

1-STAGE DELAYED BULBOPROSTATIC ANASTOMOTIC REPAIR OF POSTERIOR URETHRAL RUPTURE: 60 PATIENTS WITH 1-YEAR FOLLOWUP

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ABSTRACT

Purpose: The long-term results of delayed 1-stage bulboprostatic anastomotic urethroplasty for posterior urethral ruptures are evaluated.

Materials and Methods: A total of 63, 1-stage delayed repairs of complete posterior urethral ruptures in 60 men with at least 1-year followup were reviewed. Two ruptures were due to gunshot wounds and 58 were secondary to a pelvic fracture. There were 58 repairs done by the perineal approach and 5 required an abdominal perineal approach.

Results: Surgical complications included 2 (3%) rectal injuries, 3 (5%) repeat strictures that required reoperation and 20 (32%) repeat strictures that required dilation or visual internal urethrotomy. By 1 year after surgery all patients had a patent urethra and did not require further treatment. At 1 year 43 (72%) patients voided normally, 5 (8.3%) were areflexic and performed self-catheterization, 5 (8.3%) had urge incontinence and 5 (8.3%) had mild stress incontinence requiring no treatment. Moderate stress incontinence responded to imipramine in 1 case and collagen injection in 1. Of the patients who were potent preoperatively 31 (52%) remained potent postoperatively. Of the 29 (48%) patients who were impotent preoperatively and immediately postoperatively 9 regained potency at 1 year. However, at 1 year, the quality of erections of the 40 potent men was normal in only 22 (37%) and fair to poor in 18 (30%).

Conclusions: The 1-stage delayed bulboprostatic anastomotic urethroplasty has a good long-term result with little morbidity for treatment of posterior urethral ruptures in men.

KEY WORDS: urethra, wounds and injuries, rupture

Of the men who have a pelvic fracture 14% will have injury to the lower urinary tract and 7% will have partial or complete rupture of the posterior urethra.¹ Penetrating trauma can also cause type II or III urethral disruption.² Our usual approach to the management of complete ruptures has been to place a suprapubic tube in the bladder at the time of injury and perform a 1-stage bulboprostatic anastomotic urethroplasty at least 6 months later.³ Our surgical technique is described and the results in 60 men who were evaluated at least 1 year after surgical repair are analyzed.

MATERIALS AND METHODS

We performed a retrospective chart review of 60 cases of 1-stage delayed bulboprostatic anastomotic urethroplasty for rupture of the posterior urethra. Two ruptures were due to gunshot wounds and 58 were secondary to a pelvic fracture. The etiology of the injury, associated organ system injuries as well as prior attempts at reconstructive procedures were recorded. A total of 49 patients were seen at our emergency room at the time of initial injury, diagnosis was made by retrograde urethrogram and a suprapubic tube, which was usually percutaneous, was placed. A suprapubic tube was placed in 11 patients elsewhere and then they were referred to us for reconstruction. Repair was delayed 6 to 26 months (mean 8) until the soft tissues of the pelvis and perineum had

healed and all other injuries were corrected. The majority of the urethral repairs were done by the author.

Preoperative studies. Before surgical repair a cystometrogram, static cystogram and combined attempted voiding cystourethrogram and retrograde urethrogram were performed. The cystometrogram was done to rule out an areflexic bladder, especially seen in patients with a sacral fracture.³ The static cystogram was done to identify patients with an open bladder neck who may have a high postoperative incontinence rate.³⁻⁵ The combined study was performed to see if the bladder neck would open normally when voiding was attempted as well as evaluate stricture length (fig. 1).

Surgical procedure. With the patient in the exaggerated dorsal lithotomy position the suprapubic tube was removed, and the perineum and abdomen were prepared and draped. Bladder endoscopy was performed through the suprapubic tract, the bladder neck and posterior urethra were inspected and any bladder calculi were removed.

A midline perineal incision was made, the urethra and surrounding corpus spongiosum were freed and transected at the area of the stricture, the stricture was excised and the normal urethra was spatulated. A curved sound was passed via the suprapubic tract into the posterior urethra to act as a guide for subsequent excision of all scar tissue. The prostate was then beveled from the verumontanum posteriorly to the mid prostate anteriorly. Urethroscopy of the proximal urethra was used to locate the verumontanum. A 16F, fenestrated nasogastric tube was placed as a stent into the urethra to be eventually locked to the abdomen with 1-0 nylon suture. The distal end of the tube was tied into a knot to prevent displacement. The spatulated end of the urethra was sutured with 4, 3-0 polyglycolic quadrant sutures to the beveled pros-

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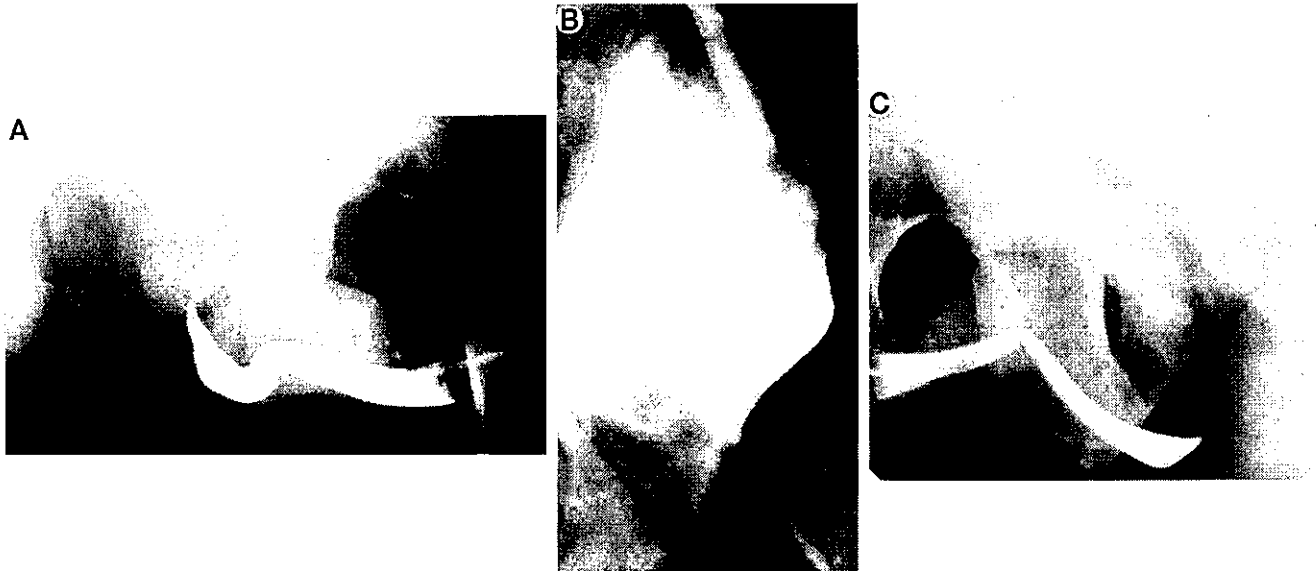


FIG. 1. A, static cystogram and retrograde urethrograph with bladder neck closed. B, static cystogram of bladder neck open. C, combined voiding cystogram and retrograde urethrograph show bladder neck opens as patient attempts to void.

tate. The wound was closed and a suprapubic tube was placed (fig. 2).⁶

If the prostate and bladder had not descended enough during the time from injury to surgery to allow perineal anastomosis, a midline abdominal incision was made and scar excision as well as excision of the underside of the pubis using gouges was performed from above and below. This step was necessary in 5 procedures. Anastomosis, stenting and closure were performed as described previously after the omentum was freed and used to fill the pelvic dead space.

Postoperative care. The urethral stent was removed at 3 weeks and a voiding cystourethrogram was performed. If the urethra was healed the suprapubic tube was removed and antibiotics were given. If extravasation was present suprapubic drainage was continued for another week and the study was repeated. All leaks were closed by 4 weeks postoperatively. Periodic flow rates and urethrograms, if necessary, were repeated at 3-month intervals for at least 1 year.

RESULTS

Demographics. The 60 men ranged in age from 15 to 61 years (mean 35). The majority of injuries were work related (42%) or due to motor vehicle accidents (38%), followed by auto/pedestrian accidents (17%) and gunshot wounds (3%). Of the patients 97% had injuries to other organ systems (table 1), and 10% had injuries to the kidney and/or bladder.

TABLE 1. Injuries associated with posterior urethral ruptures

	No. (%)
Polvic fracture	58 (97)
Spinal cord, peripheral nerve	12 (20)
Fractures, other	11 (18)
Intra-abdominal	8 (13)
Urinary tract, other	6 (10)
Thoracic	6 (10)
Head	4 (7)
Rectal	3 (5)
None	2 (3)

Procedures. A total of 63 procedures were performed in these 60 men, of which 58 involved the perineal and 5 abdominal perineal approach. Perineal procedures had previously failed in 5 cases, including 3 early in our series, and required an abdominal perineal approach in 3 and repeat perineal repair in 2. Preoperatively 3 patients had urethrocutaneous fistulas and 1 had a urethrocolic fistula. All fistula tracts were excised at surgery and closed.

Surgical complications. A total of 38 (60%) procedures were performed without incident and required no further therapy. Intraoperative rectal injury was repaired primarily in 1 case, and 1 required a colostomy with delayed repair and colostomy closure. In both of these patients urethral reconstruction was primarily successful, for an overall success rate of 63% (40 cases).

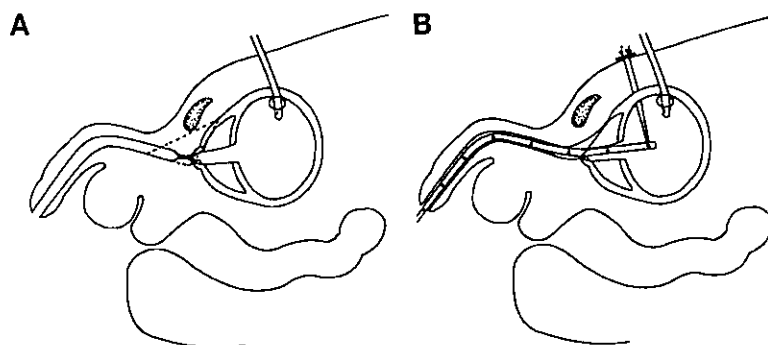


FIG. 2. A, preoperative stricture between normal distal urethra and prostatic urethra. Entire scar must be excised to normal beveled urethra and prostate tissue (broken line). B, postoperatively urethra is anastomosed to prostate, and fenestrated urethral catheter is placed and locked to abdominal wall.

TABLE 2. *Erectile function*

	After Injury	Immediate Postop.	1-Yr. Postop.
No. potent (%)	31 (52)	31 (52)	40 (67)
No. impotent (%)	29 (48)	29 (48)	20 (33)

TABLE 3. *Quality of erections*

	No. (%)
Normal	22 (37)
Fair to poor	18 (30)
None	20 (33)

Early in the series strictures developed in 3 patients, and 6 months later they underwent reoperation successfully, using a perineal approach in 2 and abdominal perineal approach in 1. In 2 of these 3 patients adequate scar excision had not been performed and in 1 a short incomplete stricture developed that could and should have been treated with internal urethrotomy. Postoperatively a short, soft anastomotic stricture developed in 20 (32%) patients which required visual internal urethrotomy in 15 and dilation with a metal sound in 5. None of the latter 5 patients had undergone either a flow rate study or urethrogram initially but a sound was passed based on patient complaints of difficult voiding. No patient required continued dilation and may not have had a true urethral obstruction but are mentioned for completeness.

Voiding and continence. All 60 patients had a patent urethra 1 year after surgery and needed no further treatment. At last followup 43 (72%) patients were voiding normally and were continent. There were 5 (8.3%) patients who had an areflexic bladder secondary to injury and were continent on clean intermittent catheterization. Five (8.3%) patients had mild urge incontinence and 5 (8.3%) had mild stress incontinence when the bladder was full but they did not require treatment or protection from leakage. The remaining 2 (2.1%) patients had an open bladder neck preoperatively and moderate stress incontinence, which responded to imipramine in 1 and collagen injection in 1.

Erectile function. Impotence was present preoperatively and postoperatively in 29 (48%) patients. However, by 1 year after urethroplasty only 20 (33%) were still unable to have erections (table 2). Of the 40 (67%) patients who had erections 1 year postoperatively 18 (30%), although able to have erections sufficient for vaginal penetration, claimed that the quality of erections was fair to poor (table 2).

DISCUSSION

Bulboprostatic urethroplasty was initially described and taught to me by Turner-Warwick.⁷ The operation has become popular and is the repair of choice by most reconstructive

surgeons.^{2,8,9} Descriptions of modifications of the original perineal technique, such as corporeal separation or urethral rerouting, have produced additional urethral length, allowing for most procedures to be done entirely by the perineal approach.^{7,10}

The key to good long-term results with this technique is complete excision of all periurethral scar and performance of a true mucosal to mucosal anastomosis. Merely dilating the scar and anastomosing the urethra to this scar will result in early failure that will not respond to endoscopic repair, which was the cause of 2 failures early in the series. This complication can be overcome by increased experience. Sometimes the scar distal to the verumontanum will dilate and appear to be normal urethra, and if used for anastomosis it will surely fail (fig. 3). If one remembers that the injury is at the level of the membranous urethra this apparent contradiction becomes clear.

However, if the scar is completely excised and a stricture reoccurs at the level of the anastomosis, it is typically a narrow mucosal ring and will usually respond to visual internal urethrotomy.^{8,11} The third patient in whom we considered treatment a failure clearly had a stricture of this type and it would have been corrected with visual internal urethrotomy. Again, there is no better teacher than experience. Reports of this complication vary from 11% to 27.8% in the literature, which is lower than our 32% rate. However, since 5 of our 20 patients were empirically treated with dilation with a metal sound with no documented obstruction or stricture, if we assume that these patients did not have a mucosal ring, our rate would decrease to 23%, which is well in line with the aforementioned figures.

Other than the well reported problem of moderate stress incontinence noted in patients with an open bladder neck,^{3,5} to our knowledge most series rarely evaluate or list patients who have urge or mild stress incontinence requiring no therapy.^{2,8,9} We first reported these symptoms as well as an incidence of areflexia in 1994 in a smaller series of cases.³ The distribution of complaints presented in table 3 is approximately the same in this expanded series as in our prior report. Our 48% impotence rate after injury and immediately postoperatively is in line with the 40% to 68% reported in the literature.^{2,8,12} The finding that potency is eventually regained by 15% of patients is also well documented (3% to 16%) and is the same as in our earlier series.³ However, the finding that 30% of patients indicate that, although they achieved an erection satisfactory for vaginal penetration it was of inferior quality compared to erections before injury, is rarely described.

CONCLUSIONS

If all scar tissue is excised in patients with posterior urethral rupture at delayed 1-stage urethroplasty and a urethro-

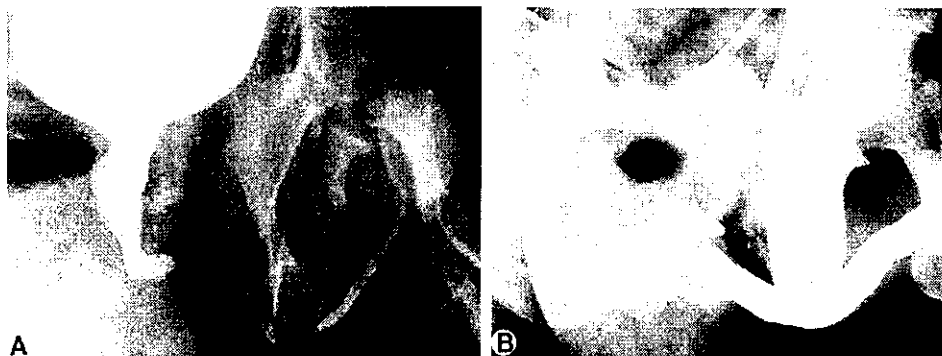


FIG. 3. A, distended scar distal to verumontanum appears to be normal urethra. B, 3-month postoperative urethrogram shows contraction of scar if not excised but used for proximal anastomosis.

prostatic anastomosis is performed, all patients should have a patent urethra at 1 year and require no further instrumentation. Of these patients three-quarters will void normally with few needing therapy for voiding dysfunction. A third of the patients will be impotent, a third fully potent and a third will have poorer quality erections than before the injury but will be able to have vaginal intercourse.

Drs. G. S. Benson and D. C. Rudy provided their patients for study inclusion.

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