A novel technique for direct visualization of reservoir placement for penoscrotal inflatable penile prostheses using a single incision

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INTRODUCTION

Erectile dysfunction (ED) impacts a significant proportion of men annually in the United States. Common etiologies of ED include medical comorbidities and pelvic surgeries. Less common reasons for developing ED include spinal cord injuries, postpriapism ED, or Peyronie’s disease. Initial management generally consists of phosphodiesterase-5 inhibitors. When they fail, other treatments including vacuum erection devices, intracorporeal alprostadil, and intracorporeal injections are offered. Implantable penile prostheses are offered in the treatment of ED when medical management fails.

Inflatable penile prostheses (IPPs) have been used since initially being described in the 1970s. Infrapubic, perineal, and penoscrotal techniques for the insertion of IPP have been described, with the first report of a single-incision penoscrotal approach being published in 2003.[1] Placement of the reservoir of the IPP can either be performed blindly or often requires a counter-incision to ensure appropriate placement and to minimize the risk of complications. Classically, the groups placing the reservoir through a
single penoscrotal incision have placed it blindly, after puncturing through the transversalis fascia and developing a space for the reservoir either sharply or bluntly in the space of Retzius.[2,3] Blind placement can be associated with bowel or bladder injuries, damage to the iliac vessels, reservoir herniation, and post-operative inguinal hernia.[2,3] Due to this, some advocate for ectopic placement of the reservoir, particularly in the setting of prior pelvic surgeries. Placement of the reservoir under direct vision through a penoscrotal incision has not been previously described. In an attempt to optimize the surgical efficiency and minimize the complications, we present a modified technique and outcomes of a novel method allowing for direct visualization of the reservoir placement during a penoscrotal IPP.

METHODS

After obtaining institutional review board approval of this retrospective study, all patients who underwent placement of an IPP performed by a single surgeon (MJM) between August 2012 and March 2015 were identified for inclusion in the study. Their charts were retrospectively reviewed to extract information including age, etiology of erectile function, surgical history, surgical technique, location of reservoir placement, length of hospital stay, and postoperative complications. A total of 165 patients were identified. Of these, 157 underwent a modified technique for direct visualization of the reservoir placement during the study period and comprised the primary cohort of this study. All IPP placements were American Medical Systems 700 devices (Minneapolis, MN, USA). The patients were selected to undergo IPP placement after failing medical management of ED and requesting placement of the prosthetic device.

Intraoperative considerations and surgical technique

Instruments
The instruments used were a standard minor surgery set for an IPP with a Lone Star retractor.

Position and incision
The patients were placed in the supine position and were administered general anaesthesia in all the cases. A standard transverse 3-cm penoscrotal incision was made in all the cases.

Corporotomies
Subcutaneous tissue was divided, and the ventral surface of the urethra and corporal bodies was exposed. 3-0 PDS stay sutures were placed in each corporal body, and corporotomies were made. The corporal bodies were dilated proximally and then distally. Crossover was examined and the corpora were measured with a Furlow introducer.

Reservoir placement
While the device was being prepped, a Deaver’s retractor was placed over the right side of the penoscrotal incision and was used to retract the incision superior to the pubic bone [Figure 1]. Under direct visualization, a small incision was made in the transversalis fascia and the dissection was performed until the space of Retzius was entered [Figure 2]. The spherical reservoir was then deployed into the space of Retzius and was filled to 65 mL [Figure 3].

Case conclusion
The implant cylinders were deployed into each corporal body, and the stay sutures were used to close the corporotomies. After test inflation, connections to the reservoir were made. The scrotal pocket was then developed and the pump was placed . After copious irrigation, the incision was closed in multiple layers, the implant was inflated to 75% rigidity, and a mummy wrap was applied.

Postoperative management and follow-up
A Foley’s catheter was kept in place overnight and was removed either while the patient was hospitalized or at home after appropriate teaching. The patients were discharged to home on 14 days of trimethoprim-sulfamethoxazole and a clinic follow-up was scheduled after 3 weeks.

Outcomes and complications
During the study period, 165 patients underwent IPP placement. 157 (95.2%) patients had their reservoirs placed in the space of Retzius via the described approach. Table 1 shows the demographic and the preoperative characteristics of the patients. The mean age was 66.2 (standard deviation [SD] 9.66, range 30–83) years.

IPP reservoir placement via the direct vision approach was performed with a mean operative time of 72.8 min (SD 14.7, 0.01).
The vast majority of procedures (79.6%) were performed on an outpatient basis and the complication rates were low (4.5%), with only 2.5% of the patients developing an infection postoperatively [Table 2]. Full details of perioperative details and outcomes are displayed in Table 2. The mean follow-up period was 8.8 months (SD 10.4).

Eight patients (4.8%) underwent ectopic placement of the IPP reservoir during the study period. Two patients had prior radical retropubic prostatectomy (RRP) and inguinal hernia repair, three patients had previous cystectomy with neobladder creation, one had prior robotic prostatectomy, one had a Monti catheterizable channel, and one did not have previous surgeries. In each of these cases, the direct visualization approach was attempted but could not be performed due to scar tissue, and therefore, ectopic placement of the reservoir was considered a safer alternative.

**DISCUSSION**

IPP and under vision placement of the reservoir into the space of Retzius is possible through a single penoscrotal incision with acceptable peri-operative outcomes. This technique compares favourably with the available literature in terms of complication rates. In patients undergoing an IPP, a postoperative infection rate of 1%–3% has been previously reported.[2,4,5] Our post operative infection rate (2.5%) compares favourably. Also, the blind placement of the reservoir into the space of Retzius may be complicated by postoperative inguinal hernia.[2,3,5] This novel method allows for direct visualisation of the pump placement and hence avoids hernia formation. In the current study, at a mean follow-up of 8.8months, no patient developed a hernia, although one patient had proximal pump migration. Another uncommon but devastating injury during blind placement of reservoir is a vascular injury.[3] By virtue of direct visualization, this catastrophic complication can be avoided.
There was some concern that this approach may be challenging in patients with prior significant mobilization of the space of Retzius, such as in the cases of RRP. However, we could perform the modified approach in the majority of the cases, and post RRP ED comprised the second largest group of patients in this study. By placing the reservoir through the same penoscrotal incision as the IPP and under direct vision, we were able to safely and efficiently complete the procedure in most of the patients, despite the majority of them having had a prior pelvic surgery. Although, this study is limited by relatively small number of patients; this is one of the first descriptions of direct visualization of the reservoir placement through a single penoscrotal incision and was associated with comparable peri-operative outcomes.

CONCLUSION

Placement of an IPP through a single penoscrotal incision with direct visualization of the reservoir placement into the space of Retzius is feasible and protects against catastrophic complications caused by blind placement. It is quick, safe, and effective and is a beneficial technique to be incorporated into prosthetic urologists’ armamentarium.

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How to cite this article: Roth JD, Monn MF, Shelton TM, Mellon MJ. A novel technique for direct visualization of reservoir placement for penoscrotal inflatable penile prostheses using a single incision. Indian J Urol 2018;34:283-6.