# Optimizing recovery: An opioid-free pathway for reconstructive urology

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## 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,

**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, Tylenol, 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.

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 United States, 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 demonstrate excellent tolerance post operatively without opioid medications, applications within urology continue to be explored. Procedure specific literature evaluating penile implantation and robotic prostatectomy have parallelled the existing surgical 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 evaluates the feasibility, patient tolerance and provider workflow volume of implementing an opioid-free postoperative pathway for patients undergoing reconstructive urologic surgery.

## METHODS

After IRB approval we performed a retrospective case-cohort study, identifying patients who underwent AUS placement, urethroplasty, or Buried Penis repair (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 post-operative 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 (NSAIDS and/or Tyelonol). 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 ~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 post-operative data for both cohorts were collected through a retrospective chart review. In person follow up visits were consistent across the entire patient cohort; 1 and 2 weeks postoperatively for BPR, 3 weeks for voiding cystourethrogram following urethroplasty, 6-8 weeks following AUS. Additionally, pain-related phone calls and opioid prescription requests within 60 days of surgery were tracked to include all the time period between surgery and standard follow-up intervals. Non-phone call communications such as patient messages within the electronic medical record were also evaluated for this time frame as well. 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 post-operatively, while 179 did not. There were no statistically significant differences between the two cohorts with regards to 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 post operatively reporting pain, compared to 23 (12.8%) patients in the opioid-free cohort (p= 0.26). For non-phone call communications, 5 (3.9%) patients contacted the clinic to report pain compared to 7 (2.8%) patients in the opioid-free cohort (p=0.57). There was no statistically significant difference in post-operative pain-related communication between cohorts, even when stratified by surgery type or (Table 2). Patients evaluated in person during regular 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 9 (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 7 (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 post-operatively to report pain, with 8 (25.8%) of those receiving a refill. In the opioid free group, 23 (12.8%) patients called with post-operative pain concerns, and 7 (30.4%) patients prescribed a first-time opioid after surgery (p = 0.26). 74.2% of all patients having received narcotics initially, and who called reporting post-operative 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 7 (3.9%) of 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 as well as robotic prostatectomy specifically have demonstrated significant reductions in narcotic necessity and use.[7, 9] Our results look to expand this notion and progression in our understanding of postoperative pain management particularly within urology.

While this momentum in prescription behavior is promising, opioid prescribing patterns remain highly variable, especially within urology and even among identical procedures. One such 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% to 88.9% among individual surgeons and 19.9% to 66.7% across institutions.[10] More specifically, and with regards to reconstructive urologic intervention, Patel et al. highlighted that reconstructive urology patients receive more opioids, in larger quantities, 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/Tylenol, 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 post operatively, as well as opioid alternatives, report similar or even lower pain scores than those arbitrarily prescribed opioids.[11,12]

It is important to note that amongst patients who called to report post-operative 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 Tylenol, alternating with Ibuprofen 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.

Utilization of non-call communication channels such as direct patient messaging have been becoming more prevalent in recent years and especially in the post-COVID health communication landscape. Despite increased prevalence and utilization, our study did not reveal a statistically significant increase in patient contact and or subsequent clinical burden.
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/Tylenol 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 (EMR) 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.

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## FIGURES AND TABLES

| **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 |

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

**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 post operatively, 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 post operatively, 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 post operatively, 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 post operatively, n (%) | 1 (11) | 2 (29) | 0.3747 |
| Patients who ultimately received an opioid prescription, n (%) | 65 (102)* | 2 (3) | <0.001 |