

## CUA 2022 Annual Meeting Abstracts – Podium Session 2: Endourology

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### POD-2.1

#### Characterizing symptomatic patients with small non-obstructing renal calculi (SNORC): A primary prospective cohort study analysis

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**Introduction:** As little data exists on the nature and causes of pain in non-obstructing renal stones, our objective was to assess how disease-specific factors, global patient characteristics, and personality traits influence perceived symptoms.

**Methods:** After consent was obtained, patients completed a standardized history, physical exam, and questionnaire sets. Enrollment was 2:1 asymptomatic patients (AP) to symptomatic patients (SP) with computed tomography-confirmed calyceal stones  $\leq 5$  mm, without focal signs of obstruction. Descriptive statistics and Student's t-tests were used to characterize and compare groups.

**Results:** Our primary analysis included 28 patients (8 SP, 20 AP). There were no significant differences in age, gender, household income, or prevalence of functional pain syndromes (i.e., 25% vs. 27% IBS, FM, IC, etc.). All (100%) SP had prior stone events (vs. 55% of AP). More AP endorsed chronic neck or back pain (25% vs. 12.5%), whereas SP reported worsened pain with physical activity (50% vs. 30%) and used more daily pain medication (62.5% vs. 25%). Standardized assessment tools for pain and psychometric contributors showed SP have significantly higher Body Pain Index (12.2 vs. 43.3,  $p=0.005$ ), and Pain Disability Index scores (5.9 vs. 23.8,  $p=0.004$ ). SP also scored higher on catastrophizing (15.2 vs. 31.7,  $p=0.008$ ), and kinesiophobia inventories (29.5 vs. 40.3,  $p=0.014$ ). No significant differences were noted in the Modified Somatic Perception Questionnaire, or Hospital Anxiety and Depression Scale. The Wisconsin Stone QoL tool did not differ between groups, however, the more generalized 15D QoL tool showed a decreased overall health-related quality of life in SP (20.3 vs. 26.8,  $p=0.05$ ).

**Conclusions:** Our preliminary analysis of the SNORC cohort identifies potential psychometric contributors to symptomatic complaints related to stone disease. Future studies based on these findings will attempt to further define this challenging population.

### POD-2.2

#### Renal colic imaging practice patterns in Ontario — a population-based study

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**Introduction:** Computed tomography (CT) is associated with increased cost and exposure to radiation when compared to ultrasound (US). Choosing Wisely recommends that US be used over CT in uncomplicated presentations of renal colic for patients under age 50. This objective of this study was to describe imaging practice patterns in Ontario among patients presenting with renal colic.

**Methods:** This is a population-based study of patients who presented with renal colic in Ontario between 2003 and 2019 using administrative data. Patients were assessed according to the imaging modality obtained during their index visit. Descriptive statistics and the Chi-squared test were used to examine differences between the groups. The primary outcome was the need for subsequent imaging. Secondary outcomes included length of renal colic episode, days to surgery, and the number of emergency department and primary care visits during the renal colic episode.

**Results:** A total of 429 060 patients were included in the analysis. Of those, 50.5% had a CT scan as their initial imaging modality, 19.7% had an US, and 3.2% had both a CT and an US on the same day. Rates of any subsequent imaging were similar across these groups. Of those who initially had an US, 38.0% went on to have at least one CT scan during their renal colic episode, including those who had a CT on the same day as the initial US, while 62.0% were able to avoid a CT scan altogether. In contrast, 16.8% had a repeat CT after an initial CT at the time of presentation. Fewer emergency department and family physician visits were seen in those who had an initial CT.

**Conclusions:** In patients presenting with renal colic in Ontario, approximately half have a CT as initial imaging despite US being recommended in uncomplicated renal colic patients. Those who have an US done first are often able to avoid subsequent CT scans. Efforts should be made to encourage the use of US in those presenting with renal colic rather than CT when clinically indicated.

### POD-2.3

#### Implementation of a clinical practice guideline for assessment and management of ureteric stones in the emergency department

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**Introduction:** Renal colic is a common emergency department (ED) presentation, however, there are no existing clinical practice guidelines at a local level. Subsequent variations in assessment and management of suspected renal colic may have significant implications on both patient and hospital outcomes. We developed a clinical practice guideline to standardize the assessment and management of ureteric stones in the ED. We subsequently compared patient and hospital outcomes pre- and post-guideline implementation.

**Methods:** The guidelines were implemented at our institution in November 2018. We standardized the analgesia regimen in the ED and on discharge, urology consult criteria, imaging modality, patient education, and followup instructions. All patients with computed tomography (CT)-confirmed stone received an X-ray kidney-ureter-bladder, and if the stone was radio-opaque, X-ray was used for followup imaging. We undertook an observational cohort study of patients presenting with renal colic prospectively (December 2018 to May 2019) after guideline implementation and retrospectively (December 2017 to May 2018) prior to guideline implementation.

**Results:** A total of 528 patients (pre-guideline group  $n=283$ ; post-guideline group  $n=245$ ) were included in our study. The number of CT scans each patient received was reduced in the post-guideline group ( $p=0.034$ ). There was a reduced ED length of stay after guideline implementation ( $p=0.017$ ).

Patients discharged for conservative management of a ureteric stone had a lower representation rate in the post-guideline group (12.6%) compared with the pre-guideline group (17.2%), however, this did not reach statistical significance ( $p=0.18$ ).

**Conclusions:** We recommend the implementation of local clinical practice guidelines to streamline and standardize the assessment and management of ureteric stones in the ED. There is significant benefit in both patient and hospital outcomes, with decreased radiation exposure through a reduced number of CT scans, reduced ED length of stay, and reduced representation rates.

## POD-2.4

### Performing urological inpatient procedures as same-day procedures during the COVID pandemic — a retrospective feasibility study

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**Introduction:** In line with provincial directives due to the COVID pandemic, certain urological procedures that are normally performed as inpatient procedures were performed as same-day procedures to reduce the usage of healthcare resources.<sup>1,2</sup> At our center, during the pandemic,

**POD-2.4. Table 1A. RARP patient characteristics**

	Planned inpatient (n=95)	Planned same-day (n=43)	p
Surgery			
RARP	92 (96.8%)	42 (97.7%)	1
RARPLND	3 (3.2%)	1 (2.3%)	
Prostate volume			
Mean (SD)	54.4 (25.0)	48.5 (18.4)	0.127
Median [min, max]	48.0 [19.0, 135]	43.0 [23.0, 108]	
Age			
Mean (SD)	60.9 (5.96)	62.4 (6.59)	0.196
Median [min, max]	62.0 [47.0, 73.0]	63.0 [45.0, 74.0]	
ASA			
1	18 (18.9%)	6 (14.0%)	0.164
2	67 (70.5%)	36 (83.7%)	
3	10 (10.5%)	1 (2.3%)	
RCRI			
0	86 (90.5%)	40 (93.0%)	0.876
1	9 (9.5%)	3 (7.0%)	
Anesthesia			
General	95 (100%)	43 (100%)	<0.001
Anticoagulated			
No	94 (98.9%)	41 (95.3%)	0.476
Yes	1 (1.1%)	2 (4.7%)	
Blood loss			
Mean (SD)	231 (96.8)	198 (65.4)	0.0194
Median [min, max]	200 [100, 600]	200 [100, 500]	
Perioperative			
Complications	83 (87.4%)	36 (83.7%)	0.757
No	12 (12.6%)	7 (16.3%)	
Yes			

Patient characteristics between planned same-day RARP vs. inpatient, including age, ASA, RCRI, anesthesia, anticoagulation, prostate volume, and perioperative complications.

we began performing robotic-assisted radical prostatectomy (RARP) and laser enucleation of the prostate (LEP) as outpatient surgeries. Recent literature has suggested that RARP and LEP are safe and feasible as same-day surgeries.<sup>3-6</sup> Our goal was to determine if there was a difference in

**POD-2.4. Table 1B. LEP patient characteristics**

	Planned same-day (n=46)	Planned inpatient (n=30)	p
Age			
Mean (SD)	70.4 (7.31)	69.3 (6.68)	0.488
Median [min, max]	70.5 [56.0, 84.0]	70.0 [55.0, 83.0]	
ASA			
1	17 (37.0%)	11 (36.7%)	0.913
2	23 (50.0%)	16 (53.3%)	
3	6 (13.0%)	3 (10.0%)	
RCRI			
0	39 (84.8%)	28 (93.3%)	0.127
1	7 (15.2%)	1 (3.3%)	
2	0 (0%)	1 (3.3%)	
Anesthesia			
General	5 (10.9%)	1 (3.3%)	0.45
Regional	41 (89.1%)	29 (96.7%)	
Anticoagulated			
No	33 (71.7%)	30 (100%)	0.00601
Antiplatelet	12 (26.1%)	0 (0%)	
Anticoagulated	1 (2.2%)	0 (0%)	
Prostate volume			
Mean (SD)	84.1 (39.6)	92.8 (43.2)	0.4
Median [min, max]	79.0 [26.0, 203]	85.0 [8.00, 170]	
Missing	10 (21.7%)	0 (0%)	
Perioperative complications	42 (91.3%)	30 (100%)	0.257
No	4 (8.7%)	0 (0%)	
Yes			

Patient characteristics between planned same-day LEP vs. inpatient, including age, ASA, RCRI, anesthesia, anticoagulation, prostate volume, and perioperative complications.

**POD-2.4. Table 2A. RARP same-day discharge success rate**

	Planned inpatient (n=95)	Planned same-day (n=43)	p
Actual patient orientation			
Hospitalized	95 (100%)	11 (25.6%)	<0.001
Discharged	0 (0%)	32 (74.4%)	
30-day emergency visit			
No	91 (95.8%)	35 (81.4%)	0.0142
Yes	4 (4.2%)	8 (18.6%)	
Readmission			
No	93 (97.9%)	39 (90.7%)	0.142
Yes	2 (2.1%)	4 (9.3%)	

Rates of successful same-day discharge, duration of hospitalization, emergency consultation, and readmission in planned same-day RARP vs. inpatient.

**POD-2.4. Table 2B. LEP same-day discharge success rate**

	Planned same-day (n=46)	Planned inpatient (n=30)	p
Actual patient orientation			
Discharged	29 (63.0%)	0 (0%)	<0.001
Hospitalized	17 (37.0%)	30 (100%)	
Duration of hospitalization			
Mean (SD)	1.41 (1.06)	1.57 (1.72)	0.705
Median [min, max]	1.00 [1.00, 5.00]	1.00 [1.00, 10.0]	
30-day emergency visit			
No	44 (95.7%)	28 (93.3%)	1
Yes	2 (4.3%)	2 (6.7%)	
Readmission			
No	46 (100%)	29 (96.7%)	0.828
Yes	0 (0%)	1 (3.3%)	

Rates of successful same-day discharge, duration of hospitalization, emergency consultation, and readmission in planned same-day LEP vs. inpatient.

**POD-2.4. Table 3A. RARP patient overall frequency of postoperative complication**

	Planned inpatient (n=95)	Planned same-day (n=43)	p
Postoperative complication			
No	82 (86.3%)	35 (81.4%)	0.625
Yes	13 (13.7%)	8 (18.6%)	
30-day emergency visit			
No	91 (95.8%)	35 (81.4%)	0.0142
Yes	4 (4.2%)	8 (18.6%)	
Reason for emergency visit	93 (97.9%)	35 (81.4%)	0.022
Abdominal pain	0 (0%)	1 (2.3%)	
Anastomotic leak	0 (0%)	1 (2.3%)	
Collection	1 (1.1%)	1 (2.3%)	
Hematuria	1 (1.1%)	1 (2.3%)	
Urinary leak	0 (0%)	1 (2.3%)	
Urinary retention	0 (0%)	3 (7.0%)	
Readmission rate			
No	93 (97.9%)	39 (90.7%)	0.142
Yes	2 (2.1%)	4 (9.3%)	
Reason for readmission	93 (97.9%)	39 (90.7%)	0.078
Anastomotic leak	0 (0%)	1 (2.3%)	
Collection	0 (0%)	1 (2.3%)	
Hematoma	1 (1.1%)	0 (0%)	
Urinary leak	1 (1.1%)	0 (0%)	
Urinary retention	0 (0%)	2 (4.7%)	

Frequency of overall complication and reason for emergency consults and readmission in planned inpatient vs. planned same day RARP.

patient outcomes in RARP and LEP patients operated as same-day surgery vs. inpatient.

**Methods:** Patients operated for RARP or LEP between May 2020 and December 2021 were studied. Among RARP patients, 95 were identified as planned inpatient (PIP-RARP) and 43 planned same-day (PSDD-RARP). Among LEP patients, 30 were identified as planned inpatient (PIP-LEP) and 46 planned as same-day (PSDD-LEP). PSDD patients were compared to PIP patients for both patient groups, with primary outcomes being SDD failure, 30-day complication, and re-admission rates.

**Results:** General patient characteristics, such as age, American Society of Anesthesiology (ASA), and Revised Cardiac Risk Index (RCRI) did not differ between PSDD and PIP in both patient populations (Table 1). Of the PSDD-RARP patients, 74.4% were successfully discharged the day of surgery. The overall postoperative complication, 30-day emergency department (ED) visits, and re-admission rates were 18.6%, 18.6%, and 9.3% in PSDD-RARP patients vs. 13.7% (p=0.63), 4.2% (p=0.01), 2.1% (p=0.14) for PIP-RARP, respectively. Of the PSDD-LEP patients, 63% were successfully discharged the day of the surgery. The overall postoperative complication, 30-day ED visits, and re-admission rates were 15.2%, 4.3%, and 0% in PSDD-LEP patients vs. 23.3% (p=0.56), 6.7% (p=1.0), 3.3% (p=0.83) for PIP-LEP, respectively (Tables 2, 3).

**Conclusions:** Same-day discharge for RARP and LEP is safe and feasible in select patients, with an acceptable and comparable complication rate.

#### References

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**POD-2.4. Table 3B. LEP Patient overall frequency of post-operative complication**

	Planned same-day (n=46)	Planned inpatient (n=30)	p
Postoperative complication			
No	39 (84.8%)	23 (76.7%)	0.556
Yes	7 (15.2%)	7 (23.3%)	
Primary reason for hospitalization	29 (63.0%)	0 (0%)	<0.001
Hematuria	3 (6.5%)	4 (13.3%)	
Infection	2 (4.3%)	2 (6.7%)	
Normal postoperative evol	12 (26.1%)	24 (80.0%)	0.828
Secondary reason for hospitalization	46 (100%)	29 (96.7%)	
Hematuria	0 (0%)	1 (3.3%)	
30-day emergency visit			
No	44 (95.7%)	28 (93.3%)	1
Yes	2 (4.3%)	2 (6.7%)	
Primary reason for emerg visit	44 (95.7%)	28 (93.3%)	0.112
Hematuria	0 (0%)	2 (6.7%)	
Retention	2 (4.3%)	0 (0%)	
Readmission			
No	46 (100%)	29 (96.7%)	0.828
Yes	0 (0%)	1 (3.3%)	
Primary reason for readmission			
Hematuria	0 (0%)	1 (3.3%)	

Frequency of overall complication and reason for emergency consults and readmission in planned same-day LEP vs. inpatient.

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## POD-2.5

### Ultrasound-only percutaneous nephrolithotomy is safe and effective compared to fluoroscopy-directed percutaneous nephrolithotomy

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**Introduction:** Use of ultrasound guidance for percutaneous nephrolithotomy (PCNL) access has gained popularity. However, reports on ultrasound-only PCNL, in which ultrasound is used for all steps of the procedure, are limited, as fluoroscopy is often used for dilation and to check for residual stones. The study goal was to compare outcomes for ultrasound-only PCNL compared to fluoroscopy-directed PCNL.

**Methods:** Prospectively collected data from the Registry for Stones of the Kidney and Ureter (ReSKU) database was reviewed for all patients who underwent PCNL at one academic center from 2015–2021. Primary outcomes were complications (Clavien-Dindo classification) and stone-free rates (no residual fragments  $\geq 3$  mm) compared between those who underwent ultrasound-only PCNL and fluoroscopy-directed PCNL in which any amount of fluoroscopy was used.

**Results:** A total of 141 patients were identified who underwent ultrasound-only PCNL and 147 who underwent fluoroscopy-directed PCNL. The mean maximum summative stone diameter was 30 mm and 44% were Guy score 3 or 4. Stone and patient characteristics were similar between both groups. There was no difference in complication rates (15% vs. 16%,  $p=0.87$ ) or stone-free status (71% vs. 65%,  $p=0.72$ ) between those who underwent ultrasound-only PCNL and fluoroscopy-directed PCNL, respectively. Ultrasound-only PCNL was associated with shorter operative time (median 99 minutes vs. 126 minutes,  $p<0.001$ ), lower percent drop in hematocrit (2.7% vs. 4.9%,  $p=0.02$ ), higher success rate of access achieved by resident (38% vs. 16%,  $p<0.001$ ), and more frequent use of supine positioning (69% vs. 25%,  $p<0.001$ ) compared to fluoroscopy-directed PCNL. After adjusting for body mass index, American Society of Anesthesiology score, stone size, and stone complexity by Guy score, ultrasound-only PCNL was not associated with any increased odds of complications (odds ratio [OR] 0.7, 95% confidence interval [CI] 0.3–1.6,  $p=0.42$ ) or residual stone fragment  $\geq 3$  mm (OR 0.9, 95% CI 0.5–1.8,  $p=0.97$ ) compared to fluoroscopy-directed PCNL (Table 1).

**Conclusions:** Ultrasound-only PCNL is safe and achieves similar stone-free rates compared to fluoroscopy-directed PCNL, with added benefits of shorter operative time, less blood loss, and avoidance of radiation.

**POD-2.5. Table 1. Ultrasound-only PCNL was associated with shorter operative time, less blood loss, and similar complication and stone-free rates compared to fluoroscopy-directed PCNL in which any amount of fluoroscopy was used**

	Ultrasound-only n=141 n (%)	Fluoroscopy-directed n=147 n (%)	p
Age, years (median, IQR)	56 (42–66)	55 (40–64)	0.48
BMI, kg/m <sup>2</sup> (median, IQR)	28.5 (24–33)	28.9 (24–33)	0.6
ASA 3 and 4	40 (28)	30 (20)	0.12
Guy score 3 and 4	50/102 (49)	46/119 (39)	0.1355
Positioning			<0.001
Prone	44 (31)	110 (75)	
Supine	97 (69)	36 (25)	
Missing	0 (0)	1 (1)	
Sum max stone diameter, mm (median, IQR)	30 (17–45)	30 (18–51)	0.31
Access person			<0.001
Attending	53 (38)	56 (38)	
Fellow	23 (16)	46 (31)	
Resident	54 (38)	24 (16)	
Missing	11 (8)	21 (14)	
Total operative time, minutes (median, IQR)	99 (74–129)	126 (100–159)	<0.001
% drop in hematocrit (median, IQR)	2.7 (-1.4–6.7)	4.9 (0.5–9.5)	0.02
Stone-free (<3 mm fragment)	100 (71)	95 (64)	0.72
Postoperative complications (Clavien-Dindo)			0.85
No complications	117 (83)	119 (81)	
Grade 1	1 (1)	3 (2)	
Grade 2	14 (10)	15 (10)	
Grade 3a	3 (2)	3 (2)	
3b	1 (1)	1 (1)	
4a	0	0	
4b	1 (1)	0 (0)	
Missing	4 (3)	6 (4)	

## POD-2.6

### Stones and bones: Evaluating the impact of metabolic stone disease on bone health

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**Introduction:** Urolithiasis is associated with lower bone mineral density (BMD), the development of osteopenia and osteoporosis, and fragility fractures. Our study aimed to further delineate the prevalence of low BMD in a metabolic stone population and to characterize metabolic risk factors.

**Methods:** A retrospective analysis of a prospectively maintained metabolic stone clinic database from September 2001 to December 2019 was performed. Patients who underwent BMD testing with a dual-energy X-ray absorptiometry (DEXA) scan were reviewed and correlation between BMD

and metabolic parameters were determined with multivariate regression analysis.

**Results:** A total of 898 patients had a mean age of  $54 \pm 14$  years, were 54% male, and had a mean body mass index of  $29.8 \pm 7$ . Calcium oxalate was the predominate stone composition (60%), followed by uric acid (16%) and calcium phosphate (11%). Metabolic abnormalities included hypercalciuria (57%), hypocitraturia (38%), primary (2%) and secondary (9%) hyperparathyroidism, complete (2%) and incomplete (13%) distal RTA, and vitamin D deficiency (78%). In our cohort, 17.6% of patients underwent BMD testing and included only a minority of patients (3%) who were eligible for DEXA scans based on age criteria alone. The majority of patients with DEXA scans (64%) had evidence of decreased BMD,

including 50% with osteopenia, 11% with osteoporosis, and 3% with severe osteoporosis. There was no female predominance of decreased BMD in our series. Multivariate regression analysis did not identify any correlation between specific metabolic parameters and BMD scan results.

**Conclusions:** Metabolic stone formers have a high prevalence of low BMD and are at a high risk of poor bone health outcomes. Our series demonstrated that the true prevalence of this condition is likely significantly under-recognized, given that only a minority of eligible patients underwent BMD testing. Further research is required to develop optimal treatment strategies to mitigate the risks of poor bone health and recurrent urolithiasis.