
The Technique of Vessel Sparing Excision and Primary Anastomosis for Proximal Bulbous Urethral Reconstruction

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Purpose: We present a technique not previously described for proximal bulbous or bulbomembranous urethral reconstruction of excision and primary anastomosis. The technique has the potential advantages of preserving the proximal urethral blood supply.

Materials and Methods: From June 2003 to October 2006, 10 patients underwent vessel sparing urethral reconstruction including 3 after radical prostatectomy, 6 following straddle trauma and 1 potentially with a congenital stricture. A plane was developed between the urethra and the proximal blood supply at the bulbospongiosum, allowing for division of the urethra without dividing the spongy tissue of the corpus spongiosum or the arteries to the bulb. Only 7 patients are presented for data analysis because the other 3 have not had sufficient followup to date.

Results: Patient age range was 15 to 72 years (mean 47). The patient with a congenital stricture was 2 years old. Stricture length ranged from 0.5 to 2.5 cm (mean 1.5). The patients who had undergone radical prostatectomy were either incontinent or were believed to be possibly rendered incontinent after the urethral reconstruction. At a mean followup of 12.5 months (range 6 to 38) all 7 patients had patent urethras, 2 were incontinent and 1 underwent implantation with an AMS 800™ sphincter using a transcorporeal approach. As of this writing all 10 patients are apparently stricture-free.

Conclusions: Preservation of blood supply is always a noble achievement in surgery. However, it technically often requires significant effort. In patients after radical prostatectomy with proximal anterior urethral or bulbomembranous strictures, preserving the blood supply possibly decreases cuff erosion when undergoing later implantation. Many patients (approximately 12% lifetime risk of prostate cancer) will require radical prostatectomy and may later require a sphincter. Further studies are warranted to evaluate the benefit of applying this technique in all suitable patients.

Key Words: anastomosis, surgical; urethral stricture; blood supply

In the management of urethral strictures it is important to gain length to anastomose the healthy edges after excising the strictured segment. The urethra can be mobilized from the penoscrotal junction to the membranous urethra with sacrifice of the bulbar arteries to the proximal segment, with few apparent ill effects. This maneuver can be used to excise 2 to 5 cm of the urethra, thus bringing the ends together without tension.

In patients with urethral stricture who are potential candidates for placement of urethral sphincter, the proximal blood supply could, however, be of significant value to reduce ischemic erosion. We present here a modification to perform EPA for strictures in the bulbous urethra with adequate mobilization and with preservation of the arteries to the bulb. Our initial motivation for investigating this technique was to allow, potentially, safer sphincter cuff placement in patients with proximal bulbous strictures

following RP. It has become apparent that the procedure was valid, from a technical standpoint, and thus we expanded to include other patients with proximal bulbous strictures as outlined.

MATERIALS AND METHODS

We reviewed the charts of 10 patients who underwent this technique by the first author from June 2003 to October 2006. Patients underwent diagnostic ascending and voiding urethrograms, and cystourethroscopy. Patients with strictures that were amenable to EPA, who potentially might require future sphincter implantation, were initially selected. During surgery patients were placed in the exaggerated lithotomy position. Urethral exposure and mobilization of the distal segment was performed using our standard technique described elsewhere.¹ The proximal segment was meticulously exposed to the level of the bulb and the urethra was dissected dorsally off the corpora cavernosa, while the bulbar arteries were dissected off the urethra ventrally (fig. 1). The strictured area was excised (fig. 2) and the anastomosis was accomplished in the usual pattern using 10 to 12 circumferential 4-zero absorbable sutures (fig. 3). The corpus spongiosum is reconstructed over the anastomosis, as shown in figure 4.

Voiding urethrograms were performed after 3 weeks, and a followup urethroscopy was performed at 6 months, in those

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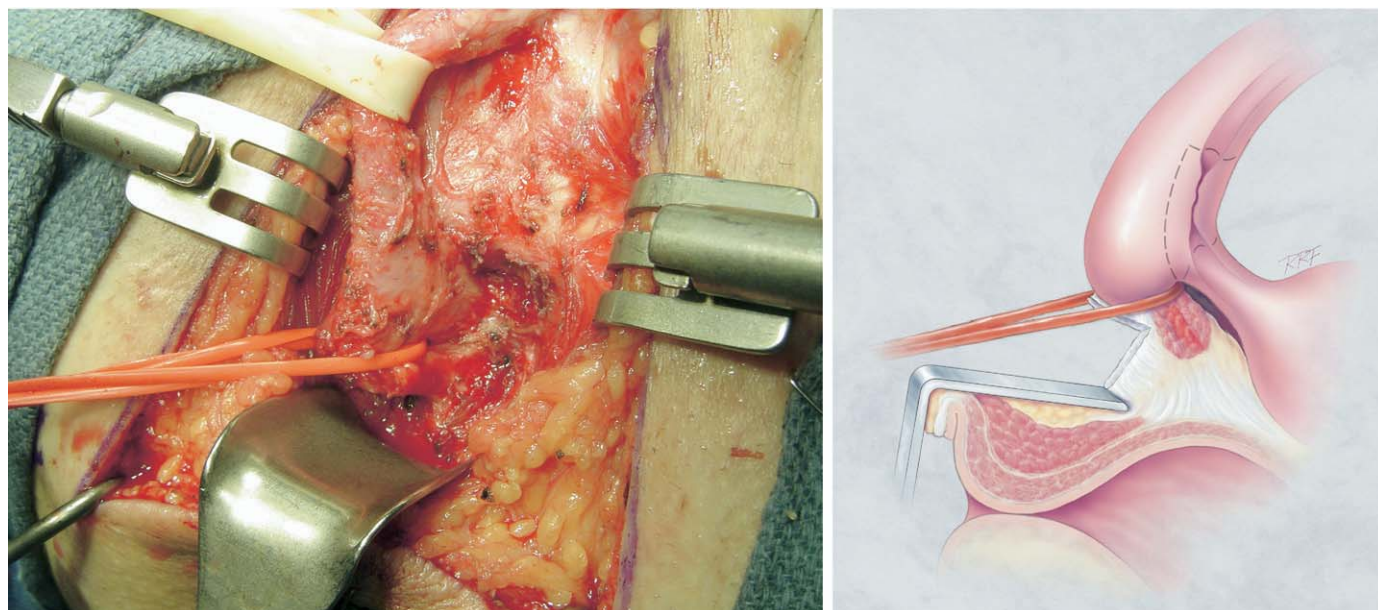


FIG. 1. Vessel loop placed over bulbar vessels to facilitate developing plane between vessels and membranous urethra

patients who reached this level of followup. Patients who were rendered incontinent after the procedure were allowed to heal completely for 6 months before the sphincter was placed in 1 patient using a transcorporeal implantation technique.

RESULTS

Mean patient age was 47 years (range 15 to 72). The patient with a congenital stricture was 2 years old. Three patients

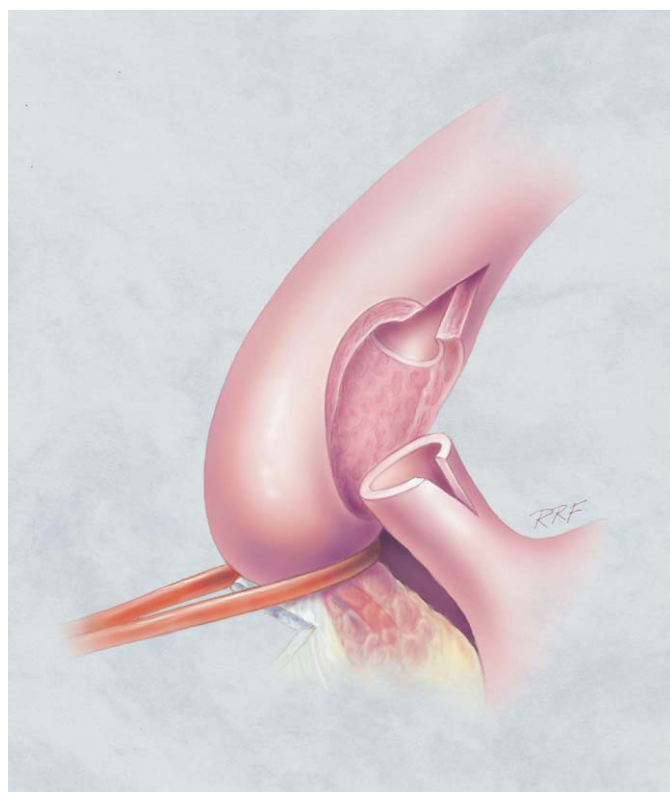


FIG. 2. Membranous urethra has been separated from vessels, allowing for identification of stricture, excision and spatulation.

had a history of localized CaP and had undergone RP, 1 had a stricture before the surgery and stricture developed in the others after prostatectomy. After the feasibility of the technique was proven in the initial patients, we expanded the technique to other patients with proximal narrow caliber strictures. Six patients with a history of straddle trauma to the perineum, and 1 patient with a congenital stricture were included. Mean stricture length was 1.5 cm, 6 patients had proximal strictures and 1 had a mid bulbous stricture. The latter required dividing the corpus spongiosum distal to the vessels. In that case vigorous arterial bleeding of the proximal corpus spongiosum was noted, proving that the technique indeed seems to preserve the proximal blood supply. Only 7 patients were included for data analysis. After a mean followup of 12.5 months (range 6 to 38) the 7 patients who underwent the procedure and were subsequently analyzed had a patent urethra by urethrocystoscopy at 6 months, and did not report any voiding difficulty (see [table](#)). Three patients have not reached 6 months followup and, thus, are not included in the data analysis. At the time of this manuscript submission, all 10 patients appear to be stricture-free. Of the patients who underwent the repair after RP 1 was continent while 2 were incontinent. Of the 2 incontinent patients 1 underwent implantation of an AMS 800™ artificial urinary sphincter by a transcorporeal technique,² and 10 months later is dry and empties without difficulty. The other incontinent patient is awaiting implantation of an artificial sphincter.

In 1 patient with a short bulbous stricture due to straddle trauma, who was not included in this study, an attempt at developing this surgical plane was unsuccessful because of marked fibrosis following the straddle injury and multiple urethrotomies. The vessels were found to be attenuated from the trauma.

DISCUSSION

The concept of proximal vascular preservation is not new, and Turner-Warwick divided the bulbospongiosum proxi-

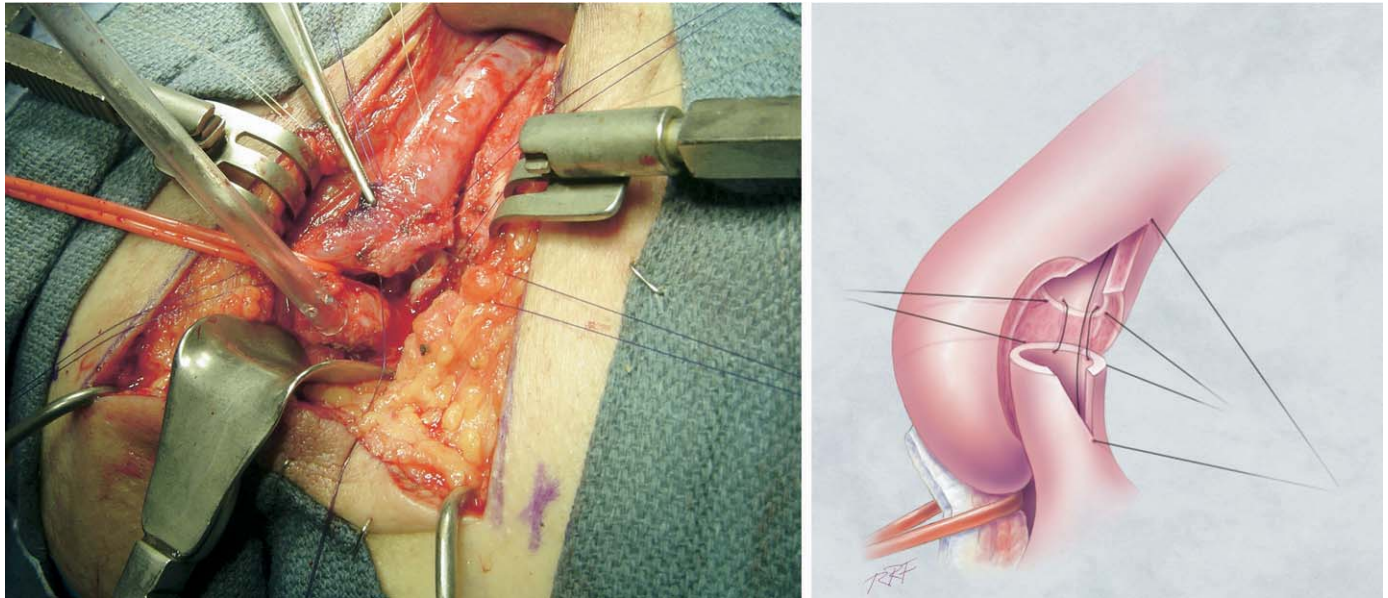


FIG. 3. Anastomotic sutures shown with corpus spongiosum intact and vessels retracted

mally in patients undergoing anastomotic reconstruction.³ In that procedure he then reestablished the continuity of the corpus spongiosum and ostensibly proximal revascularization occurred in some patients. The implementation of pros-

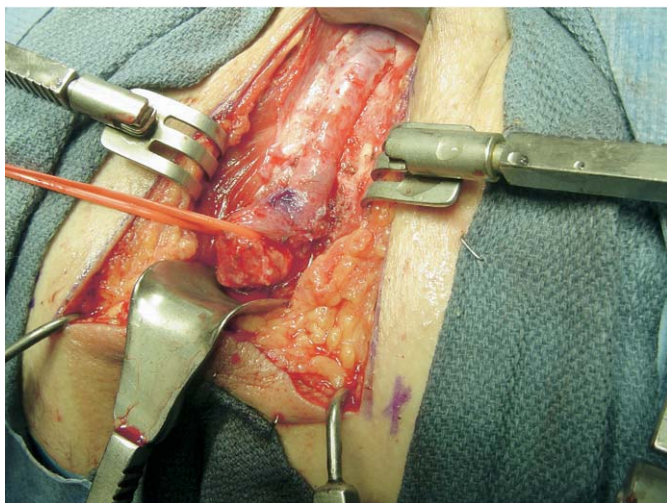


FIG. 4. Anastomosis completed, corpus spongiosum with proximal blood supply is intact.

tate specific antigen as a tumor marker for CaP and its widespread use has led to detection of CaP at a surgically curable stage. Despite the remarkable refinements in operative techniques, the use of laparoscopy and robotic assisted laparoscopy, postoperative urinary incontinence is still a source of distress for some patients and their surgeons.

The definitive treatment for patients with post-prostatectomy incontinence is the AMS 800™ artificial urinary sphincter or, in some cases, a male urethral sling. The former applies circumferential compression pressure around the corpus spongiosum. Thus, by reducing the blood supply to the subcuff urethra, the patient could be predisposed to erosion. Modifications to reduce subcuff urethral erosion include the narrow backed cuff, tandem cuffs and transcervical implantation. In the technique we describe the proximal vasculature is not disturbed and appears thus to be unaffected. Whether there is an advantage to patients cannot be said. We hope that others will apply the technique and time then will tell.

The likelihood of CaP developing is 1 in 6, and within the next half century, assuming no change in the incidence rates, it is estimated to be 1 in 3.^{4,5} Anything that can be done to improve the quality of life of those patients would appear to be worthy of a further look. Also, strictures of the sphincter active portion of the urethra following transurethral resection of the prostate are not uncommon at 2.2% to

| <i>Followup results for the 7 patients who underwent vessel sparing excision and primary anastomosis</i> | | | | | | |
|--|-----------------------|-----------------------|---|--------------|---|--|
| Pt No.—Age | Stricture Length (cm) | Radical Prostatectomy | Etiology | Mos Followup | Status | |
| 1—49 | 0.5 | No | Straddle | 8 | Patent urethra | |
| 2—29 | 1.5 | No | Straddle | 8 | Patent urethra | |
| 3—67 | 2.5 | Yes | Traumatic catheterization | 10 | Patent urethra, continent | |
| 4—72 | 2 | Yes | Long-standing history of stricture before RP | 12 | Patent urethra, incontinent | |
| 5—65 | 2 | Yes | Erosion of male sling for post-prostatectomy incontinence | 38 | Patent urethra, continent with AMS 800™ sphincter | |
| 6—34 | 2 | No | Straddle | 6 | Patent urethra | |
| 7—15 | 0.5 | No | Straddle | 6 | Patent urethra | |

9.8%.^{6,7} For those patients urinary continence can be regained after urethral reconstruction by placement of an artificial sphincter.⁸ This technique would hopefully allow sphincter placement to be feasible without increased risk of erosion.

CONCLUSIONS

While the results of EPA are excellent, it would be difficult to say that we have made things better immediately. The goal was to see if this approach could be done with good efficacy. As discussed potentially 1/3 of the aging American population could be regarded as possibly “pre-op” for radical prostatectomy. Thus, the potential for less than optimal continence could be a factor for many of these patients who would perhaps ultimately benefit from the modification.

Abbreviations and Acronyms

| | | |
|-----|---|----------------------------------|
| CaP | = | cancer of the prostate |
| EPA | = | excision and primary anastomosis |
| RP | = | radical prostatectomy |

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