

BASIC SCIENCE

Local Treatment of Penile Prosthesis Infection as Alternative to Immediate Salvage Surgery



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ABSTRACT

Introduction: Penile prosthesis (PP) is the established treatment for patients with erectile dysfunction (ED) who do not respond to phosphodiesterase inhibitors and intracavernosal injections. In general, these devices have been largely successful but there are not free of serious complication such as PP infection (PPI). PPI requires immediate surgical removal or salvage rescue of the PP.

Aim: In this report, we present two clinical cases with inflatable PP (IPP) treated locally with antibiotic and high pressure irrigation and then avoid the PP removal or salvage rescue.

Methods: We present two patients with PPI in our institution and literature review.

Main Outcome Measures: Resolution of the two cases.

Results: Patient A (A) was 44 years old and patient B (B) 51 years old presented PPI after three weeks (A) and eight weeks (B). Both patients were diabetic. Physical exploration revealed an open scrotal incision at its margin with a clear discharge. The rest of the incision and scrotum were clean and dry. They had not scrotum pain/tenderness or systemic/septic symptoms. The bacterial culture of the incisional drainage revealed a *Staphylococcus aureus* (A) and *Staphylococcus epidermidis* (B). In both cases, we performed an excision of the tissue around the pump with a high pressure pulsed irrigation (Interpulse; Stryker Corp, Kalamazoo, MI, USA). For the irrigation we used three different solutions that included povidone-iodine, antibiotics (gentamicin plus vancomycin), and hydrogen peroxide. Finally, we performed a multilayered surgical closure with the use of aspirate drainage over 24 hours and intravenous antibiotics. The patients had a total resolution of its symptoms after 20 months (A) and 36 months (B), and the IPP worked properly.

Conclusion: This treatment could be an option for to perform specific patients with local IPP infection without systemic symptoms instead of surgical removal.

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Key Words: Erectile dysfunction; Infection; Penile implantation; Penile prosthesis

INTRODUCTION

Approximately 15,000 new inflatable penile prostheses (IPP) are implanted in the United States each year.¹ Infection of the IPP is the worst complication in prosthetic urology. The infection rate is approximately 3%,¹ but this rate increases in cases of prednisone prescription (20%), revision surgery (10%), spinal cord injuries (9%), or diabetes (8%).² The recommendations in case of infection are

removal of the entire IPP followed by reimplantation 3 or 6 months later, or remove the IPP, wash out the wound, and implant a new prosthesis back in (salvage surgery).³ Both techniques are not free of further complications. Future reimplantation after initial IPP removal is an extremely difficult technique because of the presence of fibrotic tissue. The successful rate is approximately 50% in expert hands,² with a high reinfection rate, loss of penile length, and low patient satisfaction. Salvage technique is an alternative procedure with a high success rate (82%),³ but the redo surgery of penile implants carries a higher risk of infection (7% to 18%).⁴ The presence of significant necrosis, perforation of the corpora, loss of corporal tissue, or frank purulent infection are contraindications to performing a salvage rescue.

Nevertheless, the presence of biofilm or positive bacteria culture is not equivalent to infection. According to a multi-institutional study of IPP revision surgery, culture-positive

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bacteria were found in 70% of patients with clinically uninfected penile prostheses.⁵ This finding could be indicating that the tissues can heal over infected devices. There are a few reports in the literature referring local treatment instead of removal or salvage treatment in selected patients. In these reports a combination of systemic and local antibiotics plus drainage achieves a total resolution of the symptoms, preserving the original IPP.^{6,7}

In this scenario we tried to find an alternative to avoid the IPP removal. According to the experience of the orthopedic surgeons with infected prostheses, we explored the possibility of translating an orthopedic technique to the urological prosthesis field.⁸ A surgical debridement with a high-pressure pulsated lavage can remove bacteria and necrotic tissue. Applying this procedure in orthopedic implant infection, a success rate up to 85% is achieved without implant removal.^{8,9} Many prosthetic urologists were sued for delayed surgical treatment of IPP infections. We consider that publishing this alternative treatment, with an adequate result, is important to support this option from a medicolegal point of view.

The aim of the study is to present an alternative technique to preserve the IPP in 2 cases with local scrotal infection after IPP implant and check the results.

METHODS

The patients consented to surgical treatment of the local IPP infection. Both received general anesthesia. Thirty minutes before the incision, an intravenous combination of 240 mg of Tobramycin (B Braun Medical, Barcelona, Spain) plus 1 g of amoxicillin and clavulanate potassium was infused, according to the antimicrobial sensitivity of the clear discharge. Patient skin scrubbing was timed at 10 minutes with povidone iodine sponges. After 10 minutes the area was dried with sterile towels and the surgical area was prepared for incision. The scrotal area was draped in a sterile fashion. A circular incision around the open part of the primary infected incision was made. All devitalized tissue around the pump was removed. The high pressure pulsated lavage (Interpulse; Stryker Corp, Kalamazoo, MI, USA) generates pressure irrigation with a chosen solution (antibiotic, saline, etc) There is concurrent suction to avoid fluid accumulation in the treated area. At the top of the device a soft cone splash shield is provided for optimal fluid containment without damaging soft tissue.

For irrigation, vancomycin 1 g mixture in water (1,000 mL), half-strength hydrogen peroxide (500 mL), and half-strength povidone iodine (500 mL) were used. Finally, a multilayered surgical closure was performed and an aspiration drainage tube was placed for the first 24 hours, as well as intravenous antibiotics (240 mg Tobramycin/24 h plus 1 g amoxicillin and clavulanate/12 h). Patients were discharged 24 hours after the procedure. Both patients continued with amoxicillin and clavulanate 875/125 mg per os every 8 hours for 10 days.

RESULTS

A 44-year-old patient (A) and a 51-year-old patient (B) presented with infection of their IPP after 3 weeks (A) and 8 weeks (B).

An AMS 700 IPP with InhibiZone (Boston Scientific, Voisins-le-Bretonneux, France) was implanted in patient A, and Coloplast TITAN IPP (Coloplast, Madrid, Spain) with hydrophilic coating soaked in gentamicin was implanted in patient B. Both patients were diabetic type I. Physical exploration revealed an open scrotal incision with a clear discharge (Figure 1) and approximately 25% of the pump was exposed. The rest of the incision and scrotum were clean and dry. The patients had no scrotum pain/tenderness or systemic/septic symptoms. The bacterial culture of the incisional drainage revealed a *Staphylococcus aureus* (A) and *Staphylococcus epidermidis* (B). After 2 weeks of antibiotic oral treatment the symptoms remained without changes and we proceeded to surgical treatment. The technique, alternatives, risks, and limitations were carefully discussed with the patients. We performed an excision of the tissue around the pump (Figure 2) with irrigation of the area with an Interpulse device (Figure 3). The surgical examination revealed the absence of purulent secretion. The patients had a total resolution of the symptoms and their prostheses work properly after 20 months (A) and 36 months (B).

DISCUSSION

Implant infections are the most catastrophic complication in prosthetic urology, with high costs and patient dissatisfaction. The cost of treating an infected IPP has been estimated to be more than 6 times the cost of the original implant.² There are several conditions that may increase the chances of implant infection. Our patients had a medical history of diabetes mellitus (DM). Wilson et al showed that patients with DM are at higher risk for infection than men without it (8.7% vs 4%, respectively).¹⁰

Prosthetic infections can be presented in 2 groups. The presentation may be local with wound dehiscence or scarring difficulties, as our patients had. A more acute presentation with fever and swollen scrotum draining purulent material represents the other group. It is important to differentiate between them because they have different microbial etiology and different management strategies.

The treatment options for IPP scrotal pump erosion or infection include removal of the entire device with delayed reimplantation,



Figure 1. Physical exploration revealed an open scrotal incision at its margin with a clear discharge. The rest of the incision and scrotum was clean and dry. He had no scrotum tenderness.



Figure 2. All the devitalized tissue around the pump was removed.

isolated removal and reimplantation of the scrotal pump, salvage washout, and immediate reimplantation of a new IPP or malleable prosthesis.¹¹ In a nationwide United States inpatient sample (NIS) from the years 2000 to 2009 of 1557 IPP infections, explantation was used in 82.7% and salvage in 17.3%.¹²

The standard of care is still either device removal and subsequent implant or Mulcahy's salvage procedure with a new implant. We present this alternative as an emerging possibility that needs to be confirmed with larger series that try to keep the prosthesis in place. Probably the major advantage of the proposed protocol is avoiding the cost of a new device, which might not be available at the time of the treatment.

The published literature shows that most IPPs have bacteria present at the time of revision or replacement of a clinically uninfected IPP, indicating that tissues can heal over infected devices.⁵ Positive cultures and visible bacterial biofilm have been shown to be present on clinically uninfected IPPs at the time of revision surgery in the majority of patients whether or not the IPP is covered with infection-retardant coating.¹³

There are few reported cases of conservative treatment instead of immediate salvage rescue or removal. Deroue et al⁶ communicated 3 cases with postoperative purulent penile prosthesis infection successfully solved without removal by employing a

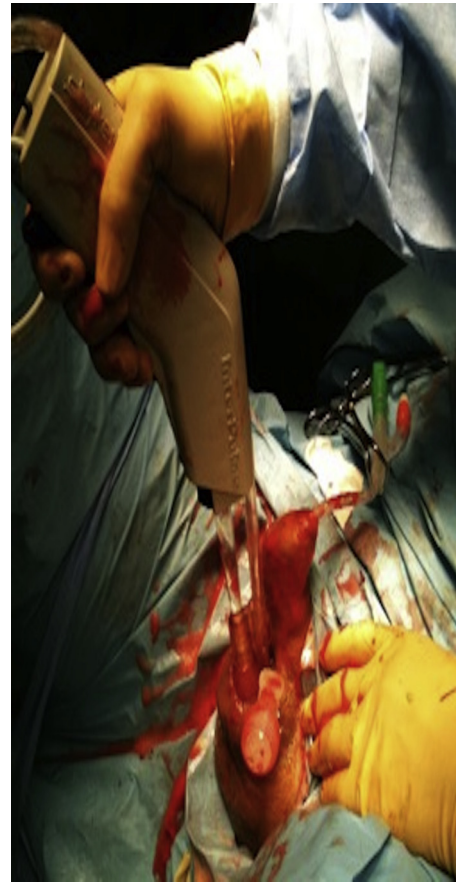


Figure 3. Irrigation high pressure pulsated lavage (InterPulse) was used with three different solutions that included povidone-iodine, antibiotics (gentamicin plus vancomicine), and hydrogen peroxide.

conservative treatment strategy of local and systemic application of clindamycin. Henry et al⁷ presented a multi-institutional study with 8 centers and 15 patients with local symptoms, but no systemic signs or symptoms of wound or IPP infection successfully treated with antibiotics, even with incisional drainage of culture-positive bacteria. They concluded that from a medico-legal point of view this information should be easy to find in the scientific literature.

In our cases, we used a pulsated lavage with high pressure, achieving an optimal necrotic tissue and biofilm removal that has been successfully used in orthopedic implant infection treatment with open debridement followed by antibiotic treatment (success rate of 86.5%).⁸ Regrettably, we did not have a control group to compare. Otherwise, we have experience with patients with skin dehiscence and negative microbiology wound cultures (labeled as not infected cases), in which the skin closed after a period of time. We did not use the device in these cases. Instead, patients were treated with long-term antibiotic therapy (3 weeks) and local wound care.

Finally, according to our results, we believe that this conservative management following the described protocol would be a salvage alternative in patients with local infection and nonpurulent

symptoms but without systemic affection. In case of failure of the conservative option described, removal or salvage treatment is the choice. Due to the successful resolution in our cases, we consider that the report may contribute to the management of IPP infection, especially from a medicolegal point of view.

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