

Treatment of recurrent stress urinary incontinence in women: comparison of treatment results for different surgical techniques

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Abstract

Introduction: There is still no consensus on which surgical technique is the most effective for female recurrent stress urinary incontinence after the initial surgery.

Aim: To compare the long-term treatment outcomes of Burch colposuspension operation, transobturator tape implantation (TOT) and tension-free vaginal tape (TVT) procedures performed for female recurrent stress urinary incontinence after the initial surgery.

Material and methods: A retrospective study was performed on 45 women operated on for recurrent stress urinary incontinence after the initial surgery. Depending on the surgical approach, the patients were divided into three groups: group I (n = 19) – Burch colposuspension operation, group II (n = 16) – TOT, and group III (n = 10) – TVT operation was performed. The treatment results were assessed using the UDI-6 (Urogenital Distress Inventory) and IIQ-7 (Incontinence Impact Questionnaire) short form questionnaires. We included one additional question: Is the patient satisfied with the treatment outcome? We classified the urinary continence results after surgery as good when patients were cured or improved, and as bad when the treatment failed.

Results: Good urinary continence results were observed in 84.2% of patients in group I, 93.8% of patients in group II, and 90% of patients in group III. 68.4% of patients in group I, 81.3% of patients in group II, and 90% of patients in group III were satisfied with the treatment outcomes.

Conclusions: Burch colposuspension operation, TOT and TVT procedures performed for the female recurrent stress urinary incontinence treatment are effective and show similar good urinary continence results and similar number of patients satisfied with the treatment outcomes.

Key words: surgery, quality of life, urinary incontinence, suburethral sling, treatment outcome.

Introduction

Female stress urinary incontinence is defined as any involuntary leakage of urine during physical activity, sneezing, or coughing [1, 2]. It is diagnosed in more than 1 in 4 adult women and approximately half of all women suffering from urinary incontinence [3, 4].

Since the 1960s, the Burch colposuspension operation has been a standard treatment method for

female stress urinary incontinence. Long-term follow-up suggests a durable outcome with cure rates of 82% after 5 years and 69% after 12 years. The reoperation rate due to persistent urinary incontinence for patients who underwent the Burch colposuspension operation ranged from 4.2 to 5.5 per 1000 women-years [3, 5].

In 1996, Ulmsten described a new minimal invasive technique, a tension-free vaginal tape (TVT) for

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urinary incontinence treatment [6]. This technique soon became very popular because of its quite low complication rate, good results, and possibility to perform it in the outpatient department. The recently published prospective randomized studies report the TVT success rate ranging from 80% to 95% with a longer than 5-year follow-up [1, 7, 8].

In 2001, the French urologist Delorme described another minimal invasive technique, transobturator tape implantation (TOT) [6]. This operative technique allowed reduction of the risk of bladder and bowel perforation and major vascular injury that can occur with TVT [8–10]. The published data reported the TOT success rate ranging from 80.5% to 96% [1].

Currently, the suburethral sling is the gold standard treatment for female stress urinary incontinence [11].

There are lots of discussions in the literature as to which of the operative techniques for female recurrent stress urinary incontinence is the most effective and the safest; however, there is no consensus on this issue.

Aim

The aim of the study was to compare the long-term treatment outcomes of Burch colposuspension operation, TOT and TVT procedure performed for female recurrent stress urinary incontinence after the initial surgery.

Material and methods

A retrospective study was performed on 45 women operated on due to recurrent stress urinary incontinence after the initial surgery at the Urology Centre of the Vilnius University Hospital “Santariskiu Klinikos” in the period from January 2003 to November 2012. The initial surgery for stress urinary incontinence was vaginoplasty, Burch colposuspension operation, TVT, or TOT operation. The recurrent stress urinary incontinence diagnosis was corroborated by physical examination, and all of the patients had a positive cough test. Also, a urogynecological examination, urinalysis, urine culture, urogenital ultrasound and the measure of postvoid residual urine, and colpocystograms were performed. Due to technical problems, urodynamic testing was not performed in all cases. The surgery for recurrent stress urinary incontinence and the further follow-up were performed by one experienced

urologist. According to the surgical technique that was chosen for recurrent stress urinary incontinence treatment, all the patients were divided into three groups: in group I ($n = 19$) Burch colposuspension operation, in group II ($n = 16$) TOT operation, and in group III ($n = 10$) TVT operation was performed. All the three groups were compared according to age, body mass index (BMI), time between initial and second surgery, number of deliveries, presence of hysterectomy, and perineal ruptures in the past. All the patients were assessed at 1 month postoperatively, at which time the cough test, postvoid residual urine volume, and procedure-related complications were evaluated. The long-term treatment outcomes were evaluated after 6 months to 9 years after the second surgery, 4 years being the median. The median time of treatment outcomes evaluation was 5 years in group I, 3 years in group II, and 1 year in group III. The UDI-6 and IIQ-7 questionnaires short forms [12, 13] were sent to the patients to evaluate the urine continence results and the quality of life after the surgery. Also, we included one additional question: Is the patient satisfied with the treatment outcome? The urine continence results were assessed as cured if the patient was completely continent; improved if partial urinary incontinence remained after the surgery; and failed if the degree of urinary incontinence remained the same or was even worse compared with the condition before the surgery. We classified it as a good continence result when the patients were cured or improved, and as a bad result when the treatment failed.

Statistical analysis

We used SPSS version 17.0 for Windows for statistical analysis. The one way ANOVA, independent sample t -test, and crosstabs were used to compare the groups by analyzed demographic and clinical characteristics and to compare the treatment outcomes between the three patient groups and to assess the risk factors that could have influenced the numbers of satisfied and dissatisfied patients. Values of $p < 0.05$ were considered statistically significant.

Results

A retrospective study was performed on 45 women operated on due to recurrent stress urinary incontinence after the initial surgery. As a second surgery Burch colposuspension operation, TOT or TVT pro-

cedure was performed. The median time from the initial surgery until the second surgery for the recurrent stress urinary incontinence was 8.1 (0.17–29) years. The demographics and clinical characteristics of the 3 patients groups are summarized in Table I. The degree of urinary incontinence before the second surgery in each group is shown in Table II. Comparing the groups by age, BMI, number of deliveries, previous perineal ruptures, presence of hysterectomy in the past, the time between initial and second surgery, and the degree of urinary incontinence before the second surgery, there was no statistically significant difference ($p > 0.05$).

We analyzed the answers to UDI-6 and IIQ-7 questionnaire short forms to evaluate the urine continence results and the quality of life after the surgery.

The assessment of UDI-6 short form questionnaire is as follows: 73.7% of patients in group I ($n = 19$), 68.8% of patients in group II ($n = 16$), and 100%

of patients in group III ($n = 10$) had no irritative bladder symptoms after the surgery at all, or these symptoms were minimal and had no negative impact on the quality of life; 84.2% of patients in group I ($n = 19$), 93.8% of patients in group II ($n = 16$), and 90% of patients in group III ($n = 10$) were completely continent or had partial urinary incontinence; 57.9% of patients in group I ($n = 19$), 93.8% of patients in group II ($n = 16$), and 90% of patients in group III ($n = 10$) did not complain of bladder obstructive symptoms and did not feel discomfort while urinating, or these symptoms were minimal and had no negative impact on the quality of life. The answers to the UDI-6 short form questionnaire are summarized in Table III. We found that women in group I statistically significantly more often complained of bladder obstructive symptoms and discomfort on urinating than women in group II and group III ($p = 0.023$).

The assessment of the IIQ-7 short form questionnaire is as follows: the urinary incontinence had no

Table I. Demographic and clinical characteristics of patients in each group

Variables	Group I ($n = 19$)	Group II ($n = 16$)	Group III ($n = 10$)	Value of p
Age, mean \pm SD [years]	56.21 \pm 7.43	62.94 \pm 6.82	60.70 \pm 12.86	0.079
Body mass index, mean \pm SD [kg/m ²]	30.27 \pm 5.86	29.38 \pm 4.28	29.18 \pm 3.99	0.823
Number of deliveries, median (min.; max.)	2 (0; 5)	2 (0; 2)	2 (0; 3)	0.152
Previous perineal rupture, n (%)	15 (78.9)	9 (56.3)	8 (80.0)	0.263
Previous hysterectomy, n (%)	3 (15.8)	5 (31.3)	2 (20.0)	0.539
Time between initial and second surgery, median (min.; max.) [years]	8 (0.17; 29)	6 (0.33; 29)	2 (0.33; 13)	0.074

SD – standard deviation

Table II. The degree of urinary incontinence before the second surgery in each group

Degree of urinary incontinence	Group I ($n = 19$)	Group II ($n = 16$)	Group III ($n = 10$)	Value of p
II, n (%)	9 (47.4)	7 (43.8)	5 (50.0)	0.950
III, n (%)	10 (52.6)	9 (56.3)	5 (50.0)	

Table III. Summary of answers to UDI-6 questionnaire short form

Symptoms	Group I ($n = 19$)		Group II ($n = 16$)		Group III ($n = 10$)		Value of p
	No or minimal (%)	Yes (%)	No or minimal (%)	Yes (%)	No or minimal (%)	Yes (%)	
Irritative	73.7	26.3	68.8	31.2	100.0	0	0.150
Urinary incontinence	84.2	15.8	93.8	6.2	90.0	10.0	0.665
Obstructive/discomfort	57.9	42.1	93.8	6.2	90.0	10.0	0.023

negative impact on physical activity in 84.2% of patients in group I ($n = 19$), 87.5% of patients in group II ($n = 16$), and 90% of patients in group III ($n = 10$); the urinary incontinence had no negative impact on travelling in 84.2% of patients in group I ($n = 19$), 81.3% of patients in group II ($n = 16$), and 90% of patients in group III ($n = 10$); the urinary incontinence had no negative impact on communication in 89.5% of patients in group I ($n = 19$), 81.3% of patients in group II ($n = 16$), and 100% of patients in group III ($n = 10$); the urinary incontinence had no negative impact on emotional status in 84.2% of patients in group I ($n = 19$), 75.0% of patients in group II ($n = 16$), and 90% of patients in group III ($n = 10$). The answers to the IIQ-7 short form questionnaire are summarized in Table IV. We did not find any statistically significant difference between the groups.

We assessed the patients' answers to the additional question: Are the patients satisfied with the treatment outcomes? 68.4% of patients in group I ($n = 19$), 81.3% of patients in group II ($n = 16$), and 90% of patients in group III ($n = 10$) were satisfied with the treatment outcomes (Table V).

The assessment of the relationship between number of patients satisfied with the treatment outcomes and the estimated risk factors showed that where time between the initial and second surgery was shorter, there were more women satisfied with treatment outcomes ($p = 0.001$) (Table VI).

The mean hospitalization stay was 5.76 days (SD 2.52). We had no intraoperative complications registered. During the early postoperative period void-

ing difficulty was present in 4 (8.88%) women: in 3 (33.33%) women after the TVT procedure (group 3) and in 1 (6.25%) woman after the TOT procedure (group 2). Two women required intermittent catheterization, which lasted 5 and 6 days, respectively. In two cases the suburethral sling was pulled down on the 8th and 3rd postoperative day, respectively.

Patients were assessed at 1 month after the second surgery. We had no late postoperative complications revealed.

Based on our study, we may conclude that the Burch colposuspension operation, TOT and TVT procedures performed for female recurrent stress urinary incontinence treatment are effective and show similar good urinary continence results: 84.2% in group I, 93.8% in group II, and 90% in group III. There were equal numbers of patients satisfied with the treatment outcomes in the groups but when the time between the initial and second surgery was shorter, there were more patients satisfied with the treatment outcomes.

The assessment of UDI-6 questionnaire short form has shown that the women after the Burch colposuspension operation (group I) performed due to recurrent stress urinary incontinence statistically significantly more often complained of bladder obstructive symptoms and discomfort on urination compared with the women after minimal invasive surgical procedures (group II and group III).

While we have found almost equal good treatment outcomes of the Burch colposuspension operation, TOT or TVT procedure performed for female

Table IV. Summary of answers to IIQ-7 questionnaire short form

Activity/status	Group I ($n = 19$)		Group II ($n = 16$)		Group III ($n = 10$)		Value of p
	No impact (%)	Yes (%)	No impact (%)	Yes (%)	No impact (%)	Yes (%)	
Physical activity	84.2	15.8	87.5	12.5	90.0	10.0	0.903
Travelling	84.2	15.8	81.3	18.7	90.0	10.0	0.835
Communication	89.5	10.5	81.3	18.7	100.0	0	0.333
Emotional status	84.2	15.8	75.0	25.0	90.0	10.0	0.596

Table V. Numbers of patients satisfied or dissatisfied with treatment outcomes

Variable	Group I ($n = 19$)	Group II ($n = 16$)	Group III ($n = 10$)	Value of p
Satisfied with treatment outcomes (%)	68.4	81.3	90.0	0.379
Dissatisfied with treatment outcomes (%)	31.6	18.7	10.0	

Table VI A, B. Analysis of risk factors associated with number of patients satisfied or dissatisfied with treatment outcomes**A**

Variable	Satisfied with surgery results	N	Mean	Standard deviation	Value of <i>p</i>
Age	Yes	35	60.20	8.203	0.881
	No	10	59.70	12.44	
BMI	Yes	35	29.10	4.83	0.134
	No	10	31.96	4.53	
Deliveries	Yes	35	1.63	1.09	0.145
	No	10	2.30	1.77	
Time between initial and second surgery [years]	Yes	35	6.51	5.01	0.007
	No	10	13.29	10.47	

B

Variable		Satisfied with surgery results		Value of <i>p</i>
		Yes	No	
Previous hysterectomy	Performed	6 (66.7%)	3 (33.3%)	0.393
	Not performed	29 (80.6%)	7 (19.4%)	
Previous perineal rupture	Performed	25 (78.1%)	7 (21.9%)	1
	Not performed	10 (76.9%)	3 (23.1%)	

recurrent stress urinary incontinence, nowadays urologists worldwide including urologists at our center prefer minimally invasive techniques. Also, the choice of female recurrent stress urinary incontinence treatment should be individual depending on the patient's age, comorbidities, previous surgical interventions, and the patient's expectations.

Discussion

Some studies report a reoperation rate of about 8% for recurrent urinary incontinence after the initial surgery within a 5-year follow-up period [14]. The risk factors for recurrent or persistent urinary incontinence after the surgical treatment include aging, obesity, medical comorbidities, especially diabetes mellitus, incontinence severity, mixed urinary incontinence type, and previous anti-incontinence surgery [7, 15–18]. Also urge incontinence symptoms, organ prolapse severity, and being post-menopausal without hormone therapy are significant predictors for failure after the initial surgery [19]. The reasons for recur-

rent urinary incontinence could include urinary bladder hyperactivity, intrinsic sphincter deficiency (ISD), urethral hypermobility, and inadequate technique of initial surgery for urinary incontinence. Most of the studies evaluating the risk factors for treatment failure after surgery for stress urinary incontinence are retrospective, poorly designed or confusing and lacking consistency in the evaluation of the results [7].

Currently, there is no consensus on how to manage failures after anti-incontinence surgery. The main reason for this conflict is the wide spectrum of anti-incontinence procedures. Repeat surgery is associated with a higher risk of intraoperative complications and lower success rate than initial surgery [5]. If there is treatment failure after the initial suburethral sling implantation, a second sling implantation is recommended; if no good result is achieved, an artificial sphincter, periurethral injections or periurethral balloon implantations are treatment options [7].

From 2003 until 2008, Burch colposuspension operation was the first choice of treatment for recurrent stress urinary incontinence at the Urology Centre of

the Vilnius University Hospital “Santariskiu Klinikos”; however, our urologists have become more experienced in the synthetic suburethral sling implantation techniques and started treating patients by performing minimally invasive TVT or TOT procedures.

There is some evidence that the Burch colposuspension operation is less effective for recurrent stress urinary incontinence treatment if there is a suspicion of intrinsic sphincter deficiency. The TVT procedure's effectiveness for recurrent urinary incontinence has shown success rates of 71% to 82% depending on the ISD degree. The TOT procedure may not be as effective as TVT and if there is an element of ISD the success rate of the procedure is approximately 50% [20–22].

The overall success rate of suburethral sling implantation operations for recurrent urinary incontinence after the initial surgery for SUI is 60% to 78.5% [23, 24]. The reoperation success rate is less than the initial operation [25].

The limitations of our study include the retrospective study design, small number of patients in each group, and the fact that due to technical problems urodynamic testing was not performed in all cases. To confirm our study results, we need a well-designed prospective study with a sufficient number of patients.

Conclusions

Our study did not reveal any differences in the treatment of recurrent stress urinary incontinence outcomes by performing the Burch colposuspension operation, TOT or TVT procedures. Nevertheless, minimally invasive techniques undoubtedly have many advantages compared to the Burch colposuspension operation and nowadays TVT and TOT procedures are the first choice procedures for recurrent stress urinary incontinence treatment. Although we did not observe a statistically significant difference, in our opinion, the TVT procedure is more reasonable in obese patients and in cases of intrinsic sphincter deficiency.

The most important factors that influence the treatment results include an appropriate surgical approach taking account of the patient's risk factors, in particular obesity, sphincter deficiency, bladder hyperactivity, and proper suburethral sling implantation technique.

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