

# Penile Prosthesis Implantation for Treatment of Postpriapism Erectile Dysfunction

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**Introduction:** Our aim was to evaluate the procedure and outcome of penile prosthesis surgery in the treatment of men with postpriapism erectile dysfunction.

**Materials and Methods:** During the period between 1997 and 2004, a total of 17 patients with postpriapism erectile dysfunction underwent penile prosthesis implantation at our institution. Prosthesis implantation was done electively 6 to 18 months after priapism, when the patients presented with erectile dysfunction. Of the prosthesis implanted, 11 were malleable, 4 were 2-piece, and 2 were 3-piece prostheses (AMS, Minnetonka, Minnesota, USA).

**Results:** All the 17 patients were successfully implanted with penile prosthesis. Intra-operatively, corporeal dilation was difficult due to extensive corporeal fibrosis, which led to urethral injury in 2 patients. There were no major postoperative complications. The median hospital stay was 5 days. The follow-up period ranged from 2 to 9 years (median, 6 years). All the patients were satisfied with the prosthesis.

**Conclusion:** Penile prosthesis implantation is the modality of treatment for patients with postpriapism erectile dysfunction at our institution. It has a high patient satisfaction rate. Although procedure-related complications are common due to corporeal fibrosis, they were mostly minor ones and did not affect the outcome of the procedure.

*Keywords: prosthesis, priapism, erectile dysfunction, satisfaction, infection*

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## INTRODUCTION

Priapism is a state of prolonged erection of the penis without sexual desire. The delicate balance between arterial inflow and venous drainage in the corporeal bodies is impaired in priapism, resulting in prolonged tumescence. Its clinical importance lies largely in the significant consequences that may result from delayed management.<sup>(1)</sup>

Priapism can be classified into low-flow and high-flow types. The low-flow type of priapism (ischemic) occurs when there is obstruction

to the venous outflow from the tumescent penis, and the high-flow type (nonischemic) is caused by increased arterial flow into the tumescent penis. Common causes of low-flow type priapism are sickle-cell disease and intracorporeal injection of vasoactive drugs such as papaverine, prostaglandin E1, etc.<sup>(1,2)</sup> Priapism in sickle-cell disease occurs as a result of sickling of erythrocytes within the sinusoidal spaces. Obstruction to the venous outflow in the low-flow type, leads to ischemia of the

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cavernosal smooth muscle after a period of time. This ischemic insult leads to corporeal necrosis, fibrosis, and eventually, erectile dysfunction (ED).

Phosphodiesterase-5 inhibitors are generally ineffective for treatment of postpriapism ED because of the destruction of erectile tissue and its replacement by fibrosis.<sup>(3)</sup> Penile prosthesis implantation, although associated with significant procedure-related morbidity may be the only effective treatment for these patients with postpriapism ED.<sup>(4)</sup> Since 1988, a total of 605 penile prostheses implantations have been done at our institution, for treatment of penile disorders with various etiologies. In this study, we retrospectively analyzed the procedure and the outcome of prosthesis implantation in patients with postpriapism ED.

## MATERIALS AND METHODS

### Patients

Between January 1997 and May 2004, a total of 17 patients with postpriapism ED underwent penile prosthesis implantation at our institution. The patients were between 18 and 28 years of age (median, 22 years). All the procedures were performed by one surgeon. Sickle-cell disease was the cause of priapism in 16 patients, and in 1 patient with psychogenic ED, priapism resulted from intracorporeal injection of an erectogenic drug. Six patients with sickle-cell disease presented to us with priapism and 11 were referred to us from other centers for postpriapism ED.

### Treatment of Priapism

The median duration of priapism at presentation in the 6 patients treated at our center was 21 hours. They were initially managed conservatively by aspiration and irrigation of the corporeal bodies with saline solution and adrenergic drugs. General measures were taken to relieve pain and to improve hydration and oxygenation status in these sickle-cell disease patients. Later, distal corporospongiosal shunt was made in all as they failed to respond to conservative management. Proximal corporosaphenous shunt was made in 1 patient. There was no immediate response to shunt

surgery in any of these patients. The penile rigidity then gradually decreased and the penis became flaccid. After a few days, the penis was noticed to be hard and fibrous. During the follow-up, all the 6 patients were clinically diagnosed to have penile fibrosis with ED. In 1 patient, fibrosis was confined to the distal shaft of the penis.

### Penile Prosthesis Implantation

All of the 17 patients with postpriapism ED consented for penile prosthesis implantation. Four of them were unmarried at the time of prosthesis implantation. The procedure was done electively 6 to 18 months (median, 10.5 months) after the priapism. Penile lengths in these patients varied from 14 cm to 20 cm with a median of 16 cm. They were implanted with the prosthesis manufactured by the American Medical Systems (AMS, Minnetonka, Minnesota, USA), as they were the only available penile implants in our country. Malleable prosthesis (AMS 650) was implanted in 11 patients, 2-piece inflatable Ambicor prosthesis in 4, and 3-piece inflatable 700CX in 2. Selection of the type of the prosthesis depended to a large extent on the patient's opinion which was mostly based on the costs.

The patients were admitted 1 day before the operation. All of them received a third-generation cephalosporin (ceftazidime, 1 gm, twice daily) antibiotic prophylaxis, first dose given 12 hours before the operation and continued for 24 hours after the operation. After 24 hours, oral formulation of amoxicillin plus clavulanic acid was continued for 10 days.<sup>(5)</sup>

The malleable prostheses were implanted through a ventral-distal penile incision, while Ambicor prostheses through a penoscrotal incision and the 3-piece devices (700 CX) through a vertical infrapubic incision. Ventrolateral corporotomy was done for the penile and penoscrotal approach, while dorsolateral corporotomy was done for implantation of the cylinder of the 3-piece devices. In all these cases, extensive bilateral corporeal fibrosis was encountered. A 3-cm to 4-cm incision was made in the corporeal body (*corporotomy*) and diathermy straight knife was used to pierce through the middle of the fibrous tissue using cutting current to create a space.

In case of severe fibrosis, this maneuver was combined with partial excavation of fibrous tissue at the corporotomy site. Later, corporeal dilation was done with Hegar’s dilators starting with small-sized dilator (size numbers, 6 or 7), and usually up to 13-sized dilator. Biopsy of the corporeal tissue was taken in all the patients. Copious irrigation of corporeal bodies with antibiotic solution (gentamicin and cefuroxime) was done throughout the procedure. The cylinder diameter ranged between 11 mm and 12 mm. The cylinder plus rear tip extender length ranged between 14 cm and 20 cm. In cases with difficult closure of corporotomy, small corporeal release incisions were made at different levels on either side of the corporotomy to facilitate closure.

A Foley catheter was inserted preoperatively in all of the patients, which was removed the next morning. In patients with urethral injury, the catheter was kept for 5 days. Postoperatively, the patients were advised to take a 2-week course of antibiotics (amoxicillin plus clavulanic acid), along with anti-inflammatory drugs, analgesics, and local ice-pack application for a few days after the operation.

**RESULTS**

Penile prosthesis implantation was done in all of the 17 patients. Intraoperatively, the urethra was injured in 2 patients at the beginning of the dilation. In these 2 patients, the small-sized dilator was passed distally from the penoscrotal corporotomy wound, perforated the distal penile urethra, and was seen protruding at the external meatus. A distal corporeal incision was made at the same site, urethral injury was identified, and a formal 3-layer closure of the urethra was done

through the corporotomy over a 12-F silastic Foley catheter. Both of these patients were implanted with 2-piece Ambicor prosthesis after urethral repair in the same sitting.

In 1 patient with severely fibrous corpora, corporeal body on one side was incised on the lateral aspect, and the incision was extended both proximally and distally. The intervening septum between the two corporeal bodies could not be identified, and the fibrous corporeal tissue distal to the incision was excised, thus creating a single corporeal cavity in the penile shaft for prosthesis insertion. In this patient, only 1 cylinder (15 mm) of Ambicor prosthesis could be placed. The other cylinder was detached from the implant and the tubing was ligated. In another patient, the fibrosis was patchy. The fibrous plaque was mainly confined to the distal shaft making proximal dilation easier.

The median duration of the operative procedure was 60 minutes ranging from 30 minutes to 3 hours. The procedure was relatively easy and could be completed in 30 to 60 minutes (median, 45 minutes) in 7 patients who underwent prosthesis insertion within 10 months after the priapism (Tables 1 and 2). In the other 10 patients who underwent prosthesis insertion 1 year after the priapism, dilation was difficult and the procedure was completed in 60 to 180 minutes (median, 95 minutes). The procedure was not abandoned during the surgery in any of these patients.

There were no major postoperative complications. Minor postoperative complications such as penile edema and superficial hematoma were seen in 9 patients that subsided with

**Table 1.** Details of 6 Patients Presented With Priapism Due to Sickle-Cell Disease Who Later Underwent Penile Prosthesis Implantation

Patient	Age, y	Time to Presentation, h	Treatment of Priapism*	Time to Surgery, mo	Operative Time, min	Prosthesis	Complications
1	25	18	DCS shunt	6	40	Malleable	Superficial hematoma
2	22	12	DCS and CS shunts	13	90	Malleable	Penile edema
3	26	24	DCS and CS shunts	7	45	Malleable	...
4	19	24	DCS and CS shunts	14	90	Malleable	...
5	20	18	DCS and CS shunts	11	100	Ambicor	Superficial hematoma
6	22	24	DCS and CS shunts	6	30	Malleable	...

\*DCS indicates distal corporospongiosal and CS, corporosaphenous.

**Table 2.** Details of 11 Patients With Postpriapism Fibrosis Referred for Penile Prosthesis Implantation

Patient	Age, y	Cause of Priapism*	Time to surgery, mo	Operative Time, min	Prosthesis	Complications
1	25	SCD	6	30	Malleable	...
2	20	SCD	12	90	700CX	Penile edema
3	28	Intracavernosal injection	12	60	Malleable	Penile edema
4	22	SCD	15	100	Ambicor	Urethral injury
5	18	SCD	9	45	Malleable	...
6	25	SCD	18	100	Malleable	Superficial hematoma
7	20	SCD	14	150	Malleable	Hematoma
8	21	SCD	6	60	700CX	Penile edema
9	18	SCD	8	45	Malleable	...
10	22	SCD	10	60	Malleable	...
11	23	SCD	12	180	Ambicor	Urethral injury

\*SCD indicates sickle-cell disease.

observation. There was no case of prosthesis infection. One patient with malleable prosthesis complained of numbness of the penile shaft after the surgery which subsided after a few days. Five patients complained of shortened penile length after the surgery in spite of being counseled preoperatively about the penile length. Postoperatively, the patients were followed up at 1 week and 3 weeks postoperatively. Training by prosthesis specialist was provided after 4 weeks. Later, the patients were followed up until their device was assessed to be functioning satisfactorily. Corporeal tissue biopsy confirmed fibrosis in all the patients.

Hospital stay ranged from 3 to 7 days, (median, 5 days). Malleable prosthesis in 1 patient was changed to 2-piece Ambicor after 1 year for cosmetic reasons. The follow-up ranged from 2 to 9 years with a median of 6 years. During the follow-up, 3 of the 4 unmarried men got married. All the 16 patients who were married had successful sexual intercourse with high satisfaction as assessed subjectively.

## DISCUSSION

Corporeal fibrosis following priapism is invariably dense and extensive resulting in penile induration and shortening. Penile prosthesis surgery in patients with corporeal fibrosis is difficult and is associated with high rates of complications. Various techniques have been reported to minimize the complications. Montague and Angermeier reported a technique

of corporeal excavation wherein nearly all of the fibrous corporeal tissue was excised leaving behind the tunica albuginea, and the cylinders were placed in the empty corporeal bed.<sup>(6)</sup> George and colleagues reported a technique of excision with minimum scar formation and used polytetrafluoroethylene graft to cover the corporotomy defect.<sup>(7)</sup> Recently, Shaer and Shaer reported the techniques of transcorporeal resection and optical corporotomy as adjuvant measures for excavating the fibrous corpora cavernosa under vision, without the use of force against resistance.<sup>(8)</sup> Shaer also described application of sheathed sharp instruments guided by ultrasonography as an alternative to cavernotomes, allowing fast, efficient, and visually monitored drilling into the fibrous tissue.<sup>(9)</sup>

In our series, dilation of fibrous corpora was possible in all of the patients. In completely fibrous corporeal body, an incision was made in the fibrous tissue at the site of corporotomy using cutting current diathermy. Later, the fibrous tissue on either side of the diathermy incision was excised, thus creating a space to accommodate the dilator. Nearly total excision of fibrous tissue from the corporeal body was required in only 1 of the 17 patients. We feel that corporeal dilation rather than excavation leaves a rim of fibrous tissue around the cylinder which adds to the rigidity of the device. None of our patients required patch graft to cover the corporotomy defect. In patients with extensive fibrosis and fused corporeal bodies, a single large-diameter

cylinder can be placed to accommodate both of the corporeal bodies. In 1 of our patients with severe corporeal fibrosis, only 1 cylinder was implanted occupying the fused corporeal bodies.

With a reported incidence of 0.8% to 8.9%, infection represents the most serious complication of penile prosthesis surgery.<sup>(10)</sup> We observed that prosthesis insertion in patients with postpriapism corporeal fibrosis is not associated with a higher rate of infection. With the implementation of strict aseptic measures along with prophylactic broad-spectrum antibiotics, none of our patients had prosthesis infection. In addition, no cases of mechanical failure or prosthesis erosions were seen during the follow-up.

There are reports of early prosthesis insertion in patients with priapism. Rees and associates reported immediate insertion of prosthesis as a definitive management of low-flow priapism.<sup>(11)</sup> The advantages of immediate prosthesis insertion included simple and rapid placement of the device, which might have accounted for the low rate of infection in their series. Early insertion of prosthesis also maintains penile length which results in higher patient satisfaction rates. However, immediate insertion of prosthesis needs a well-motivated patient and a readily available prosthesis. Our patients who had normal erectile function before priapism did not agree to undergo immediate prosthesis insertion even after proper explanation about the consequences of long-standing priapism. In some patients, this was due to the lack of finances in procuring the prosthesis and in others, decision-making was difficult as they had never experienced ED before.

Penile prosthesis implantation is associated with high satisfaction rates and is considered to be the gold-standard treatment for irreversible ED of organic causes.<sup>(12)</sup> Satisfaction rates depend on the sexual function and associated complications. In the present study, all of the patients with partner were satisfied during their sexual intercourse with the function of the device.

## CONCLUSION

Prosthesis implantation for patients with

postpriapism ED is associated with high patient satisfaction rates. Corporeal dilation, though difficult, was possible in all of our patients. Diathermy knife incision of the fibrous tissue at the corporotomy site along with minimal excision of the fibrous tissue will aid in corporeal dilation. Minor procedural complications are common due to corporeal fibrosis.

## CONFLICT OF INTEREST

None declared.

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