

Tension-free vaginal tape sling for recurrent stress incontinence after transobturator tape sling failure

Robert D. Moore · Kendra Gamble · John R. Miklos

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Abstract The transobturator tape (TOT) sling is a new minimally invasive technique to treat stress urinary incontinence (SUI). Short-term follow-up studies show high success rates; however, as with any surgical treatment of SUI, failures are known to occur. The treatment of recurrent or persistent stress urinary incontinence after a TOT sling is therefore a new dilemma as well. In this paper, we describe the successful use of a retropubic tension-free vaginal tape (TVT) sling in five patients after failed TOT sling. We present case series of five patients who had TOT slings placed for stress incontinence that failed and subsequently had TVT slings placed for persistent SUI. The TVT slings were placed under local/regional anesthesia without removal of the TOT sling. Retrospective chart review of office and hospital charts was completed, and both objective and subjective data were collected. Five patients had TVT slings placed 6–30 weeks after early failure of TOT slings that were placed for stress urinary incontinence. Postoperatively, all patients with urodynamic testing showed evidence of intrinsic sphincter deficiency; however, all maintained urethral mobility of 30°. All five patients had successful treatment of their incontinence with the retropubic tension-free sling procedure with a mean follow-up of 17 months. Recurrent or persistent stress urinary incontinence after TOT sling may be treated with TVT sling without removal of the TOT sling. Further studies with larger numbers and longer-term follow-up is warranted.

Keywords Transobturator tape · TOT sling · Tension-free transvaginal tape · TVT sling · Stress urinary incontinence · Suburethral sling

Introduction

The tension-free vaginal tape sling (TVT) has become the treatment of choice for female stress urinary incontinence (SUI) over the past years. It has been shown to have excellent cure rates for SUI caused by urethral hypermobility (UH) and has been advocated for SUI caused by intrinsic sphincter deficiency (ISD) and recurrent incontinence after retropubic urethropexy [1–3]. In an attempt to reduce the morbidity of retropubic needle passage, the transobturator modification of the tension-free suburethral tape sling was recently developed. The technique of the transobturator tape sling (TOT), originally described by Delorme [4–6], is indicated for the primary treatment of SUI caused by urethral hypermobility and recurrent incontinence after failed retropubic urethropexy. Although clinical data is minimal, it has rapidly gained popularity in both Europe and the US because of its minimally invasive nature. Recent studies suggest that cure rates of the TOT procedure are comparable to TVT in short-term follow-up, with reduced incidence of intra- and postoperative complications [6–8]. While the procedure does not eliminate risks such as bladder perforation or nerve injury, risks of major complications such as large vessel injury or bowel injury are thought to be much less given the anatomy of the TOT needle passage. The TOT sling lies in a position that mimics the pubourethral ligament, at less of an acute angle compared to the TVT sling. Therefore, the risk of postoperative voiding dysfunction is thought to be less as well. However, as with any procedure for stress incontinence, failures or persistent stress incontinence have been known to occur with the TOT sling, and the management of these failures is a new challenge that has not been reported on to date. We describe the first cases reporting the successful use of a TVT sling after primary failure of

R. D. Moore (✉) · K. Gamble · J. R. Miklos
Division of Urogynecology, Atlanta Urogynecology Associates,
3400-C Old Milton Pkwy, Suite 330,
Alpharetta, GA 30005, USA
e-mail: Moorer33@hotmail.com

Table 1 Demographics

Patient	Age	Diagnosis	Initial procedure	Time between procedures (weeks)
1	65	SUI, vault prolapse, pelvic pain, h/o failed Burch	Laparoscopic sacral colpopexy, TOT	13
2	67	SUI	TOT	6
3	76	SUI, cystocele	TOT, anterior repair	6
4	68	SUI	TOT	30
5	56	SUI, cystocele, enterocele, rectocele,	Laparoscopic sacral colpopexy, paravaginal repair, TOT, hernia repair	6

SUI Stress urinary incontinence

TOT sling in five patients with persistent stress urinary incontinence.

The tension-free vaginal tape (TVT) (Gynecare, Sommerville, NJ, USA), first described by Ulmsten in 1995 [9], is still one of the most commonly used methods to treat female SUI. The TVT procedure, as well as the other subsequent mid-urethra tension-free tape procedures that followed the release of TVT, is designed to restore support to the mid-urethra with the use of polypropylene mesh passing through the retropubic space and abdominal wall fascia suprapubically. The mesh is then adjusted in a tension-free manner under the mid-urethra. It has become one of the most widely published procedures ever in the literature for female SUI with reported cure rates in the range of 85–95% [10–12]. The TVT sling was also reported to successfully treat recurrent incontinence [13] and ISD [14]. We have previously reported the successful use of repeating the TVT sling in cases of failure of the original TVT [15]. We now report on its successful use in five cases of failed TOT slings.

Materials and methods

Five patients initially had TOT slings placed at our institution for stress urinary incontinence with UH, but they continued to have symptoms of SUI after the procedure. They continued to have leakage with stress

events such as laughing, coughing, sneezing, or other activities that resulted in increased intra-abdominal pressures and were deemed early failures of the procedure (less than 6 weeks). The procedure was initially performed with needle passage from an incision in the genitofemoral crease below the adductor longus tendon into a suburethral vaginal incision with direct finger guidance, as previously described [4, 5]. The tape was placed at the mid-urethra in a tension-free manner. The patients' demographics and initial concomitant procedures are described in Table 1. The cause of failure in these five patients is not entirely clear; however, all presented postoperatively with persistent leakage with stress events such as coughing, laughing, sneezing. Four of the patients had results consistent with intrinsic sphincter deficiency (ISD; i.e., MUCP < 20 cmH₂O or LPP < 65 cmH₂O) or borderline ISD on preoperative urodynamic testing (Table 2). Two patients had their TOT sling placed under general anesthesia secondary to having laparoscopic reconstruction procedures at the same time and had their slings adjusted in a tension-free manner under the urethra. The other patients were completed under local/regional anesthesia and, therefore, had their slings adjusted using the standard cough test, with 250 cm³ in the bladder. There were no intraoperative or postoperative complications in any of the patients, and all were seen for standard follow-up at 4 weeks. All of the patients complained of persistent stress incontinence at their fourth week postoperative visit and had clear objective evidence of leaking

Table 2 Pre- and postoperative testing

Patient	VLPP		MUCP		Urethral mobility	
	Pre	Post	Pre	Post	Pre	Post
1	41	24	29	27	50°	N/A
2	57	52	45	15	30°	30°
3	90	N/A	15	N/A	30°	25°
4	88	46	30	30	40°	40°
5	51	25	24	6	40°	10°

VLPP Valsalva leak point pressure, MUCP Maximum urethral closure pressure, N/A not applicable because test not performed

very easily with supine cough test with 250 cm³ in the bladder. All patients were given the option of conservative therapy with pelvic floor exercises vs returning for surgical intervention. Three of the five opted for immediate intervention, and the other two attempted conservative therapy. One of these had no improvement and therefore returned to surgery at 13 weeks; the other had significant improvement with conservative therapy at first, then symptoms became much worse again and she opted for surgical intervention at 30 weeks post-op from initial sling placement. All patients were also given the option of collagen injection vs repeat sling, and all opted for the sling procedure. Four of the five patients received postoperative urodynamic testing (Table 2) before going back to surgery. All four patients showed evidence of ISD on testing per their leak point pressure values.

Because of the initial failure of the transobturator approach as well as evidence of ISD on urodynamic testing, the decision was made to place TVT slings under regional or MAC anesthesia with intraoperative cough test for adjustment of the sling. Standard approach was utilized for placement of the TVT sling in all patients. The suburethral incision was made and the vaginal epithelium dissected off the underlying suburethral tissues. The previously placed TOT sling was not dissected out and the TVT was placed over the previously placed sling. Retropubic needle passage was not hampered by the previously placed sling and was completed without difficulty in all patients. Cough provocation testing was completed in all patients, and their slings were adjusted in a tension-free manner until no leakage was noted.

Results

There were no intra- or postoperative complications in placing the TVT sling after previous TOT sling failure. The previously placed TOT sling was left in place in all patients and did not hamper the placement of the TVT. All patients were discharged in less than 23 h. Average blood loss was less than 50 cm³. All of the patients were evaluated 1 month postoperatively and were all cured of their SUI, both subjectively and objectively with full bladder cough test (300 cm³). All patients had normal post-void residuals and showed no evidence of voiding dysfunction on follow-up. There were not any postoperative infections, and all incisions were well healed at the fourth week visit with no evidence of mesh exposure or vaginal pain on examination. Average objective follow-up was 5 months (range 1–8) with mean subjective follow-up in the 17th month via telephone survey completed by a single coauthor (KG). Patients were asked if they had any urinary leakage; if they did, they were asked whether they leaked with stress

events, such as laughing, coughing, sneezing, etc., or urge events, or both. None of the patients complained of stress incontinence or exhibited stress incontinence on exam. One patient complained of mild urge incontinence and was on anticholinergic therapy for this; however, this patient had this problem preoperatively as well. Only two of five were sexually active; however, neither complained of pain or sexual dysfunction after the second sling.

Discussion

The TOT sling is a new and effective means to treat stress urinary incontinence. Delorme originally introduced the technique, which inserts the polypropylene mesh tape sling between the two obturator foramen with a mechanism of action similar to that of the TVT. However, blind needle passage through the retropubic space is avoided. Because the retropubic space is avoided, the potential for bladder and bowel injury and hemorrhage are significantly decreased. When the two procedures were compared, there was higher risk of bladder injury, hematoma, abscess, and higher post-op pain scores in the retropubic approach for sling vs TOT [16]. However, risk of bladder injury is not completely eliminated as there have been reports of bladder injury with the TOT procedure when larger C-shaped needles are used (vs the smaller helical needles) [17]. In the initial study by Delorme, there was a 90.6% cure rate after TOT sling placement at the mean follow-up of 17 months [6]. Several studies have compared the efficacy of TVT vs TOT, but most of the studies were limited by the small sample size. In a small, prospective randomized trial comparing TVT and TOT, there was no difference in efficacy of the two techniques at 1 year follow-up [8]. Although the TOT sling is associated with high success rates, failures are known to occur. Management of such failures has not been described to date. The etiology of the failure in the initial placement is unclear, but may be related to improper adjustment of the sling at the time of placement, failure of the sling to fix into place, or incorrect diagnosis of the form of incontinence. It may be possible that, in cases of ISD as defined in our study or low leak point pressures with decreased or minimal mobility, that the TOT sling does not provide enough angle of support or possibly urethral kinking to provide continence in all women (especially if the sling is adjusted loosely in the typical tension-free manner).

In the present series, there is no definitive identifiable cause for failures of the TOT sling. Intraoperative cough test for adjustment of tension-free retropubic slings was shown to be more effective than adjustment with no cough test under general anesthesia [18]; however, three of the five failures in this series had successful adjustment using

cough test and still failed the procedure. Four of the five patients in this case series had ISD before their initial TOT procedure based on a leak point pressure less than 65 cmH₂O and/or urethral closure pressure less than 20 cmH₂O on preoperative urodynamics. However, all had urethral hypermobility and, therefore, were considered good candidates for TOT sling. This does raise the question whether the TOT sling may not be as effective as slings such as the TVT for ISD; however, the present series is too small to test that hypothesis. As we gather more experience and further studies are completed, this surely will be an area of focus to clarify. Whatever the cause of failure, options for treatment of these failures include pelvic floor rehabilitation, periurethral injection of bulking agents, plication of the TOT sling under the urethra, repeat TOT sling, traditional suburethral sling or retropubic TVT sling placement. Selection of the appropriate salvage procedure may depend on several factors, including the severity and type of incontinence, patient characteristics, and surgeon experience. We have attempted plication of TVT slings in the past for failures; however, we had marginal results with this technique and we doubt that, with the less acute angle of the TOT sling, this would be an optimal salvage procedure. We did attempt this in one patient after failure of TOT sling under local anesthesia in the office; however, it was not successful.

TVT slings have been used successfully to treat recurrent incontinence and ISD. We have previously reported on their successful use in cases of failed TVT slings [15]. However, one cannot assume that, because it was successful for those patients, it would also be successful for failed TOT slings. As stated previously, the TOT sling lies in a different anatomic position than the TVT, i.e., instead of an acute retropubic angle, it goes out more laterally to the pelvic sidewall. Therefore, with a failure of the procedure, it is important to know what kind of salvage procedure can be safely done with a TOT sling in place and if it will be successful.

In this case series, we chose to perform TVT sling for the failures instead of repeat TOT sling because all patients showed evidence of ISD on physical exam and/or urodynamic testing. We feel that in these type of patients, the TVT retropubic sling may be more appropriate to treat the persistent incontinence given its more acute retropubic angle, which may be more obstructive than the TOT and, therefore, more successful in treating ISD.

In this first case series of TVT sling for failed TOT slings for female urinary incontinence, the TVT sling was performed without any complications and with successful results based on medium-term follow-up (which we define as between 1 and 3 years). All patients are currently cured of their stress incontinence and are pleased with their results. No significant scar tissues, difficulty with needle

passage, bladder injury, or increased blood loss was noted, despite previous placement of the suburethral TOT sling material (mesh). The TVT was adjusted in the normal tension-free fashion with intraoperative cough test, and none of the patients had long-term voiding dysfunction postoperatively. The decision was made not to dissect out the previously placed sling and remove it, as we felt that the potential morbidity of dissection and removal outweighed the benefits. Typically, the type I macroporous mesh tapes have very rapid tissue ingrowth and can sometimes be difficult to identify, especially if placed by other surgeons. In our experience with repeat TVT slings, we placed the TVT directly over the previously placed sling and have not seen any complications or sequelae from this, such as mesh erosion; therefore, we continued the same practice in this study.

Based on our limited experience, the TVT sling may be a viable option for failed TOT. This study is limited by its small sample size and follow-up time frame. In addition, repeat incontinence procedures have the potential risk of increased complications and should be performed carefully. Additional studies with long-term follow-up are needed to provide the best option for management of failed TOT.

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