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ORIGINAL RESEARCH

Novel Multi-Modal Analgesia Protocol Significantly Decreases Opioid Requirements in Inflatable Penile Prosthesis Patients

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ABSTRACT

Background: Inflatable penile prosthesis (IPP) surgery is associated with significant perioperative pain that may reduce patient satisfaction. Though various pain management strategies have been proposed, most implanters manage postoperative patients with only prescription opioids. No protocol to date has been implemented and reported for pain management in IPP patients throughout the entire recovery process following surgery.

Aim: Develop a multimodal analgesic (MMA) regimen consisting of perioperative administration of acetaminophen, meloxicam, and gabapentin with intraoperative local anesthetic injections, and compare postoperative pain control to a matched cohort of patients managed with an opioid-based (OB) regimen.

Methods: We retrospectively analyzed our prospectively maintained IPP database from November 2015—January 2018. The MMA protocol was instituted for all patients beginning June 2017, and these patients were matched in a 1:2 ratio to a cohort of eligible IPP patients managed through an OB protocol. Only patients receiving a 3-piece IPP were included; those with a history of narcotic dependence, neuropathy, or chronic nonsteroidal anti-inflammatory drug use were excluded. Postoperative pain scores (visual analog scale) and opioid usage (total morphine equivalents [TME] in milligrams) were compared temporally in the post-anesthesia care unit, postoperative day (POD) 0, POD 1, and following discharge.

Outcomes: The primary outcomes of the study are postoperative pain scores and narcotic usage.

Results: 57 patients were eligible for analysis: 19 (33%) and 38 (66%) in the MMA and OB groups, respectively. Groups were similar in demographics. MMA patients had significantly lower visual analog scale scores in post-anesthesia care unit, POD 0, or POD 1 (mean 0.84 vs 2.97, $P = .01$; 2.62 vs 4.73, $P = .003$; and 2.26 vs 4.0, $P = .01$, respectively) and used fewer narcotics on POD 0 (mean 4.08 vs 13.8 mg TME, $P < .001$) and POD 1 (mean 5.05 vs 25.1 mg TME, $P < .001$). MMA patients were discharged home with fewer narcotics (mean 12.7 vs 51.3 tabs, $P < .001$), and despite this, the MMA group needed less narcotic medication refills (11% vs 49%, $P = .007$). Neither group experienced a medication-related postoperative adverse event.

Clinical Implications: Multimodal pain management allows for effective pain control with minimal side effects, enhancing recovery.

Strengths & Limitations: This is the first report to assess use of a multi-modal pain regimen on IPP recipients with demonstration of tangible benefit throughout the recovery process. Limitations include a single-surgeon and retrospective study design.

Conclusion: In our rigorous assessment of IPP patients, implementation of a novel MMA protocol achieved equivalent and effective pain control, while resulting in substantially fewer narcotics throughout the entire postoperative period following IPP implantation. **Tong CMC, Lucas J, Shah A, et al. Novel Multi-Modal Analgesia Protocol Significantly Decreases Opioid Requirements in Inflatable Penile Prosthesis Patients. J Sex Med 2018;XX:XXX—XXX.**

Key Words: Multimodal Analgesia; Pain Management; Inflatable Penile Prosthesis; Opioid Narcotics; Penile Pain

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INTRODUCTION

Penile prosthesis implantation is a definitive surgical treatment for men with refractory erectile dysfunction and is associated with high satisfaction rates given its reliability and ease of use. Definition of postoperative success is complex and likely multifactorial, depending on postoperative complications, cosmetic outcome, device function, and management of postoperative pain and swelling.[1] In spite of high satisfaction rates,[2,3] patients often struggle obtaining adequate postoperative pain control, and few patients may even develop chronic pain following surgery.[4] To date, postoperative pain management strategies have not been well-characterized following inflatable penile prosthesis (IPP) implantation and the implementation of an enhanced recovery after surgery (ERAS) protocol for IPP patients is lacking.[5]

Accordingly, prior investigations have suggested pain management algorithms involving dorsal penile nerve blockage, peripenile infiltration, topical injection, and/or crural blockade,[6–9] but none have postulated management protocols that traverse the entire recovery period.[10] With the narcotic epidemic now declared a national crisis, clinicians are seeking alternatives to minimize opioid-based (OB) regimens throughout the recovery period. Here, we report outcomes of a novel algorithmic approach developed for pain management in patients undergoing IPP placement using a multimodal analgesic (MMA) protocol in the preoperative, intraoperative, and postoperative period. To our knowledge, this is the first study examining the safety and efficacy of the combination of local infiltrative anesthetics and multi-modal oral agents in urologic patients throughout the entire postoperative period. We hypothesize that our multi-modal regimen will achieve effective pain control while lowering total narcotic consumption and its potential systemic side effects.

METHODS

Patient Selection

We reviewed a prospectively maintained, institutional review board–approved database of IPP cases performed by a single urologist from November 2015–January 2018. To control for unmeasured confounders and increase statistical power, all patients who underwent a 3-piece penile prosthesis placement and received the OB regimen were retrospectively identified and matched by a 2-to-1 ratio to a prospective cohort of patients who received the MMA protocol, which was instituted for all patients beginning June 2017.[11]

Only patients who underwent placement of a 3-piece IPP or those with a malfunctioning 3-piece prosthesis requiring replacement surgery were included for initial analysis. Patients receiving malleable penile implants, 2-piece implants, as well as combination IPPs with male slings, artificial urinary sphincters, and Peyronie plaque incision were excluded from initial analysis. Strict exclusionary criteria were then developed in order to understand the true effect of the novel pain regimen. Accordingly, men were excluded from initial analysis and overall study participation if they were allergic to any component of the MMA agents or had a history of neuropathy, narcotic dependence, or prior gabapentin, pregabalin or chronic non-steroidal anti-inflammatory drug (NSAID) use (Figure 1).

Evaluated patient information included age, body mass index, and race. History of medical comorbidities including diabetes, peripheral neuropathy, chronic pain, gastrointestinal ulcers, liver disease, chronic kidney disease, bleeding diatheses, peripheral vascular disease, or prior penile implantation were also analyzed, all of which were obtained by medical record documentation from each patient's primary care physician. Preoperative or chronic use of NSAIDs, prescription opioids, gabapentin, pregabalin, or acetaminophen were determined by review of the patient's home medications and query of the patient's default home pharmacy.

Surgical Technique and MMA Protocol

All surgeries were performed under general anesthesia. Patients eligible for the MMA protocol received 975 mg acetaminophen, 300 mg gabapentin, and 7.5 or 15 mg meloxicam preoperatively prior to induction of anesthesia (Appendix A). The surgeon utilized a total 40 mL of 50/50 mixture of 1% lidocaine and 0.5% bupivacaine without epinephrine prior to incision to perform a dorsal penile nerve block (20 mL) and pudendal nerve block (20 mL). Either an AMS 700 CX/LGX device (Boston Scientific, Boston, MA, USA) or Coloplast Titan implant (Coloplast, Minneapolis, MN, USA) were placed in a standardized manner through an infra-pubic or peno-scrotal approach at the discretion of the patient and surgeon. All reservoirs in both cohorts were placed in a high submuscular position by a previously described technique.[12] Patients in the OB regimen did not receive any medications preoperatively or local anesthetic injections intraoperatively.

Postoperatively, patients in the MMA arm received 975 mg acetaminophen every 6 hours, 300 mg gabapentin every 8 hours, and 7.5 or 15 mg meloxicam daily around the clock. In addition, patients were instructed to request oxycodone 5 mg every 4 hours or morphine 2 mg every 2 hours as needed for moderate or severe pain, respectively. Patients in the OB arm were permitted to request acetaminophen/oxycodone 650/10 mg every 4 hours or morphine 2 mg every 2 hours as needed (Appendix A).

Patients were left inflated following implantation at roughly 60% for the duration of their recovery to prevent pseudocapsule formation and challenging device activation. At time of discharge, on postoperative day (POD) 1, MMA patients were discharged with 30-day prescriptions of their in-hospital pain regimen, with the addition of a prescription for oxycodone 5 mg every 4 hours as needed for pain. The purpose of discharging patients in the MMA arm with a narcotic prescription was to allow for head-to-head comparison of post-discharge narcotic usage compared with OB patients. Patients in the OB arm were discharged with acetaminophen/oxycodone 325/5 mg every 4