Case Report

Multiple revisions of inflatable penile prosthesis: a case report

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Abstract

This article presents considerations regarding dilemmas and treatment concerning the revision of inflatable penile prosthesis (IPP) after non-infectious mechanical malfunction. The aim of this report is to improve surgical planning to avoid the most common complications after revision of inflatable penile prosthesis. With greater understanding, implanters could more accurately select patients and provide increased information and advice maximizing the results.

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Introduction

Penile prosthesis is an effective option for erectile dysfunction (ED), refractory to medical and non- invasive therapy. Implants are reliable and high satisfaction rates have been recorded among patients and partners. Mechanical failure is the most common non-infectious complication. Revision rates from system failure vary between centers, with recorded failure range of 15% at 5 years and 30-40% at 10 years.[1] Failure rate was not related to surgeon expertise.[2] Mean duration to initial malfunction was 7.4 years.[3]

Infectious complications remain of significant concern in IPP revision surgery, the risk of specific device infection showing a strong correlation with increased risk being based on number of prior IPPs: 1st (6.8%; 3/44), 2nd (18.2%; 4/22), 3rd (33.3%; 4/12), 4th (50%; 4/8), and 5th (100%; 2/2) ($R2 = 0.90$, $p = 0.01$).[4]

This article presents the issues surrounding dilemmas and treatment in order to prevent infection in non- infectious revision of IPP.

Case Report

This 82-year-old Australian gentleman had his 1st implanted IPP procedure 16 years ago. He had no known etiology of ED and no history of diabetes or any potentially related disease. The 1st implant worked well for 15 years but then the malfunction occurred. A 2nd implant procedure was then carried out, also with IPP, but this was effective for only 1 year, the implant only resulting in 50% inflation. There was no sign of infection and the patient desires a 3rd implant.

The exact sites of malfunction differ between the infrapubic vs scrotal implants. Most malfunctions of the scrotal device have been shown to involve tubing fractures at the pump strain reliefs, whereas infrapubic device malfunctions typically involve the cylinders or the reservoir.[5] The dilemma is whether to only remove and replace the specific malfunction part or exchange the whole component. From a review of relevant literature the exchange of the entire component appears to be advantageous as regards low infection rate and

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future malfunction.

Another important issue is the chance of infection in revision cases. Estimates of infection rates following revision surgery have been as high as between 10.0 and 13.3% in comparison to between 0.46 and 2.00% in virgin cases.[6] Henry et al.[7] found positive bacterial cultures on 70% of clinically uninfected devices suggesting biofilms are a significant source of infection risk with revision surgery. Gross et al.[8] evaluated culture results at the time of explantation of clinically infected device or Mulcahy salvage, and found no growth in 33% of cases, gram positive isolates in 73% of cases, and gram negative isolates in 39% of cases. Candida (11.1%), anaerobes (10.5%), and MRSA (9.2%).

In the drive to prevent infection, many recommendations have proved beneficial: preoperative urine culture[9], hair removal[10], antibiotic impregnated/coated implant[11], and preoperative parenteral antibiotics.[8,9] In 1996, Mulcahy et al. described a new protocol for the immediate replacement of infected IPPs which involved complete device removal, and serial wound washout, followed by re-implantation of a new IPP (Table 1).[12] Similar results were reported in 2000 by Mulcahy[13], showing no evidence of infection in 45 out of 55 patients (82%) at a mean follow-up of 35 months.

The patient in this study took a shower with chlorhexidine solution on the day of the operation. Parenteral antibiotics were administered, specifically Vancomycin 1 gm and Amikacin 500 mg. Hair was clipped in the operating room. The operative site was scrubbed with Povidone iodine scrub for 15 minutes. A Foley catheter was inserted into the urethra to empty the bladder. An incision was made at the penoscrotal site. The former implant (AMS 700® model 20 cm length with 1 cm rear tip extender) was removed. Only 50 ml of NSS remained in the reservoir, therefore potentially the malfunction in this case was from minor leakage in the system. There was no pus or collection detected. Implant sites were vigorously irrigated following the Mulcahy protocol. Gentamicin 240 mg diluted in NSS 200 ml was used instead of Kanamycin plus Bacitracin. The surgeon and the whole team changed gowns and gloves and new cloths were draped on the patient. A 20 cm standard length Coloplast Titan® with standard cap was implanted. A new subdartos pouch was created for the pump in the scrotum to avoid infection from the Biofilm of the former pump. A 50 ml syringe filled with NSS was attached to the reservoir tube to test the prosthesis cylinders. This process was to ensure the function and quality of the erection. In preparation for reservoir placement, the contralateral side to the previous operation was selected. The external ring was identified, and a small Deaver retractor and index finger were inserted to create space in front of the transversalis fascia. The reservoir was placed and filled with NSS 60 ml, then the final connection between the pump and reservoir was completed. The system was checked by inflation and deflation several times to make sure that it was functioning properly, then the incision was closed.

On post-operative day 1 no immediate complications were detected. The catheter was removed and the patient could walk with only minor pain. An oral antibiotic was prescribed, specifically Amoxiklav® 1 gm twice daily for 2 weeks. One week after surgery there was no sign of infection. After one month, the patient started operating the implant.

Discussion

Penile prosthesis revision in a clinically uninfected patient has a higher infection rate than is found in first-time implantation. A combination of infection-retardant coated components, vigorous washout, proper preparation of skin incision site, use of perioperative antibiotics, and avoiding contact between the patient's skin and the implant lowers infection rates. Implanters should inform patients about risks associated with the procedure and carry out the operation

Table 1. Mulcahy protocol

1. Remove all prostatic parts and foreign materials
2. Irrigate wound and all compartments with 7 antiseptic solutions
2.1 Washes 1 and 7: kanamycin and bacitracin
2.2 Washes 2 and 6: half-strength hydrogen peroxide
2.3 Washes 3 and 5: half-strength povidone iodine
2.4 Wash 4: water pic pressure irrigation with vancomycin 1 g and gentamycin 80 mg in normal saline 5 L
3. Change gown, gloves, drapes, and instruments
4. Implant new prosthesis

using the strict guidelines advised in the Mulcahy protocol. Penile prosthesis infection is the most significant complication following prosthesis implant surgery leading to postoperative morbidity, increased health care costs, and psychological stress for the patient. These can all be reduced effectively following the guidelines advised in this study.

References

1. Carson CC, Mulcahy JJ, Govier FE. Efficacy, safety and patient satisfaction outcomes of the AMS 700CX inflatable penile prosthesis: results of a long-term multicenter study. J Urol 2000;164:376-80.
2. Onyaji IC, Sui W, Pagano MJ, Weinberg AC, James MB, Theofanides MC, et al. Impact of surgeon case volume on reoperation rates after inflatable penile prosthesis surgery. J Urol 2017;197:223-9.
3. Miranda E, Teloken P, Deveci S, Mulhall J. Mechanical malfunction profiles in men undergoing 3 piece inflatable penile implants. J Sex Med 2017;14:S75.
4. Montgomery BD, Lomas DJ, Zeigelmann MJ, Trost LW. Infection risk of undergoing multiple penile prostheses: an analysis of referred patient surgical histories. Int J Impot Res 2018;30:147-52.
5. Garber BB. Inflatable penile prosthesis: site-specific malfunction analysis. Int J Impot Res 2003;15:22-5.
6. Jarow JP. Risk factors for penile prosthetic infection. J Urol 1996;156:402-4.
7. Henry GD, Wilson SK, Delk JR 2nd, Carson CC, Silverstein A, Cleves MA, et al. Penile prosthesis cultures during revision surgery: a multicenter study. J Urol 2004; 172:153-6.
8. Gross MS, Phillips EA, Carrasquillo RJ, Thornton A, Greenfield JM, Levine LA, et al. Multicenter investigation of the micro-organisms involved in penile prosthesis infection: an analysis of the efficacy of the AUA and EAU Guidelines for penile prosthesis prophylaxis. J Sex Med 2017;14:455-63.
9. Wolf JS Jr, Bennett CJ, Dmochowski RR, Hollenbeck BK, Pearle MS, Schaeffer AJ, et al. Best practice policy statement on urologic surgery antimicrobial prophylaxis. J Urol 2008;179:1379-90.
10. Tanner J, Norrie P, Melen K. Preoperative hair removal to reduce surgical site infection. Cochrane Database Syst Rev 2011;11:CD004122.
11. Mandava SH, Serefoglu EC, Freier MT, Wilson SK, Hellstrom WJ. Infection retardant coated inflatable penile prostheses decrease the incidence of infection: a systematic review and meta-analysis. J Urol 2012;188:1855-60.
12. Brant MD, Ludlow JK, Mulcahy JJ. The prosthesis salvage operation: immediate replacement of the infected penile prosthesis. J Urol 1996;155:155-7.
13. Mulcahy JJ. Long-term experience with salvage of infected penile implants. J Urol 2000;163:481-2.