Optimizing recovery

An opioid-free pathway for reconstructive urology

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Cite as: Freeman S, Callegari M, Mann R, et al. Optimizing recovery: An opioid-free pathway for reconstructive urology. *Can Urol Assoc J* 2026;20(7):E238-42. http://dx.doi.org/10.5489/cuaj.9407

Published online March 16, 2026

ABSTRACT

INTRODUCTION: Even small quantities of prescribed opioids for acute postoperative pain can lead to addiction, hinder recovery, and be unnecessary. This study evaluated whether an opioid-free postoperative pathway following reconstructive urologic surgery increased pain-related patient communication.

METHODS: An opioid-free postoperative protocol was implemented at our institution in 2019. We conducted a case-cohort study of patients undergoing artificial urinary sphincter (AUS) placement, urethroplasty, or buried penis repair (BPR) between 2015 and 2023. Patients with concurrent surgeries or preoperative opioid use were excluded. Retrospective chart review captured demographics, surgical data, and pain-related communications within 60 days postoperatively. Statistical analysis included unpaired t-tests and Chi-squared tests.

RESULTS: The study included 360 patients: 181 opioid recipients and 179 opioid-free (BPR: 84; urethroplasty: 140; AUS: 132). No significant demographic differences were observed. Pain-related communication did not significantly differ between groups. In the non-opioid cohort, only 3.9% received an opioid within 60 days postoperatively. Pain-related communication occurred in 21% of opioid-treated patients and 16% of non-opioid patients. Among those who contacted providers for pain, 25.8% in the opioid group received refills, while 30.5% of opioid-naive patients were newly prescribed opioids (p=0.26). Most opioid-treated patients (74.2%) were managed with non-narcotic methods after initial contact.

CONCLUSIONS: An opioid-free postoperative regimen for reconstructive urologic procedures, such as urethroplasty, BPR, and AUS placement, is feasible, well-tolerated, and does not increase pain-related patient communication, supporting broader adoption of opioid-sparing approaches in surgical care.

INTRODUCTION

Opioid use in postoperative pain management remains commonplace in the U.S., despite growing concerns about overprescription, addiction, and adverse effects. Compared to other countries, U.S. patients receive significantly higher quantities of opioids after surgery yet report higher postoperative pain levels, raising questions about the necessity of opioids for effective pain control.[1,2] In response to the ongoing opioid crisis, healthcare institutions have explored opioid-free pathways that prioritize multimodal analgesia, including non-opioid medications and regional anesthesia, to improve pain management while reducing opioid exposure.

Urologic surgery is not exempt from opioid prescription variability, with rates ranging from as low as 3% following cystoscopy to as high as 84% following orchiectomy.[3-5] Reconstructive urologic procedures, such as artificial urinary sphincter (AUS) placement, urethroplasty, and buried penis repair (BPR), are perceived as more invasive and painful, leading to higher rates of opioid prescription;[6] however, whether opioids are truly necessary in this context has never been investigated and remains unclear.

While surgical literature within orthopedics, general surgery, otolaryngology, and dentistry demonstrates excellent tolerance postoperatively without opioid medications, applications within urology continue to be explored. Procedure-specific literature evaluating penile implantation and robotic prostatectomy have parallelled the existing surgical

KEY MESSAGES

- Among 360 patients undergoing reconstructive urologic surgeries, there was no significant increase in pain-related calls or messages in patients managed without opioids compared to those who received them.
- Only 3.9% of patients in the opioid-free cohort required a postoperative opioid prescription, suggesting multimodal non-opioid analgesia is effective for most patients.
- The success of the opioid-free pathway was attributed to the use of NSAIDs, acetaminophen, local anesthesia, and preoperative counseling on pain expectations.
- There was no statistically significant difference in pain-related communication (phone calls or EMR messages) between the two cohorts, indicating the opioid-free approach did not increase clinical workload.

literature with good effect, further suggesting that opioid-free postoperative regimens can be well-tolerated across a broad spectrum of urologic applications without increasing patient-reported pain.[7,8]

This study evaluated the feasibility, patient tolerance, and provider workflow volume of implementing an opioid-free postoperative pathway for patients undergoing reconstructive urologic surgery.

METHODS

After institutional review board approval, we performed a retrospective case-cohort study, identifying patients who underwent AUS placement, urethroplasty, or BPR between 2015 and 2023. All surgeries were performed by a single surgeon within a tertiary care facility. Patients were excluded if they had a diagnosed chronic pain condition, used opioid pain medications prior to surgery, underwent combined procedures during a single operative setting, or were admitted to the hospital overnight.

In 2019, our institution implemented an opioid-free postoperative care pathway encouraging the use of multimodal analgesia, including intraoperative local anesthesia (0.25% bupivacaine) to the incision site, as well as over-the-counter oral analgesia (non-steroidal anti-inflammatory drugs [NSAIDs] and/or acetaminophen). It is important to note that while a multimodal opioid-free pathway was encouraged, the specific timing and dosing of NSAIDs, acetaminophen, and local anesthetic use were not standardized across all cases, reflecting real-world practice variation.

Intraoperative local anesthesia was not used in AUS surgery. Patients undergoing urethroplasty with buccal mucosa grafting were given a prescription for a mixed medication mouthwash (compounded prescription comprised of diphenhydramine, generic Maalox [aluminum & magnesium hydroxide], and approximately 2% viscous lidocaine) postoperatively. Prior to implementation, patients received prescriptions for 5–10 opioids following these procedures and were categorized as "opioid-receiving." Patients undergoing surgery after 2019 did not receive postoperative opioids and were classified as "opioid-free."

Demographic, surgical, and postoperative data for both cohorts were collected through a retrospective chart review. In-person followup visits were consistent across the entire patient cohort: one and two weeks postoperatively for BPR, three weeks for voiding cystourethrogram following urethroplasty, and 6–8 weeks following AUS. Additionally, pain-related phone calls and opioid prescription requests within 60 days of surgery were tracked to include the time period between surgery and standard followup intervals. Non-phone call communications, such as patient messages within the electronic medical record, were also evaluated for this time frame. Patients were stratified by surgical procedure type.

Statistical analysis was conducted using unpaired t-tests for continuous variables and Chi-squared tests for categorical variables.

RESULTS

A total of 360 patients were included: 132 AUS placement, 88 BPR, and 140 urethroplasty. Of these, 181 patients received opioids postoperatively, while 179 did not. There were no statistically significant differences between the two cohorts regarding patient demographics, comorbidity profile, or surgery type performed (Table 1).

A total of 31 (24.8%) patients in the opioid-receiving group phoned the clinic postoperatively to report pain, compared to 23 (12.8%) patients in the opioid-free cohort (p= 0.26). For non-phone call communications, five (3.9%) patients contacted the clinic to report pain compared to seven (2.8%) patients in the opioid-free cohort (p=0.57). There was no statistically significant

Table 1. Demographics comparing those who received a postoperative opioid prescription and those who did not

All surgeries			
	Opioid receiving (181 patients)	**Opioid-free (179 patients)**	**p**
Age, median (Q1, Q3)	61 (47, 70)	54 (44, 66)	0.2392 (95% CI -1.26 –5.02)
Diabetes, n (%)	42 (23)	19 (48)	0.7594
Smoking history, n (%)	66 (36)	12 (30)	0.2446
Psych diagnosis, n (%)	40 (22)	14 (35)	0.644
Buried penis repair			
	Opioid receiving (48 patients)	**Opioid-free (40 patients)**	**p**
Age, median (Q1, Q3)	56 (45, 65)	54 (42, 65)	0.4551 (95% CI -3.88 –8.59)
Diabetes, n (%)	21 (44)	19 (48)	0.725
Smoking history, n (%)	15 (31)	12 (30)	0.8993
Psych diagnosis, n (%)	14 (29)	14 (35)	0.5586
Urethroplasty			
	Opioid receiving (69 patients)	**Opioid-free (71 patients)**	**p**
Age, median (Q1, Q3)	49 (39, 61)	54 (42, 65)	0.1263 (95% CI -8.94 –1.12)
Diabetes, n (%)	10 (14)	11 (15)	0.8684
Smoking history, n (%)	24 (35)	26 (37)	0.8206
Psych diagnosis, n (%)	16 (23)	9 (13)	0.1045
Artificial urinary sphincter insertion			
	Opioid receiving (64 patients)	**Opioid-free (68 patients)**	**p**
Age, median (Q1, Q3)	70 (65, 74)	72 (63, 76)	0.2345 (95% CI -4.04 –1.00)
Diabetes, n (%)	11 (17)	14 (21)	0.6182
Smoking history, n (%)	27 (42)	38 (56)	0.1158
Psych diagnosis, n (%)	10 (15)	13 (19)	0.597

CI: confidence interval.

difference in postoperative pain-related communication between cohorts, even when stratified by surgery type (Table 2). Patients evaluated in person during regularly scheduled postoperative visits reported no statistically significant pain or narcotic medication requirement.

Within the opioid-receiving cohort, 12 (25%) patients who underwent BPR were the most likely to call with pain, followed by 10 (14.5%) urethroplasty patients and nine (14.1%) AUS patients. In the opioid-free cohort, urethroplasty patients were the most likely to call (15.5%), followed by BPR patients (12.5%). Although BPR patients in the opioid-receiving group were twice as likely to call with pain compared to their opioid-free counterparts, this difference was not statistically significant (p=0.14).

Overall, only seven (3.9%) patients in the opioid-free cohort required and filled an opioid prescription during the 60-day postoperative period, compared to 10.4% of patients discharged with opioid prescriptions. In the opioid receiving group, 31 (24.8%) patients called postoperatively to report pain, with eight (25.8%) of those receiving a refill. In the opioid-free group, 23 (12.8%) patients called with postoperative pain concerns, and seven (30.4%) patients were prescribed a first-time opioid after surgery (p=0.26); 74.2% of all patients who received narcotics initially and who called reporting postoperative pain were successfully managed with non-opioid modalities.

DISCUSSION

Our findings demonstrate how opioid-free postoperative pain management is well-tolerated following an array of reconstructive urologic procedures. Among 360 patients (undergoing AUS placement, urethroplasty, or BPR), the rate of pain-related phone or non-call communications did not differ significantly between those who received opioids and those managed without them. Only seven (3.9%) opioid-free patients ultimately required an opioid prescription within 60 days of surgery, suggesting that nearly all postoperative pain can be effectively controlled with multimodal non-narcotic analgesia.

Our results align with prior studies across many surgical specialties, demonstrating no increase in pain-related complications or concerns with opioid-free protocols. Within urology, limited published protocols following penile implantation and robotic prostatectomy have specifically demonstrated significant reductions in narcotic necessity and use.[7,9] Our results look to expand this notion and progress our understanding of postoperative pain management, particularly within urology.

While this trend in prescription behavior is promising, opioid prescribing patterns remain highly variable, especially within urology, and even among identical procedures. One multi-institutional study of over 11 000 patients undergoing 21 different urologic procedures found wide discrepancies in opioid use, with prescription rates ranging from 0–88.9% among individual surgeons and 19.9–66.7% across institutions.[10] More specifically, and with regard to reconstructive urologic intervention, Patel et al highlighted that reconstructive urology patients receive more opioids, in larger quanti-

ties, and more quickly than patients undergoing oncologic or minimally invasive urologic procedures.[6] This variability underscores the need for consensus and standardized opioid-prescribing guidelines to ensure consistent, evidence-based postoperative pain management.

Several factors may explain why patients in our opioid-free cohort did not report increased pain-related concerns. Our multimodal opioid-free protocol included preoperative counseling, intraoperative local anesthesia (bupivacaine), and routine postoperative NSAIDs/acetaminophen, which we believe provided adequate pain relief without opioids. Interestingly, local anesthesia was not used for AUS placement (to prevent inadvertent device trauma), yet these patients did not experience increased pain-related calls compared to patients who did receive local anesthesia, suggesting that multimodal oral analgesia alone may be effective.

Additionally, preoperative education on pain expectations and non-opioid pain management strategies likely played a role in patient tolerance. Within our study, although not statistically significant, patients undergoing BPR and prescribed opioids were twice as likely to call about pain compared to the opioid-free cohort (25% vs. 12.5%), suggesting that opioid recipients may have anticipated higher pain levels or experienced opioid-induced hyperalgesia, leading to increased pain sensitivity. Published literature has reaffirmed how patients who are counseled on expectation management and opioid alternatives postoperatively report similar or even lower pain scores than those arbitrarily prescribed opioids.[11,12]

It is important to note that among patients who called to report postoperative pain (n=54), the majority (72.2%) were managed without an opioid prescription. In our practice, it is standard to ensure patients are taking scheduled acetaminophen, alternating with NSAIDs if there are no contraindications based on the patient's medical history. We also recommend the application of ice packs and the use of adaptive equipment when applicable (i.e., donut pillows for car rides). It is also important to consider other transient and often reversible causes of postoperative pain, including a catheter secured too tightly, inappropriate lifting or physical activity, or reactions from adhesives, skin glue, or surgical prep.

The use of non-call communication channels, such as direct patient messaging, has become more prevalent in recent years, especially in the post-COVID health communication landscape. Despite increased prevalence and use, our study did not reveal a statistically significant increase in patient contact and or subsequent clinical burden.

Table 2. Differences in pain-related phone calls within 60 days of reconstructive surgery between those who received a postoperative opioid prescription and those who did not

All surgeries			
	Opioid receiving (181 patients)	**Opioid-free (179 patients)**	**p**
Patients with pain calls, n (%)	31 (17)	23 (13)	0.2557
Patients with non-call pain communications, n (%)	7 (4)	5 (3)	0.5715
Patients who received opioids after communicating postoperatively, n (%)	8 (26)	7 (30)	0.7073
Patients who ultimately received an opioid prescription, n (%)	189 (104)*	7 (4)	<0.001
Buried penis repair			
	Opioid receiving (48 patients)	**Opioid-free (40 patients)**	**p**
Patients with pain calls, n (%)	12 (25)	5 (13)	0.1392
Patients with non-call pain communications, n (%)	6 (13)	2 (5)	0.2277
Patients who received opioids after communicating postoperatively, n (%)	3 (25)	1 (20)	0.8248
Patients who ultimately received an opioid prescription, n (%)	51 (106)*	1 (3)	<0.001
Urethroplasty			
	Opioid receiving (69 patients)	**Opioid-free (71 patients)**	**p**
Patients with pain calls, n (%)	10 (15)	11 (16)	0.8684
Patients with non-call pain communications, n (%)	0 (0)	1 (1)	0.326
Patients who received opioids after communicating postoperatively, n (%)	4 (40)	4 (36)	0.8639
Patients who ultimately received an opioid prescription, n (%)	73 (106)*	5 (6)	<0.001
Artificial urinary sphincter insertion			
	Opioid receiving (64 patients)	**Opioid-free (68 patients)**	**p**
Patients with pain calls, n (%)	9 (14)	7 (10)	0.692
Patients with non-call pain communications, n (%)	1 (2)	2 (3)	0.5986
Patients who received opioids after communicating postoperatively, n (%)	1 (11)	2 (29)	0.3747
Patients who ultimately received an opioid prescription, n (%)	65 (102)*	2 (3)	<0.001

*Total opioid-receiving patients, including those who received an opioid prescription refill.

Limitations

While our study provides compelling evidence supporting opioid-free postoperative care, several limitations should be acknowledged.

One limitation is that pain was not assessed using standardized quantitative scales (e.g., Visual Analog Scale) due to the retrospective nature of this

study; instead, postoperative pain was inferred from patient communications and clinical documentation. Additionally, some patients may have tolerated pain without communicating, potentially underestimating true pain levels.

While NSAID/acetaminophen use was advocated to all postoperative patients, this was not systematically tracked, meaning variation in non-opioid analgesic consumption could have influenced pain outcomes. Future studies should assess adherence to multimodal analgesia.

Quality-of-life measures and patient-reported outcomes were not captured in this retrospective review; future prospective studies should integrate standardized questionnaires to better assess functional recovery and patient satisfaction.

The broad date range (2015–2023) introduces variability in electronic medical record documentation and evolving provider prescribing practices, which may affect data consistency.

Lastly, opioid prescription variability before 2019 (5–10 pills per patient) was not controlled, potentially influencing the rate of pain-related calls in the opioid group.

Despite these limitations, our findings strongly support the successful implementation and patient tolerance of opioid-free postoperative pain management pathways for reconstructive urologic surgeries.

Future prospective studies should incorporate validated pain scores, monitor non-opioid analgesic consumption, and assess long-term functional outcomes to further refine opioid-free protocols.

CONCLUSIONS

Our study demonstrates that an opioid-free postoperative pathway can be successfully implemented in reconstructive urologic surgery without increasing patient-reported pain concerns or contact. These findings contribute to the growing body of evidence supporting opioid stewardship in surgical care and emphasize the importance of multimodal analgesia and patient education in reducing opioid reliance.

COMPETING INTERESTS: The authors do not report any competing personal or financial interests related to this work.

This paper has been peer-reviewed.

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