ABSTRACT

Objective
To evaluate the results of delayed urethroplasty after initial cystostomy following posterior urethral injury.

Design
Descriptive study.

Place and Duration of Study
Department of Urology and Transplantation, Jinnah Postgraduate Medical Center, Karachi, over the span of two years (2001-2002).

Subjects and Methods
Analysis of 15 patients undergoing delayed single stage perineal urethroplasty for posterior urethral distraction defect associated with pelvic fracture was performed. Preoperative evaluation of distraction defect included simultaneous retrograde urethrogram and voiding cystourethrogram. Postoperative pericatheter urethrogram was performed after three weeks and catheter removed in the absence of any leakage. Postoperative uroflowmetry and retrograde urethrogram was done after one month and three months respectively for average 12 months. Patients were evaluated specifically regarding stricture, impotence and incontinence postoperatively.

Results
Mean age of the patients was 25 years. The estimated preoperative distraction defect was 3 cms. Mean follow up was six months, mean hospital stay was five days and duration of urethral stenting was average 3.6 weeks. Perineal urethroplasty was successful in 60% of cases. Ten patients underwent end to end anastomosis, seven (70%) proved to be successful while in 5 patients Badenoch pull-through urethroplasty was done. Successful results were obtained in 2 patients (40%). The criteria of success was no subsequent procedure required after urethroplasty. However, postoperative soft stricture, requiring optical urethrotomy less than twice, formed in 2 patients of end to end group and 2 patients of Badenoch pull through group. Rest of the patients from both groups, requiring salvage multiple endoscopic urethrotomies, were categorized as complete failure.

Conclusion
Overall success of our one stage perineal urethroplasty was 60%. The most probable factor responsible for failure in our opinion was incomplete removal of dense fibrosis from distraction defect.

KEY WORDS: Posterior urethral distraction defects, Perineal urethroplasty, Posterior urethra.

INTRODUCTION:
Traumatic disruption of posterior urethra is the most severe form of injury of lower urinary tract resulting from violent external force, occurring in approximately 10% of patients with pelvic fractures. These are most difficult and controversial injuries to treat.¹ One detailed
analysis of the results of urethroplasty showed that the greatest rate of recurrence (29%) was noted in patients with membranous lesions who predominantly had post-traumatic stricture. Distortion of normal lower urinary tract anatomy and function, combined with dense fibrosis involving the affected area, make surgical repair of these injuries challenging even in best hands.

Historically a 1-stage Badenoch Pull-through procedure of the bulbar urethra was used for strictures less than 2cm, while larger strictures were managed by transpubic anastomotic urethroplasty or by 2-stage substitution urethroplasty by scrotourethral inlay. Abdomino-perineal repair was reserved for complex posterior urethral defects, bladder neck abnormalities and fistulae to the bladder base or rectum.

Considerable debate still exists regarding timing of repair; immediate exploration and urethral realignment versus initial suprapubic cystostomy and delayed perineal urethroplasty as well as open surgical versus endoscopic management of posterior urethral injury. Our treatment of patients with posterior urethral disruptions consists of immediate suprapubic cystostomy and delayed perineal urethral reconstruction. The goal of initial therapy is urinary diversion with least negative impact on long term rates of stricture formation incontinence and impotence. The results were then analyzed regarding patency of urethra, flow rate, continence, potency and postoperative strictures.

PATIENTS AND METHODS

A total of 15 male patients underwent posterior urethroplasty at Department of Urology, Jinnah Postgraduate Medical Centre, Karachi during the year 2001 - 2002. A one stage perineal repair of posterior urethral strictures was accomplished in 15 cases, 5 patients underwent Badenoch pull through procedure while in 10 patients end to end urethroplasty was done.

All patients underwent simultaneous retrograde urethrogram (RUG) and voiding cystourethrography, urethroscopy and antegrade cystourethroscopy via suprapubic cystostomy tract, to assess magnitude of urethral separation. The acute treatment of patients presenting at Accident and Emergency Department was placement of suprapubic cystostomy tube with no attempt at immediate realignment. Posterior urethroplasty was then performed at minimum of 6 months interval after the initial trauma.

Briefly the operative technique of end to end urethroplasty comprised:

Circumferential mobilization of bulbar urethra: This maneuver was conducted proximally to the point of obliteration and distally as far as the penoscrotal junction. A descending urethral sound/cystoscope was passed through suprapubic cystostomy tract and negotiated through the tip of the sound/cystoscope was encountered.

Separation of corporeal bodies if required: This maneuver was performed beginning at the level of crus and progressing distally along a relatively avascular plane for approximately 4 to 5cm. This maneuver allows the urethra to be redirected cephalad, resulting in an additional 1 to 2cm of apparent urethral length. The other options to get additional length of urethra although not employed in our series, are inferior pubectomy and supracrural rerouting in order to get tension free anastomosis.

Excision of strictured segments: Restoration of urethral continuity was attempted first through a midline perineal incision. The bulbar urethra was dissected down to the proximal end of the strictured segment, which led to the apex of prostate. After the stricture segment was excised, all periurethral and prosthetic fibrosis was removed until healthy pliable tissue was reached. This dissection often necessitated excision of the infravaginal corpus spongiosum. The the proximal and distal ends were then spatulated and mucosa of distal end was fixed laterally by 4/0 chromic catgut sutures.

After mobilization of the anterior urethra a tension free bulbo-prostatic anastomosis was done with 6 to 8 sutures of 3/0 polyglactin over a Foley catheter. The operation was completed by inserting a suprapubic catheter through an incision made 1cm from the pericatheter RUG, and after 3 weeks if otherwise. The suprapubic catheter was removed after a successful voiding trial usually on the same day.

Briefly the operative technique of Badenoch pull through urethroplasty comprised: Passing Nelaton tube from suprapubic tract, suturing distal end of tube with proximal end of bulbar urethra, pulling Nelaton catheter to coapt two urethral ends together and keeping netton tube on traction with skin sutures.

Outcome analysis: Postoperative RUG and uroflowmetry were done after 1, 3, 6 months and as needed thereafter. Abnormal radiography appearances associated with decrease flow rates were further evaluated endoscopically. Chart review was used to note the continence, erectile function and need for subsequent procedure. Criteria for success were no subsequent procedure requirement after urethroplasty and patient voiding as before trauma.

RESULTS

A total of 15 urethroplasties were performed comprising 5 Badenoch pull-through and 10 cases of end to end anastomosis. These cases have been followed for a mean of 1 year. All procedures were performed through
perineum in single stage. Average age of patients was 25 years (Range 15 to 50 years). All patients had history of blunt trauma to posterior urethra, fall from height in 5/15 cases and RTA in 10 patients. Eleven out of fifteen patients had associated fracture pelvis. Four patients had history of exploratory laparotomy and rail road procedure at the time of injury of elsewhere. Four patients gave the history of scrotal abscess and surgical drainage. The estimated distraction defect in posterior urethra was 3 cm (Range 2 to 5cm). Mean time between injury and repair was 6 months. Period of postoperative catheterization was 3 weeks in 11 patients and 4 weeks in 4 patients because percutaneous retrograde urethrogram revealed some degree of leakage in later cases. One patients suffered iatrogenic trauma to rectum during procedure but it was non consequential.

Procedure was completely successful in 9 patients, (2 patients from Badenoch pull through group and 7 from anastomotic repair.) In failed group, 4 patients developed soft stricture at repaired area and required optical urethrotomy twice during follow up. Two were regarded as complete failure because they underwent multiple optical urethrotomies. However they were salvaged by optical urethrotomies and self-intermittent catheterization.

A total of 7 patients complained erectile dysfunction pre-operatively and 6 remained impotent post-operatively. All 15 patients were continent postoperatively.

**DISCUSSION**

The major advantage of delayed urethral reconstruction after prostatic membranous disruption is that it can be done under controlled conditions when the patient has recovered from major associated injuries. Conventional management of posterior urethral disruption is comprised of immediate surgical exploration, haematoma evacuation and realignment of the torn urethra over a catheter in traction. However this procedure is discouraged because Foley balloon may cause ischaemic injury to bladder neck, which is a major cause of urinary incontinence after posterior urethral injury. In addition Ragde and McInnes demonstrated that catheter traction did not coapt the urethral edges. Moreover immediate exploration might introduce infection in pelvic haematoma and it exposes the severely traumatize and unstable patient to further operative risks. The rate of stricture, impotence and incontinence were high. Morehouse working on Johanson’s idea of initial cystostomy and delayed urethroplasty of inevitable stricture, rather than primary repair, reported a decrease of each of three major complications, permanent stricture, from 14% to 6%, incontinence from 21% to 6% and impotence from 33% to 10%.

Only 3 situations merit the immediate exploration.  

1. Severe prostatic-urethral dislocation with a "Pie-in-the-sky" bladder results when severe trauma disrupts all fascial attachments between the bladder/prostate and pelvic floor.

2. Failure to recognize and correct immediately a concomitant rectal tear resulting into contamination of the pelvic haematoma.

3. Tear through bladder neck generally requires more extensive mobilization and haematoma evacuation to ensure an anatomic repair. In the later event the urethra may be realigned at the same time.

The essential details to be fulfilled include meticulous and complete excision of the prostatic and preprostatic scar tissue, lateral fixation of healthy mucosa of two urethral ends, and creation of a tension free anastomosis. Morey and McAninch stressed that careful and complete excision of scar tissue is the single most important detail for achieving a successful outcome after posterior urethral reconstruction.

Suprapubic cystostomy can be performed quickly and safely even in the hemodynamically compromised patients. Since the retropubic space is not open, the tamponade effect of pelvic haematoma is not lost and the risk of infection is reduced. It is believed that no further pelvic dissection reduces the incidence of later potency disturbances.

Recently the advances in flexible endoscopic techniques and guide wires have again produced a reappraisal for both initial treatment of posterior urethral disruption and delayed repair of urethral stricture. Herschorn reported his experience comparing early endoscopic urethral realignment with suprapubic cystostomy alone in posterior urethral disruption. Suprapubic cystostomy alone was followed by inevitable stricture formation in 95.5% cases requiring urethroplasty in 89.4% of cases. In contrast successful endoscopy urethral alignment was associated with stricture formation in 53.9% cases requiring urethroplasty in 23.2% of cases. Impotence in suprapubic cystostomy group was 13% versus 50% in endoscopy group. Incontinence in suprapubic group was 0 to 14% in contrast 0 to 22% in endoscopic group. End to end anastomosis appears to be most successful method of posterior urethral reconstruction. Success rate in other large series ranges from 80 to 95%, while 60% in our small series. Failed cases either had previous laparotomy and railroad procedure or dense fibrosis.

In our experience liberal distal mobilization of corpus spongiosum with corporeal separation when necessary obviates any form of pubectomy. One of our patients regained potency while other already impotent cases remained so after the procedure. Potency as reported historically increased from 46% - 62% postoperatively. This finding was also noted by Koraitum in large series of similar patients. These results were probably due to the late recovery of potency after initial injury. Even in patients who were not operated from prostatic-membranous disruptions appear to have same rates,
suggesting that long-term prognosis in erectile function is predicted more on the magnitude of injury than the form or time of treatment.

The incidence of incontinence reflects the adequacy of bladder neck. Unfortunately there is no way to confirm it preoperatively definitely; therefore the aim of therapy is to ensure the patency of urethra.

CONCLUSION:

Delayed one stage perineal urethroplasty is preferred treatment of posterior urethral stricture provided one can observe certain essential details. These details include meticulous and complete excision of the prostatic and preprostatic scar tissue, lateral fixation of healthy mucosa and creation of tension free anastomosis. Incomplete excision of scar tissue will necessarily result in anastomosing the bulbar urethra into fibrosed prostatic apex with unhealthy adherent mucosa. The ultimate outcome is urethral obliteration shortly after removal of the urethral stent.

REFERENCES