ORIGINAL ARTICLE

The comparison of two minimal invasive surgeries, the tension-free vaginal tape (TVT) and the transobturator tape (TOT) in terms of efficiency and the complications

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ABSTRACT

Aim To examine the outcomes of two most frequently used operative techniques of the urinary incontinence.

Methods A retrospective analysis of medical records of patients were applied among randomly selected 400 women suffering from stress-incontinence or mixed-type incontinence. The patients underwent tension-free vaginal tape (TVT) (200 patients) and transobturator tape (TOT) (200 patients) operation in three Hungarian hospitals between 2002 and 2006. Patients were divided into two groups based on type of surgery. The main outcome measure were complications of the treatment.

Results As far as efficiency is concerned there was not significant difference between the two surgeries, TVT and TOT, 81.5% and 88.0%, respectively (p=0.0705). A significantly higher complication rate in women with TVT surgery compared to TOT was found; bladder injury: TVT 4.0% vs. TOT 0.5% (p=0.0182), abdominal pain: 30.5% vs. 16.0% (p=0.0005), dysuria: TVT 21,0% vs. TOT 13,0% (p=0.0331), urinary tract infections: TVT 13.5% vs. TOT 6.5% (p=0.0196), retention: TVT 7.5% vs. TOT 1.0% (p=0.0012); furthermore the operative time was longer (p<0.001). The average length of catheter use (p<0.001) and hospital stay were also longer in TVT (p<0.001). In case of TOT surgery, a significantly higher rate of vaginal erosion was found (TVT 0.0% vs. TOT 4.0%, p=0.0413).

Conclusions Both types of minor surgical interventions can be considered as efficient ways of treating incontinence but in case of TOT the number of nursing days decreased significantly with less complications. The patients could start work earlier after the surgery. Therefore, from economic and social aspect TOT is remarkably more favourable.

Key words: incontinence; tension-free vaginal tape; transobturator tape surgery

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Original submission:
19 June 2012;
Revised submission:
29 July 2012;
Accepted:
03 August 2012.

SEEHSJ 2012; 2(2):82-87

INTRODUCTION

Among women the frequency of incontinence is considerably high, the illness influences the patients' quality of life. During an international study with about 20,000 persons, among people aged over 18, 59.20 % of women and 51.30% of men reported incontinence (1). In Hungary, 40 % of women under 30, and 68 % of 51-65 year-old women had an incontinence episode. In 2001 in Hungary 35,500 women were interviewed on this topic, among the women who completed the questionnaire, the incidence rate of incontinence episodes was 32 % (2).

In the past almost 100 years more than a hundred operative methods were composed for the treatment of incontinence (3). Nowadays the minimal invasive interventions with successful outcome are considered as a modern therapy, when the risk of the duration of operation, complications and the number of the nursing days is decreased to the highest degree (3).

Currently the tension-free vaginal tape (TVT) and the transobturator tape (TOT) surgery are most frequently recommended and adapted operative techniques (4). The TVT operative technique for the treatment of women with stress incontinence was worked out by Ulmsten and his colleagues and outlined in 1996. The essence of the technique is that with a prolene lifting the middle section of urethra is underpinned without strain. During the surgery cytoscope is used to avoid the injury of urinary bladder (35). Delorme published the TOT surgery technique first in 2001. During the surgery the urethra is underpinned without strain by instruments made specially for this method, and with synthetic lifting. They lead the lifting under the urethra through the obturator openings toward the folds of femur avoiding the basin territory, and hereupon they position it without strain under the dividing line of the medial and distal part of urethra. (4-6) In Hungary the foregoing issued announcements showing the TVT and TOT operative methods, or the operative efficiency in each establishment.

The aim of our present study was to examine the efficiency of the TVT and TOT surgeries in three hospitals, by processing the data in a retrospective way.

PATIENTS AND METHODS

In this retrospective research the medical records of three Hungarian hospital (Hospital of Baja, University of Szeged Faculty of Medicine, Hospital of Kiskunhalas) were processed between 2002-2006. During the examination case-histories stored electronically, final reports, operative diaries, and ambulant appearances before and after surgeries were checked. In the analytical term 400 patients underwent TVT and TOT surgery (without exception the inside-to-outside technique was used) because of stress-incontinence or mixed-formed incontinence, but predominantly because of stress- incontinence (the cities Baja: 50 TVT surgeries, Kiskunhalas: 150 TVT surgeries and 100 TOT surgeries /from these there were 5 TOM surgeries/, Szeged: 100 TOT surgeries /from these there were 14 TOM surgeries/). (Table 1.) The frequency distribution by age-categories (20-50;51-66;67-80), the type of incontinence, developing of continence, operative time, the average length of hospital stay, the length of the catheter use and the frequency distribution by signs and complications during and after operation were examined.

For statistical analyses, data were examined using the chi square test, indicating the confidence interval (CI). The level of significance was $p<0.05$.

RESULTS

The frequency distribution by age-categories was similar in the two groups (Table 2). In the 20-50 age group TVT and TOT were noted in 23 and 36 patients (11.5% and 18%), respectively, in the 51-66 age group in 113 and 103 (56.5% and 51.5%), respectively, and in 67-80 age group in 64 and 61 patients (32% and 30.5%), respectively ($p=0.1827$).

In case of stress incontinence the TVT surgery was adopted in 146 (73%), TOT surgery in 54 (27%) patients, and in case of mixed-incontinence the TVT was adopted in 167 (83.5%), whereas TOT was applied in 33 (16.5%) cases ($p=0.0109$)

Table 1. Characteristics of study population

Hospital name	Surgery method	20-50 years n (%)	51-66 years n (%)	67-80 years n (%)	Total
Baja	**TVT**	6 (12.0)	28 (56.0)	16 (32.0)	50
	TOT	0	0	0	0
Szeged	**TVT**	17 (11.3)	85 (56.7)	48 (32.0)	150
	TOT	19 (19.0)	58 (6.0)	23 (23.0)	100
Kiskunhalas	**TVT**	0	0	0	0
	TOT	17 (17.0)	45 (45.0)	38 (38.0)	100
Total	**TVT**	23 (11.5)	113 (56.5)	64 (32.0)	200
	TOT	36 (18.0)	103 (51.5)	61 (30.5)	200

TVT, tension-free vaginal tape; TOT, transobturator tape

As for the main measure of outcome efficiency, there was no significant difference between the two surgeries, 163 (81.5%) patients treated by TVT, and 176 (88 %) by TOT, regained continence (p=0.0705) (Table 3.)

The operative time of 8-10 minutes were noted in 160 (80%) patients during TOT surgeries, whereas in 40 (20%) the time was 11-30 minutes; as compared with this TVT surgery operative time was beyond 30 minutes (p<0.001).

The length of the catheter use deviated at relevance between the two operative techniques significantly. In 22 (11%) TVT patients, and in 99 TOT patients (49.5%) it was applied for 1-3 hours; in 161 (80.5%) TVT patients, and in 91 (45.5%) TOT patients 1-2 days; in 17 (8.5%) TVT patients, and in 10 TOT patients (5%) for 3 or more days (p<0.001).

The average length of hospital stay was significantly different between the two groups, 14 (7%) patients of the group with TVT surgery treated, whereas 68 patients (34%) of the „TOT-group" stayed 2-3 days in the hospital, and 186 (93%) of the patients treated with TVT, and 132 (66%) with TOT stayed for 4 or more days in the hospital (p<0.001) (Table 4.)

Table 2. The frequency distribution by age-categories and by type of incontinence according to the two operative techniques adapted

	No (%) of patients in age group			
Category	20-50	51-66	67-80	p
TVT (n=200)	23 (11.5) (CI 0.07; 0.15)	113 (56.5) (CI 0.49; 0.63)	64 (32.0) (CI 0.25; 0.38)	0.1827
TOT (n=200)	36 (18.0) (CI 0.12; 0.23)	103 (51.5) (CI 0.44; 0.58)	61 (30.5) (CI 0.24; 0.36)	
	Type of incontinence			
	Stress-incontinence	**Mixed-type incontinence**		
TVT (n=200)	146 (73.0) CI (0.66; 0.79)	167 (83.5) CI (0.78; 0.88)		0.0109
TOT (n=200)	54 (27.0) CI (0.20; 0.33)	33 (16.5) CI (0.11; 0.21)		

TVT, tension-free vaginal tape; TOT, transobturator tape; CI, Confidence Interval

A significantly higher complication rate was found in women with TVT surgery compared to TOT method for bladder injury

Table 3. The frequency distribution by occurrence of continence according to the two operative techniques

	No (%) of patients	
	Incontinent after surgery	**Continent after surgery**
TVT (n=200)	37 (18.50%) (CI 0.13; 0.23)	163 (81.50%) (CI 0.76;0.86)
TOT (n=200)	24 (12.00%) (CI 0.07; 0.16)	176 (88.00%) (CI 0.83;0.92)
p	0.0705	

TVT, tension-free vaginal tape; TOT, transobturator tape; n, number of patients; CI, Confidence Interval

Table 4. The frequency distribution by operative time, length of the catheter use and the length of hospital stay according to the two operative techniques (khi square test)

	No (%) of patients (CI))			
Operative time	**8-10 minutes**	**11-30 minutes**	**More than 30 minutes**	**p**
TVT (n=200)	0	0	200 (100) (1.00; 1.00)	<0.001
TOT (n=200)	160 (80.0) (0.74; 0.85)	40 (20.0) (0.14; 0.25)	0	
Length of the catheter use	**1-3 hours**	**1-2 days**	**3 or more days**	
TVT (n=200)	22 (11.0) (0.06; 0.15)	161 (80.5) (0.75; 0.85)	17 (8.5) (0.04;0.12)	<0.001
TOT (n=200)	99 (49.5) (0.42; 0.56)	91 (45.5) (0.38; 0.52)	10 (5.0) (0.01; 0.08)	
Length of hospital stay	**2-3 days**	**4 or more days**		
TVT (n=200)	14 (7.0) (0.03;0.10)	186 (93.0) (0.89;0.96)		<0.001
TOT (n=200)	68 (34.0) (0.27; 0.40)	132 (66.0) (0.59;0.72)		

TVT, tension-free vaginal tape; TOT, transobturator tape; n, number of patients; CI, Confidence Interval

(p=0.0182), abdominal pain (p=0,0005), dysuria (p=0.0331), urinary tract infections (p=0.0196), retention (p=0.0012). In case of TOT surgery, a significantly higher rate of vaginal erosion was reported (p=0.0413). There was no significant difference in case of residuum (p=0.3997) (Table 5).

DISCUSSION

This research is the first Hungarian, national examination on this theme, after all our research was extended to 400 operated patients in three hospitals. In addition, there are new outcomes compared to the home announcements, because it used significant analysis with one variable, so it could subtract conclusions.

The frequency distribution by age-categories was similar in the two groups, the difference was not significant according to the TVT and TOT. These figures are similar to the results of other studies (7-10). Both incontinence types of patients in this study were treated predominantly by the TVT operative technique in the analytical time and the recovery rate did not differ significantly between the two operative techniques which is in line with other studies published in the literature (5-12).

In our examination in case of the TOT for one

Table 5. The frequency distribution by signs and complications during and after the operation according to the two operative techniques

	No (%) of patients (CI))		p
	TVT (n=200)	**TOT (n=200)**	
bladder injury	8 (4.0) (0.01; 0.06)	1 (0.5) (-0.0047; 0.01)	0.0182
abdominal pain	61 (30.5) (0.24; 0.36)	32 (16.0) (0.10; 0.21)	0.0005
dysuria	42 (21.0) (0.15; 0.26)	26 (13.0) (0.08; 0.17)	0.0331
urinary tract infections	27 (13.5) (0.08; 0.18)	13 (6.5) (0.03; 0.09)	0.0196
retention	15 (7.5) (0.03; 0.11)	2 (1.0) (-0.0037; 0.02)	0.0012
vaginal erosion	0	8 (4.0) (0.01; 0.06)	0.0413
residum	10 (5.0) (0.01; 0.08)	8 (4.0) (0.01; 0.06)	0.6295
diastasis of wound	5 (2.5) (0.0033; 0.04)	12 (6.0) (0.02; 0.09)	0.0827
other complications*	14 (7.0) (0.03; 0.10)	10 (5.0) (0.01; 0.08)	0.3997

*urethra injury, sepsis, haematoma, cut of lifting, intestine injury, postoperative fever, haemorrhage

TVT, tension-free vaginal tape; TOT, transobturator tape; n, number of patients; CI, Confidence Interval

patient, but in case of the TVT for all patients cytoscopy was necessary, which was the same in other examinations and it indicates that the operation time is significantly shorter in case of TOT surgery (7,8,11). To avoid bladder injury during the TVT surgery, cytoscopy was used. A similar complication of the lesser pelvic organs in case of TOT operation was minimal because of the retropubic technique (4,6).

The length of the catheter use became significantly shorter in case of TOT surgery in this study. It might make a contribution to slow down of the urinary tract infections significantly, like a post-operative complication in case of the TOT surgery. This technique can improve the sense of comfort of patients and avoid the unpleasant consequences of a longer catheterization (decreasing nursing hours and resource employment, catheter change, catheter cultivation, making catheter, or the possible complications of the catheterization) (8).

Like in other studies we found that in case of the TOT operative technique the duration of hospitalization decreased significantly, so the number of nursing days can be reduced, and overall costs of hospitalization will be less. In shorter term, the patient can get back to active work and can play her role in the family sooner (13-14).

In our examination bladder injuries happened significantly less frequently in case of the TOT surgery, whereas in different announcements there was no significant difference in bladder injury rates between the operative techniques (8,11,15). Our outcomes came from random stabbing of the retropubic field in case of the TVT, whereas at the TOT surgery this complication was not a characteristic one, because a needle led on a the obturator foramen avoids the bleb (7-8). The postoperative bleeding and haematoma happened significantly less frequently applying the TOT surgery, which is also in line with outcomes of other examinations (10-11).

In case of vaginal erosion the results of this study have shown the TVT to be significantly more favourable. According to Melier and Falkert as well as to other researches vaginal erosion happened significantly more frequently in case of TVT (10,11, 6). As far as retention is ocncerned, applying of the TOT technique could be experienced with significantly better outcome, therefore, our outcome is in concordance with other researches (8,10). Retention might be formed because of pulling over of the lifting, which was not the case in our study (8). Catheter wearing for long time period of time and consequently the appearance of long lasting retention might be responsible for more frequent occurrence of urinary tract infections in case of the TVT (10). The appearance of other relevant symptoms and complications occurring during and after the surgery in our study was not significantly different between the two techniques.

In conclusion, both the tension-free vaginal tape (TVT) and the transobturator tape (TOT), the most frequently used treatment options for incontinence, are effectively relevant methods. Using of the TOT surgery proved to be better because it significantly decreases the number of the nursing days, the cystoscopy has become omissible and frequency of recurrence occurrence has also been significantly reduced. All this advances recovery of patients, their return to previous job, or to their authority in the family. Taking all into consideration TOT surgery has a beneficial effect on the patient's personal life and can diminish the duration of hospitalization. Moreover, using this technique can reduce the burden on the health care system and allow for more favourable patient care.

FUNDING

No specific funding was received for this study.

TRANSPARENCY DECLARATIONS

Competing interests: none to declare.

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