

Original Article

## Tension-Free Vaginal Tape versus Transobturator Tape for Treatment of Female Stress Urinary Incontinence

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### ABSTRACT

**Objectives:** The transobturator tape (TOT) is based on a similar principle as the tension-free vaginal tape (TVT), but introduced through the obturator foramen. The aim of this study was to compare these slings as surgical procedures for the treatment of stress urinary incontinence (SUI) in women.

**Patients and Methods:** This is a retrospective case-control study including female patients with SUI, either due to urethral hypermobility or intrinsic sphincter deficiency. Thirty patients were treated with TVT (group 1) and 30 were treated with TOT (group 2). The parameters studied were: pre-operative clinical data, operative data and surgical outcome.

**Results:** The post-operative complications in group 1 consisted of bladder perforation in one patient (3.3%), urinary retention in 3 (10%) and de novo urgency in 3 (10%). The post-operative complications in group 2 consisted of vaginal exposure in 2 patients (6.7%), de novo urgency in 2 (6.7%) and transient urinary retention in one (3.3%). In the TVT group, objective cure was achieved in 27/30 patients (90%), while 3 patients (10%) reported subjective cure; failure was not encountered. In the TOT group, objective cure was achieved in 24/30 patients (80%) and subjective cure in 4 patients (13.3%); and it failed in 2 patients (6.7%).

**Conclusion:** TVT and TOT are effective procedures for the treatment of female SUI, with comparable results regarding operative time, hospital stay and the risk of complications.

**Key Words :** Stress urinary incontinence, treatment and outcome

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**Article Info:** Date received : 9/4/2009

Date accepted (after revision): 27/12/2009

### INTRODUCTION

Stress urinary incontinence (SUI) is distressing problem especially in the elderly as it has a great impact on the quality of life. Physically, urinary incontinence is associated with urinary tract infection, skin rashes and pressure sores. Psychologically, the patients often suffer from embarrassment, depression and isolation. Economically, the monetary costs of managing urinary incontinence in the USA have been estimated at about \$10.3 billion annually<sup>1</sup>.

Urodynamic SUI, defined as the involuntary leakage of urine during increased abdominal pressure in the absence of a detrusor contraction, is diagnosed in more than half of women presenting to hospital with urinary incontinence<sup>2</sup>.

The tension-free vaginal tape (TVT) procedure is one of the most popular modalities for treatment of SUI. A polypropylene tape is

inserted suburethrally under local anesthesia with sedation. The tape is thought to work by providing a pubourethral "neoligament." Increased intra-abdominal pressure results in a kink at the point of fixation, which prevents urine flow. Data from three early case studies suggested objective cure rates of 84-100%, with few complications<sup>3-5</sup>. Bladder perforation is the most frequent complication; the incidence is higher in patients who have undergone a previous retropubic procedure. Hematomas are generally uncommon. The complication of concern among all prosthetic slings is urethral erosion. Urinary tract infection may occur, and sterile urine is essential before surgery. Voiding dysfunction and dyspareunia have been reported, which in most cases resolve within 3 months of surgery<sup>6</sup>.

The transobturator tape (TOT) is based on a similar principle as the TVT but applies an innovative approach. Unlike the traditional TVT or sling that exits through the anterior abdominal wall, the TOT is introduced through the obturator foramen<sup>7</sup>. The TOT approach avoids almost all major structures in the pelvic cavity. The only potential area of concern is the one around the obturator vessels. However, the location of these vessels is on the opposite side of where the needles are placed. Therefore, with proper placement it is extremely unlikely that injury to these vessels will occur<sup>8</sup>.

The aim of this study was to compare TVT and TOT as surgical procedures for the treatment of SUI in women.

## **PATIENTS AND METHODS**

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It is a retrospective case-control study of female patients with SUI due to urethral hypermobility or intrinsic sphincter deficiency treated with either TVT (30 patients, group 1) or TOT (30 patients, group 2) in the Urology Department, Suez Canal University, from August 2006 to August 2007.

The following parameters were studied:

- Pre-operative clinical data: Age, parity, complaint, previous operations, type of incontinence, results of urological, neurological, and gynecological examinations, stress test (cough provocation test) in supine and standing positions with a bladder volume of about 300 cc and Q-tip test to assess urethral hypermobility (>30° indicated urethral hypermobility, <30° no urethral hypermobility).
- Pre-operative investigations: Urine analysis, serum-creatinine, complete blood picture, and urodynamic studies.
- Operative data: Mean duration of operation, intra-operative complications, post-operative complications and hospital stay.
- Clinical outcome: Objective cure was defined as no leakage of urine while performing the cough provocation test with at least 300 ml of saline solution in the bladder. Subjective cure was defined as no urine loss during stress as reported by the patient. Failure was defined as urinary incontinence being still considered a social or hygienic problem.

The data at one year follow-up according to the patients' medical records were analyzed. The data analysis was based on estimating the percentage of discrete data. Statistical analysis was carried out using the appropriate statistical tests. P value <0.05 was considered statistically significant.

## **RESULTS**

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There were no significant differences in age, parity, history of pelvic surgery, or type of stress urinary incontinence among the studied patients (Table 1).

Mean operative time and hospital stay were significantly shorter in the TOT group (Table 2). There were no statistically significant differences regarding perioperative complications. Vaginal exposure in 2 patients

TVT VERSUS TOT IN FEMALE SUI

**Table 1:** Demographic data.

	Group 1	Group 2	p-value
Age (mean ± SD, years)	52.6 ± 10.3	51.95 ± 10.7	0.81*
Parity (mean ± SD)	2.5 ± 1.1	2.05 ± 1.3	0.13*
	9(30)		
<b>Previous pelvic surgery N (%):</b>	6 (20)	12(40)	0.59 <sup>c</sup>
Hysterectomy	3 (10)	9 (30)	
Anti-incontinence surgery	-	3 (10)	
Cystocele repair		3 (10)	
<b>Type of SUI N (%)</b>	18 (60)		
Pure SUI	12 (40)	15 (50)	0.61 <sup>c</sup>
Mixed SUI		15 (50)	
<b>Urethral hypermobility N (%):</b>			
Q-tip test >30 degrees	24(80)	24(80)	0.75 <sup>c</sup>
Q-tip test < 30 degrees	6 (20)	6 (20)	
<b>VLPP N (%):</b>			
< 60 cm H <sub>2</sub> O	6 (20)	6 (20)	0.75 <sup>c</sup>
> 60 cm H <sub>2</sub> O	24 (80)	24 (80)	

\* t-test    c Chi-square test

VLPP – Valsalva leak point pressure

**Table 2:** Operative data and perioperative complications.

	Group 1	Group 2	p-value
<b>Operative time</b> (mean ± SD, minutes)	26.3 ± 6.46	12.3 ± 2.6	< 0.0001*
<b>Hospital stay</b> (mean ± SD, hours)	31.2 ± 5.7	6 ± 0.6	< 0.0001*
<b>Major postoperative complications N (%)</b>			
Bladder perforation	1 (3.3)	0	1 <sup>f</sup>
Vaginal exposure	0	2 (6.7)	0.49 <sup>f</sup>
<b>Minor postoperative complications N (%)</b>			
De novo urgency	3 (10)	2 (6.7)	1 <sup>f</sup>
Urinary retention <week	3 (10)	1 (3.3)	0.61 <sup>f</sup>

\* t-test    f Fisher's exact test

**Table 3:** Surgical outcome at one year follow-up.

	Group 1	Group 2	p-value
<b>Objective cure N(%)</b>	27 (90)	24 (80)	0.31 <sup>c</sup>
<b>Subjective cure N (%)</b>	3 (10)	4 (13.3)	
<b>Failure N(%)</b>	0 (0)	2 (6.7)	

c Chi-square

in the TOT group was managed with removal of the exposed tape and placement of a new tape. Both patients were continent post-operatively. Postoperative urinary retention in 4 patients resolved after urethral dilatation and the use of intermittent urethral catheterization until no significant post-void residual

urine was seen. De novo urgency was treated with anticholinergic drugs.

Objective and subjective cure and failure rates are shown in Table 3. There were no statistically significant differences between the groups (Table 3).

## DISCUSSION

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SUI is a significant problem affecting 20% of women above 45 years of age<sup>9</sup>. In our study the mean operative time in the TVT group was 26.3 minutes and mean hospital stay was 31.2 hours. These results are comparable to those reported by Kim et al. (mean operative time 23.4 minutes, mean hospital stay 1.8 days)<sup>10</sup>. The mean operative time in the TOT group was  $12.3 \pm 2.6$  minutes, and mean hospital stay was  $6 \pm 0.6$  hours. In a study by Sivanesan et al.<sup>11</sup> the mean operative time for TOT was 14.7 minutes and nearly 80% of patients were discharged on the day of surgery. The remaining patients were hospitalized because of unsatisfactory voiding or post-operative symptoms of vomiting or pain, but none of the patients had complete urinary retention.

In our study the mean operative time and hospital stay were significantly shorter in the TOT compared with the TVT group. This confirms the results of Falkert and Seelbach-Göbel<sup>12</sup> who found that the mean operative time and hospital stay were significantly less in TOT compared with TVT.

The post-operative complications in our TVT group were favorably comparable to those of Abouassaly et al. who conducted a multi-institutional review of patients subjected to a TVT procedure and encountered a larger number of early and late complications which also included blood loss >500 ml, pelvic pain and intravaginal tape erosion<sup>13</sup>. These complications were not encountered in our study.

Post-operative complications were encountered in 5 patients in the TOT group, two had vaginal exposure and three had voiding dysfunction. In both patients with vaginal exposure removal of the exposed tape and placement of a new one was performed. A comparative study carried out by Yamada et al. demonstrated a significantly higher extrusion rate using the ObTape™ sling vs the Monarc™ sling (13.4% vs 0%,  $p =$

0.004)<sup>14</sup>. Microstructural differences in the synthetic sling material may account for differences in extrusion rates. Barry et al. conducted a prospective study involving 83 women with urodynamic stress incontinence who underwent insertion of the Monarc transobturator tape. Post-operatively, four women (4.8%) had objective voiding dysfunction, but the authors concluded that this value was not statistically significant compared to the pre-operative values<sup>15</sup>.

Falkert and Seelbach-Göbel reported in their comparative study between TVT and TOT that there were no major peri-operative complications in either group, although complicated intra-operative hemorrhage (hemoglobin decrease >1.5 g/dl) was slightly commoner in the TVT group. Urinary retention (defined as post-void residual volume >100 ml) occurred in 23% of the TVT group and in 2% of the TOT group. Urinary infections were also more frequent in the TVT group<sup>12</sup>.

Although not encountered in our study, cases of bladder perforation, adductor muscle abscess formation, urethral injury and erosion, post-operative urinary retention, and bladder erosion have been reported<sup>16,17</sup>.

The objective cure rate in our TVT group was similar to that reported by Paick et al. (95.8% at a mean follow-up of 10.9 months)<sup>18</sup>. Less favorable cure rates were reported by Nilsson et al., probably due to the much longer follow-up period of 7 years (objective and subjective cure rates of 81% at a mean follow-up of 91 months)<sup>19</sup>. The objective cure rate in our TOT group is comparable to the results reported by Delorme et al. (cure rate 90.6%, improvement 9.4%)<sup>20</sup>.

In our study there was no statistically significant difference in surgical outcomes between the TOT and TVT groups. The same result was reported by Dietz et al.<sup>21</sup>.

In conclusion; both TVT and TOT are effective procedures for the treatment of

female SUI, and were comparable regarding the operative time, hospital stay, and the risk of complications related to the different path of the tape.

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