
Urethral Reconstruction for Traumatic Posterior Urethral Disruption: Outcomes of a 25-Year Experience

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Purpose: Management of posterior urethral disruption due to pelvic trauma can be quite challenging and is the subject of ongoing controversy. This study presents an update of the University of California, San Francisco experience with delayed anastomotic posterior urethroplasty for management of these injuries.

Materials and Methods: Since 1979 all patients undergoing posterior urethroplasty by a single surgeon at University of California, San Francisco and its affiliated hospitals have been entered prospectively into a patient registry. For this cohort descriptive statistics were calculated and recurrence was analyzed with the Kaplan-Meier method. Success was defined as no recurrence (by symptoms and/or retrograde urethrogram) or a mild recurrence managed successfully with a single internal urethrotomy.

Results: A total of 134 male patients were analyzed with a mean of 32.9 and a median of 12 months followup. Mean patient age at surgery was 34.8 years. Of the patients 35% had undergone at least 1 prior procedure for stricture including prior urethroplasty in 16%. In addition, 22% required partial pubectomy and 4% a combined abdominal-perineal approach with total pubectomy. Of patients with a closed bladder neck on urethrography 34% vs 7% of those with an open bladder neck required pubectomy ($p < 0.001$). Stricture length tended to be longer in pubectomy cases (mean 3.2 vs 2.1 cm by urethrography, $p = 0.055$). Of the patients 14% experienced recurrent stricture at a mean of 12 months, 42% of whom were treated successfully with a single urethrotomy. The overall success rate allowing 1 direct vision internal urethrotomy was 93%.

Conclusions: Anastomotic urethroplasty offers excellent long-term results to patients with posterior urethral trauma and stricture disease even after multiple prior procedures.

Key Words: urethra; urethral stricture; anastomosis, surgical; wounds and injuries

Posterior urethral injury complicates up to 25% of pelvic fractures arising from blunt pelvic trauma.¹ 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 potentially extensive fibrotic response to urinary extravasation. Multiple approaches to these patients have been used in past and recent series. Patients treated at or referred to UCSF undergo initial suprapubic cystostomy urinary diversion and some patients referred within the last 10 years have also had an unsuccessful attempt at primary realignment. In this article we present our experience with delayed perineal anastomotic urethroplasty for treatment of these patients in the last 25 years.

METHODS

All operations were performed by a single surgeon (JWM). The technique for anastomotic posterior urethroplasty has been reported previously.^{2,3} Key aspects of management

include accurate preoperative definition of the stricture, which is usually possible via retrograde and antegrade urethrography (RUG/VCUG). In cases in which the length of the stricture is in question (because the bladder neck does not open on RUG/VCUG, the posterior urethra does not fill with contrast or there is significant lateral distraction of the 2 urethral ends), pelvic MRI is performed to define the distraction defect. In selected patients with preoperative erectile dysfunction, penile Doppler ultrasound is used to help define the extent of baseline neurological and/or vascular compromise.

The critical surgical goals, which others have confirmed, are complete excision of existing fibrotic scar and achievement of a tension-free anastomosis apposing urethral epithelium to prostatic epithelium (fig. 1).⁴ We perform a spatulated end-to-end anastomosis. Since 1990 we have used 12 radially placed 5-zero absorbable monofilament sutures (fig. 2). Identification of the proximal urethral end is facilitated by passage of van Buren sounds or a flexible cystoscope through the preexisting suprapubic cystostomy. The bulbar urethra is mobilized circumferentially to gain sufficient length for a tension-free anastomosis. If necessary to gain adequate mobility of the distal urethra, the corporal bodies may be split, and if still more length is needed a partial pubectomy is performed. In cases of extensive scarring, usually following multiple prior failed open repairs and/or extensive trauma, a combined abdomino-perineal approach

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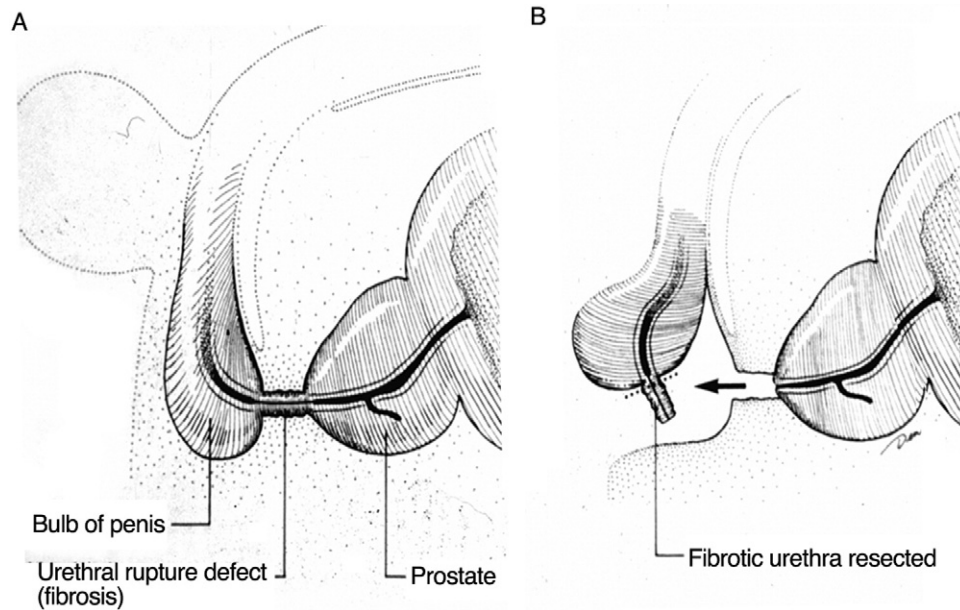


FIG. 1. Diagram of typical posttraumatic urethral distraction defect with fibrosis (A). Fibrotic scar must be completely excised to facilitate tension-free anastomosis (B).

with complete pubectomy may be performed. We do not typically use suprascrotal rerouting. A urethral catheter is typically left in place for 4 weeks postoperatively.

Aside from relatively minor issues such as scrotal hematoma, the greatest risk of complications relates to prolonged patient positioning in high lithotomy, and careful attention must be given to this aspect of the procedure. Two patients had compartment syndrome early in our experience when Allen stirrups were used for positioning, and a decubitus ulcer developed in 1 due to a long procedure with inadequate padding. We now use candy cane stirrups and a gel pad overlying a beanbag to elevate the hips, and have had no similar problems since. No patient has had symptomatic deep vein thrombotic disease. Minor lower extremity neuropathic complaints occur occasionally but are self-limiting as a rule.

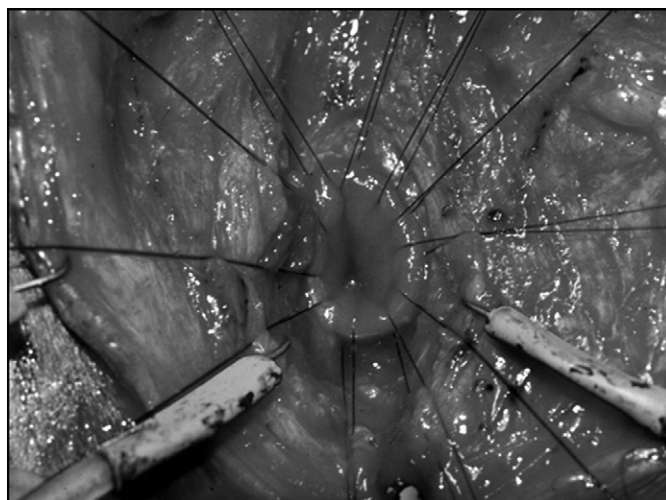


FIG. 2. Intraoperative photograph of proximal urethral end following complete excision of scar and proximal placement of anastomotic sutures.

All patients undergoing reconstructive urethral surgery at the UCSF, San Francisco General Hospital, or San Francisco Veterans Administration medical center since 1979 have been prospectively entered into a disease registry, maintained under institutional review board supervision. A variety of preoperative, intraoperative and postoperative data points are captured on each patient via review of clinical records. Between January 1979 and June 2005 there were 163 patients who underwent posterior urethroplasty. All posterior urethral procedures were anastomotic and none involved grafts or other substitution urethroplasty techniques. Those whose etiology for urethral stricture was not traumatic disruption (ie radical prostatectomy, urethral surgery and/or pelvic radiation therapy) were excluded from analysis, leaving 134 patients.

Data were analyzed with descriptive statistics. Potential predictors of the need for partial pubectomy were assessed with the t test or chi-square test, as appropriate. Surgical success was measured with Kaplan-Meier analysis of time to stricture recurrence. For this analysis 2 definitions of recurrence were used: 1) a strict definition under which any secondary procedure was considered to define failure at the date of the secondary procedure, and 2) a permissive definition under which a mild recurrence managed successfully with a single DVIU, with subsequent radiographic and symptomatic success and no further procedures, was not considered a failure (under this definition for those patients requiring additional procedures the date of failure was still defined as the date of the first DVIU). Incidences of prior urethroplasty, use of pubectomy and resticture outcomes were compared between patients treated through 1995, the point up to which our experience was previously reported,² and those treated since 1996 (chi-square test for prior urethroplasty and use of pubectomy, log rank for resticture outcomes). All analyses were performed with commercially available software.

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