THE TRANSPUBIC APPROACH FOR REPAIR OF MEMBRANOUS URETHRAL STRICTURES*

Pages with reference to book, From 78 To 82

Sajjad Ahmad (Dept. of Surgery, Postgraduate Medical Institute, Lahore.)
Farakh A. Khan (Read at the 18th Annual Medical Symposium held in December, 1980 at Jinnah Postgraduate Medical Centre, Karachi.)

Abstract

Transpubic urethroplasty was performed in 13 patients of membranous urethral strictures secondary to fracture of the pelvis and followed up for more than 6 months. Pubectomy was not associated with orthopaedic problems and provided an easy access to the membranous urethra for primary urethral anastomosis.
The post operative results were good in 6, moderate in 4 and poor in 2 patients. In one case it is too early to assess the results. Post-operative sexual functions and continence has been good in all patients. We believe that the transpubic approach to these difficult urethral strictures is a useful operative procedure (JPMA 31:78, 1981).

Introduction

Stricture urethra is a difficult urological problem. Membranous urethral stricture following fracture of pelvis have always been a challenging problem for urologists. The damage is at times extensive and surgical approach difficult. It is not surprising that large number of techniques have been advocated for the cure of these strictures. However, the failure rate is, unfortunately, rather high.
The urogenital diaphragm (i.e. triangular ligament) encloses the membranous urethra, Cowper's glands, and most of the external urinary sphincter. It is firmly attached to the pubic bone. In pelvic fractures, this fascia may be torn, shearing off the prostate from the membranous urethra. Bony spicules may perforate the urethra, and the bladder also may be lacerated. Extravasation of blood and urine into the periprostatic and perivasical tissue may be extensive in the early stages. This leads to a necrotizing phlegmon which may become infected. If this is not properly treated, early death may ensue from sepsis.
Urethral continuity cannot be restored simply by placing a catheter in the urethra (Morehouse et al., 1972). Traction upon the inflated catheter although improves the approximation of severed urethral margins, but urethral defect as great as 4 cm are seen in patients so managed (Ragde and Mclnnes, 1969).
The most troublesome and almost inevitable late complication of traumatic rupture of urethra is stricture formation. Subsequently about half of the patients can be maintained on regular urethral dilatation, but the rest requires some surgical corrective procedure (Allen, 1975). If this is not done, chronic infection with stasis of urine may lead to vesical and renal stone formation.
Sexual impotence (loss of erection) may develop, probably as a result of nerve injury, though Gibson (1970) believes it is caused by thrombosis of the arterioles of the corporacaver-nosa. Impaired control of urination occasionally results. This may be due to direct injury to the external, sphincter or may be secondary to nerve damage.
Urethroplasty for strictures of membranous urethra has always been a difficult procedure because of the inaccessible position of the urethra which lies above the urogenital diaphragm behind the pubis. In the past most of the attempts have been made through the perineum; Badenoch (1950), mobilised the bulbous urethra and pulled it through the incised stricture into the prostatic urethra while Morehouse

and Mackinnon (1969) and Turner-Warwick (1968) modified Johanson's (1953) technique of inserting scrotal inlays through the strictured area. More recently Waterhouse et al (1963) described combined approach in which the bulbous urethra is mobilized from below, then passed over the sphincter to insert into the prostatic urethra anteriorly. We believe that these methods provide good results only in a limited number of cases and in specialised centres. Moreover, the variety of operations performed testifies to the lack of agreement among urologists as to the ideal operation.

These procedures have an inherent draw back. The strictures are located above the urogenital diaphragm and the surgical approach through the perineum has to transgress the external urethral sphincter (Pierce, 1972). This has the real or potential effect of defunctionaliz-ing the sphincter and placing the full burden of continence upon the bladder neck (Allen, 1975). Moreover, in latter years of life, continence might be lost when bladder neck or prostatic resection is undertaken (Allen, 1975). Although reports from many centers have suggested that these complications are rare, we believe that these methods provide good results in a limited number of cases and there is a distinct possibility that majority of the patients undergoing these procedures would be left with unacceptable degree of urinary leakage. On the contrary membranous urethra and prostate can be reached much more easily through the transpubic approach.

Walker first described the transpubic approach in 1923, when treating carcinoma of prostate, it was not until 1962 when Pierce for the first time used this approach for, stricture of membranous urethra. Since that time, glowing reports from different authors have clearly confirmed the advantages and practicality of this procedure (Khan and Furlow, 1976). Our experience with 13 such cases have convinced us of the superiority of this approach.

Material and Methods

During a period of 5 years (1976-80), 270 cases of stricture urethra of various sites and aetiology were admitted and treated in the Department of Urology, Mayo Hospital, Lahore and Lahore General Hospital. Out of these, 13 patients with post-traumatic stricture of the membranous urethra underwent transpubic repair of the stricture. Of the 13 patients 10 were less than 30 years old, the youngest being 16 years and oldest 35 years of age. Three out of these 13 patients did not have any previous surgery. The remaining had undergone cystostomy and/or perineal approach to correct the stricture. These operations had not been successful.

Urographic diagnosis of the stricture was accomplished by a combination of voiding cysto-urethrography, retrograde urethrography (Fig. 1),

Fig. 1 : A retrograde urethrogram showing post-traumatic membranous stricture.

simultaneous antegrade-retrograde urethrography (Fig. 2) and endoscopic visualization.

Fig. 2: A simultaneous cystourethrogram showing post-traumatic membranous stricture.

Postoperative supervision included calibration of the urethra every 3 months for the 1st year. A urographic evaluation was made immediately after the removal of the urethral catheter. Sexual functions were investigated by a fixed system of questioning and by semen analysis.

All patients were followed up for an average period of 12 months, ranging from 6 to 20 months. Postoperatively 4 patients did not require urethral dilatation and in 2 patients it was necessary only once. These 6 patients were put in the category of "good" result of the procedure (Table I).

Table I: Results of Transpubic Urethroplasty for Stricture of Membranous Urethra.

Good	Moderate	Failure	Unpredictable	Total
6	4	2	1	13

Four patients required occasional urethral dilatation (once in six months) and were labled as "moderate" result of the operation. In 2 patients the procedure failed due to massive infection including a case in which the urethral catheter came out as a result of accidental rupture of its baloon on the 2nd post operative day. However, both these patients are being managed on three monthly dilatations. These 2 patients were put in the category of "poor" results. In one case it is too early to assess the results.

Results

Two patients had signs of stress urinary incontinence which does not interfere with their daily activities. The remaining patients have had normal control.
Prior to transpubic urethroplasty penile erection was reported by 8 patients and was absent in 4 patients. Loss of erection was not observed postoperatively. One patient who previously had no erection recovered it postoperatively.
None of the patients developed problems of walking as a result of pubectomy. Five patients had some problem of walking as a consequence of the pelvic fracture due to initial injury and there was no change in their condition after the operation.

Discussion

Of various urological injuries disruption of the posterior urethra following fracture of the pelvis is one of the most devastating. The surgical management of such strictures has been fraught with difficulties owing to the inaccessible position of the membranous urethra. The stricture of course could be approached directly transpubically so that the repair could be undertaken above the urogenital diaphragm allowing a direct attack upon the stricture without violating the sphincter. Originally the incision in the pubic bone was made with pincers, which was a slow and a difficult process and lengthened the operative time. Since 1962 treatment of stricture of the membranous urethra through pubectomy has been modified considerably as a result of Pierce's introduction of the Gigli saw (Zayas et al., 1979). With this instrument the incision is made much more easily and quickly (Fig. 3).

Fig. 3 : A pelvic film showing excision of the wedge of pubic bone.

Moreover, pubic incision is relatively simple procedure that provides exceptional exposure of the posterior urethra, prostate and bladder.

In our experience excision of the wedge of pubic bone was not associated with orthopaedic disability or pelvic girdle pain. This is an important consideration because most of the patients in our series were young and active. Although there is evidence that this method is well tolerated (Waterhouse et al., 1973), there are reports of orthopaedic problems following this procedure (Mackenzie and Whitemore, 1968), which have to be considered. The adductor compartment of the thigh may be weakened without significantly affecting locomotion (Khan and Furlow, 1976). No patient presented this sort of problem postoperatively in our series. Nevertheless, this procedure provided an excellent exposure for primary anastomosis of the urethra. Distal urethral mobilization and incision of the intercrural septum provided adequate urethral length for tension free anastomosis.

The results of our series show encouraging functional return of the genitourinary system. The urethra has remained patent with or without only one dilatation in 6 patients for the duration of follow up in our series. Four patients required occasional urethral dilatation (once in six months). In two patients the procedure was failed, as mentioned previously.

Close questioning elicited a history of leakage of urine with stress in 2 patients, particularly when the bladder was full. None have been sufficiently bothered by this to seek devices to protect themselves.

No patient noted any adverse effect of the operation upon potency. None of the patients who had erections before pubectomy suffered alteration in this function, postoperatively. However, one patient who complained of impotence after fracture of the pelvis regained his power of erection postoperatively.

In a series of 4 patients of post-traumatic stricture of membranous urethra by Allen (1975) undergoing transpubic urethroplasty encouraging results were achieved. All the 4 patients regained and maintained an excellent urinary stream and sterile urine for the period of follow up without adversely affecting the potency. In another series by Khan and Furlow (1976), 11 patients underwent transpubic repair for membranous strictures. All the patients had an improved urinary stream. Postoperatively 3 patients required urethral dilatation only once and one patient twice. Moreover, the procedure did not affect the continence or potency of the patients. Similarly the results were equally good in a study conducted by Zayas et al (1979) on 7 patients with membranous urethral strictures secondary to fracture of the pelvis with pubectomy and termino-terminal anastomosis of the urethra. All the 7 patients were free of catheter, urinary tract infection and resumed normal life. In Mexico, Tamayo Ochoa (1977) has been the pioneer in the use of the pubic incision to tract strictures of the membranous urethra and has reported good results.

More recently Waterhouse and colleagues (1980) from Newyork in their series of 105 patients with post-traumatic stricture of membranous urethra, highly recommended transpubic approach for repair of the long membranous stricture of more than 1.5 cm.

In a study conducted at the Department of Urology, Mayo Hospital, Lahore out of 10 cases of stricture of membranous urethra undergoing urethroplasty, 5 cases were treated by transpubic approach and 5 by Bedenoch pull-through operation, (Sajjad Ahmed-under publication). Out of the 5 patients undergoing transpubic urethroplasty three patients showed good results and did not require urethral dilatation postoperatively. One patient required urethral dilatation thrice at monthly interval. In one patient the procedure failed. Of the 5 patients undergoing pull-through operation 1 patient was cured without postoperative urethral dilatation. Two patients required fortnightly urethral dilatation for long time. In 2 patients the procedure failed altogether.

Despite some reservations we believe that this method is the best currently available for repair of the post-traumatic strictures of the membranous urethra.

References

1. Allen, T.D. (1975) The Transpubic approach for strictures of the membranous urethra. J. Urol., 114:63.
2. Badenoch, A.W. (1950) A pull-through operation for impassable traumatic stricture of the urethra. Br. J. Urol., 22:404.
3. Gibson, G.R. (1970) Impotence following fractured pelvis and ruptured urethra. Br. J. Urol., 42:86.
4. Khan, A.U. and Furlow, W.L. (1976) Transpubic urethroplasty. J. Urol., 116:447.
5. Mackenzie, A.R. and Whitmore, W.F. Jr. (1968) Resection of pubic rami for urologic cancer. J. Urol., 100:546.
6. Morehouse, D.D., Belitsky, P. and Mackinnon, K. (1972) Rupture of the posterior urethra. J. Urol., 107:255.
7. Morehouse, D.D. and Mackinnon, K.J. (1969) Uroiogical injuries associated with pelvic fracture. J. Trauma, 9:479.
8. Pierce, J.M. Jr. (1962) Exposure of the membranous and posterior urethra by total pubectomy. J. Urol., 88:256.
9. Pierce, J.M. Jr. (1972) Management of dismemberment of the prostatic-membranous urethra and ensuing stricture disease. J. Urol., 107:259.

10. Ragde, H. and Mclnnes, G.F. (1969) Transpubic repair of severed prostatomembranous urethra. J. Urol., 101:335.
11. Riches, E. Modern trends in Urology. London,Buttereworths, 1952, pp. 344-51.
12. Tamayo Ochoa, R. Lesiones Traumaticas del aparato genitourinario. In Urologia. E Introduction a la sexologia. Edited by J.W. Dominguez. Mexico. Academia Nacionale de Medicina, 1977, pp. 296-299.
13. Turner-warwick, R. (1968) The repair of urethral stricture in the region of the membranous urethra J. Urol., 100:303.
14. Waterhouse, K., Abrahams, J.L, Gruber, H., Hackett, R.E., Patil, U.B. and Peng, B.K. (1973) The transpubic approach to the lower urinary tract. J. Urol., 109:486.
15. Waterhouse, K., Abrahams, J.L, Caponegro, P., Hackett, R.E., Patil, U.B. and Peng, B.K. (1974) The transpubic repair of membranous urethral strictures. J. Urol., 111:188.
16. Waterhouse, K., Laungani, G. and Patil, U. (1980) The surgical repair of membranous urethral strictures; experience with 105 consecutive cases. J. Urol., 123:500.
17. Walker, G. (1923) Transpubic removal of the prostate for carcinoma. Ann. Surg., 78:795.
18. Zayas, E.D., Estava, J.F., Diaz, R.P., Romero, M.A.M. and Domingues, H.B. (1979) Pubectomy for repair of membranous urethral strictures. J. Urol., 121:170.