

Prospective evaluation of postoperative pain and opioid use after minor urologic surgeryBonnie Liu¹, Joseph Moryousef¹, Kevin Feng¹, Jeffrey Campbell¹¹Division of Urology, Department of Surgery, Schulich School of Medicine & Dentistry, Western University, London, ON, Canada

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ABSTRACT

Introduction: Filling an opioid prescription after a minor urologic procedure increases patient risk of overdose and misuse. Strategies to reduce the number of opioids reaching the community are critical. This study evaluates opioid use after minor urologic procedures at a Canadian academic center and guides future prescribing recommendations.

Methods: We prospectively evaluated patients over 18 years old undergoing minor urologic procedures (penile, scrotal, urethral, etc.) from September 2020 to May 2022. Consenting participants were given a pain diary and postoperative pain questionnaire. Patients on chronic pain medications or those who had major surgery within six months were excluded. Response rate, pain on visual analog scale, pain control satisfaction, quantity of opioids prescribed, and consumption of opioid and non-opioid medication were collected and analyzed.

Results: Ninety-five patients met the inclusion criteria. The mean age was 61.7 years (range 20–87) and 96% of patients identified as male. The response rate for the opioid diary and pain questionnaire was 57%. Forty-two patients (78%) were offered an opioid prescription following their surgery, but only 12 of those patients (22%) filled and consumed any opioids analgesics. Forty-two patients (78%) used no postoperative opioids, and the mean oral morphine equivalents

KEY MESSAGES

- Our prospective study at a single Canadian institution demonstrates that most patients undergoing minor urologic procedures do not require any postoperative opioid medications.
- Pain management satisfaction scores are not significantly different between patients who are prescribed opioids and those who are not.
- If opioids are deemed necessary postoperatively after a minor urologic procedure, 39 oral morphine equivalents would be sufficient to meet the pain requirements of 95% of the population.

(OME) consumed was 5.87 (standard deviation 16.7). There was a total of 259 OME unused from post-procedure prescriptions. The mean overall pain score for patients who did and did not fill opioid prescriptions were 3.18/10 and 1.79/10 ($p < 0.01$), respectively, with mean overall pain management satisfaction score of 8.63/10 and 8.58/10 ($p = 0.94$), respectively.

Conclusions: Most patients undergoing minor urologic procedures do not require opioids to manage postoperative pain. Based on our data, we suggest that a prescription for 39 OME would adequately treat postoperative pain in 95% of patients undergoing minor urologic procedures. Education around pain management with non-narcotic modalities is imperative, and practice changes are warranted to address the opioid crisis within our specialty.

INTRODUCTION

Opioid-related overdoses and deaths have been increasing in recent decades, which coincides with an increase in the rate of medical opioid prescriptions.^{1,2} In 2021, there were over 7,500 opioid toxicity-related deaths in Canada, which corresponds to a staggering 21 deaths per day.³ Post-operative opioid prescriptions are unstandardized, often given in excess, and have significant variability amongst surgeons, institutions, and procedures.^{4,5} A large U.S. national study of 96,580 opioid-naïve patients undergoing urologic surgery reported that 51% of patients filled an initial opioid prescription, and persistent use (>3 months) was found in approximately 6% of patients.⁶ Surgical patients represent a demographic at risk for opioid misuse and an important contributing source to the oversupply of narcotics within the community, with a recent Canadian study demonstrating that even short courses of post-surgical opioid prescriptions may increase the risk of persistent opioid use and opioid overdose.⁷

Strategies to reduce the number of opioids given to patients and reaching the community are imperative. Minor and common urologic procedures are ideal targets to reduce the quantity of opioids prescribed. The aim of the current study is to evaluate opioid utilization following minor urologic procedures at a single Canadian academic centre, with the secondary aim of evaluating opioid storage and disposal of unused opioids.

METHODS

We prospectively evaluated patients over 18 years of age undergoing minor urologic procedures (penile, scrotal, urethral, etc.) From September 2020 to May 2022 at St. Joseph's Hospital in London, Ontario. The study was approved by the Western University Health Sciences Research Ethics Board (HSERB) REB# 114814. Patients under the age of 18, those who had a history of chronic pain, or major surgical procedure in the last 6 months were excluded. Participants were approached by to be included in the study by their surgical team either at time of consent for surgery, pre-operatively on the day of surgery, or post-operatively if they were admitted to hospital. They were provided with an introductory letter stating the importance of the study and how it may affect future pain therapy, how their information would be used, and contact

information for the study team. Patients were consented by filling out the intake demographic information, and the consent form.

Consenting participants were given a pain diary and post-operative pain questionnaire (appendix), which were filled out by the participant and mailed back to the study team for analysis in postage-paid envelopes provided. The pain diary and questionnaire were developed in consultation with a multidisciplinary team including surgeons, nurses, and research assistants. Questions included aimed to address outcomes of interest described in previous studies. Participants were contacted up to two times to as a follow-up reminder to complete the diary and questionnaire. Response rates, pain on visual analogue scale, pain control satisfaction rates, quantity of opioids prescribed, consumption of opioid and non-opioid medication, and storage and disposal of unused opioids were collected and analyzed. Opioid analgesic doses were converted to oral morphine equivalents (omes) to account for the different potency of opioids prescribed.

Statistical analyses

All statistics were conducted using SPSS. Continuous data was expressed as a mean \pm standard deviation and proportions were expressed as percentages. Data was assessed for normality using the Shapiro-Wilk test and groups were compared with an independent samples t-test. The threshold for significance was $p < 0.05$ (two-tailed).

RESULTS

Over the course of the study, 95 patients were enrolled. 54 patients completed and returned the questionnaire and diary, with a response rate of 57%. The average age of participants was 61.72 years \pm 16.52 and 96% of patients identified as male. The median Charlson comorbidity index score was 2.83 ± 2.06 (Table 1). The majority of patients enrolled underwent a transurethral resection of prostate (TURP) (47%), with varicocelectomy being the second most common procedure (15%), and hydrocelectomy third (9%). Other procedures included transurethral resection of bladder tumour (TURBT), bladder neck resection, direct internal visual urethrotomy (DVIU), circumcision, Advance sling insertion, orchiectomy, and vasectomy.

Of the 54 participants who responded, 42 patients were given a narcotic prescription (78%), of which 16 filled their prescription (Figure 1). Of those 16, 4 patients did not use any of their filled opioids (Figure 2). In total, 42 of the participants (78%) who responded did not need any omes post-operatively (Figure 3). Patients who did require post-operative omes underwent procedures including TURP, TURBT, varicocelectomies, hydrocelectomies, DVIU, and sling placement, with no one procedure requiring more post-operative omes compared to others. Patients consumed a median of 0 omes, and there was a total 259 omes left over (unused) (Table 2). In sub-analysis including only the 16 patients who filled their narcotic prescription, the mean number of omes filled was 44.31 ± 19.15 , with a mean number of 24.38 ± 27.35 omes consumed, and 19.92 ± 17.42 omes remaining.

Four patients stated that they returned unused narcotics to the pharmacy, one patient flushed their narcotics down the toilet, and the other participants did not state how the leftover narcotics were stored or disposed of. All patients were prescribed non-opioid analgesic medications, most commonly consisting of acetaminophen, nsaids, and anti-spasmodic medications. A small proportion of patient reported using additional pain relief modalities, such as tetrahydrocannabinol (THC) or cannabidiol (CBD) containing compounds, or heat.

The mean number of days that patients had pain was for those not taking opioids compared to those who did was not significantly different (4.42 ± 2.61 vs. 3.83 ± 2.49 , $p=0.48$). The mean pain score for patients that did not use narcotics was statistically lower than those that did use narcotics (1.79 ± 1.68 vs. 3.18 ± 2.07 ; $p<0.01$). The mean pain management satisfaction score between the two groups was not significantly different (8.58 ± 2.58 vs. 8.63 ± 1.71 ; $p=0.94$). There was no statistical difference between the CC index between patients who were offered not narcotic medications and those who were (3.14 vs. 3.08 ; $p=0.91$), nor was there a statistical difference between patients who were not offered narcotic medications and those who filled their narcotic prescription (3.14 vs. 2.58 ; $p=0.47$) (Table 3).

DISCUSSION

The issue of over-prescribing of postoperative opioids in the urologic setting is being increasingly scrutinized. Our study demonstrated that less than one quarter of patients undergoing minor urologic procedures required opioids post-operatively. This is consistent with a recent large Canadian study examining 91,083 urologic patients who underwent minor procedures (i.e., vasectomy, transurethral prostatectomy, etc.) And reported that only 35% of individuals initially filled their opioid prescription.⁷ Reasons given for not filling the opioid prescriptions included lack of significant pain, adequate pain management with non-narcotic medications, and preference to avoid the side effects of narcotic medications. Of the patients who were not offered opioid prescriptions, there was no feedback given that they would have preferred to be prescribed additional opioids on top of their non-opioid analgesics.

Furthermore, among the subgroup of patients who do fill their opioid prescription, a significant majority report having unused opioids, which is consistent with rates found in previous literature. The surplus opioids are frequently stored inappropriately and/or not disposed of safely,⁸ both of which increase the risk of the excess opioids in the community. Population data from the United States shows that among people who misuse opioids, over half of individuals obtain opioids from a friend/family member, and approximately one third of misusers obtain a prescription directly from a physician.⁹

A well-recognized consequence of surgery is that it frequently serves as the first exposure to opioids for many individuals. Studies indicate that approximately 6% of patients develop prolonged opioid use after their procedure, regardless of if the surgery was considered “minor” or “major”.^{6,10} Concerningly, patients who filled an opioid prescription were at higher risk of subsequently presenting at the emergency room or being admitted for opioid intoxication/overdose (OR 3.01, 95% CI 1.55-5.85).⁷ Additionally, a recent large review

demonstrated that there was no improvement in pain control following discharge of surgical patients, however there was an increase in the frequency of common opioid-related side effects (i.e., nausea, vomiting, constipation, dizziness etc.).¹¹ Taken together, opioid overuse may lead to avoidable presentations to the emergency room in severe cases, but also more frequently leads to minor and common adverse effects patients experience at home, and possibly even more major longer-term negative outcomes such as persistent opioid misuse and overdose.

As more studies demonstrate the limited need for post-operative narcotic analgesia, clinicians need to adjust their reflexive opioid prescribing habits in order to reduce the number of unnecessary narcotics reaching the community. A recent study examining the effects of a behavioral intervention program aimed at decreasing opioid prescriptions from urologists performing major procedures (i.e., prostatectomies, nephrectomies) demonstrated a dramatic decrease in the ome (median of 195 to 19 ome for prostatectomies and 200 to 0 ome for nephrectomies) prescribed after the intervention was implemented, without significantly worsening any patient-related outcomes.¹² This study underscores the untapped potential for surgeons to reduce the amount of unnecessary narcotics prescribed.

There are emerging non-narcotic protocols that establish several strategies that can be implemented to achieve optimal pain control and minimize narcotic usage during the pre-, intra- and post-operative periods.¹³ A multidisciplinary panel developed procedure specific recommendations for 16 endourological and minimally invasive urologic procedures. For all the procedures discussed, the minimum number of opioid equivalents recommended was zero.¹⁴ This serves to highlight that adequate pain control can be achieved with opioid-sparing regimens. This is further complemented in our study, as patients reported similar pain management satisfaction scores between groups who did and did not fill an opioid prescription.

It is important to acknowledge that adequate pain control is imperative for functional recovery after surgery, and it is undeniable that opioids do play a role in management. The Choosing Wisely campaign states that surgeons should prescribe the lowest effective dose, potency, and number of doses to address the acute pain episode after considering non-opioid strategies.¹⁵ We found that 78% of patients did not require any ome post-operatively, and even those who did had an average of about 20 OME remaining. This would suggest that a better approach to post-operative pain management would be to prescribe only non-opioid analgesia to all patients, and avoid regularly prescribing opioids. Given that there were no characteristics identified in our study regarding which patients are at higher risk for needing post-operative analgesia, an individualized approach should be undertaken. Assessment in the post-operative care unit to determine level of pain should dictate if patients should be prescribed additional opioid analgesia.

Identifying which patients require opioids for adequate post-operative pain control is key. A large systematic review found that the strongest predictors of worse post-operative pain and increasing analgesic requirements included pre-existing pain, psychological factors (i.e., anxiety, depression), younger age and type of surgery being performed (i.e., abdominal surgery).¹⁶ Therefore, identifying any potential risk factors in patients planning to undergo elective urologic

procedures may allow clinicians to optimize patients prior to proceeding with non-urgent surgery, and thus, reduce or eliminate the need for opioids.

Our study has limitations. Firstly, although this study was prospective, it was conducted in a single institution and consisted of a relatively small sample size in a mostly male population, which may impact the generalizability of these results. The smaller sample size was due to both the COVID-19 pandemic, where many surgeries were cancelled or delayed, and due to time constraint limitations preventing all patients from being invited to participate. If patients were not previously consented to participate in the study prior to their OR, then they needed to be invited to participate in the pre-operative area by residents, where competing demands and responsibilities was a factor. Reassuringly however, our results are consistent with much of the existing literature. Secondly, most aspects of our data were acquired via questionnaires and diaries filled out by the patients, some of which were incomplete, or were non-specific for questions such as doses and strength of adjunct medications were taken, or disposal and storage of unused narcotics. Lack of information on use of co-analgesia limits interpretation of appropriate use of opioids which are meant to be for break-through pain only. In addition, although patients were asked not to take non-prescribed opioids, we were unable to track if patients were taking opioid medications previously prescribed to them.

CONCLUSIONS

Most patients undergoing minor urologic procedures do not require opioids to manage post-operative pain. Our study demonstrates that opioids are being overprescribed, improperly stored, and their use does not improve patient satisfaction with pain management. Pain management can safely be achieved using non-opioid analgesics, and patients should not be regularly receiving narcotic prescriptions. If patients are experiencing higher than expected pain levels in the post-operative care unit, consideration may be given to providing those patients with minimal quantities of opioid analgesia. Education around pain management with non-narcotic modalities is imperative, and practice changes are warranted to address the opioid crisis within our specialty.

REFERENCES

1. Vital signs: overdoses of prescription opioid pain relievers and other drugs among women-- United States, 1999-2010. *MMWR Morb Mortal Wkly Rep* 2013; 62(26): 537-42.
2. Belzak L, Halverson J. The opioid crisis in Canada: a national perspective. *Health Promot Chronic Dis Prev Can* 2018; 38(6): 224-33.
3. Opioid- and Stimulant-related Harms in Canada. Ottawa: Public Health Agency of Canada. 2022. <https://health-infobase.canada.ca/substance-related-harms/opioids-stimulants>.
4. Hill MV, mcMahon ML, Stucke RS, Barth RJ, Jr. Wide Variation and Excessive Dosage of Opioid Prescriptions for Common General Surgical Procedures. *Annals of Surgery* 2017; 265(4).
5. Eid AI, depesa C, Nordestgaard AT, et al. Variation of Opioid Prescribing Patterns among Patients undergoing Similar Surgery on the Same Acute Care Surgery Service of the Same Institution: Time for Standardization? *Surgery* 2018; 164(5): 926-30.
6. Berger I, Strother M, Talwar R, et al. National Variation in Opioid Prescription Fills and Long-Term Use in Opioid Naïve Patients after Urological Surgery. *J Urol* 2019; 202(5): 1036-43.
7. Welk B, mcclure JA, Clarke C, Vogt K, Campbell J. An Opioid Prescription for Men Undergoing Minor Urologic Surgery Is Associated with an Increased Risk of New Persistent Opioid Use. *Eur Urol* 2020; 77(1): 68-75.
8. Bicket MC, Long JJ, Pronovost PJ, Alexander GC, Wu CL. Prescription Opioid Analgesics Commonly Unused After Surgery: A Systematic Review. *JAMA Surgery* 2017; 152(11): 1066-71.
9. Han B, Compton WM, Blanco C, Crane E, Lee J, Jones CM. Prescription Opioid Use, Misuse, and Use Disorders in U.S. Adults: 2015 National Survey on Drug Use and Health. *Ann Intern Med* 2017; 167(5): 293-301.
10. Brummett CM, Waljee JF, Goesling J, et al. New Persistent Opioid Use After Minor and Major Surgical Procedures in US Adults. *JAMA Surg* 2017; 152(6): e170504.
11. Fiore JF, El-Kefraoui C, Chay M-A, et al. Opioid versus opioid-free analgesia after surgical discharge: a systematic review and meta-analysis of randomised trials. *The Lancet* 2022; 399(10343): 2280-93.
12. Jacobs BL, Rogers D, Yabes JG, et al. Large reduction in opioid prescribing by a multipronged behavioral intervention after major urologic surgery. *Cancer* 2021; 127(2): 257-65.
13. Katims AB, Eilender BM, Pfail JL, Sim AJ, Sfakianos JP. Tips and tricks in achieving zero peri-operative opioid used in onco-urologic surgery. *World J Urol* 2022; 40(6): 1343-50.
14. Koo K, Faisal F, Gupta N, et al. Recommendations for Opioid Prescribing after Endourological and Minimally Invasive Urological Surgery: An Expert Panel Consensus. *J Urol* 2020; 203(1): 151-8.
15. Choosing Wisely Canada. <https://choosingwiselycanada.org/opioid-wisely/2022>).
16. Ip Hui YV, Abrishami A, Peng Philip WH, Wong J, Chung F. Predictors of Postoperative Pain and Analgesic Consumption: A Qualitative Systematic Review. *Anesthesiology* 2009; 111(3): 657-77.

FIGURES AND TABLES

Figure 1. Proportion of opioid prescriptions given and proportion filled.

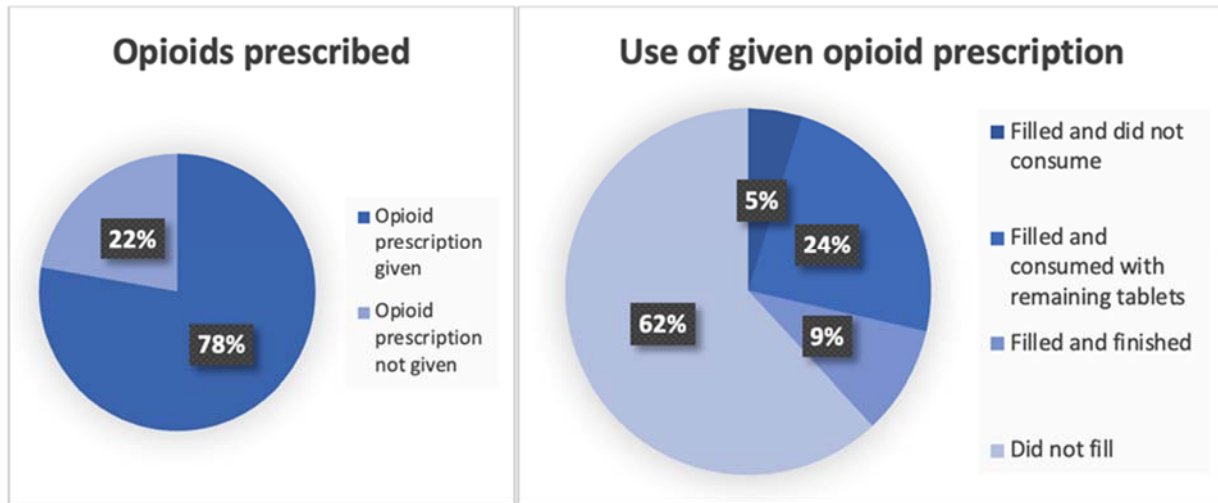


Figure 2. Opioid prescription use.

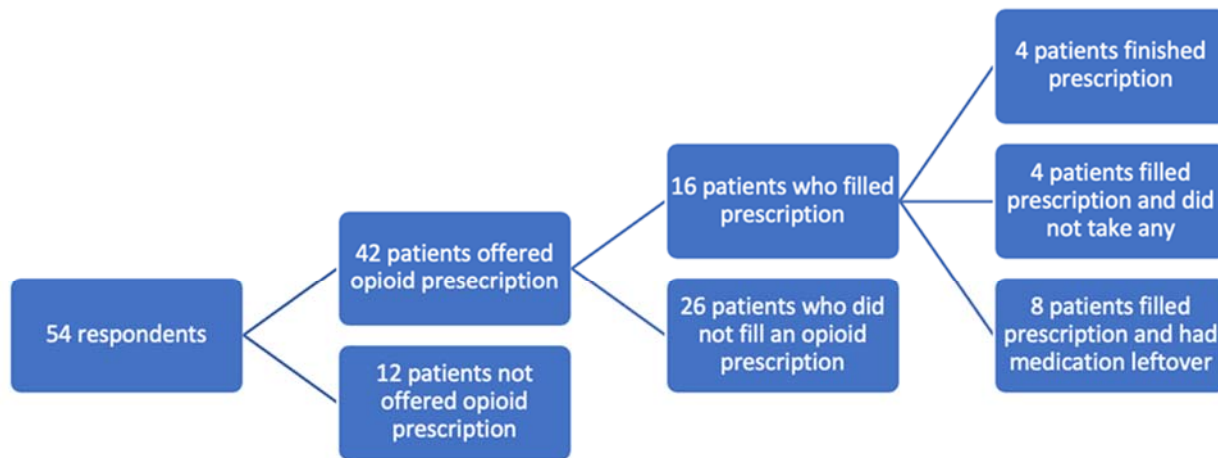


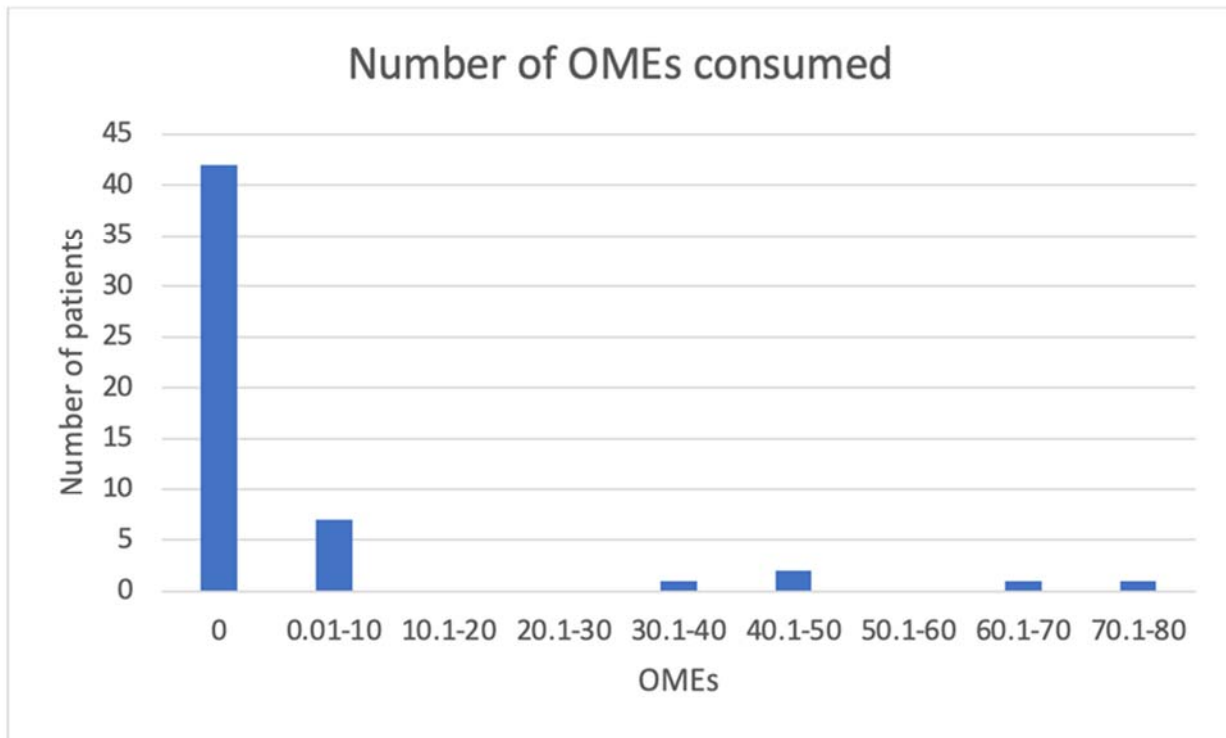
Figure 3. Number of OMEs consumed per patient. OME: oral morphine equivalents.

Table 1. Demographics	
Cohort overview	Number of patients
Cohort size	95
Number of responses	54
Average age	61.72±16.52 (years)
Number of males	91
Average Charlson comorbidity index	2.83±2.06
Procedure performed	
Bipolar TURP	45
Varicocelectomy	14
Hydrocelectomy	9
TURBT	5
Other (DVIU, circumcision, orchiectomy, vasectomy, Advance sling)	22

DVIU: direct visual internal urethrotomy; TURP: transurethral resection of prostate; TURBT: transurethral resection of bladder tumor.

Table 2. Opioid usage	
	OME
Median OME consumed	0
Total remaining OME	259
Subanalysis including only patients who filled their prescription (n=16)	
Mean OME filled	44.31±19.15
Mean OME consumed	24.38±27.35
Mean OME remaining	19.92±17.42

OME: oral morphine equivalents.

Table 3. Pain outcomes			
	Patients not taking opioids	Patients taking opioids	p
Mean number of days with pain	4.42±2.61	3.83±2.49	0.48
Mean pain score	1.79±1.68	3.18±2.07	<0.01*
Mean pain management satisfaction score	8.58±2.58	8.63±1.71	0.94
Mean Charlson comorbidity index	3.14	3.08	P=0.91

*p-value <0.05 considered significant.