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CASE REPORTS

Suprapubic Cystostomy for the Management of Urethral Injuries During Penile Prosthesis Implantation

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ABSTRACT

Introduction. Urethral injury is an uncommon surgical complication of penile prosthesis (PP) surgery. Conventional dogma requires abortion of the procedure if the adjacent corporal body is involved or delayed implantation to avert device infection associated with urinary extravasation. Besides the setback of the aborted surgery, this management approach also presents the possible difficulty of encountering corporal fibrosis at the time of reoperation.
Aim. We report an approach using primary urethral repair and temporary suprapubic cystostomy for the management of incidental urethral injuries in a cohort of patients allowing for successful completion of unaborted PP implantation.
Materials and Methods. We performed a retrospective analysis of all patients receiving PPs from 1990 to 2014 in which incidental urethral injuries were repaired and PP implantation was completed with suprapubic cystostomy (suprapubic tube [SPT] insertion). After allowing for urethral healing and urinary diversion via SPT for 4–8 weeks, the PP was activated.
Main Outcome Measures. Successful management was determined by the absence of perioperative complications within 6 months of implantation.
Results. We identified four cases, all receiving inflatable PPs, managed with temporary suprapubic cystostomy. These patients sustained urethral injuries during corporal dissection (one patient), corporal dilation (one patient), and penile straightening (two patients). All patients were managed safely and successfully.
Conclusion. Primary urethral repair followed by temporary suprapubic cystostomy offers a surgical approach to complete PP implantation successfully in patients who sustain urethral injury complications, particularly for complex PP surgeries. **Anele UA, Le BV, and Burnett AL. Suprapubic cystostomy for the management of urethral injuries during penile prosthesis implantation. Sex Med 2014;2:178–181.**

Key Words. Penile Reconstruction; Penile Fibrosis; Corporal Dilation; Erectile Dysfunction; SPT

Introduction

Penile prosthesis (PP) implantation is an effective treatment option for management of erectile dysfunction (ED) with >90% patient-reported satisfaction rates [1,2]; however, this surgery can be fraught with potential complication risks. Urethral injury is an uncommon intraoperative complication of PP implantation procedures with estimated occurrence rates ranging from 0.1% to 3% [3–5]. These injuries occur during PP surgery, most commonly in the setting of penile fibrosis [6]. When they do occur, conventional dogma maintains that the injury should be primarily repaired or, if small,

allowed to heal over a urethral catheter. The prosthesis surgery should then be aborted, especially in reference to cylinder placement within an adjacent ruptured corporal body to reduce the risk of device infection associated with urinary extravasation and bacterial colonization [6,7]. Despite this standard approach, evidence is lacking to support the necessity for procedure termination. Furthermore, delayed implantation following aborted surgery presents a potentially increased level of difficulty for subsequent PP surgery in the event of postsurgical corporal fibrosis.

In this study, we present outcomes of an alternative approach for the management of incidental urethral injuries using primary repair followed by temporary suprapubic cystostomy for urinary diversion and urethral convalescence with completion of unaborted PP implantation procedures in a series of cases.

Methods

Case Selection

This was a retrospective evaluation of prospectively followed patients undergoing PP surgery at this institution during which urethral injury occurred. The operative cases logs of the senior surgeon (ALB) from 1990 to 2014 were examined. Patients undergoing combined inflatable PP and artificial urinary sphincter (AUS) implantation procedures were included if the injury related to the PP portion of the procedure. Cases involving neophallic reconstruction were excluded.

Management Protocol

Our management protocol consists of primary urethral injury repair and completion of the PP surgery rather than abortion of the procedure. Suprapubic cystostomy is then performed, which entails filling the bladder with saline via urethral catheter and insertion of a suprapubic tube (SPT) using a suprapubic trocar cystostomy with guidance under flexible cystoscopy as needed. The urethral catheter is maintained at the surgeon's discretion. PP (American Medical Systems [AMS], Minnetonka, MN, USA; and Coloplast, Minneapolis, MN, USA) implantation is then completed routinely [8]. The reservoir placement is advisedly deferred after SPT insertion to avoid damage to the reservoir before standard placement in the right retropubic space. The PP is left deflated to reduce any additional pressure at the surgical site. Postoperatively, patients convalesce standardly and are monitored with regular clinic follow-up appointments.

Successful management is assessed by the absence of perioperative complications, specifically device infection, erosion or failure within 6 months of the procedure.

Results

Of 805 PP implantations procedures performed from 1990 to 2014, 243 were done since this protocol was implemented in 2009. Of these 243 cases, only four (1.6%) (Table 1) were identified as having intraoperative urethral injuries.

These cases represent four men ranging in age from 65 to 78 (mean 71.3) years and manifesting various comorbidities (Table 1). All presented with postprostatectomy ED after failing conservative, nonsurgical interventions over a mean interval of 8.3 (range 4–11) years and were implanted with inflatable PPs. Patient 1 presented with a history of three previous inflatable PP implantations and removals associated with device infection. Patients 2 and 4 had urinary incontinence in addition to ED, prompting combination AUS and PP implantation procedures.

Intraoperative urethral injuries occurred at various stages during the PP implantation procedure, with two occurring during penile straightening maneuvers, specifically during penile modeling

Table 1 Demographic and clinical characteristics

Patient	Age	Race	Comorbidities	Etiology of ED	Duration of ED (yrs)	Previous therapies
1	68	White	Htn, Tbc	Post-Nerve-Sparing-RRP	7	PDE5i, MUSE, VED, IPP*
2	65	White	Htn, HL	Post-RRP & Salvage XRT	4	PDE5i, ICI, VED
3	74	White	CAD, CABG, HL, Htn, former Tbc, Peyronie's disease	Post-RRP	11	PDE5i, ICI
4	78	White	Htn, HL, former Tbc	Post-RRP	11	PDE5i

CABG = coronary artery bypass graft; CAD = coronary artery disease; HL = hyperlipidemia; Htn = hypertension; ICI = intracavernosal injection; IPP = inflatable penile prosthesis; MUSE = Medicated Urethral Suppository for Erection; PD = Peyronie's disease; PDE5i = phosphodiesterase type 5 inhibitor; RRP = radical retropubic prostatectomy; Tbc = tobacco use; VED = vacuum erection device; XRT = radiation therapy.
*History of previous IPP complicated by infection and requiring three component explantation procedures prior to presentation. yrs = years.

Table 2 Surgical reconstruction and postoperative care

Patient	Intraoperative urethral injury and repair	SPT removal (wks)	PP activation (wks)
1	Penile skin reconstruction of urethral disruption during corporal dissection	8	12
2*	Primary repair of urethral rupture during penile straightening maneuver	4	8
3	Primary repair of urethral rupture during corporal dilation	4	11
4*	Primary repair of urethral and distal corporal body ruptures during penile straightening maneuver	12	14

SPT = suprapubic tube; wks = weeks.
*Concurrent AUS insertion for urinary incontinence.

to correct extreme ventral and dorsal curvatures in patients 2 and 4, respectively. Additionally, one injury occurred during manipulation of neighboring corporal tissues with dissection, and the remaining one during corporal dilation (Table 2). Each case had extensive intracorporal fibrosis, requiring corporoplasty. Patient 1 underwent urethral reconstruction using a pedicled vascular penile skin flap to repair a 1 cm long defect. The graft was then sewn in place with running 4-0 Maxon (Covidien, Dublin, Ireland) suture and stented with a 14-French Foley catheter. The reservoir was placed cephalad to the right retropubic space in an ectopic position (beneath the rectus abdominis musculature, between the musculature and peritoneal lining) due to significant scarring from multiple previous procedures. Patient 2 underwent a direct anastomotic reapproximation of separated portions of urethra using running and interrupted 4-0 Maxon suture. AlloDerm (LifeCell Corporation, Bridgewater, NJ, USA) was then sewn adjacent to the urethra bilaterally at the location of the repair to provide additional reinforcement. Patient 3 underwent opening of the distal right side of the penis with a separate corporotomy to expose the urethral injury, and the urethra was subsequently repaired with running 3-0 Monocryl (Ethicon, Inc., Somerville, NJ, USA) suture in a watertight fashion. The corporotomy was then closed with 2-0 Vicryl (Ethicon, Inc.) suture. Patient 4 underwent closure of the distal corporal bodies as well as primary repair of the urethra with 3-0 Monocryl suture. All cases were unaborted, and PP implantation was completed following suprapubic cystostomy.

Urinary diversion via SPT was maintained for 4–8 weeks allowing for urethral healing (Table 2). Periodic clinical follow-up visits were performed every 2–4 weeks to assess healing. Approximately 4 weeks after SPT removal, PPs were activated. Of note, patient 4 maintained his SPT management for 12 weeks because of his poor ability to manipulate his AUS device pump and a resulting episode of urinary retention. There were no device complications (infection, erosion, or failure) after 6 months follow-up.

Discussion

The main purpose of this study was to present an alternative surgical approach using suprapubic cystostomy temporarily for urinary diversion in order to complete traditionally aborted PP procedures in patients sustaining intraoperative urethral injuries. The prevalence of urethral injury found in this study (1.6%) is consistent with the range reported in prior studies [3–5]. We surmise that the presence and extent of penile fibrosis likely accounted for this complication. Extensive cavernosal atrophy and scarring often pose an increased challenge during corporal dissection and, as in two of our cases, penile reconstruction. Radical prostatectomy, a known risk factor for corporal fibrosis [9,10], was common to all of our patients. In addition, Peyronie's disease, which was present in patient 3 (Table 1), was also a risk factor.

As we have described, SPT insertion can be performed routinely without altering standard PP implantation. It is recommended to insert the SPT prior to placing the reservoir to avoid direct injury to the reservoir. As demonstrated, urethral injuries can occur in isolation; however, when associated with corporal body involvement, the use of inflatable PPs with delayed device activation offers the added potential benefit of relieving pressure at the site of injury compared with the effect of malleable devices. We recognize that particular circumstances may support aborting the procedure; however, they are unique to each operative case. Thus, the decision to complete PP implantation in the setting of an urethral injury must ultimately be based on patient spe-

cific assessments and relies on the level of experience and comfort of the surgeon. Consideration must be given to the risks and benefits associated with aborted vs. unaborted procedures on an individual case basis.

Limitations of this study are the small sample size and the case-based nature of this investigation, owing to the rarity of this intraoperative complication. We acknowledge the short-term follow-up period of 6 months as for evaluating surgical complications, emphasizing that our main purpose was to present the feasibility of this management technique. We also acknowledge the contrariness of this management recommendation; however, this experience suggests an alternative option for addressing this problem than aborting the surgical procedure altogether. Although this approach has been successful in this small series, we do not propose this as a standard of care as further investigations are needed.

To our knowledge, this is the only report of its kind specifically examining urethral injury during PP implantation and its completion with management using temporary suprapubic cystostomy. Although the occurrence rate of this complication is fairly low, it still does occur and can greatly alter or delay operative planning and care. The results of this study challenge traditionally established dogma and demonstrate that urethral injury may not require abortion of an implantation procedure. Primary urethral repair and temporary suprapubic cystostomy offers a surgical approach to complete PP placement successfully in patients who sustain or are at risk for urethral complications, particularly for complex PP surgeries.

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Conflict of Interest: The authors declare that they have no conflicts of interest.

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