

# Management of the complications of penile prosthesis implantation

## Keywords

Penile implants  
Complications  
Semirigid penile prostheses  
Inflatable penile prostheses

Alessandro Natali

## Abstract

Penile prostheses are considered to be the definitive solution for the treatment of organic erectile dysfunction in those in whom medical therapy, such as phosphodiesterase inhibitors, is contraindicated or in those who have failed more conservative measures. The advent of new surgical tools and new infection-resistant materials has significantly reduced the risk of intra- and postoperative complications. Nevertheless, complications do still occur and need to be recognized and managed. This review highlights the more frequently encountered complications of penile prosthetic implants and makes some suggestions on how to prevent or correct them. © 2010 WPMH GmbH. Published by Elsevier Ireland Ltd.

## Introduction

In a recent update on erectile dysfunction by the European Association of Urology, penile prosthesis implantation was considered to be a third-line therapy for use when oral and intracavernosal therapies fail [1]. The advantages of penile implantation include high technical success rates, high long-term mechanical reliability and good patient and partner satisfaction rates. Furthermore, success is independent of injections or tablet taking. This treatment option is particularly valuable in patients with penile fibrosis [1–5]. Implantation surgery is not very complex compared with many other urological procedures, but sometimes it can be tricky particularly when complications arise. Proper patient selection is important and it is just as essential to educate a prospective implant patient and his partner with regard to the reasonable expectations of, and complications associated with, this procedure [2,6–8]. This review will evaluate the intra- and postoperative complications that, in our experience and in literature reports, have occurred during the placement of penile implants (Table 1) [8].

## Intra-operative complications

Intra-operative complications consist of perforation of the tunica albuginea and/or cavernosal crossover. Perforation of the tunica albuginea can occur during the stage of either proximal or distal dilation of the corpora cavernosa [8]. If perforation occurs at the crus level (proximal), this does not mean that the surgical procedure must be terminated. The dilation should be completed contralaterally to show the true length of the crus and, later, the surgeon can return to the damaged crus to complete the dilation using large Hegar dilators only (in fact perforation occurs more frequently during the initial dilation when thin Hegar dilators are used). Before placing the cylinder, a Dacron sock can be placed at the distal rear tip of the prosthesis and this can eventually be sutured to the distal tunica albuginea. By contrast, if the perforation is proximal and involves urethral damage the procedure must be stopped (and a temporary suprapubic cystostomy must be put in place), because of the high possibility of prosthesis infection. In the case of a cavernosal crossover, if the intracavernous septum damage is very small, the procedure can continue, but if it is

Alessandro Natali, MD  
Department of Urology,  
University of Florence,  
V. le Pieraccini 18, 50139  
Florence, Italy

E-mail:  
anatali@dada.it

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**Table 1** Complications of penile implants

Complication	Incidence
Mechanical malfunction AMS	10.3%
Mechanical malfunction Coloplast (formerly Mentor)	0.8-3.1%
Corporal crossover	Common intraoperative finding
Corporal perforation/erosion	1-11% (distal)
Urethral perforation	Rare
Infection	0.68-1.06%
Glans bowing (SST)	Up to 10%*
Reservoir herniation	0.7%
Deep venous thrombosis	Extremely rare
Reservoir erosion into adjacent viscera	Extremely rare

Adapted from Sadeghi-Nejad [8].AMS = American Medical Systems; SST= supersonic transport.

wide then cessation of surgery is the best solution.

### Postoperative complications

Postoperative complications can be minor or major. Minor postoperative complications consist of wound haematomas and superficial wound infections that can be resolved using antibiotic therapy. Major complications include prosthesis infection, mechanical failure, protrusion, erosion, “S-shaped” deformity of the penis and the so-called “Concorde syndrome”

### Prostheses infection

Prosthesis infections can occur with both semi-rigid and inflatable prostheses [8–10], although the risk of infection has decreased since the introduction of antibiotic-coated implants [11,12]. To prevent prosthesis infection, the following procedure can be used: in the 5 days prior to surgery, the patient is asked to scrub the genital area with an antiseptic solution twice daily; this is followed by antibiotic prophylaxis (vancomycin plus gentamicin) prior to surgery [9]; finally, immediately before surgery, in the operating theatre itself, the genital area is shaved and scrubbed with an antiseptic solution [10].

The role of diabetes in the development of infection following the implantation of a penile prosthesis remains controversial. Bishop et al [13] suggested that penile prosthesis implantation should not be performed unless the preoperative glycosylated haemo-

globin A1C level was less than 11.5%. They estimated, based on a statistical model, that a patient with a glycosylated haemoglobin level of 14% had an approximately 40% chance of developing a postoperative infection [13]. However, Wilson et al [14] have claimed that the usefulness of glycosylated haemoglobin values for identifying and excluding surgical candidates at an increased risk for infections has not been proven. Furthermore, elevation of fasting sugar or insulin dependence has not been shown to increase the risk of infection in diabetics undergoing prosthesis implantation [14].

However, we do believe that in order to minimise the risk of infection, it is extremely important to limit the traffic of personnel in the operating theatre, to conduct the surgery as quickly as possible, and to wash the corpora cavernosa and operative field copiously with antibiotic solution during surgery. Postoperative infection of implants usually occurs within 6 months of implantation (and is most frequently caused by *Staphylococcus epidermidis* and *S. aureus*). Infection can be suspected when there is local pain and erythema, fever and cutaneous fixation of the prosthesis components, such as the pump, to the scrotal skin. In this situation there are two main options. The first is to remove the prosthesis and reinsert it at least 6–8 months later [15]. However, repeat surgery can be difficult because of the formation of scar tissue in the corpora cavernosa. Some surgeons will remove the infected prosthesis and, after copious washing of the corpora cavernosa with an antibiotic solution, will then place a “tutor” cylinder inside the corpora cavernosa to prevent shortening and the development of internal scarring of the

**Table 2** Steps in the Mulcahy salvage protocol for prosthesis infection

Step	
1.	Remove all prosthetic parts and foreign material
2.	Irrigate wounds using 7 antiseptic solutions (see Table 3)
3.	Change gowns, gloves, surgical drapes, and instruments
4.	Insert new prosthesis
5.	Close wounds with no drains or catheters
6.	Administer oral antibiotics for 1 month

**Table 3** Mulcahy salvage protocol: antiseptic irrigating solution

Order of use	
1.	Antibiotics (kanamycin–bacitracin)
2.	Half-strength hydrogen peroxide
3.	Half-strength povidone iodine
4.	Pressure irrigation (water pic) with 1 gram vancomycin and 80 grams gentamicin in the 5 litres of irrigating solution
5.	Half-strength betadine
6.	Half-strength hydrogen peroxide
7.	Antibiotics (kanamycin–bacitracin)

penis. The second option is complete removal of the infected part of the prosthesis together with all foreign materials (pump, abdominal reservoir and tubes), followed by the use of the Mulcahy salvage procedure (Tables 2 & 3) to reinsert a new penile prosthesis in the same sitting [16]. Using this procedure, Mulcahy reported a success rate of 85%. However, Deroué et al [17] have reported a third option, with

**Fig. 1** Cylinder erosion at the level of the glans (semirigid prosthesis).**Fig. 2** Cylinder erosion at the level of the glans (inflatable prosthesis).

eradication of implant' infections being achieved by the use of systemic antibiotics alone, without the removal of the implants. This is a difficult solution, because after surgery a pseudo-capsule develops around the device. This pseudo-capsule, together with the poor blood supply to the area and the biofilm or slime produced by the bacteria, provides a protected cavity in which the bacteria can proliferate and the antibiotic alone can not work. The American Medical System Company (AMS), has recently developed a minocycline–rifampicin-



**Fig. 3** Pump erosion to the scrotal skin.

coated penile prosthesis named Inhibizone [11]. With this new device, Wilson et al. demonstrated a marked reduction in overall penile prostheses infections [18].

### Mechanical failure

Mechanical failure can occur with both semirigid and inflatable (two- and three-component) prostheses. For inflatable implants, causes of failure can be leakage from the cylinder, reservoir or tubing, an aneurysm in the cylinder or damage to the tubes [19]. For semirigid implants, mechanical failures are frequently caused by rod fracture. In the past, in cases of mechanical problems in an inflatable prosthesis the trend was to remove only the damaged part (pump, reservoir, cylinder, tubes), but recently the more common management option is to remove and replace, in the same sitting, the entire prosthetic device. This has arisen because, after 4 to 5 years, if there is a problem in one part of the prosthesis, it is likely that other components of that pros-

thesis will also have suffered significant wear [19].

### Erosion

Again erosion can occur in both semirigid and inflatable (two- and three-component) prostheses [2,20]. This is the most common complication and usually occurs around 6 months after implantation and in spinal cord injured (SCI) men with a penile prosthesis. Extrusion without infection in SCI patients is mainly due to the decreased blood supply and to disorders affecting peripheral sensitivity [21]. Every prosthesis component can produce an erosion: the cylinders at the level of the glans (Figs. 1 & 2), the pump can erode the scrotal skin (Fig. 3), and the tubes can erode the skin if placed too superficially. The distal erosion of a cylinder at the glans level is frequently due to the use of an oversized cylinder, and the precursor to erosion is protrusion (Fig. 4). Again, in these cases, it is necessary to remove the entire prosthetic device and to replace the implant in the same sitting.



**Fig. 4** Distal protrusion of oversized cylinders (inflatable prosthesis).



**Fig. 5** "S-Shaped" deformity of the penis.



**Fig. 6** "Concorde syndrome" floppy glans.

**"S-shaped" deformity of the penis**

The "S-shaped" deformity of the penis (Fig. 5) is a complication that frequently occurs after a

penile implant if complete distal dilation of the corpora cavernosa was not performed and/or cylinders that are too short have been inserted [22]. In such cases, the device has to



**Fig. 7** Concorde aircraft highlighting nose shape.

be removed, the distal part of the corpora cavernosa has to be inflated and the replacement prosthesis must have longer cylinders.

### “Glans – Concorde syndrome”

This is a particular condition that occurs after a penile implant if an undersized cylinder has been used. It results in a “floppy and hypermobile glans” (Fig. 6), which resembles the very distinctive nose of the supersonic transport (SST) aircraft, Concorde (Fig. 7). This condition can produce some problems in sexual intercourse. Cylinder removal is not necessary and the best treatment involves the partial dissection of the glans from the underlying tissue using a subcoronal incision, followed by fixation of the glans, using non-absorbable sutures, to the tips of the corpora cavernosa.

### Conclusions

Penile prosthesis implantation is a highly successful treatment for erectile dysfunction (ED). It is no longer the first-choice therapy, but is very often the last chance for impotent patients if oral and intracavernosal therapy have not been successful. Today, the advent of new surgical tools and advances in biomedical engineering have significantly reduced the risk of intra- and postoperative complications and the need for revision surgery. Nevertheless, urologists who do perform penile prosthesis implantation should be familiar with several different devices and must have a meticulous respect for sterility to guarantee the success of this particular kind of urological surgery.

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