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Original Article

Comparison between tension-free vaginal tape and transobturator tape in treating stress urinary incontinence after vaginal mesh surgery

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ABSTRACT

Objective: A midurethral sling is the gold standard surgical treatment for stress urinary incontinence (SUI), however a lower success rate has been reported in the treatment of SUI after pelvic organ prolapse surgery. The aim of this study was to compare the success rates, quality of life, and complications with treatment using tension-free vaginal tape (TVT) and transobturator tape (TOT) in these patients.

Materials and Methods: We enrolled patients who had symptomatic SUI after anterior vaginal mesh repair who underwent either TVT or TOT surgery. Successfully cure was defined as the absence of urinary leakage in a stress test during filling cystometry, and a negative cough test. Quality of life was evaluated using the short form of the Urinary Distress Inventory (UDI-6) and Incontinence Impact Questionnaire (IIQ-7).

Results: We included 50 patients in the TOT group and 37 patients in the TVT group, with a median follow-up of 18.5 months. The TVT group had a significantly higher success rate than the TOT group (88% vs. 60%, $p = 0.036$), while there was no statistically significant difference in de novo detrusor overactivity (30% vs. 9%, $p = 0.090$). There was also no significant difference in postoperative quality of life (UDI-6, 5.9 ± 7.9 vs. 5.0 ± 5.9, $p = 0.639$; IIQ-7, 5.2 ± 12.5 vs. 4.3 ± 9.7, $p = 0.766$). The TVT group had a longer operative time ($p < 0.001$) and hospital stay ($p = 0.004$), however the TOT group required more repeat surgeries for recurrent SUI ($p = 0.045$).

Conclusion: Retropubic TVT is a more effective surgical option than TOT in women with SUI after vaginal mesh repair.

Introduction

Stress urinary incontinence (SUI) is a common disorder that occurs in 15–80% of women worldwide [1]. The gold standard of surgical treatment is a midurethral sling, with long-term cure rates of 77–90% [2]. Numerous studies have compared retropubic tension-free vaginal tape (TVT) and transobturator tape (TOT) in the treatment of urinary stress incontinence. Review articles have also compared treatment in specific patient groups including the elderly, obese, and those with intrinsic sphincter deficiency or mixed urinary incontinence [3]. In addition, meta-analyses have shown no significantly favorable outcomes between TOT and TVT, and suggested that the choice of surgery should be based on adverse effects [4]. However, there is currently no consensus on the procedure of choice in treating patients with de novo or persistent incontinence who have undergone vaginal mesh surgery.

Prolapse is a pelvic floor disorder which commonly coexists with SUI and reportedly affects up to one in five women [5]. The incidence rate of de novo SUI after prolapse repair has been reported to range from 12 to 35% [6,7]. For these patients, peri-urethral tissue damage or denervation after mesh inlay may lead to decreased maximal urethral closure pressure, and subsequently urethral incompetence or even intrinsic sphincter deficiency. In addition, mesh implanted below the bladder neck or proximal urethra may cause peri-urethral tissue fibrosis, leading to a less mobile urethra. These findings suggest that a midurethral sling may be less effective in the treatment of SUI. As a result, de novo or persistent SUI after vaginal mesh repair can be considered to be a specific type of incontinence, and it is possible that the surgical

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outcomes of TVT and TOT treatment may be different in such patients. A prospective study of 100 women showed that women with previous transvaginal mesh repair had a significantly lower success rate of TOT surgery compared to those with pure SUI who had not previously undergone prolapse repair surgery [8]. The choice of anti-incontinence procedure for patients with de novo and persistent SUI after mesh repair remains controversial. The primary aim of this study was to evaluate the effectiveness of TVT and TOT in such patients, and the secondary aim was to assess the quality of life and peri- or post-operative complications.

Materials and methods

This retrospective study was conducted at a tertiary medical center from September 2010 to August 2015. Eligible patients were women who had undergone anterior mesh repair and reported symptomatic SUI postoperatively. The medical records of the patients who underwent either TVT or TOT for post-mesh SUI were reviewed in detail. All surgeries were performed by two experienced urogynaecologists in our hospital. The exclusion criteria included previous urethral surgery, pelvic irradiation, and planning pregnancy. The hospital's Institutional Research Board approved the study protocol [10MMHIS105].

Baseline assessments included demographic data, medical history, 1-h pad test, and multichannel urodynamic study (UD-2000, Medical Measurement System, Enschede, Netherlands). The quality of life of the patients was evaluated via questionnaires, which included the short form of the Urinary Distress Inventory (UDI-6), and Incontinence Impact Questionnaire (IIQ-7) [9], both of which assessed urinary incontinence-related symptom distress and quality of life. In both instruments, a higher score indicated worse symptoms and poorer quality of life. Postoperative follow-up was scheduled at 1 week, 1, 3, 6, and 12 months, and yearly thereafter. Incontinence was defined as being successfully cured by the absence of urinary leakage in a stress test during filling cystometry, or a negative cough test. Data on blood loss, operative time, hospital stay and further anti-incontinence surgeries were recorded. Surgical records, peri- and post-operative complications were also reviewed.

The terminology used in this paper conforms to the standardized terminology for female pelvic floor disorders of the IUGA/ICS joint report [10]. Discrete variables were analyzed using the chi-square test or Fisher's exact test, and continuous variables were analyzed using the Student's t-test or paired t test. All analyses were performed using the Statistical Package for the Social Sciences (SPSS) software version 17.0 for Windows (SPSS Inc., Chicago, IL, USA). A p value of <0.05 was taken to indicate statistical significance.

Results

A total of 87 patients were included in the analysis, including 50 patients in the TOT group and 37 patients in TVT group. The median follow-up period was 18.5 months. The baseline demographic and clinical characteristics were similar between the two groups except for age, intrinsic sphincter deficiency and IIQ-7 score (Table 1). The mean age was significantly older in the TVT group (68.5 ± 9.1 vs. 62.2 ± 10.3 years, $p = 0.004$), and the TVT group had more patients with intrinsic sphincter deficiency (38% vs. 18%, $p = 0.043$) and higher IIQ-7 scores (32.6 ± 12.6 vs. 16.3 ± 17.4, $p = 0.008$).

The postoperative quality of life of both groups was not significantly different (UDI-6: 5.9 ± 7.9 vs. 5.0 ± 5.9, $p = 0.639$; IIQ-7: 5.2 ± 12.5 vs. 4.3 ± 9.7, $p = 0.776$), however the success rate was significant higher in the TVT group (88% vs. 60%, $p = 0.036$). De novo detrusor overactivity was higher in the TVT group (27% vs. 9%, $p = 0.090$), but not significantly (Table 2).

Table 1
Demographic and clinical characteristics at baseline.

Characteristic	TOT group (n = 50)	TVT group (n = 37)	p
Age, years	62.2 ± 10.3	68.5 ± 9.1	0.004
Parity, *n*	3.7 ± 1.4	3.6 ± 1.5	0.734
Menopause, *n* (%)	50 (100)	37 (100)	NA
Concomitant detrusor overactivity, *n* (%)	2 (4)	1 (3)	>0.999
Concomitant hysterectomy, *n* (%)	0 (0)	1 (3)	0.425
Body mass index, kg/m2	25.3 ± 3.0	24.9 ± 3.3	0.595
MUCP, cmH2O	49.2 ± 27.1	46.1 ± 21.7	0.624
Intrinsic sphincter deficiency[a], *n* (%) or VLPP≦60 cmH2O cmH2O	9 (18)	14 (38)	0.043
UDI-6	19.3 ± 16.3	20.6 ± 14.7	0.811
IIQ-7	16.3 ± 17.4	32.6 ± 16.6	0.008
One-hour pad test (g)	48.2 ± 40	53.2 ± 44.8	0.586
<10 g, *n* (%)	5 (10)	0 (0)	0.127
10–50 g, *n* (%)	25 (50)	22 (59)	
>50 g, *n* (%)	20 (40)	15 (41)	

Descriptive data are presented as mean ± standard deviation or *n* (%).
NA: not applicable, MUCP: maximal urethral closure pressure, UDI-6: the short form of the Urinary Distress Inventory, IIQ-7: the short form of the Incontinence Impact Questionnaire.
[a] Intrinsic sphincter deficiency: maximal urethral closure pressure <20 cmH2O, or Valsalva leak point pressure <60 cmH2O.

None of the patients in either group had peri-operative complications. However, the patients in TVT group had a higher rate of urinary tract infections (6% vs. 0%, $p = 0.140$) and voiding dysfunction (18% vs. 9%, $p = 0.285$), although without significance (Table 3). Compared with the TOT group, the patients in the TVT group had more prolonged catheterization with borderline statistical significance (9% vs. 0%, $p = 0.051$). In addition, the patients who received TVT had a longer operative time (47.4 ± 14.4 vs. 26.0 ± 11.4 min, $p < 0.001$) and hospital stay (3.9 ± 1.7 days vs. 2.8 ± 1.8 days, $p = 0.004$). During follow-up, four patients in the TOT group underwent subsequent treatment for recurrent urinary incontinence compared to no patients in the TVT group (9% vs. 0%, $p = 0.045$) (Table 4).

Discussion

In the present study, TVT had a higher success rate in the women with SUI after vaginal mesh repair, while the TOT group had more recurrent SUI as well as a higher risk of further anti-incontinence treatment. However, there was no significant difference in postoperative quality of life and in terms of adverse events.

Table 2
Quality of life and objective surgical outcomes of the patients undergoing transobturator (TOT) or retropubic midurethral sling (TVT) therapy.

Outcome	TOT group (n = 43)	TVT group (n = 33)	p
Quality of life			
UDI-6	5.9 ± 7.9	5.0 ± 5.9	0.639
IIQ-7	5.2 ± 12.5	4.3 ± 9.7	0.766
Objective outcome			
Success rate, *n* (%)	26 (60)	29 (88)	0.036
De novo detrusor overactivity, *n* (%)	4 (9)	9 (27)	0.090

Values are presented as mean ± standard deviation or *n* (%).
UDI-6: the short form of the Urinary Distress Inventory, IIQ-7: the short form of the Incontinence Impact Questionnaire.