Two-Stage Transperineal Management of Posterior Urethral Strictures or Bladder Neck Contractures Associated with Urinary Incontinence after Prostate Surgery and Endoscopic Treatment Failures

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Abstract

Objectives: The treatment of posterior urethral strictures or bladder neck contracture associated with severe urinary incontinence after prostate surgery and failure of endoscopic treatments is controversial. We report our experience with a transperineal approach in two steps: end-to-end urethroplasty/anastomosis and subsequent artificial urinary sphincter implantation.

Methods: Between September 2001 and January 2005, we observed six patients (58–68 yr old), with a combination of severe urinary incontinence and posterior urethral stricture with anastomotic bladder neck contracture after prostate surgery. In all cases, repeated endoscopic treatments of the strictures failed. The patients underwent transperineal end-to-end urethroplasty or anastomosis followed by transperineal artificial urinary sphincter placement after 6 mo.

Results: After the first surgical step, all patients were completely incontinent with absence of urethral strictures and complete anastomotic healing in all cases. Therefore, all patients underwent artificial urinary sphincter insertion. After a mean follow-up of 38 mo (range: 18–57 mo), five patients are continent with no postvoid residual urine and a perfectly functioning device. One artificial urinary sphincter was removed due to urethral erosion.

Conclusions: In patients with posterior urethral strictures or bladder neck contractures associated with severe urinary incontinence, an artificial urinary sphincter implantation as a second step allows verification of the outcome of a previous end-to-end urethroplasty or anastomosis and utilizes a dedicated operative field to reduce the risks of prosthesis implants.

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1. Introduction

Urinary incontinence and iatrogenic bladder neck/urethral strictures are annoying complications of prostate surgery. The incidence of late iatrogenic urinary incontinence after transurethral resection of the prostate or open simple prostatectomy for benign prostatic hyperplasia (BPH) ranges from 0.5% to 1% [1,2]. The broad range in the incidence of urinary incontinence after radical prostatectomy (RP) results from variability in defining continence, the surgeon’s experience, the surgical technique, patient selection, and the time of assessment relative to surgery [3]. However, persistent post-RP urinary incontinence after 1 yr affects 2% to 5% of patients [4].

The exact incidence of strictures of the prostatic urethra after transurethral resection of the prostate or open simple prostatectomy for BPH is not clear, although it has been reported to range from 0.6% to 14% [5], whereas the incidence of post-RP bladder neck strictures in contemporary series ranges from 7% [6] to 9.4% [7].

The majority of strictures can be conservatively managed with dilatation or endoscopic treatments. If severe incontinence develops after incision of the stricture, however, it can be successfully handled with an artificial urinary sphincter (AUS) [8], although treatment of strictures in incontinent patients who cannot be managed successfully by transurethral procedures is controversial. Often a permanent stent or a urinary diversion (with catheters or major surgery) are used without achieving an optimal functional result, that is, the combination of lumen patency and urinary continence [9].

Some authors advocated complex abdomino-perineal approaches to perform urethroplasty and AUS implantation in one or two stages [2,10], whereas others performed a one- or two-stage prostatic stent and AUS implantation [9,11]. However, such procedures are complex, invasive, and potentially morbid.

We report our experience in the management of patients with combined urinary incontinence and stricture after prostate surgery with a two-step transperineal approach: open urethroplasty followed by AUS insertion after 7 mo. To the best of our knowledge, this is the first published report of this kind of experience.

2. Methods

2.1. Patients

Between September 2001 and January 2005, we observed six patients (58–68 yr old) with a combination of severe urinary incontinence and posterior urethral stricture or anastomotic bladder neck contracture after prostate surgery. Two patients had a non-insulin-dependent diabetes mellitus, and one was affected by chronic hepatitis C. All the patients had erectile dysfunction at the time of presentation.

Three patients had a posterior urethral stricture following prostate surgery for BPH; according to the criteria of Pansadoro and Emiliozzi [5] two of these patients had a type II prostatic plus membranous urethral stricture (one after transurethral resection of the prostate and one after open simple prostatectomy) and one patient had a type III prostatic urethral stricture after open simple prostatectomy. The other three patients had an anastomotic bladder neck contracture after RP for localized prostate cancer.

Prior to definitive treatment, all the patients underwent four or more aggressive internal urethrotomies or resections with symptomatic recurrence of a tight contracture. To exclude detrusor overactivity or compliance abnormalities, the patients were subjected to a complete diagnostic work-up, including retrograde and voiding urethrogram, flexible ureteroscopy, and urodynamic investigations, according to the methodology and definitions of the International Continence Society guidelines [12]. All the patients were scheduled for a two-step transperineal approach and first underwent anastomotic urethroplasty.

2.2. Surgical technique: transperineal urethroplasty

Antibiotic intravenous prophylaxis with a cephalosporin (cefotaxime) is preoperatively administered while the patient is on call to the operating room. Hair removal from the surgical field area is performed in the operating room just before surgery.

With the patient in the lithotomy position, a guide-wire is passed into the bladder with the help of a flexible cystoscope. A perineal reversed Y-shaped incision is made. Exposure of the bulb urethra is achieved by separating the bulbospongious muscles. A vascular loop is passed around the bulbar urethra. The distal edge of the stricture is recognized with the help of a 24-Ch catheter or the flexible cystoscope. The guide-wire is used for correct orientation, and the stricture is removed starting from the urethral lumen to the periphery until healthy tissue is observed, in order to obtain a large lumen while allowing an anterior deletion (upward to the pubis) and avoiding the rectum.

For a tension-free anastomosis, the anterior urethra is largely dissected from the corporal bodies and the intracrural space may be developed with a wide mobilization, starting from the bifurcation of the corporal bodies. The anterior urethra is widely spatulated dorsally. Interrupted 3-0 polygalactic acid sutures are placed on the proximal mucosal edges. Sutures are then placed in the distal segment of the urethra and are tied under direct vision after placement of a 18-Ch catheter (Fig. 1A, B). Four more sutures are placed between the urethra and the corporal bodies to better guarantee the integrity of a tension-free anastomosis. The urethra is then evaluated to find the right place where the cuff of the AUS may be placed, and a nonabsorbable suture is passed as a future landmark. The bulbo-urethral muscles are reconstructed, and the superficial perineal fascia is...
re-established. The incision is then closed in layers. The catheter is removed at postoperative day 10 after cystography. A 14-d course of antibacterial therapy is given as the oral fluoroquinolone levofloxacin.

2.3. Follow-up after the urethroplasty

All patients were evaluated with urine cultures after 1, 3, and 6 mo. A flexible urethroscopy was performed after 6 mo. If complete incontinence and a patent urethral lumen occurred, the patient was scheduled for AUS placement within 1 mo. Thus, we performed a transperineal AUS placement 7 mo after the urethroplasty.

2.4. Surgical technique: transperineal AUS insertion

Antibiotic intravenous prophylaxis with an aminoglycoside (gentamicin sulphate) plus the glycopeptide vancomycin is preoperatively administered [13] while the patient is on call to the operating room. Hair removal from the surgical field area is performed in the operating room just before surgery. Antibiotic solution is used to immerse the elements of the system, which is liberally irrigated throughout the procedure.

With the patient in the lithotomy position, a vertical midline perineal incision is made. The landmark suture placed in the previous operation is found (Fig. 2A). This marker is very useful for finding the plane between the urethra and the corporal bodies. The urethra is circumferentially dissected off the corporal bodies for a length of about 2 cm to accommodate the cuff of the AUS (Fig. 2B). The circumference of the urethra is measured for cuff size selection (in all cases, a 4-cm cuff size was implanted). A small incision in the right iliac region is then made, and a pocket is bluntly created under the rectus muscle, extraperitoneally, to allow placement of the balloon reservoir. The reservoir tubing is brought out through a separate incision in the anterior rectus fascia. A long clamp is passed down over the pubis to the perineal incision in a plane superior to the fascia to avoid scrotal violations. The cuff tubing is grasped and guided up into the abdominal wound passing through the bulbourethral muscles. A lateral subcutaneous hemiscrotal

Fig. 1 – (A) Interrupted 3-0 polygalactic acid sutures placed on the mucosal edge of the proximal urethra, close to the bladder neck; (B) end-to-end tension-free anastomosis. Arrow, bladder neck and proximal prostatic urethra; arrowhead, corporal bodies; dot, anterior urethra; asterisk, levator ani muscle.

Fig. 2 – (A) Landmark suture placed in the previous operation; (B) cuff of the urinary sphincter placed around the urethra. Asterisk, urethra; arrowhead, left corporal body.
pouch is then created using sequential Hegar dilators. The pump is then placed in the pouch after accurate saline filling. All of the appropriate tubing connections are made, and the device may be tested and deactivated. The incisions are then closed in layers. A 14-d course of antibacterial therapy is given as the oral fluoroquinolone levofloxacin. The device is activated at 4 to 6 wk.

2.5. Follow-up after the AUS insertion

The postoperative evaluation included urine cultures, objective examination, and postvoid residual urine every 3 mo.

3. Results

We did not observe intraoperative or early postoperative complications for either procedure in any patient. At 6 mo after the urethroplasty, all patients were completely incontinent. All the urine cultures were negative. The diagnostic work-up at this time showed absence of urethral strictures and complete anastomotic healing in all cases. Therefore, all patients underwent AUS insertion. The device was activated in all patients 4–6 wk after implantation. After a mean follow-up of 38 mo (range: 18–57 mo), five patients are continent with no postvoid residual urine and a perfectly functioning device.

Fig. 3 shows a postoperative urethrogram in a patient with a type II prostatic plus membranous urethral stricture. The retrograde urethrogram (Fig. 3A) illustrates the correct position of the AUS cuff and the normal healing of the urethroplasty. The voiding urethrogram (Fig. 3B) shows a large urethral lumen.

Three months after device activation, the patient with chronic hepatitis C presented with persistent right hemiscrotal pain and swelling over the prosthetic pump, but without purulent drainage, an exposed device, fever, leukocytosis, or high levels of inflammatory C-reactive protein. Ultrasonography revealed a low level of echogenicity around the pump, measuring 2 cm in diameter. Fine-needle aspiration was performed, but the microbiological examination proved sterile. Retrograde urethrogram and flexible uretroscopy excluded urethral erosions. After 2 wk of antibiotic therapy without successful results, the patient underwent pump removal and device deactivation with symptomatic relief. The microbiological examination of the prosthetic pump proved sterile. After 2 mo, ultrasonography revealed a low level of echogenicity around the cuff and the balloon reservoir without symptoms. A flexible uretroscopy revealed a partial urethral erosion, and the patient underwent removal of the device. The patient is now completely incontinent with a patent urethral lumen.

4. Discussion

After prostate surgery for BPH or prostate cancer, the majority of strictures can be easily and conservatively managed with an endoscopic treatment [5], while severe urinary incontinence may be managed with an AUS, which is considered the gold standard, with a continence rate of around 90% in both the short and long term [14]. When urinary incontinence and posterior urethral stricture are combined, however, treatment is controversial, especially after failure of endoscopic treatment of the stricture.

4.1. The suprapubic approach

Abdomino-perineal approaches to perform urethroplasty plus AUS in one or two stages were described.
previously [2,10], but these are complex, invasive, and potentially morbid procedures. In fact, suprapubic access after open simple prostatectomy or repeated endoscopic treatments has a high perioperative complication rate [15]. Furthermore, leakage at the site of the anastomosis with infection/erosion of the AUS as well as formation of new scar tissue with subsequent restricture may occur [10]. Therefore, this kind of approach should be used only if an abdominal procedure is needed (eg, ileocystoplasty).

4.2. Use of a urethral stent

Prostatic stent implantation and AUS placement for anastomotic bladder neck contracture and urinary incontinence following RP is an alternative approach with acceptable outcomes [9,11]. Elliott and Boone [9] treated nine men with stent placement followed by AUS insertion. After a 17.5-mo mean follow-up since placement of the AUS, pad use after sphincter implantation decreased from a mean of 6.5 (range: 4–12) to 0.7 (range: 0–2) pads daily. Eight patients were completely satisfied with the results and would undergo the procedures again. Two patients described “mild” perineal discomfort, and in one case bladder neck contracture recurred before implantation of the AUS, which was successfully treated with repeat internal urethrotomy and placement of a second stent partially overlapping the first stent. The authors did not report malfunctions, recurrent strictures, or the need for adduction surgery on the AUS. Anger et al. [11] placed a stent across the anastomosis followed by an AUS in eight patients. Later ingrowth and stent obstruction occurred in two cases. The other patients were continent and free of obstruction at a mean 7.4-mo follow-up.

Although avoiding an open urethroplasty, this kind of management should be used with caution. In fact, when prostatic stents are used for benign prostatic diseases [16,17] the complication rate is significant. Moreover, several well-recognized complications can occur with stents (eg, stent migration, encrustation, and recurrent contracture), and the management of such cases with an AUS in situ may be challenging.

4.3. The transperineal approach

The results of transperineal anastomotic posterior urethroplasty are excellent, with a 90% success rate [18]. The transperineal approach allows clear exposure and access to the bladder neck, as clearly showed in transperineal RP [19]. Therefore, it is reasonable to perform a transperineal urethroplasty to obtain a lumen patency while waiting for a durable result before a definitive AUS implant, although with the cost of temporary but severe urinary incontinence. After a 6-mo successful anastomosis, AUS implantation with a clean dedicated operative field and a revascularized urethra [20] may be performed to achieve complete urinary continence for an optimal functional result.

Compared with the abdomino-perineal approach, the perineal route is less invasive and does not cause specific complications in patients affected by urinary incontinence and erectile dysfunction. In our experience, the stenotic urethra and the prostatic apex or the bladder neck were easily recognized by following the guide-wire. The scar tissue was always completely removed, and a large lumen was obtained. The bladder neck was easily reached with the perineal approach, and a tension-free anastomosis was always performed under direct vision. A tension-free anastomosis may be easily obtained by following three common surgical steps: (1) a wide anterior urethral mobilization; (2) the development of the intracurcal space, starting from the bifurcation of the corporal bodies; and (3) the placement of supporting sutures between the urethra and the corporal bodies. If difficulty is encountered, a transperineal approach does not preclude a combined perineal-abdominal urethroplasty.

In re-operations, the plane between the urethra and the corporal bodies may be hardly developed. The landmark suture placed during the urethroplasty is very useful for finding this plane and helps to avoid urethral lesions. In these patients, the AUS placement in the bulbar urethra was not particularly difficult. If the plane between the urethra and the corporal bodies cannot be developed, a transcorporal cuff implantation may be performed, as described by Guralnick et al. [21].

All the patients in our series underwent AUS implantation after a successful urethroplasty. Our long-term results confirm the excellent results of transperineal anastomotic posterior urethroplasties and AUS implantations. Only one patient needed AUS explantation due to prosthesis rejection without clear evidence of infection.

4.4. Advantages and disadvantage of the two-step transperineal approach

The two-step transperineal procedure seems to be a reliable alternative to previously reported approaches. It is less invasive than abdomino-perineal surgery. The success of the anastomosis may be assessed after a reasonable time (6 mo), thus avoiding the risks of simultaneous transperineal
urethroplasty plus AUS implant. Finally, it avoids the potential morbidity of a prostatic stent combined with an AUS. An obvious disadvantage, however, is the need for a second operation.

5. Conclusions

The treatment of severe urinary incontinence combined with posterior urethral stricture or anastomotic bladder neck contracture after prostate surgery and failure of endoscopic treatments is challenging. Here, we report our experience with a two-step transperineal approach of anastomotic urethropasty and AUS placement. The first transperineal step for treating a bladder neck contracture or a urethral stricture was feasible and not particularly difficult after open simple prostatectomy or retropubic RP. A 6-mo follow-up allowed us to evaluate the outcome of the urethropasty. During the second transperineal step, the nonabsorbable suture placed around the urethra served as a useful landmark for easy identification of the plane between the urethra and the corporal bodies. The second transperineal step provided a dedicated operative field for AUS implantation with reduced risks of perioperative complications. Finally, this two-step transperineal approach is not as invasive as abdomino-perineal approaches. In our opinion, this graded approach is a reasonable option for successfully treating such complicated cases.

Conflicts of interest

The authors have nothing to disclose.

References


