One-Stage Urethral Reconstruction for Stricture Recurrence After Urethral Stent Placement

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Purpose: We report our 8-year experience with 1-stage open urethral reconstruction in 10 patients with recurrent bulbar and/or membranous strictures after UroLume® urethral stent placement.

Materials and Methods: Ten consecutive referral patients underwent preoperative contrast imaging and urethroscopy followed by primary anastomotic repair or substitution urethroplasty, with concomitant open UroLume removal (when the stent was still present). Postoperative evaluation included contrast imaging 3 weeks after surgery, urethroscopy 4 months after surgery, uroflowmetry, and American Urological Association symptom score assessment.

Results: At a medium followup of 51.2 months all patients remain free of bulbar or membranous stricture recurrence. No patient has required dilation or any other intervention.

Conclusions: One-stage open reconstruction with stent extraction offers a definitive treatment option with a high success rate for patients with recurrent bulbar and/or membranous strictures following urethral stent placement.

Key Words: urethral stricture, stents, reconstructive surgical procedures, recurrence

The Wallstent® and the commercially available UroLume endoprosthesis were developed to provide a simple treatment option for recurrent bulbar urethral stricture disease.[1–3] The UroLume stent is a self-expanding superalloy braided wire mesh cylinder that is placed endoscopically. Initial reports suggested that the UroLume stent offered an efficacious and durable treatment option for recurrent bulbar strictures, and it was advocated as a primary therapy for bulbar or prostatomembranous strictures.[3–5] For patients in whom strictures recurred, re-treatment with endoscopic resection of the hyperplastic tissue regrowth or the insertion of additional stents was described.[4–8]

Recurrent strictures following stent placement pose a challenging problem as further endoscopic treatments sometimes only provide temporary symptomatic improvement. Although some investigators have reported good long-term results with the UroLume, up to 47% of patients may require surgical intervention including explantation for restenosis, obstruction, stent migration, discomfort or other stent related problems.[4–6,9,10] Given the relatively high complication rate reported with stent placement, it is imperative to have effective treatment options in our armamentarium for patients who fail stent placement and then desire definitive open urethral reconstruction. To date there are few reports describing definitive open urethral reconstruction after stent placement.[11] We report our 8-year experience with 10 patients who underwent 1-stage urethral reconstruction for stricture recurrence after urethral stent placement. To our knowledge this is the largest series with the longest followup of its kind.

MATERIALS AND METHODS

Between 1999 and 2005, 10 consecutive patients underwent 1-stage open urethral reconstruction repair for recurrent urethral stricture after stent placement by a single surgeon (JG) at 1 institution. The stricture etiology was straddle or pelvic trauma in every case. All patients underwent preoperative assessment with urethroscopy, RUG and VCUG. A representative preoperative RUG is shown in the figure. The table describes prior interventions, stricture location and length, and the surgical procedure performed on all patients.

Perioperative antibiotics were given the day of surgery when the urine was sterile. Patients with indwelling suprapubic tubes were admitted the day before surgery for preoperative intravenous antibiotics. All surgeries were performed in the exaggerated lithotomy position via a perineal approach. In 3 cases stent removal was performed before referral to our center. The remaining 7 patients had UroLume stents in place when referred and underwent open stent removal at the time of reconstruction. EPA was performed for strictures involving the bulbar or bulbomembranous urethra when a tension-free primary repair was feasible. This included 2 patients with bulbar strictures and all 3 patients with traumatic posterior strictures. The remainder 5 patients had longer strictures precluding primary anastomosis and required tissue transfer. In 4 of these patients the stent was excised, the proximal and distal segments were spatulated dorsally, the ventral portion was reconstructed primarily, and the dorsal aspect was repaired with a substitution dorsal onlay. We used a penile skin flap in our first patient, and have since converted to using dorsal buccal grafts. A 5 cm total obliteration developed in 1 patient who

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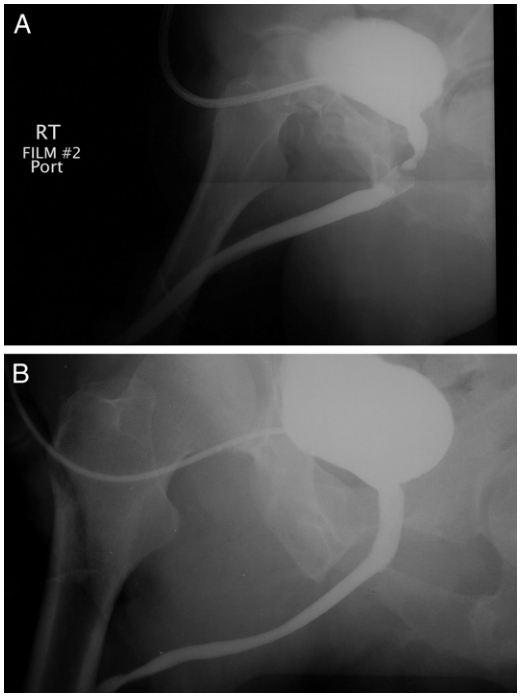

Patient number 10, preoperative *(A)* and postoperative *(B)* imaging studies.

had his endoscopic stent removed before referral, preventing primary or onlay repair. This patient underwent reconstruction of his circumferential urethral defect using 2 buccal grafts. The dorsal portion of the urethra was reconstructed using a buccal graft quilted to the corporal bodies as the recipient bed, and the ventral urethra was reconstructed with a buccal graft quilted to the corpus spongiosum.

Postoperatively, patients were managed with 14Fr stenting urethral catheters and suprapubic tubes. Three weeks after surgery, the urethral catheters were removed, VCUGs were performed, and the suprapubic tubes were subsequently removed. A representative postoperative VCUG is shown in the figure. No patient was managed with dilation to maintain urethral patency after catheter removal. All patients returned 4 months after surgery and underwent flexible urethroscopy. A technical success was defined as wide patency of the entire urethra confirmed by direct visualization. No patient was lost to followup. Subsequent followup included assessment of peak urinary flow rate, postvoid residual and American Urological Association symptom score assessment. Repeat urethroscopy was performed if recurrence was suspected.

RESULTS

The table lists postoperative followup and outcomes. There were no intraoperative complications. Perioperatively mild neuropraxia developed in 1 patient related to positioning. All VCUGs performed 3 weeks after surgery revealed no extravasation. Four months after surgery, all patients were asymptomatic with negative urine microscopy. Flexible urethroscopy at that time revealed wide patency along the entire urethra in all 10 patients. At a mean followup of 51.2 months (range 5 to 88), no patient has required dilation, catheterization, or other intervention. The mean postoperative AUAss was 4.5 (range 0 to 10). These scores were obtained by telephone interview from every patient just before the submission of this article so that the length of followup would represent the true long-term outcome rather than the length of time since surgery. The patient with the AUAss of 10 reported irritative symptoms only. He underwent repeat urethroscopy which confirmed wide patency. Another patient reported good urinary flow but had some deterioration over time. This patient underwent urethroscopy 82 months after surgery which also confirmed wide patency. All other patients reported excellent flow rates without deterioration.

DISCUSSION

The UroLume endoprosthesis was developed as a definitive treatment option for recurrent urethral strictures, and promoted as an efficacious alternative to dilations and urethrotomies.[3–6] UroLume failures are well documented and pose challenging surgical dilemmas. In 1995 The North American UroLume Study Group reported their results in patients with bulbar strictures who were treated with a urethral stent.[4] Of 175 patients 45 (26%) required additional treatment for urethral narrowing within, adjacent to, or separately from the stented region. Seven patients required removal of the stent. In 1996 Milroy et al presented their long-term results of 50 patients treated with stent placement for bulbomembranous strictures.[5] Significant intraluminal narrowing requiring re-treatment developed in 8 patients (16%), insignificant intraluminal narrowing developed in 1 patient (2%) and extraluminal stricture developed in 9 patients (18%) who also required additional treatment. In 2003 an outcome analysis of 24 patients from the North American multicenter UroLume trial who completed 11-year followup reported a 33% failure rate.[6] A recent long-term study of men who underwent stent placement revealed that only 45% of the patients were free of recurrence and complications, and 45% suffered multiple complications.[12] It was concluded that UroLume stents should only be used in patients who refuse or are unfit for bulbar urethroplasty, a procedure with a documented success rate of greater than 97% to 98%.[12,13]

Most recurrences reported in the stent literature are initially treated endoscopically with resection/incision, dilations, or placement of overlapping stents. Unfortunately, many of these endoscopic procedures are only temporary solutions that may lead to an increase in the length and density of the stricture disease. Endoscopic stent explantation has been reported. However, this procedure does not effectively treat the underlying stricture disease.[6,9,14] Open stent removal with urethrectomy and urinary diversion has also been described as a last resort.[14–16] Definitive treatment with open stent removal and functional urethral reconstruction after failed UroLume placement is not well described in the literature. In 2004 Parsons and Wright described open stent extraction with 1-stage urethral reconstruction in 3 patients.[11] Followup was limited to 3 to 22 months with a 67% success rate as 1 patient required a direct vision internal urethrotomy. Although published abstracts from our institution and other centers also have described open reconstruction after stent placement, to our knowledge, there are no other published reports in the literature.

At our institution we do not perform UroLume stent placement. Stent insertion for the treatment of posterior urethral