SEXUAL MEDICINE REVIEWS

# Pain Management in Penile Prosthetic Surgery: A Review of the Literature

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ABSTRACT

**Introduction:** The literature on perioperative pain control and management in inflatable penile prosthesis placement is not firmly established. Because inflatable penile prosthesis placement is an elective procedure, pain can be one of the many issues that influence patient decision making. Pain control also presents a unique challenge to providers in an era of widespread opiate abuse.

**Aim:** To review published data on pain management before, during, and after penile prosthetic surgery.

**Methods:** Peer-reviewed literature and conference abstracts were analyzed for all relevant publications related to this issue.

**Results:** The past several decades have seen a shift from general to local anesthesia for penile prosthetic surgery. This has been well characterized and is seen as successful with different local anesthetic options and techniques. To date, only one study has provided follow-up for longer than 1 week regarding postoperative pain management for prosthetic surgery.

**Conclusion:** Perioperative pain management for the patient receiving a penile prosthetic is well characterized; postoperative pain management is not. Although periprocedural local anesthesia has been well described for penile prosthesis surgery, a standardized postoperative pain management plan does not exist. This review highlights the need for further characterization of postoperative pain and the subsequent development of an algorithmic approach for management. **Reinstatler L, Shee K, Gross MS. Pain Management in Penile Prosthetic Surgery: A Review of the Literature. Sex Med Rev 2017;X:XXX–XXX.**



**Key Words:** Penile Prosthesis; Penile Prosthetic Outcomes; Pain Management; Penile Pain

## INTRODUCTION

In an era of drug addiction and narcotic epidemics, postoperative pain management is of substantial importance to all clinicians. Efforts to adequately control pain without contributing to addiction and/or illegal distribution of narcotic substances have spurred not only millions of dollars in federal funding but also numerous research studies. Multimodal analgesia is the standard, yet consistent pain management plans for many procedures do not exist.[1]

Urology practice frequently involves pain management. From chronic pain illnesses such as interstitial cystitis and pelvic pain syndrome to the acute pain of patients with renal colic, the well-trained urologist is versed in pain management. Difficult operations such as cystectomies and radical prostatectomies have merited attention to pain management and the literature on treating pain in these procedures is robust. What is not well characterized is pain management in penile prosthetics. These procedures are elective; thus, pain management is crucial to surgical decision making and postoperative success.

This article provides a comprehensive review of perioperative and postoperative management of the patient receiving a penile prosthesis (PP). Aspects considered include surgical techniques in installation including intraoperative anesthesia, pain control in other urologic procedures, the pathophysiology of penile pain, reported penile and scrotal pain management, a review of the different anesthetic options, and a comprehensive examination of current studies examining inflatable PP (IPP) pain management.

## METHODS

A literature search was conducted using PubMed for publications related to PPs, penile and scrotal surgery, penile and scrotal pain, techniques of PP implantation, management of perioperative pain, and various types of local anesthetics. Abstracts were reviewed based on title and appropriate articles

Received April 30, 2017. Accepted May 15, 2017.

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http://dx.doi.org/10.1016/j.sxmr.2017.05.005

were included in the review. Conference abstracts also were available from the annual American Urological Association meeting and the Sexual Medicine Society of North America conferences; these were screened for similar topics.

## PENILE PROSTHETIC DEVICES

The treatment of erectile dysfunction with PPs has existed for hundreds of years.[2] The literature on the evolution of PPs and surgical techniques is robust.[3,4] With improving research over the years, prosthetic design and technology have expanded exponentially and the current models have high levels of patient satisfaction and low complication rates.[3–8] PPs are classified into two groups—inflatable and semirigid. Each device type has its own set of benefits and risks and suitable patient populations. The most commonly implanted device is the three-piece IPP[9,10] and nearly 20,000 are placed in the United States every year.[11]

## PENILE PROSTHETIC TECHNIQUES

In general, there are two surgical approaches for the placement of an IPP: infra-pubic and penoscrotal; these techniques have been described extensively.[12,13] Although this was once an inpatient procedure, most of these surgeries are currently performed as same-day or outpatient procedures.[7,14] The Prospective Registry of Outcomes with Penile Prosthesis for Erectile Restoration (PROPPER) study is a large, international, multicenter ongoing analysis of patients with IPPs. Among the more than 1,000 patients in their registry, 51% stayed for less than 24 hours of observation, 43% underwent same-day discharge, and 5% were admitted to the hospital for more than 1 day.[6]

## UROLOGIC PAIN

Urologists frequently treat pain for different conditions, such as renal colic, malignancy, trauma, and so on. Pain control perioperatively and intraoperatively for penile surgery has been extensively studied. From the first publication to describe a painless neonatal circumcision using a dorsal peripheral nerve block (DPNB) in 1977 to the caudal block, control of penile pain in pediatric urology has been well described. Hsu et al[15–17] published several studies citing their experience and recommendations in controlling penile pain in adult urologic surgeries. They tried various local nerve blocks and recommended that the dorsal nerve block is effective for many penile surgeries including vascular procedures, curvature correction, circumcision, and partial penectomy. For insertion of a PP, they strongly recommended a crural block to specifically address the dilatation pain.

A large prospective study aimed at studying surgical pain was conducted in Germany and reported in 2016. The study examined postoperative pain in elective joint, back, and urologic surgeries to include cystectomy, nephrectomy, and radical prostatectomy. Pain was assessed before surgery, on postoperative day 2, and 6 months after surgery. Almost 20% of urology patients reported pain preoperatively. Their pain on a rating scale of 1 to 10 changed from a preoperative average of 1.6 to postoperative day 2 to an average of 4.2 and then back down to a level of 1.1 at 6 months postoperatively. Two percent of patients were still using opioids at the 6-month mark.[17] These data are encouraging in that the vast majority of patients recovered from their acute surgical pain.

## PATHOPHYSIOLOGY OF PENILE AND SCROTAL PAIN

Pain is defined by the International Association for the Study of Pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage."[14] Men and women experience acute and chronic urologic pain. Although it is well known that the penis is a highly innervated and vascularized organ, the pathophysiology of chronic penile and scrotal pain remains poorly understood.

Acute penile pain arises from the somatosensory peripheral nerve pathways. These pathways begin at afferent terminations in the penis: the skin, glans, urethra, and corpora cavernosa. These sensory receptors consist of many free nerve endings and corpuscular receptors at a ratio of 10:1.[13] These terminal nerve fibers from the receptors converge to form the dorsal nerve of the penis, one of the major branches of the pudendal nerve. The pudendal nerve enters the spinal cord through the S2 to S4 roots to terminate in the central gray region of the lumbosacral segment. Then, these signals are sent to the thalamus and sensory cortex along the spinothalamic and spinoreticular pathways, which translate to sensations of pain, temperature, and touch.[18] Three of the major nerve blocks used for penile surgery target the three major nodes in the somatosensory nerve pathway: the dorsal nerve of the penis, the pudendal nerve, and the S2 to S4 roots (caudal block).

A group from Brazil led by Nakano et al[19] recently published their study of nearly 870 men and reported the prevalence of penile pain to be 9.3%. They found significant associations of pain with the presence of lower urinary tract symptoms and suggested that in working up any type of pelvic pain, lower urinary tract symptoms should be assessed and could be a potential therapeutic target.

In contrast to the dearth of understanding about chronic penile pain, chronic scrotal content pain has been well characterized in the literature. A recent review by Levine and Hoeh[20] summarized the evaluation and management of these patients, recognizing that this condition is frustrating for providers and patients and that there is no standard protocol for management. These patients tend to be in their 30s, tend to "doctor shop" (averaging 4.5 different urologic evaluations), and many have normal physical examination findings. Therapy is difficult and options range from outpatient spermatic cord block to orchiectomy.