

## ORIGINAL RESEARCH—SURGERY

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# Management of Distal Extrusion of Penile Prosthesis: Partial Disassembly and Tip Reinforcement by Double Breasting or Grafting

Osama Shaeer, MD

Department of Andrology, Faculty of Medicine, Cairo University, Egypt

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### ABSTRACT

**Introduction.** Distal erosion and perforation of penile prosthesis have been reported in association with neurologic impairment, diabetes mellitus, and following irradiation for prostatic cancer. Once perforation occurs, reimplantation carries a higher risk of reperforation unless adequate preventive measures are taken.

**Aim.** This is a description of a procedure whereby the point of perforation was exposed and repaired to restore distal support.

**Methods.** In three patients with distal extrusion of penile prosthesis through the urethra, the glans was mobilized off the tip of the corpus cavernosum and the caverno-urethral fistula was disconnected from the corpus cavernosum. The fistula was sealed by primary sutures. The perforation on the corpus cavernosum side was sealed by double breasting in two cases and by grafting in one case. Prosthesis was reimplanted.

**Main Outcome Measures.** Complications, recurrence of erosion, and postoperative coital pain.

**Results.** No complications, recurrence, or persistent pain occurred in any of the three cases.

**Conclusion.** The management of the distal extrusion of penile prosthesis by partial disassembly, double breasting, or grafting may provide reliable distal support and thereby avoid reperforation and repeated extrusion. **Shaeer O. Management of distal extrusion of penile prosthesis: Partial disassembly and tip reinforcement by double breasting or grafting. J Sex Med 2008;5:1257–1262.**

**Key Words.** Extrusion; Erosion; Perforation; Penile Prosthesis; Penile Implant; Double Breasting

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### Introduction

Distal erosion and perforation of penile prosthesis through the glans penis or urethra have been reported in association with neurologic impairment, diabetes mellitus, and following irradiation for prostatic cancer [1]. The rate of perforation is particularly high with the utility of semirigid penile prosthesis. Perforation among patients with neurologic impairment occurred in 18.1% of cases with a semirigid penile prosthesis implanted, and 2.4% with self-contained inflatable devices [2]. Extrusion has also been attributed to technical reasons such as vigorous distal dilatation or oversizing of the prosthesis [3]. Once perforation occurs, reimplantation carries a higher risk of

reperforation unless adequate preventive measures are taken. In some cases, reperforation necessitated several revisions [3].

This is a description of an approach to cases with distal perforation where the weaker point of perforation was accessed via partial disassembly of the corpus cavernosum and corpus spongiosum, and reinforced with either two-layer repair or grafting.

### Patients and Methods

We reported on the management of three patients with distal extrusion of penile prosthesis through the urethra, referred to a tertiary referral center. Two patients had a semirigid prosthesis (case 1



**Figure 1** Distal extrusion of a penile prosthesis through the urethra.

and case 2) and one had a two-piece inflatable device (case 3). Upon presentation, the tip of the prosthesis protruded through the urethral meatus (Figure 1). Two patients had a spinal cord injury as a predisposing factor for extrusion.

The three cases were operated upon. The implant was removed (the extruded rod, in case of the semirigid prosthesis, and the whole of the inflatable prosthesis). The point of perforation between the glans and the tip of the corpus cavernosum was exposed. The perforation on the undersurface of the glans was sealed, and the tip of the corpus cavernosum was reinforced. Reinforcement was performed by either double breasting or grafting. For double breasting, the edge of the perforated tunica albuginea was freshened and sealed in two layers. As to grafting, a dermal graft was harvested and inserted between the glans and the tip of the corpus cavernosum. Adequate scraping of the glans undersurface is mandatory for graft take.

Reimplantation was performed in the same setting for cases 2 and 3, and after 6 months for case 1. For the latter case, repair was delayed on account of suspicion of infection.

A written informed consent was obtained from the three patients. For cases 1 and 2, the procedure started with a hemicircular subcoronal incision on the side of the perforation. Buck's fascia and the tunica albuginea on the side of the perforation were incised longitudinally. The glans was pulled distally such that the tip of the rod would fall off the perforation into the corpus cavernosum. An indwelling urinary catheter was inserted. The rod

was extracted through the corporotomy. The corpus cavernosum was irrigated with antibiotic solution (vancomycin, bacitracin, and gentamicin in 0.9% normal saline). A large-caliber metal dilator was inserted through the corporotomy and distally so as to define the contour of the corpus cavernosum without protruding through the perforation. The glans and its corona were retracted distally and everted. Alternating sharp/blunt dissection was carried out along the plane between the corpus cavernosum and the undersurface of the glans to separate them, starting at the distal angle of the corporotomy (Figure 2). The dissection was facilitated by following the plane immediately superficial to the tunica albuginea by identifying its outer longitudinal fibers at the corporotomy edge. A small-caliber dilator was inserted into the perforation in the urethra and through the fistula between the urethra and corpus cavernosum to stop at the larger dilator in order to define the fistula. Dissection proceeded until the connection between the fistula and the cavernosum was reached, incised and totally separated from the tunica albuginea of the corpus cavernosum (Figures 3 and 4). If necessary, the urethra was mobilized to a short distance guided by the indwelling catheter.

Once the fistula was separated from the corpus cavernosum (Figure 3), the edges of the corporeal



**Figure 2** Development of the plane between the glans penis and corpus cavernosum.



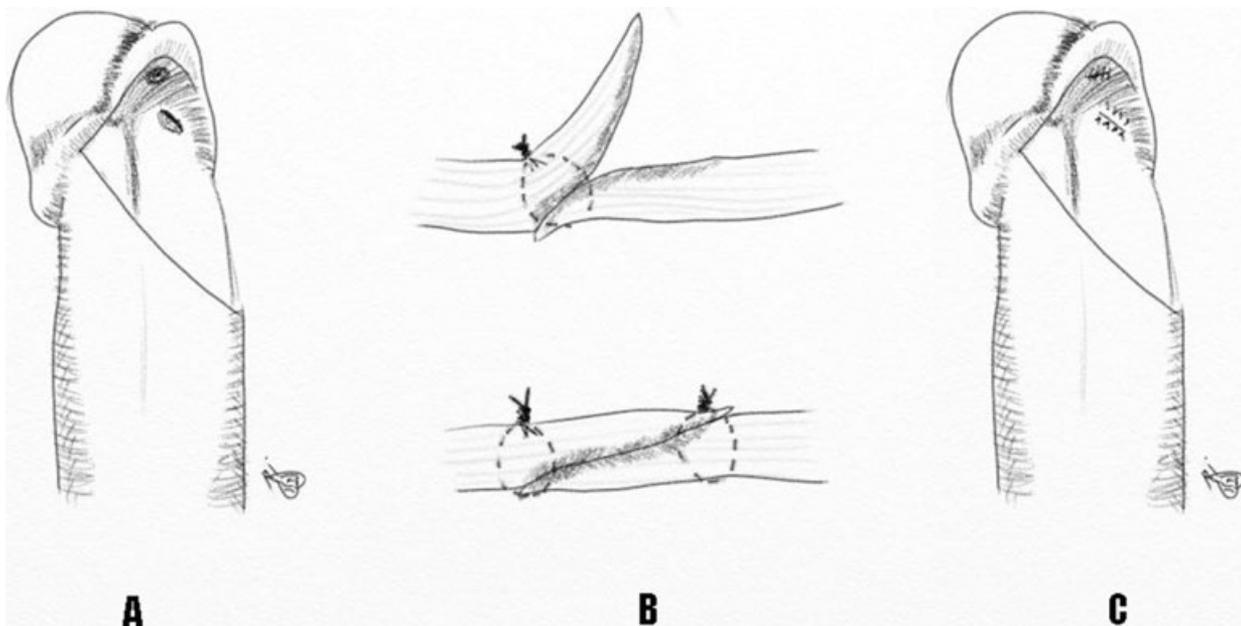
**Figure 3** Disconnection of the glanular fistula (small dilator) from the corpus cavernosum (larger dilator).

perforation were freshened by excising the contour down to a bleeding edge. The same was performed for the proximal and distal edges of the fistula, as well as to its inner surface that was scrapped off (as much as possible) with the tip of a small scalpel. The undersurface of the glans was also scrapped so as to create a blood-oozing raw surface that would provide adequate vascularity to the intended repair of the corpus cavernosum perforation.

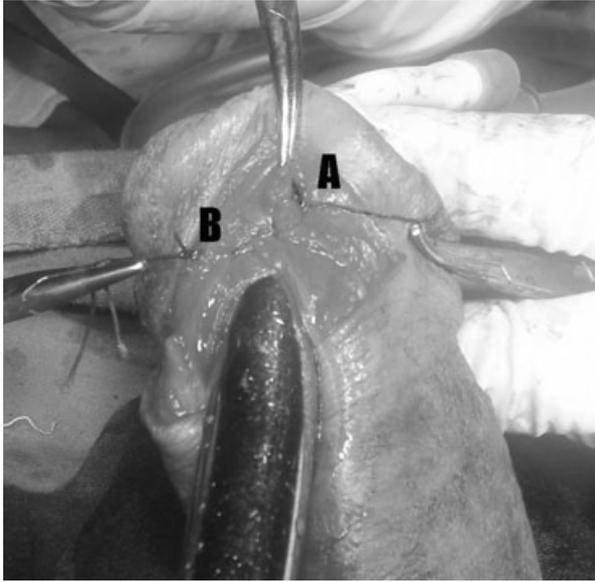
As to case 3, a penoscrotal incision was cut in addition to the subcoronal incision. The prosthesis was removed through the penoscrotal incision. From the distal incision, Buck's fascia was incised, and the disassembly of the tip of the corpus cavernosum and the fistula-bearing glans was performed as mentioned earlier.

The proximal opening of the fistula on the undersurface of the glans was sutured with continuous absorbable sutures (Figure 5A). The distal opening could be repaired by a single stitch in two cases, and could not be easily accessed in one. Being a raw surface, the scrapped interior of the fistula was supposed to heal.

In case 1, the perforation in the tunica albuginea was sealed by double breasting. The opposing edges were trimmed in a slanting direction so as to create two flaps with overlapping raw surfaces facing each other. The two surfaces were coapted and sutured together by two rows of sutures (Figures 4B and 5B). The blood-oozing undersurface of the glans was affixed to the repair to provide vascularity that would assist healing. In case 2, the corpus cavernosum was recalibrated and a new rod was inserted, followed by the primary closure of the defect over the tip of the new rod as for case 1 (Figure 4C). The patient was advised that an inflatable prosthesis would be a necessity in his case, but he declined the inflatable device for financial reasons and provided a written consent



**Figure 4** Operative steps. (A) Exposure and disconnection of the glanular fistula and the perforation in the tunica albuginea. (B) Double breasting. (C) Sealing the fistula and perforation in the tunica independently.



**Figure 5** Repair of the glanular fistula (A) and the corpus cavernosum perforation (B).

that he bears the responsibility for that decision. The length of the new rod was 5 mm shorter than the one in place to accommodate for the very slight shortening that resulted from double breasting, and to ease the tension on the repair.

As to case 3, excising the border of the perforation down to adequate vascularity resulted in the gaping of the perforation to the extent that primary closure was not possible without shortening the corpus cavernosum. A dermal graft was harvested from the hairless inguinal region (Figure 6). The graft was de-epithelialized and defatted. It was then sutured to the healthy



**Figure 6** Dermal graft harvested from the inguinal region. The glans has been dissected off the corpus cavernosum.



**Figure 7** Graft secured to the recipient site.

edges of the perforation, with its undersurface (subdermis) facing and affixed to the blood-oozing undersurface of the glans, to provide a vascular bed for the graft (Figure 7). An inflatable device was implanted. The insertion of the cylinder on the perforated side was performed as gently as possible and under direct vision through the subcoronal incision. The new cylinders were of the same length as the removed ones. No shortening resulted from the procedure.

The patients were discharged the next day following surgery. The indwelling catheter was removed 7 days later. Sexual activity was resumed after 2 months. Case 1 came in for the insertion of a new rod after 6 months. Again, he declined an inflatable device for financial reasons. Blunt dilatation of the corpus cavernosum proved difficult. We resorted to ultrasound guided excavation [4] by a sharp laparoscopy trochar and successfully implanted a rod equal to the indwelling one in length and girth.

## Results

Case 1 was followed up for 6 months following reimplantation, and then dropped out. Case 2 and case 3 were followed up for 1 and 3 years, respectively. For the three cases, no complications were issued following surgery, and perforation did not recur throughout the follow-up period. Revision was not required.

None of the three patients reported any change in glanular sensitivity in comparison to the preoperative period. None reported coital or persistent noncoital pain, and none could notice any inequality in the length of both cylinders/rods.

Approximate surgical time for repair and reimplantation was 80 minutes for primary closure, and 110 minutes for the grafting technique.

### Discussion

Diabetes mellitus, neurogenic impairment, and radical prostatectomy comprise common and important risk factors predisposing to erectile dysfunction, and indicating penile prosthesis implantation. On the other hand, distal erosion and perforation of penile prosthesis is most frequent among those risk groups [1]. It is possible that the associated microangiopathy, lack of trophic impulses, and frequent unrecognized trauma on the account of hypoesthesia are the precipitating factors. Technical factors predisposing to distal perforation include aggressive dilatation, mostly adopted for prosthesis implantation in cases of corporeal fibrosis [1]. The distal corporal tunica albuginea has been found to be thinner and less reinforced than that of the penile shaft, suggesting structural basis for distal erosion and perforation [5]. It has been reported that distal extrusion tends to recur following reimplantation, several times in some cases [3].

Several surgical techniques have been described for the management of the perforation and reimplantation, some relying on natural tissue repair, while others adopting artificial prosthetic materials.

The rerouting procedure comprises the creation of a new track for the prosthesis beside the capsule that surrounded the cylinder, all within the corpus cavernosum [1,6]. This is achieved by incising a longitudinal corporotomy, deflating and retracting the cylinders, incising the medial wall of the surgical capsule, dilation of a track next to it, and reinsertion of the cylinder into the new track [6].

A prefabricated interposition flap can be applied to seal the perforation in a two-stage procedure. A strip of anterior rectus sheath is grafted to the tunica vaginalis, and mobilized in a second stage as a pedicled island flap to the recipient site on the distal penis [3].

Prosthetic repair can be achieved by fashioning a Gortex mesh into a windsock that fits the extruded cylinder. Long sleeves are fashioned and secured to the tunica albuginea proximally, in a trial to avoid the recurrence of extrusion [1]. The cylinder is reintroduced within the windsock. In comparison to rerouting, Gortex windsock repair

resulted in more infections and recurrences [1]. This is in agreement with other reports that attribute higher infection rates to prosthetic materials [7,8].

Implants usually perforate into the urethra, and to a lesser extent, through the glans or corporeal shaft [3]. In case of perforation into the urethra or into the glans, the weak point is usually at the very tip of the corpus cavernosum, which bears the brunt upon sexual intercourse. This point is left unrepaired in case of rerouting and windsock techniques. Although the prosthesis is within a new sleeve (the new route or the windsock), it still hits against the flimsy, unrepaired tip of the corpus cavernosum. This is the rationale behind our approach to distal extrusion, where we tried to repair the perforation in two separate layers with healthy native tissues, or if not possible, with a graft based on a highly vascular bed, the glans penis, in a trial to restore the integrity of the tip of the corpus cavernosum.

Double breasting creates two independent suture lines that are on either side of the midline, thereby escaping—to some extent—the tension upon sexual intercourse, as compared with midline repair. The tip of the prosthesis pushes against a surface rather than a suture line. A very sturdy repair is possible if the surgeon invests in double breasting in terms of widening the flaps, on the expense of shaft length, in which case, a slightly shorter implant will be required. In our experience, inequality was minimal and unnoticeable, as the flaps we created were 5-mm wide. A solution to overt inequality is to reimplant both sides with rods/cylinders of equal length. Fixing the glans to the repair—a part of our procedure—will prevent the excessive mobility of the glans and subsequent subcutaneous protrusion of the prosthesis. Shortening the rods/cylinders per se is one of the reported solutions for impending or actual prosthesis extrusion [9], especially with the presence of a predisposing factor such as neurologic impairment.

Nevertheless, if shortening is a disturbing problem, grafting the tip of the corpus cavernosum is an alternative. Considering the rich vascular supply of the glans penis that nourishes the graft, and considering the small size of the graft, we felt that the two-stage flap technique [3] was not necessary. The rich blood supply of the glans and its reliability as a graft shepherd is well documented in medical literature, particularly in the course of hypospadias repair. Glanular wing flaps have been an integral part of most graft urethroplasties, whether utilizing skin or mucosa [10,11].

The distraction of the fistula track from the perforation in the corpus cavernosum and sealing each one separately help to prevent reperforation through the same track. In addition to the added distal support, the utility of natural tissue avoids the higher infection rate attributed to prosthetic materials [7,8].

### Conclusion

The management of distal extrusion of penile prosthesis by partial disassembly, double breasting, or grafting may provide reliable distal support and thereby avoid reperforation and repeated extrusion. Natural tissue repair avoids the complications attributed to the utility of artificial prosthetic materials.

**Corresponding Author:** Osama Shaeer, MD, Andrology, Faculty of Medicine, Cairo University, 21 Gaber Ibn Hayan Street-Dokki, Cairo, Egypt, 12311 ARE. Tel: 0020106600606; Fax: 0020227605181; E-mail: dr-osama@link.net; Web: <http://www.maleGENITALsurgery.com>

*Conflict of Interest:* None declared.

### Statement of Authorship

#### Category 1

##### (a) Conception and Design

Osama Shaeer

##### (b) Acquisition of Data

Osama Shaeer

##### (c) Analysis and Interpretation of Data

Osama Shaeer

#### Category 2

##### (a) Drafting the Article

Osama Shaeer

##### (b) Revising It for Intellectual Content

Osama Shaeer

#### Category 3

##### (a) Final Approval of the Completed Article

Osama Shaeer

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