Treatment success of transobturator tape compared with tension free vaginal tape for stress urinary incontinence at 24 months: A randomized controlled trial

Mahmoud Fathy Hassan1*, Osama El-Tohamy1, Mostafa Kamel2

1Faculty of Medicine, Ain-Shams University, Cairo, Egypt
2Faculty of Medicine, Zagazig University, Zagazig, Egypt
Email: *mahmoudfathy74@yahoo.com

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ABSTRACT

Objective: To compare the long term efficacy of transobturator Tape (TOT) with tension free vaginal tape (TVT) at 24 months postoperatively. Patients & Methods: 160 women with stress urinary incontinence (SUI) were randomly allocated to either TVT or TOT procedures and reviewed at 24 months after surgery. The primary outcomes were objective cure (a negative cough stress test, and a negative 1-hour pad test), and subjective cure (defined as “very much better” or “much better” improvement in the Patient Global Impression of Improvement scale). The secondary outcomes included incontinence related quality of life (using Urogenital Distress Inventory Questionnaire, and Incontinence Impact Questionnaire), and complications. Results: No statistical difference was reported in objective and subjective cure rates between both groups. Objective cure rate was 85.6% and 81.6% in the TOT and TVT groups respectively (P = 0.55). Subjective cure rate in the TOT and TVT groups were 87% and 83% respectively (P = 0.68). There were no significant differences in postoperative complications and incontinence related quality of life. However, the operating time was significantly shorter in the TOT group compared with the TVT group (22.6 ± 3.9, 27.1 ± 3; respectively, P < 0.001). Conclusion: TOT and TVT procedures were equally efficient and safe for treatment of SUI, with maintenance of high objective and subjective cure rates for 24 months. Longer follow-up is needed to confirm these results.

KEYWORDS

Urinary Incontinence; Stress; Suburethral Slings; TOT; TVT

1. INTRODUCTION

The International Continence Society defines stress urinary incontinence (SUI) as the complaint of involuntary leakage during effort or exertion or during coughing or sneezing [1]. Stress urinary incontinence affects 4% to 35% of women, and the prevalence increases with age. Ten percent of middle-aged women report SUI and at least one-third report leakage at least weekly [2]. Stress urinary incontinence can be treated with both non-surgical and surgical treatments. However, conservative treatments for SUI are often of partial or time limited success, and surgery becomes the only solution. More than 200 surgical procedures are described for the treatment of SUI. Minimally invasive synthetic slings have now become the most common procedure performed for SUI [3]. A midurethral sling is now considered the gold standard for SUI treatment with over 103,000 performed annually [4]. Since it was introduced by Ulmsten in 1996, the retropubic tension-free vaginal tape (TVT) procedure has become the surgery of choice for treating SUI [3]. In spite of its proven efficacy, relative safety and widespread adoption, some authors have expressed concern because of reports of rare but serious and, in some cases, life-threatening complications from this procedure. The blind retropubic passage of trocar from the vagina to the abdomen is unique to the TVT and is associated with a 3% - 9% bladder perforation rate.
and, on rare occasion, bowel and major vascular damag-
es [5]. In 2001, a surgical technique similar to TVT but
that reduced the complication rate by replacing the re-
tropubic route with the transobturator route was proposed.
Delorme was the first to describe the transobturator tape
(TOT) midurethral sling [6]. The transobturator tech-
nique has been advocated because it avoids this retropub-
icle passage and, at least in theory, should reduce the
risk of bladder, bowel, and iliac vessel injury [4].

The majority of studies comparing TVT with the TOT
had limited follow-up, reported mainly subjective out-
comes, and concluded that the transobturator approach is
associated with decreased risk of complications, but there
is currently no evidence to suggest that one approach
results have superior objective or subjective outcomes.
The aim of this study was to evaluate the efficacy and
safety of TOT compared with TVT in terms of objective
and subjective cure rate at 24 months postoperatively.

2. PATIENTS AND METHODS

The present study was conducted at the Department of
Obstetrics and Gynecology of a large Governmental Mil-
itary Hospital, Dhahran, Saudi Arabia, from January 2009
till May 2013. The study protocol was approved by the
Hospital Research and Ethical Committee, and all pa-
tients provided an informed written consent for partici-
pation. All the interventions in this trial were conducted
in compliance with the Declaration of Helsinki. All meth-
ods and definitions conform to the standards proposed
by the International Continence Society [1].

Women were eligible for inclusion if they: 1) were
visualized leaking urine from the urethra with cough
stress test, 2) demonstrated urodynamic SUI on multi-
channel urodynamic testing, and 3) were suitable for ei-
ther the TVT or TOT sling procedure. Subjects were
excluded if they: 1) demonstrated detrusor over-activity
or intrinsic sphincter defect on urodynamic testing, 2)
had a post-void residual volume greater than 100 mL, 3)
had previous incontinence surgery, 4) were requiring con-
comitant surgery for pelvic organ prolapse, 5) desired
future childbearing, 6) had inguinal lymphadenopathy or
mass, 7) had a history of a bleeding tendency or were
currently on anticoagulation therapy, 8) had a current
genitourinary fistula or urethral diverticulum, 9) had Alz-
heimer’s disease, Parkinsonism, or progressive neuro-
logical disease as multiple sclerosis, 10) had a contrain-
dication for surgery, or 11) would be unavailable for
follow-up.

At baseline, all participants underwent a standardized
evaluation, which included urogynecologic history, cough
stress test, post-void residual volume and urodynamic
evaluation including a filling cystometry, abdominal leak
point pressure determination, urethral pressure profile-
metry, and uroflowmetry study. All participants were
asked to complete the quality of life questionnaire in-
cluding incontinence-related quality of life questions
(Urogenital Distress Inventory [UDI-6], a six-item mea-
sure to assess symptoms of urinary incontinence, and In-
continence Impact Questionnaire (IIQ-7), a seven-item
measure to assess the impact of urinary incontinence on
quality of life [7]).

Women who fulfilled the appropriate criteria were in-
vited to participate in the study. One hundred sixty par-
ticipants were randomized with equal probability to TVT
(control group) or TOT (case group) procedure by com-
puter-generated allocation. The randomization list was
generated by the study statistician (using the online re-
search randomizer software
http://www.graphpad.com/quickcalcs/index.cfm) using
permuted block randomization with block sizes varying
from 4 to 8. Randomization was stratified by the surge-
obns. Group allocation was concealed in serially num-
bered, opaque, and sealed envelopes that were opened in
the operating room just before the surgical procedure.

All surgical procedures were executed by one of the
surgeons participating in the current study. Anesthesia
was either general or spinal, depending on the clinical
state and the choice of patients. The TVT procedure was
performed using the “bottom up” approach following the
technique described by the manufacturer (Gynecare, Eth-
icon Inc., Somerville, NJ, USA). The TOT procedure
was done with the Obtryx Halo midurethral sling system
(Boston Scientific, Natick, MA, USA) using the tech-
nique recommended by the manufacturer. For both pro-
cedures the slings were placed “tension-free.” All pa-
tients underwent intraoperative cystoscopy to assess for
lower urinary tract injury. After checking for any injury
of urinary bladder, a Foley catheter was inserted, and re-
moved on the first postoperative day.

All participants were invited for follow up in the Uro-
gynecology Clinic at 6 weeks, 6, 12, 18 and 24 months.
Outcomes were measured at 24 months after surgery.
Data were collected by an independent research nurse.
Objective evidence of SUI at 24 months after surgery
was obtained by combined negative cough stress test and
negative 1-hour pad test (if the pad weight gain was less
than 1 g after the one hour test period). Women under-
taking the pad test had retrograde bladder filling with
300 mL of sterile water and wore pre-weighed pads while
they undertook the physical activities recommended by
the International Continence Society [8]. Perioperative
complications were identified from the hospital and fol-
low-up charts. At the 24-month follow-up, women un-
derwent a urine-flow test to assess voiding dysfunction.
Subjective symptom assessment by questionnaire took
place 24 months after surgery. Patient global improve-
ment in the bladder function was assessed by the Patient
Global Impression of Improvement scale (PGI-I) [9]. It is a scale of seven items to describe how is the bladder condition after the treatment, compared to how it was before treatment. Subjective cure was defined as “very much better” or “much better” by the PGI-I scale. Additionally, all women were asked at 24 months to complete IIQ-7 and UDI-6 questionnaire [9]. Each measure produces a single score of 0 (no impact for IIQ-7, no distress for UDI-6) to 21 for IIQ-7 (maximum impact) and 18 for UDI-6 (maximum distress).

The required sample size was estimated by a priori analysis using the G*power3 program (Heinrich-Heine-Universität, Düsseldorf, Germany). Sample size calculations assumed an 80% success in the TVT group [10]. To detect a difference of approximately 20% between the two groups, assuming 80% power and a two-sided significance level of 0.05, a sample of 70 patients per group with complete follow-up would be required (total 140). Anticipating a 10% loss to follow-up and/or dropout rate over the period of the study, the total enrollment goal was 160.

Analyses were undertaken following the intention to treat principle: women were analyzed in the surgical group to which they were randomized. A single analysis was planned when all women had completed the 24 months follow-up. The Kolgomorov-Smirnov test was applied to check the deviation from Gaussian distribution. The median (range), mean (standard deviation), or number (%) was used to present the data according to distribution. Unpaired student t test was used for normally distributed continuous variables, while the non-normally distributed variables were compared by the Mann-Whitney U test. The Fisher exact test was used for analysis of categorical variables. Two tailed P value < 0.05 was considered statistically significant. Statistical analysis was accomplished by using the Statistical Package for Social Sciences, version 14.0 (SPSS Inc., Chicago, IL, USA).

3. RESULTS

The study recruited 238 women between January 2009 and May 2013. Figure 1 shows the patients flowchart. Seventy eight women withdrew before randomization and were not included in the analysis. One hundred sixty participants were randomized and allocated to surgery. One hundred fifty-three patients (95.6%) completed 24 months of follow-up. Baseline data were presented in Table 1. Mean age was 53.1 years for the TVT group and 51.6 for the TOT group. The median parity of both groups was 5. No statistical difference between the two groups was found in the BMI, the menopausal status, and the preoperative urodynamic parameters. Median IIQ-7 scores were 8 for the TVT group and 9 for the TOT group. Meanwhile, median UDI-6 scores were 8 for both groups with no statistical difference between both groups in both questionnaires.

Hospital data and intraoperative and postoperative complications were presented in Table 2. Operating time was significantly longer in the TVT group compared with the TOT group (27.1 ± 3, 22.6 ± 3.9; respectively, P < 0.001). Estimated blood loss, change in hematocrit, and length of hospital stay were similar between the two groups. There was no major perioperative complication. There were 3 bladder perforations in the TVT group and none in the TOT group. Meanwhile, there was one case of vaginal wall perforation in the TOT group and none in the TVT group. During long-term follow-up, recurrent urinary tract infection occurred in 10 (12.5%) patients in the TVT group and 7 (8.8%) patients in the TOT group (P = 0.61). Mesh erosion developed in one patient in the TOT group and was cured after 5 months by removing the part of the mesh ejected out and suturing the above mucosa. On the contrary, no case with mesh erosion was reported in the TVT group. Furthermore, No leg or obturator complications developed in either group during the perioperative period. Voiding dysfunction was not statistically different between the two study groups (P = 0.1).
Table 1. Clinical, demographic, and preoperative characteristics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>TVT N = 80</th>
<th>TOT N = 80</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>53.1 ± 8.1</td>
<td>51.6 ± 7.9</td>
<td>0.24†</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td>29.9 ± 5.5</td>
<td>30.4 ± 4.9</td>
<td>0.56*</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td>5 (2 - 8)</td>
<td>5 (2 - 9)</td>
<td>0.37†</td>
</tr>
<tr>
<td><strong>Menopausal status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenopausal</td>
<td>43 (53.8%)</td>
<td>48 (60%)</td>
<td>0.52‡</td>
</tr>
<tr>
<td>Postmenopausal with HRT</td>
<td>24 (30%)</td>
<td>21 (26.3%)</td>
<td>0.73†</td>
</tr>
<tr>
<td>Postmenopausal without HRT</td>
<td>13 (16.2%)</td>
<td>11 (13.7%)</td>
<td>0.83†</td>
</tr>
<tr>
<td><strong>IIQ-7</strong></td>
<td>8 (0 - 21)</td>
<td>9 (0 - 21)</td>
<td>0.76†</td>
</tr>
<tr>
<td><strong>UDI-6</strong></td>
<td>8 (0 - 18)</td>
<td>8 (0 - 18)</td>
<td>0.79†</td>
</tr>
<tr>
<td><strong>Preoperative urodynamic parameters:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum urine flow rate (mL/s)</td>
<td>29 ± 3.7</td>
<td>29.9 ± 4.5</td>
<td>0.18†</td>
</tr>
<tr>
<td>MUCP (cm H2O)</td>
<td>50.9 ± 8.2</td>
<td>52.6 ± 6.8</td>
<td>0.17†</td>
</tr>
<tr>
<td>VLPP (cm H2O)</td>
<td>94.1 ± 4.6</td>
<td>93.3 ± 3.9</td>
<td>0.2*</td>
</tr>
<tr>
<td>PVR (mL)</td>
<td>28.2 ± 4.7</td>
<td>29.1 ± 5.8</td>
<td>0.26†</td>
</tr>
</tbody>
</table>

TVT, tension-free vaginal tape; TOT, transobturator tape; BMI, body mass index; HRT, hormone replacement therapy; IIQ-7, Incontinence Impact Questionnaire; UDI-6, Urogenital Distress Inventory Questionnaire; MUCP, maximal urethral closure pressure; VLPP, valsalva leak point pressure; PVR, post-voiding residual. Data are mean (standard deviation), median (range), or number (%). *Student t test was used, †Mann-Whitney U test was used, ‡Fisher exact test was used. P value < 0.05 is significant.

Table 2. Hospital data and intraoperative and postoperative complications.

<table>
<thead>
<tr>
<th>Variable</th>
<th>TVT N = 80</th>
<th>TOT N = 80</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time (min)</td>
<td>27.1 ± 3</td>
<td>22.6 ± 3.9</td>
<td>&lt;0.001†</td>
</tr>
<tr>
<td>Estimated blood loss (mL)</td>
<td>45 (25 - 350)</td>
<td>35 (20 - 300)</td>
<td>0.09†</td>
</tr>
<tr>
<td>Change in hematocrit (%)</td>
<td>5 (2 - 9)</td>
<td>5 (2 - 8)</td>
<td>0.07†</td>
</tr>
<tr>
<td>Hospital stay (d)</td>
<td>1.4 ± 0.6</td>
<td>1.2 ± 0.5</td>
<td>0.19†</td>
</tr>
<tr>
<td>Intraoperative complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bladder injury</td>
<td>3 (3.8%)</td>
<td>0</td>
<td>0.25‡</td>
</tr>
<tr>
<td>Vaginal wall perforation</td>
<td>0</td>
<td>1 (1.3%)</td>
<td>1‡</td>
</tr>
<tr>
<td>Urethral injury</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Postoperative complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinary tract infections</td>
<td>10 (12.5%)</td>
<td>7 (8.8%)</td>
<td>0.61‡</td>
</tr>
<tr>
<td>Leg/obturator complication</td>
<td>0</td>
<td>0</td>
<td>1‡</td>
</tr>
<tr>
<td>Voiding dysfunction</td>
<td>8 (10%)</td>
<td>2 (2.5%)</td>
<td>0.1‡</td>
</tr>
<tr>
<td>Mesh erosion</td>
<td>0</td>
<td>1 (1.3%)</td>
<td>1‡</td>
</tr>
</tbody>
</table>

TVT, tension-free vaginal tape; TOT, transobturator tape. Data are mean (standard deviation), median (range), or number (%). *Student t test was used, †Mann-Whitney U test was used, ‡Fisher exact test was used. P value < 0.05 is significant.

In the TVT group, four subjects (5%) required a sling release, and an additional four subjects (5%) required prolonged urinary catheterization (4 - 6 weeks) postoperatively. In contrast, only two subjects in the TOT group (2.5%) required prolonged catheterization.

Statistical analysis failed to detect any significant differences between TVT and TOT procedure with regard to objective and subjective cure rates (Table 3). Sixty two (81.6%) and 66 (85.6%) women were objectively cured in the TVT and the TOT groups, respectively (P = 0.55). Subjective cure rate was assessed by the Patient Global Impression of Improvement (GPI-I) scale which revealed that 63 (83%) and 67 (87%) women expressed to be very much better or much better in the patient GPI scale in the TVT and the TOT groups, respectively (P = 0.68). Quality of life was statistically equivalent for both groups as reported using IIQ-7 and UDI-6 questionnaire (Table 3). On the other hand, Table 3 displayed no statistically significant difference between the TVT and TOT procedures for postoperative urodynamic parameters concerning bladder outlet obstruction (Maximum urine flow rate, and post-voiding residual).

4. DISCUSSION

The National Institute of Health (NIH) has emphasized the importance of evaluating efficacy of SUI therapies with composite outcomes that include subjective and objective efficacy measures. [11] In this study, we prospectively compared the effectiveness of TVT and TOT in treating SUI using validated objective and subjective measures at 24 months postoperatively. Our trial showed that there was statistical and clinical equivalence in the rates of treatment success according to objective and subjective criteria between the two performed midurethral sling procedures for the treatment of SUI in women. Patient-reported satisfaction with the results of the procedure, and improvement in quality of life were also sim-
Table 3. Objective and subjective cure rates after 24 months.

<table>
<thead>
<tr>
<th>Variable</th>
<th>TVT N = 76</th>
<th>TOT N = 77</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative cough stress test &amp; negative 1-hour pad test</td>
<td>62 (81.6)</td>
<td>66 (85.6)</td>
<td>0.55†</td>
</tr>
<tr>
<td>Urodynamic parameters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum urine flow rate (mL/s)</td>
<td>27.5 ± 5.5</td>
<td>27.8 ± 4</td>
<td>0.74‡</td>
</tr>
<tr>
<td>PVR (mL)</td>
<td>36.4 ± 14.2</td>
<td>32.7 ± 11.2</td>
<td>0.08§</td>
</tr>
<tr>
<td>IIQ-7</td>
<td>0 (0 - 21)</td>
<td>0 (0 - 20)</td>
<td>0.67‡</td>
</tr>
<tr>
<td>UDI-6</td>
<td>0 (0 - 18)</td>
<td>0 (0 - 18)</td>
<td>0.63‡</td>
</tr>
<tr>
<td>PGI-I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Much Better</td>
<td>44 (58%)</td>
<td>46 (59.7%)</td>
<td>0.87†</td>
</tr>
<tr>
<td>Much Better</td>
<td>19 (25%)</td>
<td>21 (27.3%)</td>
<td>0.86♂</td>
</tr>
<tr>
<td>A Little Better</td>
<td>3 (3.9%)</td>
<td>4 (5.2%)</td>
<td>1†</td>
</tr>
<tr>
<td>No Change</td>
<td>4 (5.3%)</td>
<td>3 (3.9%)</td>
<td>1†</td>
</tr>
<tr>
<td>A Little Worse</td>
<td>3 (3.9%)</td>
<td>2 (2.6%)</td>
<td>1†</td>
</tr>
<tr>
<td>Much Worse</td>
<td>2 (2.6%)</td>
<td>1 (1.3%)</td>
<td>1†</td>
</tr>
<tr>
<td>Very Much Worse</td>
<td>1 (1.3%)</td>
<td>0</td>
<td>1†</td>
</tr>
<tr>
<td>Subjective cure rate†</td>
<td>63 (83%)</td>
<td>67 (87%)</td>
<td>0.68†</td>
</tr>
</tbody>
</table>

TVT, tension-free vaginal tape; TOT, transobturator tape; PVR, post-voiding residual; IIQ-7, Incontinence Impact Questionnaire; UDI-6, Urogenital Distress Inventory Questionnaire; PGI-I, Patient Global Impression of Improvement. *Subjective cure rate: defined as “very much better” or “much better” by the Patient Global Impression of Improvement scale. Data are mean (standard deviation), median (range), or number (%). †Fisher exact test was used, ‡Student t test was used, §Mann-Whitney U test was used. P value < 0.05 is significant.

similar between the two procedures. However, TOT showed a significantly shorter operating time.

Many systematic reviews have evaluated the efficacy of TOT compared with TVT, without finding clear differences in the objective and subjective cure rates [12-15]. Objective cure after TOT ranged from 84% to 98%; and for TVT it ranged from 86% to 99%. The wide range in objective cure rates caused by the use of different methods for the assessment of objective cure rate as urodynamic assessment, negative cough-stress test, 1 h pad test of 2 g or less, 1 h pad test of 1 g or less, or 24 h pad test of 5 g or less. Similarly, Freedman et al. [16] evaluated both approaches at 12 months, and revealed 65.5% of the TVT group and 63.4% of the TOT group reported no SUI. In addition, there was a similar improvement in patient satisfaction, quality of life, and sexual function between the TOT and TVT groups. Likewise, a study by Wadie and El-Hefnawy [17] stated that both tapes had similar objective and subjective cure rates of incontinence at two years follow up.

On the contrary, Albo and colleagues [18] evaluated the treatment success of TVT and TOT at 24 Months, and conveyed higher objective and subjective cure rates in the TVT group. The objective success rate for the retropubic and transobturator slang was 77.3% and 72.3%, respectively (95% CI for difference of 5.1% was −2.0%, 12.1%), while the subjective success rate was 55.7% and 48.3%, respectively (95% CI for difference of 7.4% was −0.7%, 15.5%). However, neither the objective nor the subjective success rates met the pre-specified criteria for equivalence. Moreover, each of the confidence intervals included 0%, indicating that the success rates also cannot be considered different from one another.

The present study displayed that duration of operation was significantly shorter with TOT procedure, with a mean duration of 22.6 ± 3.9 min compared to 27.1 ± 3 min for the TVT (P < 0.001). Similarly, a systematic review by Ogah et al. [14] stated that a significantly shorter mean operation time was reported with TOT compared with TVT (20 min, 27 min; respectively), with mean difference 5.5 min (95% CI 5.0 - 6.0). On the other hand, our data revealed that three patients (4%) had bladder perforation in the TVT group, but with no statistical significance when compared to TOT (P = 0.25). Bladder perforation was found to be the most commonly reported complication for TVT in studies comparing TVT with TOT [5,14,19]. In addition, our data revealed that TVT had a non-statistically significant higher incidence of UTI and voiding dysfunction (assessed by urine flow test at 24 months). Our findings are consistent with previous reports of higher rates of voiding dysfunction after TVT procedure than after TOT procedure [18,20]. The higher rate of this complication in the TVT group may be due to the relatively greater urethral obstruction that results from the fact that the anatomic relationship between the sling and the urethra is different for the TOT than for retropubic slings. In the TVT, the sling axis is roughly vertical in relation to the urethral axis, whereas the axis of the TOT is more horizontal. As such, TOT provides less circumferential compression of the urethra than does the TVT. This decreased compression may result in fewer postoperative voiding difficulties and irritating bladder symptoms [5].

This study had several strengths. The study was prospective and randomized design. Objective and subjective measures of surgical success were used to capture a broad spectrum of outcomes. Rates of participant assessment two years after surgery were high. Our study did not in-
clude patients requiring concomitant procedures such as hysterectomy or prolapse repair, allowing us to be confident that the outcomes measured were related to the SUI surgery. However, our study had some limitations included a non-blinded study design of surgeon and patient to the treatment assignment. The study power was not enough to validate the comparison of safety profile between both procedures. So, it is important to have larger multicenter prospective studies within ethnically different populations to reach a more powerful conclusion and to evaluate the relative risk of the adverse events that have been seen with both procedures. As well, studies with longer follow-up are necessary to determine if the efficacy of TOT is durable.

5. CONCLUSION

In conclusion, no significant differences in objective and subjective outcomes between women who had TOT or TVT procedures at 24 months follow up. Both procedures had similar complication rate. However, TOT procedure had a shorter operating time.

ACKNOWLEDGEMENTS

No financial or commercial interests from any company were involved.

CONFLICT OF INTEREST

No conflict of interest is declared by authors.

REFERENCES


ABBREVIATIONS

BMI: Body mass index;
CI: Confidence interval;
HRT: Hormone replacement therapy;
IIQ-7: Incontinence impact questionnaire;
MUCP: Maximal urethral closure pressure;
NIH: National institute of health;
PGL-I: Patient global impression of improvement scale;
PVR: Post-voiding residual;
SUI: Stress urinary incontinence;
TOT: Transobturator tape;
TVT: Tension-free vaginal tape;
UDI-6: Urogenital distress inventory questionnaire;
VLPP: Valsalva leak point pressure.

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