



# Patterns of opioid prescription post ureteroscopy among members of the Endourological Society

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**Background:** Postoperative opioid prescribing has been linked with persistent opioid use. Ureteroscopy (URS) is a common urologic procedure and a potential area to focus on opioid reduction. We aim to characterize international practice patterns of opioid prescribing post URS and what measures may decrease the need for opioid prescription.

**Methods:** We developed a survey directed to members of the Endourological Society. The survey queried the frequency of opioid prescribing post URS, challenges when opioids are not prescribed, and measures thought to reduce the need for opioids.

**Results:** We received 159 responses with the majority reported practicing urology for >20 years (37.1%), and performing 10–20 ureteroscopies/month (45.3%). Forty-one percent were from the United States (US) and Canada. Sixty-six percent completed a fellowship, 84% in endourology. Twenty-six percent prescribe opioids more than half the time and the majority do so less than 10% of the time (61.6%). Thirty-eight percent had no challenges when opioids were omitted. Measures felt to decrease the need for opioids were preoperative counseling, nonsteroidal anti-inflammatory drugs use, and use of adjunct medications. After adjusting for location and type of practice, endourology fellowship completion, years of practice, and number of ureteroscopies/month, we found that respondents from the US and Canada were more likely to prescribe opioids more than half the time post URS compared to respondents from the rest of the world [odds ratio (OR): 87.5,  $P < 0.001$ , 95% confidence interval (CI): 17.3–443.5].

**Conclusions:** Despite proven feasibility of non-opioid pathway, nearly one-quarter of participants in our survey prescribe opioids >50% of the time post URS. Most important factors felt to reduce opioid prescription post URS were preoperative counseling, nonsteroidal anti-inflammatory drugs use. US and Canadian urologists were more likely to prescribe opioids >50% of the time post URS compared to the rest of the world. We believe best practice guidelines should be considered by the American and Canadian Urological Associations to address post URS opioid prescribing.

**Keywords:** Ureteroscopy (URS); opioids; postoperative; prescription; endourology

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## Introduction

The impact of the opioid epidemic in the United States (US) is clear and research continues to focus on characterizing the role of opioid prescribing patterns to better identify ways of limiting this contributory factor. The use of opioid medications in the post-surgical setting has been shown to be an important factor and often, this may be a patient's initial exposure. There is a reported 6% incidence of persistent opioid use among opioid-naïve patients in this setting (1). Over-prescription of opioid medications is common after urologic procedures and variation in opioid prescription patterns exists after these procedures nationally (2,3). In addition, patients with kidney stones may have a higher risk for long-term opioid use than non-stone formers (4).

The management of pain and stent symptoms post ureteroscopy (URS) have received particular attention partly due to the increasing incidence of stone disease (5). Non-steroidal medications have been shown to effectively manage symptoms of post-endoscopic procedural pain (6,7). In addition, single-center experiences have shown the feasibility of a non-opioid approach after endourologic intervention for urolithiasis (8–10). An expert panel from the US recently recommended 0–5 and 0–10 Oxycodone 5 mg pills to patients undergoing URS with lithotripsy without and with stent placement, respectively (11). The European Association of Urology (EAU) recommends NSAIDs as the first-line treatment for post URS pain control, reserving opioids for refractory pain (12). Interestingly, other Urologic Societies have not made formal recommendations on this matter.

The purpose of this study was to survey and define worldwide opioid prescribing patterns after URS. We aimed to define reasons for prescribing opioids after URS and factors that urologists feel impact the need for opioid use in this setting. Types of interventions thought to be most useful to limit opioid prescribing were also explored. We present the following article in accordance with the SURGE reporting checklist (available at <http://dx.doi.org/10.21037/tau-20-1121>).

## Methods

### *Ethical statement*

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by our institution (University of Vermont) review board (STUDY0000101) and informed consent was taken

from all the participants by filling the survey

### *Survey*

We developed a survey directed to members of the Endourological Society directory. The survey was composed of 12–16 questions targeting practice patterns, frequency of opioids prescription post URS as well as challenges encountered when opioids were not prescribed. In addition, measures thought to be helpful to reduce future opioid prescribing were explored. After developing and reviewing the survey by all the authors, we pilot-tested our survey on a sample of four urologists and finalized the 16-question survey based on that feedback.

### *Questionnaire administration*

After obtaining our institutional review board approval, the final survey was electronically distributed via REDCap (Nashville, TN, USA) to 2,000 Endourology Society members listed in the 2018–2019 Membership Directory. Respondents were e-mailed a cover letter by the Endourology Society with a hyperlink to the electronic survey. Nonrespondents were e-mailed a reminder cover letter 2 weeks after the first email. Data were organized and secured by the REDCap's proprietary software. No respondent identifiers were collected and no incentives were provided.

### *Predictor and outcome variables*

Predictor variables included locations of practice, type of practice, endourology fellowship (yes/no), years of practice, and number of ureteroscopies per month.

Our main outcome was routine opioid prescribing post URS which we defined as prescribing opioids post URS more than 50% of the time. Secondary outcomes were challenges encountered when participants do not prescribe opioids, what they think may lead to the need for opioids and what measures may decrease that.

### *Statistical analysis*

Data were analyzed using STATA v14 (College Station, TX, USA). Characteristics of participants, opioid prescription patterns post URS, experienced challenges when opioids were not prescribed, patient factors thought to lead to the need for opioids and measures that may decrease the need

**Table 1** Characteristics of participants

Characteristics	N (%)
Location of practice	
United States	57 (36.1)
Canada	8 (5.1)
Central America	4 (2.5)
South America	17 (10.8)
Europe	36 (22.8)
Asia	30 (18.9)
Africa	4 (2.5)
Australia	2 (1.3)
Type of practice	
Academic Medical Center	96 (60.3)
Solo Practice Provider	18 (11.3)
Single Urology Group Practice	26 (16.4)
Multi-specialty Group	19 (12.0)
Fellowship completed	
Yes	105 (66.0)
Fellowship	
	N=105
Endourology/stone disease	88 (83.8)
Urologic oncology	12 (11.4)
Andrology/infertility/erectile dysfunction	1 (1.0)
Male reconstructive urology/trauma	2 (1.9)
Female pelvic medicine and reconstructive surgery	0 (0.0)
Pediatric urology	1 (1.0)
Transplant	1 (1.0)
Years of practice	
Less than 5 years	21 (13.2)
5 to 10 years	34 (21.4)
11 to 20 years	45 (28.3)
More than 20 years	59 (37.1)
Ureteroscopies per month	
Less than 10	27 (17.0)
Between 10 and 20	72 (45.3)
More than 20	60 (37.7)

for opioids were all reported with descriptive statistics. We used univariate and multivariate logistic regression to determine risk factors associated with routinely prescribing opioids post URS. Confounding variables were chosen a priori in the multivariate model which included (locations of practice, type of practice, endourology fellowship (yes/no), years of practice, and number of ureteroscopies per month). All tests were two-sided and a P value of  $\leq 0.05$  was considered statistically significant.

## Results

Of the approximately 2000 Endourological Society members who received the email invitation to participate in the survey, 159 completed the survey (8%).

### *Characteristics of participants*

The majority of participants were from the US (36.1%) followed by Europe (22.8%). Most practiced clinical urology within an academic setting (60.3%), practiced for more than 20 years (37.1%), and performed between 10 and 20 URS per month (45.3%). 66% of respondents completed a fellowship of which endourology was the most common (83.8%) (*Table 1*).

### *Opioids prescription patterns and challenges experienced when opioids are not prescribed*

Approximately one-quarter (26%) of respondents reported prescribing opioids more than 50% of the time (*Table 2*). The majority (61.6%) of respondents prescribed opioids less than 10% of the time. Thirty-eight percent of the respondents reported having no challenges at all when not prescribing opioids post URS. When challenges were encountered, the most commonly reported were patient calls to clinic for stent related symptoms. Of respondents who reported challenges, these occurred less than half of the time (*Table 2*).

### *Factors leading to opioids prescription and measurement to decrease prescription post URS*

The most common factor felt to lead to opioid prescription

**Table 2** Opioids prescription patterns post URS and experienced challenges when opioids are not prescribed

	N (%)
Frequency of prescribing opioids	
Less than 10% of the time	99 (61.6)
Between 10–50% of the time	20 (12.6)
More than 50% of the time	28 (17.6)
Always	13 (8.2)
Challenges when opioids not prescribed <sup>†</sup>	
Patient returns to ED	33
Need for early stent removal	27
Patient calls to clinic for stent related symptoms	75
Patient calls for opioids or additional pain medications	47
Other healthcare providers who believe the patient needs opioids	23
No challenges	60
Frequency of challenges	
Patient returns to ED	N=33
Less than 10% of the time	20 (60.6)
Between 10–50% of the time	9 (27.3)
More than 50% of the time	2 (6.1)
Always	2 (6.1)
Need for early stent removal	N=27
Less than 10% of the time	18 (66.7)
Between 10–50% of the time	6 (22.2)
More than 50% of the time	2 (7.4)
Always	1 (3.7)
Patient calls to clinic for stent related symptoms	N=74
Less than 10% of the time	22 (29.7)
Between 10–50% of the time	36 (48.7)
More than 50% of the time	14 (18.9)
Always	2 (2.7)
Patient calls for opioids or additional pain medications	N=46
Less than 10% of the time	15 (32.6)
Between 10–50% of the time	17 (37.0)
More than 50% of the time	12 (26.1)
Always	2 (4.3)

<sup>†</sup>, Participants were able to choose multiple choices. URS, ureteroscopy; ED, emergency department.

**Table 3** Patient factors leading to the need for opioids post URS, and measures that may decrease the need for opioids

	N (%)
Factors leading to the need for opioids <sup>†</sup>	
Patient with mental health diagnoses	32 (15.9)
Patients with substance abuse disorders	58 (28.9)
History of needing opioids for previous URS	111 (55.2)
Measures that may decrease the need for opioids <sup>†</sup>	
Pre-op counseling and patient education	109 (21.1)
Post-op follow-up calls	47 (9.1)
Printed educational materials	67 (13.0)
NSAIDs use	116 (22.5)
Adjunct medications (alpha-blockers, anti-cholinergic, phenazopyridine)	107 (20.8)
Protocol/culture change in not using opioids	70 (13.6)

<sup>†</sup>, Participants were able to choose multiple choices. URS, ureteroscopy.

by respondents was a history of the patient previously taking opioids after URS. Of the measures felt to decrease opioid prescription, the majority of respondents chose NSAIDs use, adjunct medications (alpha-blockers, anti-cholinergic, phenazopyridine), pre-op counseling and patient education (Table 3).

### Univariate and multivariate analysis

On univariate analysis, we found that respondents from the US and Canada were more likely to prescribe opioids routinely post URS [odds ratio (OR) 42.7,  $P < 0.001$ , 95% confidence interval (CI): 12.2–149.2]. Endourologists were less likely to prescribe opioids (OR: 0.5,  $P = 0.055$ , 95% CI: 0.2–1), however, this association did not reach statistical significance. On multivariate analysis, after adjusting for location of practice, type of practice, completion of an endourology fellowship, years of practice, and number of URS per month, we found that respondents from the US and Canada were more likely to prescribe opioids routinely post URS, OR: 87.5,  $P < 0.001$ , 95% CI: 17.3–443.5 (Table 4).

Figure 1 demonstrates percentage of participants who routinely prescribe opioids post URS by location of practice.

## Discussion

The results of our survey highlight several important

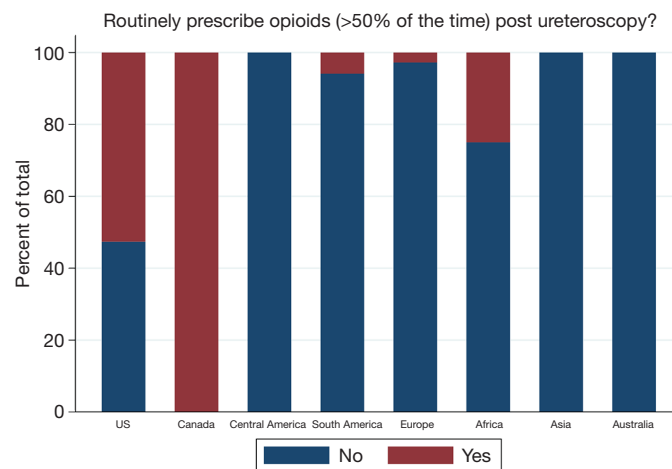
findings related to opioid prescribing after URS. First, one-quarter of our international survey respondents reported prescribing opioids more than half the time after URS. The majority (61.6%) who prescribed did so less than 10% of the time. Interestingly, and not surprisingly, there were very obvious differences in prescribing based on geographic location. Compared to the rest of the world, participants from the US and Canada were much more likely to prescribe opioids after URS (Figure 1).

In the US, opioid prescription patterns and outcomes have been studied by several groups. Berger *et al.*, using a private national database of patients undergoing 15 different urologic procedures, found that 51% filled an opioid prescription after surgery (3). Furthermore, the majority of patients who had a vasectomy and endoscopic kidney stone surgery received opioids (3). Fujii *et al.* reported on opioid prescribing patterns after various surgical procedures in a single center setting. Using both a retrospective and prospective sample, opioid prescribing was common at 76% and 92%, respectively. Importantly, the median opioid use was found to be 27% of the total prescribed and very few (18%) received proper disposal instructions (13). Brummett *et al.* used a nationwide insurance data base to look at the incidence of new persistent opioid use after major and minor surgeries. New persistent use was found to be common (5.9–6.5%) and the incidence did not differ between major and minor procedures. The patients most at risk for persistent use were those with pain conditions,

**Table 4** Univariate and multivariate analysis of provider characteristics associated with prescribing opioids routinely (more than 50% of the time) post URS

	Univariate		Multivariate	
	OR (95% CI)	P value	OR (95% CI)	P value
Location of practice				
United States or Canada	42.7 (12.2–149.2)	<0.001	87.5 (17.3–443.5)	<0.001
Rest of the World	Referent		Referent	
Type of practice				
Academic Medical Center	Referent		Referent	
Solo Practice Provider	0.6 (0.2–2.2)	0.449	6.9 (0.7–67.3)	0.097
Single Urology Group Practice	1.3 (0.5–3.5)	0.554	3.9 (0.8–19.4)	0.089
Multi-specialty Group	1.4 (0.5–4)	0.552	2.5 (0.5–12.6)	0.268
Endourologist				
No	Referent		Referent	
Yes	0.5 (0.2–1)	0.055	0.9 (0.3–2.7)	0.854
Years of practice				
Less than 5 years	Referent		Referent	
5–10 years	1.8 (0.5–6.9)	0.395	2.9 (0.6–15.3)	0.207
11–20 years	1.5 (0.4–5.5)	0.503	2.8 (0.6–13.8)	0.205
More than 20 years	1.4 (0.4–4.9)	0.557	1.8 (0.4–7.9)	0.456
Number of ureteroscopies per month				
Less than 10	Referent		Referent	
Between 10–20	2.1 (0.6–6.7)	0.231	1.4 (0.3–7.5)	0.689
More than 20	2.5 (0.7–8.2)	0.140	1.6 (0.3–8.4)	0.610

URS, ureteroscopy; OR, odds ratio; CI, confidence interval.

**Figure 1** Percentage of participants who routinely prescribe opioids post ureteroscopy by location of practice.



substance abuse, and mental health disorders (1). The suggestion from this work is that patient factors are likely more influential than postoperative pain in determining postoperative opioid use.

In our survey, we asked urologists to identify patient characteristics thought to increase the likelihood of requiring opioids post operatively and what concerns they have if these medications are not given post procedure. The most common reason that urologists reported that contribute to the need for post URS opioid prescriptions is whether or not the patient needed or received these for previous ureteroscopic intervention. The reasons for this can be surmised to be multi-factorial. There are reports that prior opioid exposure may impact the need for opioids at a later time. Kang *et al.* retrospectively reviewed patients who underwent URS to identify predictors of receiving additional pain medication after intervention as well as predictors of persistent opioid use defined as use 60 days post-procedure. They found that preoperative opioid exposure including the number of prescriptions, days prescribed and number of different providers was associated with both the need for additional postoperative opioids and long term use (8). Another thought is that stone formers in general have a higher likelihood of long-term opioid use. Shoag *et al.* used the National Health and Nutrition Examination Survey (NHANES) and found that a self-reported history of kidney stones was associated with current narcotic use (4). In addition, patient history of mental health co-morbidities and substance abuse disorders were also felt by participants in our survey to increase the chances that opioid prescriptions would be needed after URS. Leapman *et al.* looked at patients undergoing different procedure types for kidney stone treatment in the national Women Veterans Cohort Study (WVCS) and found that patients with a diagnosis of post-traumatic stress disorder PTSD were more likely to receive higher doses of opioids than others in the cohort (14).

The concerns of the urologist when opioids are not given after URS were also addressed in our survey. The most common concern was patient calls to the clinic for stent-related symptoms. Groups have demonstrated that in their institutional experience, patients who were not given opioids after URS do not in fact call the provider more often than those that do receive them. Large *et al.* retrospectively reviewed 104 patients who underwent URS with ureteral stent placement in which one group was given opioids and one was narcotic-free. They found no significant differences in patient calls for postoperative pain or need for narcotics

between the two groups concluding that a non-opioid approach was safe and effective in their population (10). Similarly, Sobel *et al.* retrospectively reviewed patients who underwent URS with an intention to avoid opioids whenever possible on discharge. A non-opioid approach was feasible in 75% of patients and those not receiving opioids did not make more phone calls to clinic for concerning symptoms, require more post-procedure pain medications, or visit the emergency department (ED) more frequently for pain (9). The same group recently presented their updated results at the 2020 AUA annual meeting, which included 391 patients over a span of 3 years and the non-opioid approach was feasible in 91.3% of patients (15). In addition, Gridley *et al.* recently implemented an Enhanced Recovery After Surgery (ERAS) protocol prospectively for patients undergoing URS. The rate of opioid prescription on discharge decreased from 93% to 0% and similarly there was no difference in postoperative calls for pain or in unscheduled encounters compared to patients discharged pre implementation of the their ERAS protocol (16).

After identifying patient factors that may increase the need for opioids and the concerns of the urologist for not prescribing, the next logical question is what interventions are felt to be useful to limit opioid use in this setting? The most common measures were NSAID use, the use of adjunct medications (alpha-blockers, anticholinergics, phenazopyridine), and pre-op counseling and patient education. Several meta-analyses have reported on the treatment of acute renal colic. Findings support that NSAIDs provide effective analgesia but with fewer adverse events like vomiting and less need for rescue analgesia (6,7).

Patient expectations likely play a major role in how symptoms of pain are managed in the post URS setting. Patients previously receiving opioids for URS may believe that opioids were “needed” in the past and therefore not receiving a prescription goes against the care that they need. For these patients, we feel that this is where education and expectation setting is paramount. While prior opioid use was not incorrect, patients will potentially be more accepting of alternative approaches to pain control when the rationale is carefully explained. Additionally, the general awareness of the detrimental effects of opioids and the epidemic we are facing should lend further support and acceptance. Patients who understand ureteral stent related symptoms and are told what symptoms are concerning warranting medical care likely will call less for the more common routine symptoms. This probably has little to do with the types of medications prescribed.

Complete avoidance of opioids after URS is probably not feasible nor is it the goal. Most patients however do not require opioids in this setting. The impact of patient education and setting expectations along with a focus on pre-operatively identifying those at risk of needing opioids postoperatively (for example, those with mental health and substance abuse history) have not yet been explored in the literature. This approach may prove to be the most effective way to appropriately decrease post URS opioid prescribing in the future.

### Limitations

Our study is limited by its cross-sectional design with known inherent bias. Our response rate was low (8%) but common among surveys; as such, there might be a nonresponse bias. The population sample was skewed towards endourologists given our distribution method was through the endourological society, however, 55.4% of respondents were non-endourologists. In addition, this highlights the opioid prescribing patterns post URS for endourologists who are the most to perform ureteroscopies. We did not account for number of opioid pills prescribed or if prescription patterns differ for participants if their patients were on prior narcotics. Finally, we used a non-validated survey which makes it not possible to predict the reproducibility of our study.

Among participants in our survey, nearly one-quarter of urologists prescribe opioids routinely post URS, and US and Canadian urologists were more likely to prescribe routinely compared to the rest of the world. Despite proven feasibility of non-opioid management following URS, many urologists continue to prescribe opioids in this setting. Most important factors felt to reduce opioid prescription post URS were preoperative counseling, and nonsteroidal anti-inflammatory drugs use. We believe best practice guidelines by the American and Canadian Urological Associations should be considered to reduce opioid prescribing post URS.

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### Footnote

*Reporting Checklist:* The authors have completed the SURGE reporting checklist. Available at <http://dx.doi.org/10.21037/tau-20-1121>

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*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by our institution (University of Vermont) review board (STUDY0000101) and informed consent was taken from all the participants by filling the survey.

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