Externally Readjustable Sling for Treatment of Male Stress Urinary Incontinence: Points of Technique and Preliminary Results

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ABSTRACT

Background and Purpose: Slings have been successful in the treatment of male stress urinary incontinence (SUI). However, in many situations, the sling may have either an excess of or inadequate tension, producing voiding difficulties or urinary leakage, respectively. The effectiveness of a readjustable sling for the treatment of male SUI has been evaluated.

Patients and Methods: Between October 2001 and November 2002, six consecutive male patients with SUI, aged 69 to 81 years, received a readjustable sling (Remeex®) at the Monforte Comarcal Hospital.

Results: Five patients (83%) achieved continence, while the remaining patient showed important improvement. All patients were satisfied or very satisfied with the results. The average follow-up time was 18 months (range 12–50 months). There were no postoperative complications.

Conclusions: This original treatment allows readjustment of the sling tension in the immediate or mid-term postoperative period. Initial clinical results are encouraging.

INTRODUCTION

MALE STRESS URINARY INCONTINENCE (SUI) secondary to sphincter deficiency after radical prostatectomy remains a frustrating problem for patients and physicians. Mild degrees of incontinence may be managed with Kegel exercises, biofeedback and pharmacotherapy. More severe leakage is usually treated with collagen injections, artificial urinary sphincter placement, or sling procedures. The likelihood of success depends mainly on the severity of the incontinence and the presence of comorbidities such as postoperative pelvic irradiation changes.

Slings are gaining the confidence of many urologists in the treatment of male SUI; however, in many situations, the sling has either an excess or a lack of tension, producing voiding difficulties or urinary leakage persistence, respectively. The effectiveness of a readjustable sling (Remeex®) for the treatment of male incontinence has been evaluated.

PATIENTS AND METHODS

Patients

Between October 2001 and November 2002, six consecutive male patients with SUI, aged 69 to 81 years (mean age 74 years), were operated on for placement of a readjustable sling at the Monforte Comarcal Hospital. Five patients were incontinent after radical retropubic prostatectomy performed between 2 and 10 years earlier. The remaining patient had undergone two pelvic operations (rectosigmoid amputation and retropubic prostatectomy). The patients were informed of the available surgical alternatives and possible complications. Preoperative evaluation included clinical and micturition history, neuromodulatory examination (perineal sensation, bulbocavernosus reflex, and anal sphincter tone), urodynamic studies, and urine culture. Urodynamic evaluation (including flowmetry, cystometry, and uroflowmetry) was performed.

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measurement, and urethral pressure profilometry) was performed in three patients. No patient had preoperative instability symptoms. On the basis of the radiographic, urodynamic, and endoscopic findings, pure sphincteric incompetence was diagnosed in all patients.

**Surgical technique**

RE.ME.EX® are the Spanish initials for Readjustable Mechanical External device. The sling was initially designed for postoperative regulation of suburethral sling support level (SSSL) in female SUI surgery. The intervention consists of placing a short (3-cm) monofilament suburethral sling that is connected to a mechanical regulator through two long monofilament traction threads. The mechanical regulation part is a subcutaneous permanent implant, the \textit{varitensor}, which is placed over the abdominal rectum fascia 2 cm above the pubis and permits adjustment of the SSSL from outside the body by means of an external manipulator (Fig. 1-1). The manipulator is a disposable part of the set, which is attached to the varitensor and permits activation of the regulation mechanism from outside the body. A special screwdriver called the disconnector is used to separate the external manipulator from the varitensor once the desired continence level is achieved.

The varitensor is a small (1 × 1 × 2.5-cm) cubic device with an internal never-ending screw to wind the traction threads. The threads are introduced into the varitensor through two lateral holes and emerge through the central hole at the varitensor midline (Fig. 1-2), where the threads are tied to each other (Fig. 1-3). The varitensor has a mechanical connecting point for the external manipulator on its upper side. By rotating the manipulator clockwise or counterclockwise, the surgeon adjusts the SSSL higher or lower. These components are made of biocompatible materials such as titanium and ultra-high-molecular-weight polyethylene. The Remex system urethral support consist of two nonreabsorbable 0.5-mm polypropylene threads joined to a short (1.5 × 3-cm) suburethral polypropylene sling mesh (Fig. 1-1).

Under spinal anesthesia, the patient is placed in the lithotomy position and prepared by shaving the abdomen and perineum. Antibiotic prophylaxis with cefonicid is started preoperatively and continued for 72 hours. The surgical field is...
draped, taking care to exclude the anus by fixing a towel to the perineum with silk stitches. A perineal retractor is used to aid in exposing the posterior urethra, and an 18F Foley catheter is placed per urethra. A 4-cm transverse incision is created just above the upper side of the pubic bone, and the subcutaneous tissue is dissected until the anterior rectal muscle fascia is seen. A vertical incision is made in the perineum, and the urethra, surrounded by the bulbocavernous muscle, is carefully dissected in order to locate the angle between the bulbocavernous and ischiocavernous muscles (Fig. 2 asterisk).

At this point, the urogenital diaphragmatic fascia is sharply penetrated, and the hole is enlarged with scissors to permit the introduction of the index finger. Digital ascending dissection of the retropubic space is performed, trying to reach the highest possible position in order to minimize the space between the fingertip and the anterior rectal fascia. A 60° modified Stamey needle is pushed down from the retropubic area until it reaches the fingertip. At this moment, the needle is passed down to the perineal area through the Retzius space guided by the finger to avoid urethral or bladder perforation. The same maneuver is performed contralaterally. Cystourethroscopy is used to confirm bladder integrity. If there is no perforation, the traction thread tips are passed through the needle hole and the needles pushed from the perineal field to the suprapubic area, where the tips of the traction threads are pulled up until the polypropylene sling mesh is in full contact with the bulbocavernous muscle without pressure. The sling is then fixed and fully extended by placing four reabsorbable stitches. The perineum is closed in layers with reabsorbable sutures without leaving drains.

Suprapublically, the traction thread tips are introduced into the varitensor through the corresponding lateral hole, appearing through the central varitensor hole. After several knots have been made, the traction threads are wound into the varitensor by rotating the manipulator clockwise until the varitensor rests freely over the abdominal rectal fascia. Two fingertips must pass easily between the fascia and the varitensor (Figs. 1-4 and 3A). The operation is completed by closing the abdominal incision, leaving the external manipulator connected to the varitensor and protruding through the center of the abdominal incision.

The morning after the operation, the bladder is filled with 250 to 300 mL of saline through the urethral catheter, and the

FIG. 2. Bulbocavernous and ischiocavernous muscle angle (*) and digital ascending dissection of retropubic space (arrow).
patient is asked to stand up and perform Valsalva maneuvers and all the movements that usually produce urinary leakage (Fig. 4). If incontinence appears, the external manipulator is rotated four complete turns clockwise, and continence is checked again. If the patient is still incontinent, four additional turns are applied to the manipulator; this maneuver is repeated until leakage disappears. Then the patient is invited to urinate, and the postvoiding volume is measured by sonogram or with a urethral catheter. If residual urine is <100 mL and the patient is able to void well, the disconnector is used to remove the manipulator from the varitensor (Fig. 1-5), and patient is discharged (Figs. 1-6, 1-7, and 3B).

RESULTS

A bladder penetration in one patient was closed intraoperatively without further complications. Small perineal hematomas were seen in three patients but required no treatment. There were no wound infections, and local pain was easily treated.

The average follow-up was 18 months (range 12–50 months). Five patients achieved urinary continence (no pad needed) while maintaining an almost normal urethral flow (Fig. 5). In the other patient, who had been incontinent for a very long time, urinary continence was not possible without causing urinary retention, and we finally decided to apply less tension to the sling and leave the patient with minimal urinary leakage. We are hoping for improvement in bladder wall contraction and then will readjust the sling in the near future. All patients are voiding well, and no one has a postvoiding volume exceeding 100 mL. All patients are satisfied or very satisfied with the results of the procedure.

DISCUSSION

Severe stress incontinence is a bothersome complication of radical prostatectomy and myelomeningocele. The treatment options include the use of urethral catheters, penile clamp, or collecting device; periurethral injection of bulking material; or placement of an artificial urinary sphincter or perineal sling. An indwelling catheter may cause recurrent infections, hematuria, and stone formation. A condom requires a permanent drainage bag, produces chronic irritation of preputial skin, and can be difficult to keep secured because of penile shortening after radical surgery and antiandrogen therapy. A penile clamp can cause local pain and skin excoriation. Injection of bulking agents is expensive and has a low cure rate, ranging from 8% to 36%, with few differences between retrograde or antegrade techniques.2,3

Artificial urinary sphincter placement is the current gold standard for the correction of postprostatectomy incontinence. Long-term follow-up reports of this procedure (mean ranging from 18 to 44 months) describe a success rate of approximately 60% to 80%, but the success rate generally is 10% to 20% lower among patients with a history of radiation or associated bladder dysfunction.4–7 Despite its attractiveness, the artificial urinary sphincter is an expensive mechanical device that can fail
and requires manual opening to empty the bladder. It is also associated with high surgical revision rates, which range from 35% to 50%, and necessitates plantation in 14% to 17% of the patients because of erosion, infection, or mechanical malfunction.4–7

Sling procedures for incontinence are conceptually attractive inasmuch as they are inexpensive and nonmechanical and allow physiologic voiding without significant obstruction. Initial attempts to correct male SUI were made by Kaufman,8 who designed three perineal techniques. However, the first fascial sling operation to correct postprostatectomy incontinence was performed by Servadio in 1974.9 Over the next 20 years, the male sling was used by only a few groups to treat urinary incontinence in neurologic patients.10–13 The procedure was not used to treat male SUI until 1992, when Mizuo and colleagues14 published their successful experience with three cases. The rebirth of the male sling can be credited to Schaeffer and associates,15 who published a 64-patient series in which they obtained a 64% initial success rate (cured or improved). Since that time, slings have been developed that are secure and cheap and achieve high success rates, ranging from 66% to 75%.16–19 Patient satisfaction appears to be higher with slings than with artificial urinary sphincters because of the maintenance of physiologic voiding. Moreover, unassisted voiding is possible in patients with impaired manual dexterity or mental ability.15,20

Unlike the artificial sphincter, which compresses the urethra circumferentially, thereby interfering with venous blood flow and causing urethral atrophy and even erosion, the male sling compresses only the ventral area of the bulb urethra, leaving the dorsal and lateral blood flow unaltered.20,21 Additionally, the bulbospongious muscle is left intact, serving as a cushion between the urethra and the sling, further minimizing the risk of erosion. Finally, in sling surgery, there is no need to wait 6 weeks to activate the pump, as is necessary with the artificial sphincter: as soon the catheter is removed, normal voiding may occur. Finally, the risk of mechanical malfunction is minimized by the absence of a pump, fluid-filled chambers, and tubal connections.14,15,20,21

Despite these advantages, slings have problems with either an excess of or inadequate tension, which produces voiding difficulties or persistent urinary leakage, respectively. Schaeffer et al15 had to perform a total of 23 retightening procedures in 17 of their 64 patients (26.6%) to improve their success rates from 64% to 75%. In our short experience, optimal suburethral tension was achieved in four patients during the first 2 postoperative days; these patients stopped wearing pads and are voiding without difficulty, while only one patient has a small amount of leakage and is waiting for readjustment.

The high success rates of suburethral male slings are conditional on restrictive patient selection criteria. Prior irradiation clearly predisposes to failure of postprostatectomy incontinence procedures. In the series of Schaeffer and colleagues,15 the success rate following a single sling procedure was only 29% for irradiated patients, while the rate for the other patients was 68%. Some papers have also shown high success rates with suburethral slings to treat neurogenic male incontinence (as high as 90% if patients needing sling retightening are included).22 However, poor tissue compliance, severe detrusor instability, and reduced bladder capacity are associated with significantly less favorable outcomes after various surgical treatments of male SUI (including artificial urinary sphincter, bulking agent injections, and suburethral slings). In these cases, preoperative cystometry must be done to evaluate the need for simultaneous bladder augmentation and to inform the patients about the likelihood of

**FIG. 4.** Postoperative readjustment of SSSL.

**FIG. 5.** Voiding cystourethrogram showing no urethral obstruction and Remeex prothesis in place (arrow).
postoperative urge incontinence that will need pharmacologic treatment. 15,23

Urodynamically, the Valsalva leak-point pressure increased significantly in our cured patients after suburethral sling procedures \( (P < 0.001) \), while the maximum resting urethral pressures did not change. These findings show that male sling surgery may achieve urinary continence without causing significant voiding difficulties. 23

Technically, the male suburethral sling procedure is easy to perform, but careful attention to detail is required. 21 The main intraoperative factors to watch are the sterility of the procedure, delicate bulbospongious dissection, good hemostasis, avoiding urethrobladder perforation, and achieving optimal sling tension. We believe that suburethral tension regulation is an advantage in both female and male incontinence surgery, but it becomes even clearer in male patients because they have a smaller error margin. In our opinion, the use of a readjustable sling may represent a significant improvement in male incontinence surgery.

REFERENCES


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