

A new, simple, safe, effective and cost-effective procedure for genuine stress incontinence: Midurethral polypropylene sling

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Abstract

We developed a cost-effective procedure for genuine stress incontinence (GSI) that has the advantages of the tension-free vaginal tape (TVT). The midurethral polypropylene sling procedure (MPS) is carried out under local anaesthesia. A self-fashioned sling (7.5 × 1 cm) was created from a polypropylene mesh with two lengthening polypropylene sutures at the ends. The sutures are carried through the rectus fascia using a needle and the sling is placed around the urethra. Ten patients underwent the MPS and were followed up for a mean of 6.2 months. All patients were cured. The short-term results of the MPS were comparable to those of the TVT. The procedure costs approximately US\$9. We conclude that the MPS can be considered as an alternative to the TVT procedure.

Key words: incontinence surgery, midurethral sling, tension-free vaginal tape, urinary incontinence.

Introduction

Burch colposuspension and pubovaginal sling procedures are commonly used for genuine stress incontinence (GSI) and have high success rates. Recently, tension-free vaginal tape (TVT) has gained worldwide popularity. It has several advantages such as low morbidity, rare urinary retention, no need for general anaesthesia and effectiveness also in type III urinary incontinence.

Pelvic reconstructive surgery and anti-incontinence procedures are commonly carried out as part of our routine practice. We also initiated the TVT procedure and have been benefiting from its advantages mentioned above. However, the majority of our patients have no health insurance and, thus, cannot afford the TVT set. We therefore attempted to develop a new, cost-effective procedure with the advantages of TVT, which we called midurethral polypropylene sling procedure (MPS). This article reports our short-term results.

Materials and methods

During a 12-month period, 10 patients with GSI were recruited for the MPS procedure. The pre- and post-operative protocol included urodynamic studies, voiding diary, 1-h pad test and cough stress test. All patients gave informed consent to participate in the study and the ethical committee of the hospital approved the study. The cure was defined as pad weight 2 g or less.

The patients were placed in the dorsal lithotomy position. All patients had local anaesthesia and sedation of 1 mg benzodiazepine and 0.05 mg fentanyl citrate, followed by

100 mL of 1% lidocaine plus 0.5 mg adrenalin injected at the areas of the proposed incision over the abdomen down to the rectus fascia, the retropubic space, and over the vaginal wall and paraurethral tissue.

A self-fashioned sling was created by cutting a 15 × 15 cm piece of polypropylene mesh (Prolene, Ethicon, Somerville, USA) into 30, 7.5 × 1 cm tapes. The ends of the sling were tapered a little with scissors, and were sutured and tied with several bites of No.1 polypropylene suture. A specially designed 4 mm-needle instrument with an eye near the tip was used to introduce the sling. The sutures of the sling were threaded through the eye of the needle (Fig. 1).

A 3 to 5 cm transverse incision, depending on the patient's body mass index, was made in the abdominal skin just above the superior rim of the pubic bone. A 3-cm incision is sufficient in non-obese patients, but in obese patients a 5-cm incision is more suitable. The incision is carried down through subcutaneous tissue until the rectus fascia is seen.

A sagittal incision 1.5 cm long was made in the suburethral vaginal wall, beginning 1 cm from the external urethral meatus. Minimal bilateral paraurethral dissection up to the edge of the pubic bone was carried out. The needle instrument with the sutures of the sling was introduced into the retropubic space, and brought up to the corner of abdominal incision, keeping the tip of the needle in close contact with the back of the pubic bone. While passing the needle through the rectus fascia, the corner of the incision was pulled

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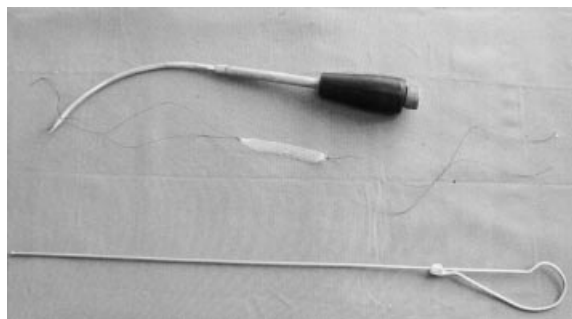


Figure 1 The carrier needle, sling and its lengthening sutures, and rigid catheter guide.

approximately 1–2 cm to the lateral side to obtain a 5 cm distance between the two needle punctures. As soon as the needle passed over the fascia, the sutures were pulled out. In recurrent cases, a rigid catheter guide may be used for repositioning of the bladder and the urethra to avoid injury. The procedure was repeated on the other side. The sling is thus placed in a U-shape around the midportion of the urethra.

After carrying out a cystoscopy, with 300 mL saline solution in the bladder and using a 70° lens, to ensure that the bladder was intact and confirm proper placement of the sling, the sling sutures were tied to each other over the rectus fascia at tension such that only a few drops leaked when the patient was asked to cough repeatedly and vigorously. One of the sling sutures was threaded through a free needle and a bite was taken into the rectus fascia, and was tied again to prevent the sling from sliding. The abdominal skin was closed with subcuticular sutures and the vaginal incision was closed with a continuous suture.

The Foley catheter was removed on the first postoperative day. The patients were discharged home when they had residual urine of less than 100 mL. Follow-up visits were scheduled at 1, 3, 6, 9 and 12 months.

Results

Ten patients who had GSI underwent the MPS procedure. Their mean age was 51 (30–75), and their mean parity was 4 (2–6). All patients had GSI and were positive for the cough stress test. Two patients had recurrent GSI. One of them had type III incontinence (Valsalva leak point pressure (VLPP) = 40 cm H₂O). Bladder neck hypermobility was confirmed in all patients by perineal ultrasonography. Six patients had urgency symptoms; these symptoms were relieved in three patients in the postoperative period.

The mean actual operative time (excluding anaesthetic time) for the MPS was 32 min (range 25–45 min). There were no intraoperative, early or late postoperative complications. Mean postvoiding residual urine volume following removal of Foley catheter was 35 mL (range 5–110 mL). At a mean follow-up of 6.2 months (1–12) no patients had rejection, erosion or stress incontinence. All patients had stable detrusor activity, negative cough stress test and pad test.

Discussion

Placement of the sling at the level of the mid-portion of the urethra is based on the anatomical and pathophysiological study of the urethral closure mechanism of Petros and Ulmsten.¹ According to the integral theory, the female urethra is closed off in its midportion, rather than the bladder neck. Lack of support of the midurethra from the pubourethral ligaments and from the suburethral anterior vaginal wall, and impairment of the function and insertion of the pubococcygeal muscles predispose the subject to stress incontinence. The TVT procedure, described by Ulmsten *et al.* aims at reinforcing the above-mentioned structures, using a polypropylene tape.² They reported a 92% success rate in 75 patients over a period of 2 years. Our success rates are in agreement with published short-term results of TVT – 100% of 131 patients in 8 months and 98% of 31 patients in 12 months.^{3,4}

The technique we have developed is a combination of the TVT procedure described by Ulmsten *et al.* using polypropylene tape placed at the mid-urethra.² The pubovaginal sling procedures described by McGuire and Wan using free-rectus fascia⁵ and by Ghoneim and Shaaban⁶ using polypropylene mesh placed suburethrally at the bladder neck level.

We used polypropylene tape as a sling and placed it at the midportion of the urethra similar to TVT procedure. Differently from TVT, we lengthened the sling with polypropylene sutures from its ends and tied them over the rectus fascia as in the abovementioned pubovaginal sling procedures. Recently, Chong *et al.* described a new midurethral sling insertion technique, using a fenestrated trochar to pass a 1.5 × 10 cm tape of polypropylene through the rectus fascia.⁷ In our technique, carrying the sutures instead of the tape through the rectus fascia is easier and less traumatic because of the smaller dimension of needle carrier (4 mm).

We used 7.5 × 1 cm polypropylene tape and one No. 1 polypropylene suture instead of the standard TVT set. The cost of our procedure is approximately US\$9, which includes the polypropylene tape and the suture. In comparison to the TVT procedure, the disadvantage of the MPS is that it requires an incision of 3–5 cm (depending on patients body mass index) in the suprapubic area. An incision of only 3 cm is sufficient in slim patients. In addition to its cost-effectiveness over the TVT, our procedure is simple, safe, minimally invasive and as effective as the TVT for the treatment of GSI.

We conclude that the MPS procedure can be considered as an alternative to the TVT procedure, particularly in patients who live in underdeveloped or developing countries with restricted health budgets, who lack health insurance or who cannot afford the standard TVT set.

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