

URETHROPLASTY FOR REFRACTORY ANTERIOR URETHRAL STRICTURE

JEAN V. JOSEPH, DANIELA E. ANDRICH, CAROLINE J. LEACH AND ANTHONY R. MUNDY

From the Institute of Urology, London, United Kingdom

ABSTRACT

Purpose: We present our results managing anterior urethral strictures previously treated with urethroplasty and/or urethrotomy.

Materials and Methods: During a 32-month period 69 males 10 to 76 years old (mean age 36) underwent treatment for anterior urethral stricture, including 32 (46%) and 26 (38%) previously treated with urethroplasty and urethrotomy, respectively. In 11 patients (16%) no previous procedures had been done. Anastomotic and dorsal patch urethroplasty was performed for bulbar stricture in 13 and 14 cases, respectively, while in 4 a penile skin flap was placed for penile stricture and in 38 a 2-stage procedure was done with urethral substitution using buccal mucosa or post-auricular skin grafts. Patients were followed with ascending urethrography at 3 weeks, and 12 and 18 months as well as with uroflowmetry. Symptoms were assessed for 6 months to 4 years.

Results: Only 1 stricture recurred in patients treated with anastomotic or patch urethroplasty, or a skin flap. Of the patients scheduled for a 2-stage procedure stage 1 revision was required due to graft scarring or stenosis at the urethrostomy site in 21% and stage 2 revision was required in 23%. Other complications in this series included fistula in 3% of cases, wound infection in 3% and post-void dribbling in 12%.

Conclusions: Overall early results are good in our urethroplasty series in patients with a previously instrumented urethra. Patients should be advised of the possible need for multiple revisions of planned staged procedures. The increased rate of revision in these staged procedures compared with the excellent outcome of 1-stage procedures appears to be inherent in this operation in patients with multiple previous procedures rather than due to surgeon experience.

KEY WORDS: urethra, transplants, surgical flaps, urethral stricture

A consistent and successful outcome remains a challenge to reconstructive urological surgeons who treat patients with recurrent urethral stricture. Fibrosis, a poor vascular supply and tissue availability worsen the outcome in patients with previous urethroplasty or urethrotomy.¹ The nature, number of previous instrumentations and urinary tract infection preoperatively are well-known factors influencing the success of these operations.^{2,3} Stricture cause and length of the obstructed urethral segment as well as postoperative catheter drainage after urethrotomy are also significant risk factors for recurrence after internal urethrotomy.⁴ Long-term results after internal urethrotomy indicate a recurrence rate of 45% to 68%.^{3,4}

A 10% resticture rate at 1 year of followup that increased to 15% at 5 years was reported in a series of 200 patients treated with anastomotic or patch urethroplasty.⁴ A long-term recurrence rate of 14.3% was also reported by Roehrborn and McConnell⁵ in patients with no previous manipulation. This rate almost doubled to 27.6% in patients with a history of urethrotomy and increased further to 31.6% when urethroplasty had previously been performed. Barbagli et al noted no adverse results in 20 patients treated with repeat urethroplasty involving excision and re-anastomosis, a Barbagli patch and 2-stage repair for stricture in the bulbar and penile urethra.⁶ Similarly Morey et al observed excellent results with 90% success after previously failed repair using a 1-stage procedure with primarily fasciocutaneous flaps.⁷ In this study we assessed the outcome of urethroplasty in our patients in whom urethrotomy or urethroplasty had previously failed.

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PATIENTS AND METHODS

During a 32-month period, 69 males 10 to 76 years old (mean age 36) with previously managed urethral stricture disease were treated at our institution. Previous therapy included urethrotomy in 26 cases (38%), anastomotic urethroplasty in 32 (46%), and none in the remaining 11 (16%). Only patients with anterior stricture were included in this series. The strictures site was bulbar in 27 cases, penile in 28 and the whole length in 14 (see table). Overall these patients were referred from elsewhere and had undergone several open and endoscopic procedures. The cause of stricture was iatrogenic in 27 cases, idiopathic in 11, balanitis xerotica obliterans in 8 and traumatic in 23. Surgical technique was individualized based on stricture length and site, as determined by combined ascending and voiding urethrography. Other factors considered included the extent of previous manipulation, availability of healthy penile skin suitable for a flap or free graft and balanitis xerotica obliterans.

Bulbar stricture was treated with excision of the stricture site with end-to-end anastomosis in 13 patients, while patch urethroplasty as described by Barbagli et al⁶ was performed in 14.⁸ In 4 cases of penile stricture a 1-stage procedure was done using an Orandi flap.⁹ The remaining 38 patients underwent a 2-stage procedure with urethral substitution at stage 1 using buccal mucosa or post-auricular grafts for stricture involving the penile and bulbar urethra, as previously described.^{10,11} Of these patients 14 with a full-length penile and bulbar stricture underwent staged surgery, while 24 had a long stricture involving the glanular and penile urethra. Stage 2 was done at least 6 months after the stage 1 substitution procedure.

Procedures, stricture sites and complications

	No. Anatomical Urethroplasty	No. Patch Urethroplasty	No. Orandi Flap	No. 2-Stage Procedures
Stricture site:				
Bulbar urethra	13	14	0	0
Penile urethra	0	0	4	0
Penile/glanular urethra	0	0	0	24
Full length	0	0	0	14
Totals	13	14	4	38
Complications:				
Recurrent stricture	0	0	1	8 Stage 1 revisions
Fistula	0	0	1	1
Wound infection	0	0	0	2
Post-void dribbling	0	3	0	5
Totals	0	3	2	16

Followup included retrograde urethrography 3 weeks, and 12 and 18 months. At each followup uroflowmetry was done and symptoms were assessed. Patients were followed yearly thereafter for 5 years.

RESULTS

No stricture recurred in patients treated with anastomotic or patch urethroplasty at a maximum followup of 4 years but 1 recurred. One stricture was noted in the 4 treated with an Orandi flap. Stage 1 revision was required in 8 of the 38 patients treated with a 2-stage procedure and revision of stage 2 was also necessary in 8. The remaining complications in this series included urethra fistula in 3% of cases, wound infection in 3% and post-void dribbling in 12% (see table).

DISCUSSION

Urethral reconstruction after previous manipulation is limited by the compromised vascular supply, fibrosis and lack of healthy penile skin. Reconstructive surgeons must have a wide range of procedures in the armamentarium. An excellent outcome was noted in patients treated with patch or anastomotic urethroplasty. Strictures were often longer than estimated on combined ascending and voiding urethrography. These studies were more deceptive in patients previously treated with urethrotomy or dilation. Luminal size adjacent to the stricture segment did not correlate with the extent of the fibrotic area. An increase in the repeat stricture rate secondary to previous urethrotomy was not noted in our study. Our approach has been to start surgery for even the shortest strictures with dorsal stricturotomy. This maneuver is helpful for accurately determining stricture length and for deciding whether to perform patch urethroplasty if the strictured segment is more extensive than previously thought. These factors may have contributed to our high success rate in this group of patients.

Preoperative ultrasonography has been suggested as a means for accurately assessing the extent of spongiofibrosis in an effort to decrease the recurrence rate.^{7,12} In our group of patients the diseased urethra was palpated and visually inspected before determining the anastomotic sites. Patients with balanitis xerotica obliterans on physical examination were generally treated with 2-stage repair with urethral substitution using nongenital skin, particularly buccal mucosa, as previously reported.^{11,13} In patients free of balanitis xerotica obliterans there was no advantage of using a buccal mucosal graft versus post-auricular skin. A prospective randomized study is needed to further assess this question. We have observed no complications of harvesting buccal mucosa graft. It has become our graft of choice in substitution urethroplasty. Adverse results of grafts have not developed when grafting the bulbar urethra in our experience. Perhaps the fixed location of the bulbar urethra compared with the penile urethra is responsible for the lack of complication in that segment. Grafted distal penile urethra is significantly

more prone to complications. Wessells and McAninch reported an 85% success rate in 30 patients using a free graft.¹⁴ Patient age as well as graft placement on the penile urethra were identified as the factors associated with failure. Donor site, stricture cause and previous instrumentation did not correlate with the success rate.

Our complication rate of 22% is similar to that in several other reported series. Excellent results were also noted in the repeat urethroplasty series of Barbagli et al,⁶ and Roehrborn and McConnell⁵ using the patch technique, while 80% success has also been reported using penile fasciocutaneous flaps. In our experience with patients who underwent multiple previous open procedures grafts are versatile and reliable. The local skin is often scarred and thickened, precluding its use as a flap. The literature review of Wessells and McAninch showed that free grafts and flaps are effective in 84.3% and 85.9% of cases, respectively, for reconstructing complex anterior urethral strictures.¹⁵ We observed no adverse results in our group of patients treated with a flap. However, cases were limited to those of penile stricture.

A significant number of patients who had previously undergone urethroplasty and were treated with a 2-stage procedure required revision because of ostial stenosis, skin bridges or significant scarring of the surrounding skin. In these cases scar excision and Y-V plasty were done. This 20% failure seems to remain constant at our unit. We have noted that a planned 2-stage procedure is often converted to a multistage procedure. A single patient required 3 revisions of stage 1 before he was deemed a suitable candidate for stage 2. In conclusion, patients with a history of urethroplasty failure who present for reoperation should be counseled regarding the possibility of a multistage procedure instead of simple 2-stage repair.

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