

The Penile Prosthesis and Diabetic Impotence: Some Caveats

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Literature published as of January 1978 contains reports of 103 diabetic men who have undergone implantation of a penile prosthesis as treatment for sexual impotence. Two forms of prosthesis have been used. One procedure involves the use of semi-rigid silicone rods. The other procedure uses inflatable silicone rubber cylinders. Both devices have yielded very high success rates within diabetic populations. Prospective recipients of a penile prosthesis should undergo extensive evaluation geared toward discrimination of organic versus psychogenic factors contributing to the sexual dysfunction. Before recommending prosthesis implantation, the physician should assess the expectations of the patient and his regular sex partner regarding the effects of the procedure. The stability of the patient's relationship with his regular sex partner should be considered an important determinant of response to implantation. Controlled investigations regarding the short- and long-term effects of this procedure are still needed.

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Approximately 50% of men who have suffered from diabetes for over six years experience sexual impotence.^{1,2} The exact etiology of diabetic impotence is not always clear. Contributory factors that have been suggested include: endocrine disorders;^{3,4} vascular complications;¹ interplay between diabetes and other systemic diseases;¹ secondary effects of medication;^{5,6} anti-erotic emotional reactions which occur in response to chronic illness (e.g., depression, anxiety, or anger);^{6,7} and neuropathy.^{2,5,8}

Treatment strategies for diabetic impotence vary according to suspected etiology. Treatment is most difficult in those cases secondary to neuropathy, and these often must be classified as irreversible organic impotence. Initial attempts to treat irreversible organic impotence consisted of using a tourniquet-like device that is strapped to the base of the penis, thereby preventing detumescence from return blood flow.⁵ This device has proven to be unsatisfactory for many patients due to its highly variable success in enhancing erection and to its general unacceptability.

The most recently developed mechanical aid in treating organic impotence is the penile prosthesis. Two basic forms of prostheses have been developed.⁹ One technique is the

implantation of a semi-rigid silicone rod in the matrix of each corpus cavernosum.¹⁰ The other major form of penile prosthesis consists of inflatable silicone rubber cylinders that are placed inside each corpus cavernosum and connected to a pumping mechanism encased in the scrotal pouch. The cylinders are inflated by fluid that is stored in a reservoir implanted behind the rectus muscle.^{11,12}

Literature published as of January 1978 contains reports of approximately 1500 sexually impotent men who have been treated with penile prosthesis implantation.⁹ Diabetes mellitus is the second most frequently reported etiologic factor within the population of prosthesis recipients. The purpose of this paper is to review the literature concerning the use of the penile prosthesis in treating diabetic impotence and to offer suggestions on the future use of this procedure with diabetic men.

FREQUENCY OF USE AND PATIENT CHARACTERISTICS

A total of 17 studies have been published that collectively makes mention of the use of some form of penile prosthesis in treating 103 diabetic men suffering from impotence (Table 1). Unfortunately, specific patient characteristics were reported

in only five of these investigations.^{11,13-16} These data indicate that the penile prosthesis has been used in treating men who ranged in age from 31 to 59 yr. Duration of impotence within this group ranged from 1.5 to 10 yr. Although not consistently reported, it appears that the implant recipients varied widely in degree of penile sensation, erectile ability, orgasmic ability, and extent of neuropathy.

Because of the scant description of the patient population treated, generalization of the results of these investigations is severely restricted. While it is unrealistic to expect an exhaustive description of every subject included in clinical research, some degree of subject description is imperative if generalization of results is to be possible. The penile implant literature collectively suggests that information on the following patient characteristics be included in any published report: demographic data (e.g., age, marital status); duration of impotence; information on premorbid and current sexual functioning (e.g., degree of penile sensation, erectile ability, level of sex drive, orgasmic and ejaculatory capacity); level of motivation for treatment; and the results of psychiatric/psychological evaluation. Reports concerned specifically with a diabetic population should also include information regarding the duration of diabetes, current level of control of the disease, and the extent of neuropathy and other physical problems associated with each patient's diabetes.

PATIENT SELECTION

This literature indicates little uniformity in the procedures used to determine which diabetic patients will be appropriate candidates for prosthetic implantation. However, the importance of exhaustive screening in selecting any patient for this procedure cannot be overemphasized.

A general guideline for patient selection is the use of the penile prosthesis only in cases of organically caused impotence. In dealing with a diabetic population it is important to remember that many sexually impotent diabetic males do not have an organic basis for their erectile dysfunction.^{2,6} Such psychogenic factors as depression, anxiety regarding sexual performance, and anger resulting from marital discord promote erectile impairment that may be superficially indistinguishable from organically caused impotence. Cases of psychogenic impotence should be treated with appropriate psychiatric, sexual, or marital therapy rather than with penile prosthesis implantation.

Renshaw⁶ has called attention to the prevalence of iatrogenically caused impotence in the treatment of diabetic males. The physician who is unaware of the normal sexual changes that accompany aging or who incorrectly assumes that impotence is an inevitable reaction to diabetes may inappropriately promote an expectation of sexual dysfunction

TABLE 1
Treatment outcome with penile prostheses in diabetic men

Study	N	Outcome			No. of complications
		Satisfactory	Fair	Poor	
Rod-like*					
Apfelberg et al. ²⁹	7	7	—	—	NS
Finney ¹⁵	1	1	—	—	1
Gee et al. ^{20†}	3	2	—	1	1
Gee et al. ^{13†}	3	2	—	1	1
Loeffler and Iverson ³⁰	4	4	—	—	0
Mellman ¹⁹	8	8	—	—	0
Merrill and Swanson ¹⁴	2	2	—	—	1
Morales et al. ²⁸	5	3	—	2	2
Nellans et al. ²⁷	6	5	—	1	1
Small ^{21†}	13	13	—	—	0
Small and Carrion ^{31†}	8	8	—	—	0
Small et al. ¹⁰	2	2	—	—	0
Total	62	57	0	5	7
Percentage		91.9	0.0	8.0	12.7
Hydraulic§					
Ambrose ¹⁶	1	1	—	—	0
Malloy and Voneschenbach ³²	17	17	—	—	NS
Scott et al. ¹¹	2	2	—	—	0
Total	20	20	0	0	0
Percentage		100	0.0	0.0	0.0

* Excludes one study²⁵ on 9 subjects due to total lack of specificity in discussing outcome.

† There appears to be some subject overlap between these pairs of investigations.

^{||} Estimated from data presented.

§ Excludes one study²⁶ on 12 subjects due to total lack of specificity in discussing outcome.

in certain cases. When this medical indictment is categorically and authoritatively given to a vulnerable patient, resultant anxiety over sexual performance may interfere with the parasympathetic activities necessary for effective sexual functioning.

Techniques for differentiating organic from psychogenic impotence have been extensively discussed elsewhere.^{1,9} Briefly, these techniques include detailed laboratory monitoring of various physiologic processes,⁹ monitoring of nocturnal penile tumescence,^{17,18} and simple interview strategies.¹ These interview strategies involve assessment of the following factors: level of libido, course of the onset of erection loss, presence or absence of morning erections, and the extent to which the erectile dysfunction is situational versus universal in occurrence. Diabetic men with organic impotence typically evidence continued sexual interest, slow onset of erectile dysfunction, absence of morning erection,

and total to partial loss of erectile firmness in all situations (i.e. regardless of sex partner or type of stimulation). Psychogenic impotence, on the other hand, is generally characterized by low libido, abrupt onset of erection loss, presence of morning erections, and differential firmness of erection dependent upon the type of stimulation (e.g. masturbation versus coitus) and/or upon situational factors (e.g. return of potency with a partner other than spouse).

Once the presence of organic etiology has been substantiated, a number of other factors have to be considered in determining appropriateness of treatment by prosthetic implantation. Paramount among these factors are the expectations of the patient and his regular sex partner regarding the effects of implantation.⁹ Many couples inappropriately expect that prosthetic implantation will solve interpersonal problems or automatically enhance the male's sex drive and orgasmic ability. The prospective recipient and his regular sex partner should be made aware of the facts that: (a) the prosthesis is merely a crutch to aid intromission,^{19,20-21} (b) the implant does not provide sensations of arousal, erection, ejaculation, or orgasm for the male;⁶ and (c) enhanced penile rigidity does not solve marital discord in most cases. Once these limitations are made clear, suitable candidates for implantation should still evidence a high level of motivation to undergo this procedure.

Another important consideration in selecting candidates for prosthetic implant is the stability of the patient's relationship with his regular sex partner. Exploration of both sexual and non-sexual aspects of the patient's primary relationship are important. Sexual issues that appear to be related to favorable prognosis in prosthetic implantation include current level of libido,²² the quality of the pre-impotence sexual relationship,¹³ and the extent to which the male has attempted to promote sexual gratification for the female since the onset of impotence.⁶

Two general relationship issues which appears to be particularly important in determining adjustment to implantation are the existing levels of communication and affection between the partners. Divita and Olsson²³ have called attention to the fact that sexual dysfunction may be adaptive for a particular relationship, and that sudden removal of this method of adaptation may precipitate a crisis in the couple's relationship. Although no specific data have been published regarding this issue, it is likely that a functional relationship is an important asset in successful adjustment to prosthetic implantation. Given the importance of relationship factors in determining response to treatment, a brief course of marital/sexual therapy should both precede and follow prosthesis implantation in most cases.

It is stressed that the prognostic factors discussed in the preceding paragraphs are largely theoretical. To date there has been no systematic, well-controlled investigation of prognostic indices in penile implantation.

OUTCOME AND COMPLICATIONS

The penile prosthesis literature contains an ongoing debate regarding the relative merits of the semi-rigid, rod-like prosthesis and the inflatable hydraulic device. Advocates of the rod-like prosthesis point to ease of insertion, relatively lower cost, and low possibility of complications due to simplicity of design as advantages of their device.²⁴ Proposed advantages of the hydraulic device include enhanced control of erection and the production of an erection that more closely approximates physiologic normalcy.^{16,24}

Literature reporting outcome data was reviewed in hopes of shedding some empirical light on the relative merits of the two basic types of prostheses for a diabetic population. As can be seen from reference to Table 1, 12 reports of the use of a rod-like device and three reports of the use of the hydraulic device were located. The investigations reviewed varied widely in the degree of explicitness exercised in discussing treatment outcome and in the criteria used in determining outcome. In order to provide some uniformity of comparison, the following operational definitions of outcome classes were adopted in formulating Table 1. An outcome that was functional in the sense of producing sufficient penile rigidity to allow intercourse was termed "satisfactory." The "fair" category was intended for cases that evidenced some difficulty but which ultimately attained a functional postoperative adjustment. The patients who rejected the prosthesis medically or who failed to effect a functional sexual adjustment postoperatively were placed in the "poor" category.

This classification scheme lent itself to the summarization of outcome for 62 cases in which a rod-like prosthesis was used and for 20 cases in which a hydraulic device was employed. Two investigations,^{25,26} one within each type category, were omitted from Table 1 due to their total lack of specificity in discussing treatment outcome.

The group data presented in Table 1 indicate that a satisfactory outcome has been reported for 91.9% of recipients of the rod-like prosthesis and for 100% of the recipients of the hydraulic device. No patients evidenced a fair outcome. This literature suggested an 8.0% failure rate with the rod-like prosthesis as compared with a 0% failure rate with the hydraulic implant. Explicit follow-up data were not given in any of the investigations reviewed.

The data in Table 1 indicate that postoperative complications were experienced by seven recipients of a rod-like prosthesis. This represents a 12.7% complication rate with the rod-like device. There were no reported complications with the hydraulic device.

Specific information on the nature of complications was presented for five diabetic recipients of the rod-like prosthesis. Wound infection of sufficient severity to warrant removal of the prosthesis was experienced by three patients.^{13,20,27}

Prosthetic removal due to postoperative infection of the corpora cavernosa and crura occurred with one patient.²⁸ Additional complications included persistent penile pain,^{14,28} mechanical difficulty with the prosthesis,¹⁵ and pressure necrosis and voiding difficulties.²⁷

No systematic assessment of subjective aspects of outcome was reported in this literature. Merrill and Swanson¹⁴ most closely approximated such assessment by including at least superficial measures of both patient and mate satisfaction with the effects of implantation. These investigators also reported explicit objective outcome data on ejaculatory ability and weekly frequency of intercourse. Finally, several investigators (e.g. 11) made anecdotal mention of enhanced self-confidence, optimism, and positive personality change in reaction to prosthetic implantation.

DISCUSSION

From a purely objective standpoint, implantation of a penile prosthesis appears to be an effective mode of treating the diabetic male suffering from organic impotence. Very high success rates have been reported with both the rod-like and hydraulic devices. Complications have been few and have been restricted to subjects using the rod-like prosthesis. The most frequent complication within the diabetic population appears to be infection. However, the overall prevalence of infection in diabetic recipients has been quite low. Indeed, comparison of the results of the current review on diabetic patients with the results of a review of the overall penile prosthesis literature⁹ strongly suggests that diabetic men are relatively good candidates for penile prosthesis implantation. Specifically, the literature indicates complication rates of 16.7% with the rod-like device and 31.2% with the hydraulic device.⁹ Comparable figures for the diabetic population suggest a 12.7% complication rate with the rod-like device and a 0% complication rate with the hydraulic implant.

It is emphasized that the long-term effects of penile prosthesis implantation in diabetic patients have yet to be determined. Extended evaluation of the physical, psychological, and relationship aspects of the patient's sexuality is highly recommended in selecting patients for this procedure. Future research efforts should focus on controlled assessment of objective and subjective aspects of immediate and long-term reactions to prosthetic implantation.

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Editor's Note: Dr. Sotile did not have access to other articles in this symposium at the time he prepared his manuscript.