

Complex posterior urethral stricture- A Review

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Introduction

The results of traumatic posterior urethral stricture have improved a lot as a result of the development of a variety of anastomotic technique for urethral reconstruction. The combination of the relatively restricted surgical access together with its inherent sphincter function makes any reconstruction of the posterior urethra a much more complicated procedure. The difficulties are compounded when a posterior urethral stricture is complex. Some of these complex problems are the inevitable consequence of extensive damage; others may result from mismanagement of less severe injuries which could have been avoided by appropriate treatment.

The initial extent of prostatic dislocation resulting from pelvic fracture depends upon the severity of injury and extent of pelvic haematoma separating the two urethral ends. The end result of a urethral injury can only be assessed once the healing process is complete.

Aetiopathogenesis and classification of Complex Posterior Urethral Structures:

Posterior urethral structure may be regarded as complex for 3 main reasons:¹

1. Strictures more than 3cm long and surrounded by dense fibrosis usually resulting from organisation of a massive pelvic floor haematoma.
2. Strictures associated with extravasation, diverticula, false passages or fistulas.
3. Extensive sphincter damage involving the bladder neck and the distal intrinsic urethral mechanism.
4. Failed primary urethroplasty.
5. Associated anterior urethral strictures.

Urethral Diverticulae: Early attempts to voiding can create tracks in the pelvic floor haematoma which persist as epithelial diverticulae once the healing process is complete. These diverticulae can themselves be a potential source of complication 1) calculi may-develop in them, 2) infection in them may result in periurethral abscesses, the natural drainage of which can create fistulas into the perineum, the thigh or the rectum and occasionally, even an osteomyelitic sinus into the pubic fracture 3) paraurethral diverticula can create natural false passages and any attempt to dilatation can create secondary false passages into the bladder base or the rectum.

Urethrocutaneous fistula: Infection associated with traumatized pelvic floor tissue may result in abscesses

that track into the perineum or the inner aspect of the thigh subsequently discharging to form persistent urinary fistulae. Management involves separation of the fistulous communication and curettage of the track followed by bulboprostatic anastomosis and omental support in association with a transpubic repair.

Rectal fistulas: These may develop as a result of concomitant rectal injury at the time of initial accident, rectal drainage of a subsequent paraurethral abscess or urethral instrumentation.³ Defunctioning colostomy should use the pelvic colon because a transverse colostomy would make it difficult to mobilize the omentum in case a transpubic repair is planned subsequently. This type of complex stricture can also be managed by Pena's posterior approach. Most of these patients can be managed by a transperineal inferior pubectomy approach with interposition of subcutaneous dartos pedicle flap.⁴

Paraurethral bladder base fistulas: These can result by the initial injury or as consequence of misdirected urethral dilatation. Close proximity of such a passage to the bladder neck may damage its sphincter mechanism resulting in postoperative incontinence. Large and irregular false passage may require its complete excision with or without bladder neck reconstruction. Small passage may need simple curettage of the epithelial lining. With a coexistent paraurethral bladder base fistula it is important that the true posterior urethra is identified prior to the anastomosis. This can be confirmed by identification of verumontanum or the external urethral meatus by direct vision or suprapubic cystoscopy.

Sphincter Mechanism: Competence of bladder neck sphincter is essential to urinary continence when the distal sphincter is destroyed by a severe membranous urethral injury. Any injury to the bladder neck resulting from primary trauma or during the immediate management or definitive repair of stricture or subsequent bladder neck or prostatic surgery carries the risk of urinary incontinence. Bladder neck reconstruction is planned only if there is gross bladder neck scarring; any lesser injury is preferably observed and reevaluated post operatively by urodynamic study if necessary. When the bladder neck is obviously destroyed, by a previous prostatectomy for instance, the posterior stricture urethra is best treated by urethrotomy or dilatation rather than urethroplasty.⁵

However, if dilatation proves impossible a simple resleeving "push in" (Modified Badenoch) or a free

patch graft is preferable in the hope of preserving the remnants of the distal sphincter function.

Preventive measures during early management to avoid possible complications:⁶

1. Indwelling catheterization with the standard shaft catheter in case of fracture pelvis with suspected urethral injury obstructs the drainage of exudate from pericatheter space which gets infected and hampers healing. Fenestrated catheters should be used to drain the exudate and collection.
2. Contrast medium, used for retrograde urethrogram, should be aqueous based and as dilute as possible so that any extravasation is rapidly dispersed and absorbed. Viscid and concentrated contrast extravasation can cause extensive tissue necrosis and affects the healing of a stricture. Ideally it should be done under screening control.
3. Trial catheterization, if at all necessary, should be done very gently by expert hands. Rough and inexperienced attempt under non aseptic conditions can risk compounding any urethral injury. Foley's balloon held up or diverted at the site of rupture will increase the extent of a minor urethral injury. The shaft of indwelling catheter should have hole cut in it to provide drainage of the exudate from the pericatheter space.
4. Urethral dilatation: Any attempt at dilating the posterior urethral stricture should be made very carefully to avoid any rectal and bladder base fistulas.

Management: Most of the traumatic posterior urethral strictures are managed by perineal one stage anastomotic urethroplasty. Less than 10% prove sufficiently complex to require other procedures including the transpubic approach. The pre-operative evaluation of a complex stricture is most important to its treatment. Detailed retrograde urethrography and voiding cystourethrography are essential to the identification of peri urethral pockets, false passages and fistulae because these are often quite difficult to identify in the course of an operation. The procedure to be adopted depends finally upon the findings on perineal exploration. If the tip of the descending sound can be palpated easily in the perineum, the extent of the paraurethral fibrosis is unlikely to compromise a perineal repair. However a transpubic procedure may be indicated nevertheless for a short stricture with retropubic paraurethral diverticulum, which cannot be excised properly from the perineum.⁷

Abdominoperineal transpubic approach:⁸

1. The bulbar urethra is fully mobilized through midline perineal incision and the stricture is evaluated carefully. If it seems not amenable to the simple progressive perineal approach, we proceed to the next step.
2. Inverted 'Y' shaped incision made on the pubic region. Perivesical and retropubic space is dissected. Pubic bone is excised in a V shape with the help of a Gigli saw. Sometimes partial removal of the posterior surface of pubis with the help of an arthroplasty Capener's gouge will give sufficient exposure.
3. The whole of the dense fibrosis encasing the anterior aspect of prostate is excised carefully. This creates a sizeable abdominoperineal tunnel.
4. The anterior wall of the bladder is opened well above the bladder neck. The true prostatic urethra is identified accurately by visualization and by descending sound. Any parallel false passages are evaluated.
5. The distal prostatic urethra is cut below the level of verumontanum. Both the ends are spatulated. The bulbar end is passed up through the subpuboperineal tunnel. The anatomic course can be further foreshortened by transposing it over the crura thus taking a direct transpubic course.
6. After completion of bulboprostatic anastomosis with 3-0 Vicryl sutures, the dead space around it can be filled with an omental pedicle graft. It helps in healing and prevent fistulae occurring as a result of accumulation of exudate and infection around it. The use of omentum also facilitates occlusion of paraurethral extravasation pockets, extensive urethral cutaneous tracks and urethrorectal fistulae once their linings have been removed by curettage. It also provides a supple surrounding tissue that facilitates the urodynamic movements of the bladder neck.

Other Procedures: Substitution urethroplasty is mainly indicated when the defect is too long for primary reanastomosis or where there is associated anterior urethral stricture disease compromising retrograde urethral blood flow, precluding mobilization of urethra for anastomosis as a distally based flap. It may be performed in one or two stages.⁹ The one-stage procedures include pedicle skin island and full thickness skin graft repairs both as tubes and inlays. Two stage procedures include a variety of scroto-urethral inlay procedures and mesh split thickness skin graft urethroplasty.¹⁰

In a retrospective study of one thousand cases of traumatic stricture urethra in last 10 years operated in our Department of Urology, SMS Hospital, Jaipur, 84 patients had complex posterior urethral strictures, which were operated by anyone of the above procedures depending upon the type of complexity.

References

1. Turner-Warwick R: Complex traumatic posterior urethral strictures. *Trans Am Assoc Genitourin Surg* 1976;68:60-72.
2. 72.
3. Incidence, Causes, and Complications of Urethral Stricture Disease Massimo Lazzeri a, Salvatore Sansalone b, Giorgio Guazzo, Guido Barbagli. *Euro Urol supplement* 15(2016)2-6
4. Xy YM, SaYL, FuQ. Surgical treatment of 31 complex posterior urethral strictures associated with urethrorectal fistulas. *Eur Urol* 2010 57(3): 514-20.
5. S.K. Bhagat, G. Gopalakrishnan, S. Kumar, A. Devasia, N.S. Kekre.Redo-urethroplasty in pelvic fracture urethral distraction defect: an audit.*World J Urol* 29 (2011), pp. 97-101
6. A.R. Mundy.Anastomotic urethroplasty *BJU Int* 96 (2005), pp. 921-944
7. Sanjay B. Kulkarni, Pankaj M. Joshi,* Craig Hunter, Sandesh Surana, Walid Shahrour, and Faisal Alhajeri. Complex posterior urethral injury *Arab J Urol* 2015 Mar;13(1):43–52.
8. Gupta NP, Mishra S, Dogra PN Transpubic urethmoplasty for complex posterior urethral structures – a single center experience *Urol Int* 2009, 83(1):22-6.
9. Management of complex urethral stricture disease: Algorithm and experience from a single institute Yu-Hua Shau, Sheng-Tang Wu, Chien-Chang Kao, Tai-Lung Cha, Chih-Wei Tsao, En Meng, Dah-Shyong Yu , Guang-Huan Sun , Shou-Hung Tang. *Urological Science* 26 (2015)
10. S.H. Tang, C.C. Kao, S.T. Wu, E. Meng, T.L. ChaInlay buccal mucosal graft for reoperative posterior urethroplasty Kaohsiung *J Med Sci* 28 (2012), pp. 220-24
11. M.M. Koraitim Failed posterior urethroplasty: Lessons learned *Urology*, 62 (2003), pp. 719-722
12. H.S. Al-Qudah, R.A. Santucci.Extended complications of urethroplasty *Int Braz J Urol* 31 (2005), pp. 315-23