INTRODUCTION

Urethral dilatation has been used to treat urethral strictures for about 5000 years and urethrotomy for about 1500 years. Each had higher failure rates thus excision and primary anastomotic urethroplasty is becoming standard and is being adopted worldwide. Increasing Road Traffic Accidents (RTA) has increased the incidence of posterior urethral injury often associated with pelvic fracture. As a result, rail road, primary anastomosis with or without abdomino-perineal approach and primary endoscopic realignment were tried in the near past but without satisfactory results in term of restructuring, incontinence and erectile dysfunction.

In the posterior urethra, the emphasis has always been on the management of pelvic fracture related urethral injuries after external trauma, typically motor vehicle accidents until recently. The management of post-instrumentation sphincter stricture are best managed endoscopically for urethral dilatation to give the best chance of retaining sphincter function. Surgery has been reserved for those when it is no longer possible to manage the patient by instrumentation. By contrast almost all-pelvic fracture related urethral injuries are best managed by perineal end-to-end anastomotic urethroplasty, except when the treating urologist is determined to persist with endoscopic management even if this is repeated frequently and without any prospect of cure. Recent arguments mainly focus on how to determine the length of distraction defect pre-operatively and to scope or totally rely on concomitant ante and retrograde urethrogram. Secondly, in this relation whether it is possible to predict whether a perineal or an abdomino-perineal approach should be performed. Others argue that the length of defect cannot accurately be measured and it is not routinely possible to predict a three-dimensional problem from a two-dimensional image.

These length measurement defects can be solved by MRI scans in the authors' opinion but endoscopic evaluation remains the best solution. Some people argue that only two or three steps are needed to repair almost all pelvic fracture related urethral injuries, whereas others argue that more extensive injuries require more extensive surgery. Approximately 4 - 14% of pelvic fractures cause posterior urethral distraction injury. These injuries pose a significant management challenge, aggravated by the frequently severe extent of associated organ injuries, initial medical instability of many patients, distortions of pelvic and lower urinary tract anatomy, and the

ABSTRACT

Objective: To determine the delayed single stage perineal posterior urethroplasty for treatment of posterior urethral stricture/distraction defect.

Study Design: Descriptive case series.

Place and Duration of Study: Department of Urology, Jinnah Postgraduate Medical Centre, Karachi, from January 2009 to December 2011.

Methodology: Patients were selected for delayed single stage perineal posterior urethroplasty for treatment of posterior urethral stricture / distraction defect. All were initially suprapublically catheterized followed by definitive surgery after at least 3 months.

Results: Thirty male patients were analyzed with a mean follow-up of 10 months, 2 patients were excluded as they developed failure in first 3 months postoperatively. Mean patient's age was 26.25 ± 7.9 years. On follow-up, 7 patients (23.3%) experienced recurrent stricture during first 10 months. Five (16.6%) patients were treated successfully with single direct visual internal urethrotomy. Two patients (6.6%) had more than one direct visual internal urethrotomy and considered failed. Re-do perineal urethroplasty was eventually performed. The overall success rate was 93.3% with permissive criteria allowing single direct visual internal urethrotomy and 76.6% with strict criteria allowing no more procedures postoperatively.

Conclusion: Posterior anastomotic urethroplasty offers excellent long-term results to patients with posterior urethral trauma and distraction defect even after multiple prior procedures.

potentially extensive fibrotic response to urinary extravasation. Multiple approaches to these patients have been used in past and recent series. When the pubis is fractured and displaced, the puboprostatic ligaments typically remain intact. This causes a shearing force across the membranous and bulbary urethra as the prostatic urethra is adherent to the displaced pubic symphysis through its ligamentous attachments. Straddle fractures, including sacroiliac diastasis and bilateral pubic rami fractures, are associated with posterior urethral injury more often than other more simple pelvic fractures. Rarely do the diseases that affect the anterior urethra, such as lichen sclerosis, cause strictures as distal as the membranous urethra.

The objective of this study was to determine the delayed single stage perineal posterior urethroplasty for treatment of posterior urethral stricture/distraction defect.

**METHODOLODY**

This series included patients with posterior urethral strictures or distraction defects undergoing single-stage repair at the Department of Urology, Jinnah Postgraduate Medical Centre, Karachi, from January 2009 to December 2011.

Definitive urethroplasty was done at least 3 months after initial trauma. Surgical goal was complete excision of existing fibrotic scar achieving tension free anastomosis opposing urethral epithelium to prostatic epithelium. Extended lithotomy position was adopted and identification of proximal urethra was done by Van burne sounds / rigid cytoscope through SPC site.

Maneuvers to gain more length also employed, were urethral mobilization up to suspensory ligament, separation of corporal bodies and partial pubectomy. Spatulated end-to-end anastomosis was performed with 3/0 vicryl sequentially (others have described PDS 5/0). Replaced SPC, per urethral catheter was kept for 21 days. Percath urethrogram was done prior to catheter removal and surgical success measured by permissive and strict criteria.

The data were entered and analyzed into Statistical Package for Social Sciences (SPSS) version 17. Mean and standard deviation were calculated for continuous variables, frequencies and percentages were calculated for categorical variable.

**RESULTS**

Thirty (30) male patients were analyzed with a mean follow-up of 10 months, excluding 2 patients who were regarded failure in the first 3 months postoperatively. Mean patient age at surgery was 26.25 ± 7.9 years, mean stricture length 3 cm (range 2 - 5 cm).

Ten patients (33.33%) had undergone at least one prior procedure like incision and drainage and direct vision internal urethrotomy (including prior urethroplasty in patients. Pelvic fracture was present in 29 patients. Five patients were impotent. Time since trauma in 29 patients was 6.5 months on an average with the exception of one patient who had urethral injury 12 years back.

There was history of intervention other than SPC in 10 patients before our perineal urethroplasty. Single time direct visual internal urethrotomy in 4 patients, multiple time direct visual internal urethrotomy in one patient, incision and drainage for perineal / periurethral abscess in 2 patients. Three patients had previous failed perineal urethroplasty done elsewhere (Table II). Twenty seven patients had failed urethral catheterization in Emergency Department initially.

All patients were chosen for delayed single stage perineal urethroplasty for treatment of posterior urethral stricture / distraction defect were included. Thirty male patients were analyzed with a mean of 10 months follow-up, excluding 2 patients who were regarded failure in the first 3 months postoperatively. Mean patients age at surgery was 26.25 ± 7.9 years, mean stricture length 3 cm (range 2 - 5 cm).

<table>
<thead>
<tr>
<th>Causes</th>
<th>Number of patients</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blunt abdominal trauma</td>
<td>28/30</td>
<td>93.3%</td>
</tr>
<tr>
<td>Gun shot injury</td>
<td>2/30</td>
<td>6.6%</td>
</tr>
<tr>
<td>Pelvic fracture</td>
<td>29 /30</td>
<td>96.6%</td>
</tr>
<tr>
<td>Impotence (pre-operative)</td>
<td>5/30</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

Time since trauma at least 3 months (29 patients) with the exception of one patient (12 years).

<table>
<thead>
<tr>
<th>Previous intervention</th>
<th>Number of patients</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single time urethroplasty</td>
<td>4</td>
<td>13.3%</td>
</tr>
<tr>
<td>Multiple times</td>
<td>1</td>
<td>3.3%</td>
</tr>
<tr>
<td>Perineal urethroplasty elsewhere</td>
<td>3</td>
<td>10.0%</td>
</tr>
<tr>
<td>Perineal incision and drainage</td>
<td>2</td>
<td>6.6%</td>
</tr>
</tbody>
</table>

Table I: Causes of stricture.

Table II: Previous intervention.

Figure 1 (a-h): Showing steps of EPA urethroplasty.
10%) from initial suprapubic cystostomy. Definitive procedure comprised tension free end-to-end urethroplasty over the silicon catheter, ensuring mucosa-to-mucosa anastomosis. Per operative 5 patients (16.6%) required partial pubectomy and all other urethral dissection and corporal separation to stage the urethral length. On follow-up, 7 patients (23.3%) experienced recurrent stricture during first 10 months. Five (16.6%) of these patients were treated successfully with single direct vision internal urethrotomy while 2 patients (6.6%) had more than single direct visual internal urethrotomy and Re-do perineal urethroplasty was eventually done.

Postoperative follow-up was made by history and physical examination, retrograde urethrogram, uroflowmetry, culture and sensitivity and postoperative residual volume. Success was assessed by strict criteria i.e. no further procedure required, while as for permissive criteria; single direct vision internal urethrotomy after definitive procedure was allowed.

The overall success rate was 93.3% with permissive criteria allowing single direct vision internal urethrotomy and 76.6% with strict criteria allowing no more procedures postoperatively.

Included in the series were 2 cases of repeat urethroplasty, the first procedure previously done elsewhere. One patient (3.3%) required second direct vision internal urethrotomy and one patient (3.3%) was required multiple direct vision internal urethrotomy and these subsequently were submitted to repeat urethroplasty.

Postoperative urinary infection was discovered in 11 (36.3%) patients, out of these, 8 patients had urinary tract infection and 3 patients had epididymo-orchitis which was (treated conservatively) pericatheter leakage was found in 3 patients (10%) at the second week. Complete failure not amenable to optical internal urethrotomy was in one patient (3.3%). Impotency and incontinence was not reported in any patient.

**DISCUSSION**

Posterior urethral disruption is one of the more challenging injuries to manage following urological trauma. Early intervention may be complicated by bleeding and / or hematoma, concurrent injuries, potential instability, edema and friability of traumatized tissues. After a more prolonged delay these issues settle, but at the expense of more extensive fibrosis. Therefore, significant controversy continues regarding the best approach to these cases.

Some authors advocate primary realignment after urethral disruption. For example, Mouraviev et al. recently reported realignment in 57 men of 96 surviving pelvic injury with urethral disruption, and noted urethral patency in 51% at 2 years follow-up. They claimed better quality of life end points (urinary and erectile function) among those undergoing primary realignment. However, these were selected patients with presumably milder injuries, and only 19% had prostatic or membranous urethral disruptions while the remainder had bulbular urethral injuries. Asci et al. reported that among 20 patients undergoing primary realignment, stricture developed in only 45%, and 10% underwent urethroplasty with a mean of 39 months of follow-up. Again, these patients were carefully selected from the patients presenting with trauma. This group found that sexual and urinary function did not vary significantly with management approach.

Thus in the presence of these references, our unit refrained from primary realignment and headed mainly towards delayed urethroplasty.

Conversely, Koraitim found significantly higher rates of impotence among those undergoing primary realignment using interlocking sounds compared to delayed urethroplasty. To-date, no study has prospectively assigned let alone randomized patients to primary vs. delayed treatment.

Considering efficacy and cost, Nazir recommend optical internal urethrotomy as first treatment choice for short post-traumatic posterior urethral stricture and urethroplasty reserved for those who undergo repeated urethroplasty over short period of time.13

Delayed endoscopic approaches, variations such as core-through, cut-to-the-light and stenting procedure, typically are not successful in the long run because they do not adequately address the fibrotic reaction. A case of successful buccal mucosal grafting for posterior urethral disruption has been reported recently. The University of California, San Francisco reported success rate even among patients referred to them following failed urethroplasty was 86%. The mean time to recurrence was one year but their experience with posterior urethral reconstruction was reported in 1998, including cases presenting up to 1995. At that time the rates of prior procedures were lower (9% DVIU or dilation and 11% urethroplasty) and intraoperative use of pubectomy was higher.

In this series of post-urethral distraction defect, initial closed / open suprapubic cystostomy was adopted. After 3 months, once pelvic fracture stabilized and tissue edema settled, patients underwent concomitant ante and retrograde cystourethrogram, endoevaluations and then excision and primary anastomotic urethroplasty.

The authors have found that delayed anastomotic urethroplasty offers excellent long-term patency results, with 76.6% requiring no further procedures (strict criteria) and 93.3% requiring at most a single optical internal urethroplasty (permissive criteria), this also concluded the prior failed urethroplasty patients. The mean time to recurrence was 10 months, highlighting the
need for long-term follow-up of patients following complex reconstruction. Few lengthening maneuvers like separation of crura, transaction of suspensory ligament and dissection of urethra were also adopted routinely with rare use of inferior pubectomy.

Marhar et al. in his study on complex posterior urethral strictures concluded abdominal transpubic posterior urethroplasty as a better surgical technique as it provides an excellent exposure, tension and scar free bulboprostactic anastomosis. But I believe we by using antegrade sounds brought posterior urethra at a very reasonable approach through perineum and thus achieved excellent results.16

Perineal urethroplasty has also been demonstrated effective in children, with similar primary and ultimate success rates.17,18 With increasing experiences, pubectomy is less frequently required, although it is still an important component of the surgical approach in patients with longer strictures. Rare cases of complex strictures may still require a combined abdomino-perineal approach.19

Transmyphseal urethroplasty is a satisfactory technique for the repair of posterior traumatic posterior urethral injuries in children. It provides improved visualization of the posterior urethra and bladder neck, which is ideal for optimal urethral reconstruction in children.20

In this series, extended lithotomy position on standard lithotomy poles was used with use of self-retaining mastoid retractor for better exposure. We didn't need abdomino-perineal approach in any of the patient. This study does have few limitations. The most important is follow-up protocol we used history / physical examination, UFM, retrograde urethrogram to define success.

In the history, help was taken from Internal Prostatic Symptoms Score (IPSS).10,21,22 Aydos et al. reported successful use of the International Prostatic Symptom Score as a measure of urinary outcomes following urethroplasty.23 However, this instrument was designed to capture obstructive voiding symptoms and is not sensitive to continence or potency outcomes.

Continence and potency are important outcomes following urethral reconstruction, which can also be measured with validated, patient reported instruments. The questions comprising the urinary and sexual domains of the expanded prostate cancer index composite for example, may be quite applicable in the setting of urethroplasty.24

Sexual function was not addressed objectively in this series. We only looked into subjective evaluation, which we believe needs more improvisation. Thus we have plan to administer objective tools of extended prostatic cancer index composite (sexual domain) as pre-operative and postoperatively. If equivocal / in conclusive colour doppler or angiography can also be employed.

CONCLUSION

Post-anastomotic urethroplasty offers excellent long-term results to patients with posterior urethral trauma and distraction defect even after multiple prior procedure. Future research will be directed at more formal assessment of patient reported urinary and sexual quality of life before and after urethroplasty. Sexual dysfunction is more related to initial trauma.

REFERENCES


