

ORIGINAL RESEARCH—SURGERY

Tips and Tricks of Inflatable Penile Prosthesis Reservoir Placement: A Case Presentation and Discussion

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ABSTRACT

Introduction. There have been many advances in the inflatable penile prosthesis (IPP) since the 1970s. While these devices were initially fraught with mechanical malfunction, the most recent models prove to be much more reliable. Although reservoir complications are not common, when they do occur, it typically involves damage to the surrounding tissues. The ability to recognize and treat these complications is paramount for any surgeon that routinely places IPPs.

Aim. The aim of this article was to present a unique reservoir-related complication as well as perform a literature review of reservoir-related complications and techniques for reservoir placement, and provide a summary of dimensions and technical aspects of commonly used reservoirs.

Methods. We reviewed a unique reservoir-related complication that presented to our institution with urinary retention and constipation. We also reviewed reservoir-related complications since 1984, reviewed the most recent surgical techniques involved in reservoir placement, and summarized the dimensions and technical characteristics of both the American Medical System® and Coloplast® reservoirs.

Main Outcome Measure. A reservoir-related complication that resulted in urinary retention and constipation is the main outcome measure.

Results. Although uncommon, reservoir complications do occur. The most common case report complication in the published literature is bladder erosion followed by external iliac compression, ileal conduit erosion, and small bowel obstruction. The case that presented at our institution was the result of a reservoir that was improperly placed in the perineum, causing urinary retention and constipation due to the compression of the bulbar urethra and rectum.

Conclusions. In this era, mechanical failures of IPP reservoirs are rare as most complications occur due to damage of the surrounding tissues. Prevention, diagnosis, and treatment of these complications are important for any surgeon that implants IPPs. **Simon R, Hakky TS, Henry G, Perito P, Martinez D, Parker J, and Carrion RE. Tips and tricks of inflatable penile prosthesis reservoir placement: A case presentation and discussion. J Sex Med 2014;11:1325–1333.**

Key Words. Inflatable Penile Prosthesis; Penile Implant; Perineum; Reservoir; Urinary Retention

Introduction

In the 16th century, a French surgeon Ambroise Pare created the first documented artificial penis made of a wooden pipe to facilitate micturition while standing in a patient who sustained a traumatic amputation of his phallus [1–3]. A

Russian surgeon named Nikolaj Bogaraz placed rib cartilage outside the tunica to create the first penile implant in the management of erectile dysfunction in 1936. Pearman later implanted acrylic rods beneath Buck's fascia and superior tunica albuginea in the 1960s. These unfortunately had a very high rate of erosion and did not provide a

natural look, as they did not reside within the corpus cavernosum [3,4]. Later, an Egyptian physician placed the implants into the corpora and noted a more natural look [1,3]. It was not until the 1970s that the creation of the first inflatable implant marked a turning point in surgical management of erectile dysfunction. The original concept of the design was a three-piece inflatable device that is very similar to many implants today and had the advantage of creating sufficient tumescence while providing the natural look of detumescence [2,5,6]. Regrettably, these devices initially proved to have a high rate of mechanical failure. This often involved the inability of the cylinder to retain adequate pressure. With the advances in technology and device improvements of these implants and reservoirs, the rates of mechanical failure of these devices have dwindled. Today, surgical reservoir placement can be technically challenging, and in many cases, can lead to injury to surrounding structures [2,7,8]. Even though inflatable penile prosthesis (IPP) reservoir complications are unusual, and mechanical failure or spontaneous rupture of the reservoir is almost unheard of, complications involving surrounding tissues can lead to adverse outcomes that must be managed properly.

Materials and Methods

A literature review was performed July 2013 using PubMed and Medline. Searched terms utilized were “reservoir,” “inflatable penile prosthesis,” and “complication.” This search resulted in 131 results, dating back to 1984, with 88 articles excluded as they did not pertain to IPP reservoir placement or were review articles. Additionally, we did not include any cases of mechanical failure as we only wished to examine cases of reservoir placement that caused damage to the surrounding tissues.

Results

In our recent literature review conducted in July of 2013 utilizing PubMed and Medline, we identified 37 cases of nonmechanical reservoir-related complications dating back to 1984. The most common complication was erosion of the reservoir into the bladder; which comprised 15/37 (41%) of the cases [9–18]. The most common symptom of bladder erosion was hematuria; which was found in 100% of cases. Dysuria, frequent urinary tract infections (UTIs), and urinary frequency were also notable symptoms. The most commonly utilized imaging

modality to detect bladder erosion was cystoscopy used in 14/15 cases. Computed tomography (CT) pelvis was also frequently used in 5/15 cases. The method of management used in all cases of bladder erosion (15/15) was replacement of the existing reservoir with an additional reservoir placed to the contralateral side after a dual-layer bladder closure. All cases of bladder erosion resulted in complete resolution of symptoms. These results are summarized in Table 1.

Compression of the external iliac vein was also a frequently reported complication noted in 5/37 (14%) cases [23,25,26,29,30]. The most common symptom noted was lower extremity edema in 5/5 cases. Additionally, shortness of breath and tachycardia were noted in 2/5 cases, which was caused by pulmonary embolism. All patients (5/5) required removal of the reservoir: 3/5 required inferior vena cava filter placement, 2/5 required heparin/warfarin treatment, 1/5 required thrombectomy, and 1/5 had an ectopic reservoir placed after the initial removal of the abdominal reservoir. CT pelvis was utilized in 3/5 cases to diagnose external iliac compression; 3/5 patients received a duplex ultrasound and 1/5 received a ventilation/perfusion scan to rule out pulmonary embolism. Although 2/5 patients required an extended hospital admission, there was complete resolution of symptoms in all cases of external iliac vein compression. These results are summarized in Table 1.

Erosion of the reservoir into the ileal conduit/neobladder was found in 4/37 (11%) cases [11,20,32,33]. Flank pain was present in 2/4 cases, hematuria was present in 1/4 cases, 1/4 cases had the presence of recurrent UTI, and 1/4 cases was asymptomatic. Loop endoscopy was utilized to diagnose the presence of ileal conduit/neobladder erosion in 2/4 cases, CT pelvis was utilized in 2/4 cases, and cystoscopy was utilized in 1/4 cases. Complete removal and conduit repair was utilized in 2/4 cases, 1/4 cases involved explantation of the reservoir with creation of a new ileal conduit, and 1/4 cases involved repositioning of the reservoir and conduit repair. All cases of ileal conduit/neobladder erosion resulted in complete resolution. These results are summarized in Table 1.

Small bowel obstruction has also been repeatedly reported in the literature and was present in 4/37 (11%) cases [19,21,22,24]. In all the reported cases (4/4), the patients presented with nausea, vomiting, and abdominal pain. Additionally, 1/4 patients presented with melena. Exploratory laparotomy was utilized to diagnosis of small bowel obstruction in 3/4 cases, barium swallow in 1/4

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