

Repeat midurethral sling treatment for prior midurethral sling failure

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Abstract We reviewed articles in the PubMed database which describe the results and outcome of a repeat midurethral synthetic sling (MUS), known as tension-free vaginal tape (TVT), or transobturator tape/tension-free vaginal tape obturator for prior MUS failure in patients who presented with persistent or recurrent stress urinary incontinence (SUI). We combined or separated the keywords “TVT,” “failure,” “repeat TVT,” and “recurrent/persistent SUI.” The search was limited by publication data from 2000 to 2010, humans, female, and English text. A repeat TVT procedure treating prior TVT failure showed success rates ranging from 70% to 90%. The outcomes showed no significant differences between a repeat retropubic route or transobturator route. A repeat MUS procedure for persistent or recurrent stress urinary incontinence is a reliable option for patients with prior MUS failure.

Keywords Midurethral sling · Repeat TVT · TVT-O · Recurrent/persistent SUI · Failure

Synopsis: Repeat midurethral sling treating recurrent or persistent stress urine incontinence reveals a good outcome.

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Background

A midurethral synthetic sling (MUS) procedure, known as tension-free vaginal tape (TVT), tension-free vaginal tape obturator (TVT-O), transobturator tape (TOT), and intra-vaginal slingplasty (IVS), is considered the preferred effective treatment for female stress urinary incontinence (SUI). The minimally invasive method well known as TVT was first reported by Ulmsten [1] and now includes the retropubic route and transobturator route (TVT-O or TOT). It has shown a high success rate ranging from 80% to 95% in more than 5 years of follow-up [2–5]. However, as many as 5–20% of patients experience failed sling treatment. Recently, several possible salvage options have been published, including pelvic floor rehabilitation, placement of an artificial urethral sphincter [6, 7], periurethral injection of bulking agents [7], colposuspension [8, 9], readjustment (placation, shortening, or retensioning) of previously implanted tape [10–13], and a repeat MUS procedure (TVT/TVT-O/TOT) [14–22]. The MUS procedure has been reported to be successful in treating recurrent/persistent SUI no matter which type of procedure had failed previously.

SUI failure after any prior sling procedure is defined as persistent SUI (leakage within 6 weeks of a previous MUS procedure) and recurrent SUI (leakage more than 6 weeks after initial success of first MUS) [17]. The etiology of persistent or recurrent SUI after surgery is unclear, but it may be related to improper adjustment of the tape intraoperatively, failure to fix the sling into place, or incorrect diagnosis of the form of incontinence [15, 16, 20]. Palva and Nilsson [21] grouped the reasons for a failed MUS procedure as follows: inadequate tape material, inadequate surgical technique, patient’s medical condition, and unrecognized reasons. The mechanisms of the continence action

of the MUS procedure (TVT/TVT-O) are the same, based on the integral theory by Ulmsten in 1993 [1]. A retropubic midurethral sling, also called TVT, was first introduced by Ulmsten. TVT acted as the pubourethral ligament (PUL) at an acute angle which provided continence by urethral kinking when coughing. Transobturator sling procedures, such as TOT described by Delorme [4] and TVT-O described by de Leval [5], also mimic the PUL but at less of an angle, acting as a hammock to provide continence by intermittent compression on the midurethra during increasing intra-abdominal pressure, consistent with the De Lancey theory [23].

Methods

We conducted combined or separate searches with the keywords: “TVT,” “failure,” “repeat TVT,” and “recurrent persistent SUI” and reviewed the published literature solely on repeat MUS procedures to treat patients with failed prior MUS procedures. Medline and Science Citation Index databases were searched on PubMed to identify articles published between 2000 and 2010. Searches were also limited to humans, female patients, and English evidence-based papers.

Articles were focused on prior MUS procedure failure (TVT, TVT-O, TOT, and IVS) then treatment with a repeat MUS procedure. Primary references were also searched for secondary references.

Eight evidence-based research papers met our search criteria, two case reports [10, 20], and five original articles [14–17, 21, 22]. Clinical characteristics of the reviewed papers are summarized in the Table 1. Previous surgery indicated a first or multiple MUS procedures for SUI, which may have been combined with pelvic reconstructive surgery. Repeat surgery indicated repeat MUS using TVT, TVT-O, or TOT to treat recurrent or persistent SUI. Repeat MUS procedures in the reviewed papers could be combined with pelvic reconstructive surgery.

Findings

TVT has been shown to have excellent cure rates for SUI caused by urethral hypermobility (UH), intrinsic sphincter deficiency (ISD), and recurrent incontinence after retropubic urethropexy [24–26]. TVT-O/TOT has also shown excellent cure rates for SUI caused by UH and recurrent incontinence after retropubic urethropexy. These procedures have been performed for more than 20 years, with reported success rates over 90% in long-term follow-up. Various salvage methods have also shown good outcomes for MUS failure. However, there are limitations in papers reporting

on repeat MUS (TVT, TVT-O, or TOT) after a prior MUS failure. It might be interesting to understand how repeat MUS (TVT/TVT-O/TOT) can be used to treat prior MUS failure. It really does not add anything to the paper and should not be used in the “**Findings**” paragraph. It would be better in the “**Background**” paragraph. Since you already stated the purpose of this paper several times, you really do not need the sentence.

Moore et al. [15] reported five patients with a diagnosis of SUI caused both by ISD (maximum urethral closure pressure <20 cmH₂O and Valsalva leak point <65 cmH₂O) and UH (cotton swab test $>30^\circ$). Their five patients had persistent SUI after a primary TOT procedure. Postoperatively, all patients with urodynamic testing still showed evidence of ISD and were treated successfully with repeat TVT without removal of the TOT sling from the prior procedure. Moore et al. [15] reported just five patients and concluded the TOT sling did not provide a large enough angle of support or enough urethral kinking to provide continence in patients with ISD. Therefore, a TVT sling was a viable option for a prior failed TOT [14]. Villet et al. [10] reported three patients with recurrent or persistent SUI after a prior TVT procedure. The position of the mesh from the first procedure was very loose in one patient, was not identified in a second patient, and was in a relatively good position and state of tension in the third patient. Tsivian et al. [16] reported that failures in 12 MUS procedures (TVT 9 cases, TOT 1 case, and IVS 2 cases) were at least in part because of a technical error (tape position too loose). They also reported that the problem of how tightly the sling should be placed beneath the urethra remained unresolved. This continues to be the long-standing “Achilles heel” of anti-incontinence surgery [16]. Paick et al. [11] reported two cases of recurrent incontinence treated by shortening the tape with clamp application, which may have indicated that loose tape caused the TVT failure.

The proper intervention and management of MUS failure has varied for patients with persistent and recurrent SUI. Preoperative evaluation has included a comprehensive medical history, physical examination (e.g., stress test, Bonney and Q-tip test), neurological evaluation, urinalysis, urine culture, pad test, uroflowmetry, post-void residual urine measurement, voiding diary and complete urodynamic study, and even a cystoscopic examination [14–17]. Before a repeat MUS procedure, conservative treatment, such as pelvic floor exercises or periurethral collagen injections and tape readjustment, was provided in some studies [13–16]. Moore et al. [15] provided the option of pelvic floor exercises and collagen injections, but patients eventually returned to a repeat TVT surgical intervention when they had no improvement. Tsivian et al. [16] reported a patient with unsuccessful TOT tape readjustment (plication) who was treated successfully by a second TOT

Table 1 Characteristics of the reviewed researches

Study	Sample (n)	Age (years) or mean, and range or SD	Prior surgery	Repeat surgery	Time to repeat surgery (months) or mean, and range or SD	UD finding before repeat surgery	Outcomes/conclusions
Riachi et al. [19]	2	64	MMK urethropexy, allograft fascial sling, TVT	TVT (previous TVT tape was not identified)	8	Q-tip=40°, UD confirmed SUI	Remained continence on 13-month follow-up
		71	Autologous fascial sling, TVT	TVT (previous TVT tape was found)	9	UD confirmed SUI with ISD	SUI completely resolved on 6-month follow-up
Villet et al. [10]	2 of 3	54	TVT	TVT (previous TVT was not identified)	18	Patient gained 6 kg; positive stress test with urethral hypermobility	At 12 months follow-up, the patient is still continent
		73	Burch colpopexy, TVT	TVT (previous TVT tape was found)	8	No mention may be due to persistent SUI	At 4 months follow-up, the patient is continent
Eandi et al. [13]	10	65.1 (range 43–80)	TVT 5 cases, TOT 5 cases	All TVT	14 (3–32)	VLPP (cmH ₂ O) <60, 3 cases 60–100, 4 cases >100, 3 cases	Follow-up at a mean of 16 months (range 6–33); 7 patients (70%) reported complete or improved continence and quality of life, 3 patients failed; second TVT may be a viable option after failure of initial MUS procedure
Moore et al. [14]	5	66.3 (range 56–76)	TOT (initial TOT in 4 cases, and 1 with h/o failed Burch, combined pelvic reconstruction in 4 cases)	All TVT	3 (1–7)	Diagnosis of ISD for 5 patients (ISD, MUCP <20 cmH ₂ O or VLPP <65 cmH ₂ O)	All five patients successfully treated with repeat TVT; TVT may be more appropriate treating patients with ISD because TVT offered more acute retropubic angle
Tsivian et al. [15]	12	64.3 (range 47–80)	TVT 9, TOT 1, IVS 2	TVT 5, TOT 3, IVS 4	21.4 (1–48)	4 cases of VLPP <60 cmH ₂ O, 8 cases of mobile urethra	11 patients (91.7%) achieved continence after repeat MUS (mean follow-up of 23.2, range 14–44); the choice of MUS procedure is a matter of surgeon's preference; the timing of repeat MUS is no delay
Lee et al. [16]	29	54.1±10.8 (SD)	Retropubic route—TVT 17 Transobturator route—TOT 6, TVT-O 6	Retropubic route—TVT 13 Transobturator route—TOT 8, TVT-O 8	20.0±16.9	In patients with UD examination, increased VLPP (mean±SD, 55.4±22.6 cmH ₂ O) after initial MUS procedure (35.6±12.9)	Total cure rates: 22/29 (75.9%) at mean follow-up of 13 months; cure rates: retropubic (12/13, 92.3%) vs. transobturator (10/16, 62.5%) with <i>p</i> =0.0089; transobturator approach: TVT-O (6/8, 75%) vs. TOT (4/8, 50%) with significant <i>p</i> =0.048
Palva and Nilsson [20]	20	61±9 (SD)	All TVT (tape material—Teflon 3, Mersilene 5, polypropylene 13)	All TVT (Gynecare, J&J)	57±32	Stress test (−) in 15 patients, pad test was negative in 13 patients; both stress and pad test (−) in 11 patients	5 years follow-up of repeat TVT revealed a 75% (15/20) objective cure or improvement rate; inadequate tape material, inadequate surgical technique, patients' medical condition, and unrecognized reasons may cause the failed primary TVT
Van Baelen and Delaere [22]	21	56 (range 33–77)	TVT 5, TOT 16	All TOT	18	Urodynamic study performed, but no mention of the report	Failure rate was 30% in repeat TOT surgery; the transobturator approach seems to show poorer outcomes than the retropubic approach in repeat sling surgery

MMK Marshall–Marchetti–Krantz urethropexy, UD urodynamic study, VLPP Valsalva leak point pressure, ISD intrinsic sphincter deficiency, MUCP maximum urethral closure pressure, MUS midurethral sling, TVT tension-free vaginal tape, TOT transobturator tape, IVS intravaginal slingplasty

intervention. Riachi et al. [20] reported two patients treated by a repeat TTV sling. The tape from the previous procedure was not identified in one patient, but in the other, the mesh was partially visualized in a good position and was not removed. The management and the findings were the same as in Villet's study [10]. Tsivian et al. [16] suggested adjustment of the tape from a prior procedure if it is in good condition and a good location. However, in view of their limited experience with readjustment, they currently prefer a repeat MUS procedure. The choice of procedure (TTV, TTV-O/TOT, or IVS) is the surgeon's preference, and surgery need not be delayed unless there is local inflammation [16].

A repeat TTV sling for the treatment of a failed primary TTV was first reported by Riachi et al. [20]. Since then, a case series study and small population outcome studies have been reported worldwide with success rates of 70–92% for a repeat tape procedure [14–17, 21, 22]. In a larger study at two Korean centers [17], 29 of 31 female patients with a repeat MUS, 13 with TTV and 16 with TTV-O/TOT, were followed. The cure and improvement rates were 75.9% (22/29 patients) and 6.9% (2/29), respectively. The cure rates in the repeat retropubic vs. transobturator route were 92.3% (12/13 patients) vs. 62.5% (10/16 patients) with a *p* value of 0.089 (>0.05), although the rate for the retropubic route was higher than that of the transobturator route. Moreover, they found out that in the repeat transobturator route (*n*=16), TTV-O (75%, 6/8 patients) were more effective than TOT (50%, 4/8 patients) with a *p* value of 0.048. Van Baelen and Delaere [22] reported 21 patients (prior failed TTV, 5 cases and TOT, 16 cases) with a success rate of 70% for a repeat TOT procedure and concluded that the transobturator approach had poorer outcomes than the retropubic approach in repeat sling surgery.

In the reviewed studies, a repeat TTV procedure for prior TTV failure showed success rates ranging from 70% to 90%. The outcomes were not significantly different between a repeat retropubic route (TTV) or transobturator route (TTV-O/TOT). A repeat MUS procedure for persistent or recurrent stress urinary incontinence is a reliable option for patients with prior MUS failure.

Conclusions

The cure rates for treating recurrent or persistent SUI after a repeat MUS show good outcomes, proving this is a viable procedure. The choice of repeat MUS procedure might depend on the type of SUI determined after a thorough preoperative examination. The retropubic sling might be better than the transobturator approach in repeat MUS surgery. Meanwhile, there is no need to delay

repeat TTV for patients with a prior failed MUS, and it is unnecessary to identify and remove the tape used in previous procedures.

Declaration of interest The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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