81.5 (55–93)	0.435	80 (62–95)	81 (35–93)	0.777
PSA reduction, %, median (range)	84 (30–97)	83 (8–99)	0.968	92 (52–98)	89.5 (32–97)	0.23	84 (8–99)	91 (32–98)	0.142
1 month postoperative									
IPSS, median (range)	5.5 (1–21)	9.5 (4–24)	0.089	7 (2–18)	8 (3–15)	0.905	8.5 (1–24)	8 (2–18)	0.988
QoL, median (range)	1 (0–6)	3 (0–5)	0.393	2 (0–4)	2 (0–5)	0.549	2.5 (0–6)	2 (0–5)	0.696
Qmax, mL/s, median (range)	25 (11–50)	19 (16–35)	0.805	16 (6–34)	28 (13–40)	0.435	23 (11–50)	17 (6–40)	0.31
PVR, mL, median (range)	47 (0–390)	35 (0–150)	0.28	30 (0–100)	49 (0–160)	0.78	44 (0–390)	47 (0–160)	0.897
Stress incontinence, n (%)	2 (20)	1 (10)	0.5	1 (10)	2 (20)	0.5	3 (15)	4 (20)	0.5
3 months postoperative									
IPSS, median (range)	5 (0–21)	10 (3–24)	0.063	5.5 (1–23)	5.5 (2–14)	0.842	7.5 (0–24)	5.5 (1–23)	0.347
QoL, median (range)	2 (0–3)	3 (1–5)	0.014	1 (0–5)	1.5 (1–2)	0.78	2.5 (0–5)	1 (0–5)	0.081
Qmax, mL/s, median (range)	22 (20–34)	20 (11–32)	0.053	21 (13–45)	21 (15–40)	0.959	20 (11–34)	21 (13–45)	0.72
PVR, mL, median (range)	39 (0–110)	53 (11–130)	0.387	70 (0–150)	45 (0–90)	0.78	40 (0–130)	63 (0–150)	0.281
Stress incontinence, n (%)	0	1 (10)	0.5	1 (10)	1 (10)	0.763	1 (5)	2 (10)	0.5
6 months postoperative									
IPSS, median (range)	7 (2–16)	6 (3–14)	0.968	4.5 (1–7)	4 (2–10)	0.661	6 (2–16)	5 (1–10)	0.126
QoL, median (range)	2 (0–3)	2 (0–4)	0.78	1 (0–3)	1 (0–2)	0.497	2 (0–4)	1 (0–3)	0.111
Qmax, mL/s, median (range)	19 (13–36)	20 (8–39)	0.999	22 (15–41)	21 (15–40)	0.661	20 (8–39)	22 (15–41)	0.532
PVR, mL, median (range)	93 (0–130)	30 (0–100)	0.065	71 (0–110)	15 (0–80)	0.4	49 (0–130)	24 (0–110)	0.48
Stress incontinence, n (%)	0	0	–	0	0	–	0	0	–

UP 11.3. Table 2. Comparison of patient demographics, perioperative and postoperative outcomes of top-down HoLEP between the clinical fellows' and supervisor's cases

Parameters	Cumulative cases of clinical fellows	Cases of supervisor	p
Number of participants, n	40	148	–
Age, years, median (range)	70 (52–88)	76 (55–93)	0.000
Preoperative prostate size by TRUS, cc, median (range)	99 (55–210)	116 (42–273)	0.059
Enucleated tissue weight, g, median (range)	77 (33–240)	80 (25–242)	0.288
Operative efficiency, g/min, median (range)	0.83 (0.4–1.29)	1.41 (1.2–1.81)	0.000
Enucleation time, min, median (range)	70 (45–159)	42 (10–96)	0.000
Enucleation efficiency, g/min, median (range)	1.06 (0.5–1.72)	1.6 (1.25–2.48)	0.000
Blood transfusion, n (%)	0	0	–
Success of first TOV, n (%)	38 (95)	136 (91.9)	0.394
Intraoperative complications, n (%)	0	4 (2.7)	0.293
Postoperative complications, n (%)			
Clavien I	7 (17.5)	2 (1.4)	0.001
Clavien II	0	0	–
Clavien III	0	0	–
Prostate weight reduction, %, median (range)	81 (35–95)	82 (55–97)	0.437
PSA reduction, %, median (range)	88 (8–99)	88 (10–99)	0.964
1 month postoperative			
IPSS, median (range)	8 (1–24)	6 (0–25)	0.067
QoL, median (range)	2 (0–6)	1 (0–6)	0.073
Qmax, mL/s, median (range)	19 (6–50)	25 (6–73)	0.071
PVR, mL, median (range)	45 (0–390)	47 (0–400)	0.328
Stress incontinence n (%)	7 (17.5)	9 (6.1)	0.030
3 months postoperative			
IPSS, median (range)	6.5 (0–24)	4 (0–21)	0.287
QoL, median (range)	2 (0–5)	1 (0–6)	0.064
Qmax, mL/s, median (range)	20 (11–45)	24 (9–49)	0.188
PVR, mL, median (range)	50 (0–150)	48 (0–200)	0.937
Stress incontinence, n (%)	3 (7.5)	4 (2.7)	0.167
6 months postoperative			
IPSS, median (range)	5 (1–16)	3 (0–30)	0.061
QoL, median (range)	1 (0–4)	0 (0–5)	0.204
Qmax, mL/s, median (range)	21 (8–41)	26 (1–76)	0.109
PVR, mL, median (range)	44 (0–130)	45 (0–370)	0.962
Stress incontinence, n (%)	0	1 (0.7)	–

not statistically significant ($p=0.74$). Mean time from temporizing to definitive intervention increased in the first three months of the pandemic (17.9 vs. 32 days) but no statistically significant effect on the overall proportion of patients undergoing definitive intervention was observed. The pandemic was associated with a 29.5% reduction in SWL, along with 7.9% and 5.4% increases in URS and NT use, respectively. Hospital admissions for RC increased by 10.9%, while ICU admissions decreased by 25% during the pandemic.

Conclusions: Rates of RC ED visits, admissions, and interventions were similar before and during the pandemic. NT use increased and definitive stone interventions were delayed in patients with temporizing measures in the first months of the pandemic. Understanding these trends can inform protocols to streamline care in future health crises.

UP 11.5

Ureteral stent insertion under local anesthesia: A single-center experience

Paul Cheon¹, Kashif Visram¹, Jason Y. Lee², Michael Ordon¹, Kenneth Pace¹, Robert Stewart¹, Monica Farcas¹

¹Division of Urology, St. Michael's Hospital, Toronto, Canada; ²Division of Urology, University Health Network, Toronto, Canada

Introduction: Ureteral stents are used for various indications, such as obstructing stones, ureteral strictures, and ureteropelvic junction obstructions. Insertion of ureteral stents is typically done with the patient under general anesthesia (GA), which requires substantial OR resources. Stent insertion under local anesthesia (LA) has been described in the literature but is uncommonly used. At our hospital (St. Michael's Hospital, Toronto), this has been a standard practice for many years. Our aim was to describe our experience of ureteral stent placement under LA and demonstrate its safety and efficacy.

Methods: In this retrospective, observational study, patients who underwent ureteral stent insertion under LA for any indication at our center between 2017 and 2022 under a single surgeon were identified. All patients were provided transurethral xylocaine jelly only (with no conscious sedation or general anesthesia), and flexible cystoscopes were used, along with c-arm fluoroscopy for insertion or exchange of ureteral stent(s) in the cystoscopy unit. Patient demographics, indication for stent, size and location of stone (if applicable), success, reason for failure, requirement for admission, patient tolerance, and complications were analyzed.

Results: A total of 53 patients were identified to have undergone ureteral stent insertion or exchange under LA. There were 25 (47%) male patients and 28 (53%) female patients, with a mean age of 63 and median age of 62. With regards to indication, 36 (68%) patients had obstructing ureteral stones, seven (13%) patients had ureteropelvic junction obstruction, and six (11%) patients had ureteric strictures. Forty-eight (90.5%) patients had successful outcomes, of which 44 (83%) patients had successful unilateral stent insertions, four (7.5%) patients had successful bilateral stent insertions, and four (7.5%) had successful unilateral stent exchanges. There were four (7.5%) failed stent attempts identified, consisting of one unilateral stent insertion for stricture, two bilateral stent insertions for stones, and one unilateral stent exchange for stricture. Two of these failed attempts were due to patient intolerance, and only one patient subsequently had successful stent insertion under GA while the rest required nephrostomy tubes via interventional radiology. Two patients reported discomfort under LA despite successful outcomes. One patient had bilateral obstructing stones, for which a right-sided stent could be inserted under LA but not for the contralateral side due to stone burden; however, the patient comfortably tolerated both flexible and semirigid ureteroscopy under LA during the same procedure. Thirty-one (58%) patients were admitted, with the most common reasons being septic obstructing stones and observation of patients with a solitary kidney. No patient was admitted for post-procedural or stent-related pain.

Conclusions: Insertion of ureteric stents under LA is effective and efficient, especially for obstructing ureteral stones, and is well-tolerated by patients. With correct patient selection, this may be a useful approach and may decrease OR time and use of OR/anesthesia resources. Limitations of our study include the retrospective nature of our data, the lack of a GA arm for comparison, and the single-surgeon sample. The next steps include further analysis of the other urologists' patients at our center meeting the inclusion criteria.

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UP 11.6**Perioperative outcomes in patients undergoing holmium laser enucleation of the prostate (HoLEP) with and without diabetes mellitus**

Jenny N. Guo¹, Nicholas S. Dean¹, Jordan Rich¹, Jessica Helon¹, Amy E. Krambeck¹
¹Department of Urology, Northwestern University, Chicago, United States

Introduction: Diabetes mellitus (DM) is a known risk factor in the perioperative setting for poor wound healing and postoperative complications. In this study, we compared surgical outcomes post-HoLEP in patients with and without DM.

Methods: From January 2021 to April 2022, we collected a prospectively maintained database of 640 patients undergoing HoLEP. Patients with a history of neurological diseases, radiation, radical prostatectomy after HoLEP, intravesical BCG, or chemotherapy were excluded from the control group. A total of 117 patients were identified as diabetics and 414 as non-diabetics. DM patients were further categorized based on A1c levels and insulin dependence. Statistical analysis was performed using t-tests, Chi-squared, and binomial tests ($p < 0.05$).

Results: Diabetic patients were significantly more likely to have indwelling catheters prior to undergoing HoLEP (60% vs. 38%, $p = 0.002$), history of UTIs preoperatively (28% vs. 18%, $p = 0.04$), and ASA 3 or greater (72.8% vs. 46.3%, $p < 0.001$). Postoperatively, DM patients were more likely to be admitted rather than discharged same-day (21% vs. 8.5%, $p < 0.001$) and fail initial trial of void (15% vs. 7.8%, $p = 0.026$). Within three months, DM patients had higher rates of complications of any kind (24% vs. 12%, $p = 0.003$) and higher rates of UTIs (12% vs. 2.8%, $p < 0.001$). HoLEP decreased the proportion of DM patients with at least one UTI pre- vs. postoperative (21% to 12%, $p = 0.05$). At the time of last mean followup (4.1 months), 3/117 (3.2%) patients in the DM group required Foley/CIC at 90 days compared to none in the non-DM group ($p = 0.01$). Two of the three patients requiring catheterization had evidence of neurogenic bladder. Postoperative IPSS scores were similar between both groups (7.5 vs. 7.8, $p = 0.7$). There were no differences in Michigan Incontinence Symptom Index (M-ISI) severity/bother scores postoperatively between DM and non-DM groups (severity: 7.48 vs. 5.7, $p = 0.13$; bother: 1.9 vs. 1.5, $p = 0.8$). DM patients showed significant improvements in IPSS scores, from 26 to 7.5 ($p < 0.001$). When stratified based on A1c levels and insulin dependence, no correlation was noted between increased A1c or insulin use and postoperative UTIs, IPSS, or M-ISI scores.

Conclusions: Diabetic patients appear to have similar IPSS and M-ISI scores to non-diabetics but have higher rates of postoperative complications, UTIs, and need for catheterization. HoLEP is effective in reducing the need for catheterization and the proportion of UTIs in diabetics. A1c levels and insulin dependence do not affect surgical outcomes.

UP 11.7**A comparison of anesthetic options for Rezum water vapor therapy: Minimal sedation is tolerable for a minimally invasive procedure**

Dhiraj S. Bai¹, Kapilan Panchendrabose¹, Jainik Shah¹, Naomi Gebru², Matthew Urichuk¹, Premal Patel³

¹Max Rady College of Medicine, University of Manitoba, Winnipeg, Canada;

²Department of Microbiology, University of Manitoba, Winnipeg, Canada;

³Department of Surgery, University of Manitoba, Winnipeg, Canada

Introduction: Rezum is an emerging procedure to treat benign prostatic hyperplasia (BPH). There are several anesthetic options at the discretion of the physician. General/spinal anesthesia (GA) is a common choice but has several drawbacks, including anesthetic complications, costs, and higher wait times. Currently, there is a gap in the literature on patient-reported outcomes with alternative anesthetic choices. This study aimed to examine patient-reported tolerability of Rezum under minimal oral sedation or IV sedation.

Methods: This retrospective comparative study included adult patients undergoing Rezum from April to November 2022. Oral sedation (OS) included Percocet, lorazepam, local injection of sterile 2% xylocaine jelly with 20-minute indwell time, and pudendal nerve block (20 cc of 1% lidocaine and 0.25% bupivacaine). Intravenous sedation (IS) included midazolam, ketamine, and continuous infusion of propofol and remifentanyl. A standardized questionnaire relating to tolerability and complications was administered to patients.

Results: Fourteen patients were enrolled in each group with a mean patient age \pm SD of 67.5 ± 7.2 years. Mean prostate volume was 80.2 ± 8.5 mL, with a mean of 3.2 ± 0.4 injections per lobe and no median lobe present in any patient. On followup in the OS group, 85.7% of patients reported they would opt for OS for a repeat procedure over GA and recommend OS. In comparison, 100% of patients chose IS and recommended it in the IS group. Rates of complications, self-reported excess pain, and infection were similar between groups.

Conclusions: Our study is the first to show high patient-reported tolerability of Rezum under OS and IS. The results show that a minority of patients may not tolerate OS but would tolerate the procedure well with IS — an important factor being the ideal patient selection for OS. Given high tolerability rates in both groups, this suggests GA or spinal anesthesia may be unnecessary, risking higher rates of anesthetic complications and longer wait times.