

A Prospective Study of the Quality of Life of Patients With Stress Incontinence Before and After a Transobturator Tape (TOT) Procedure

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Research

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Abstract

Background: Urinary incontinence (UI) is a significant social problem. The latest figures show that it affects as many as 17%–60% of the female population, and it is one of the most common chronic diseases. Incontinence substantially decreases the quality of patients' lives. The transobturator tape (TOT) procedure is the gold standard in surgical treatment due to its high effectiveness and a small percentage of complications.

Objective: The aim of this study was to assess the quality of life (QoL) of patients with stress incontinence before and after the TOT procedure.

Method: The study involved 57 patients diagnosed with stress incontinence on the basis of an ultrasound scan and an interview. The QoL before and after surgery was measured using the *Incontinence Impact Questionnaire (IIQ-7)* and the *Incontinence Quality of Life (I-QOL)* standardized questionnaires.

Results: The IIQ-7 results for each question were higher (signifying worse) before surgery than after it. The results for almost all domains were statistically significant. The I-QOL results also showed that, in most cases, the quality of patients' lives improved after surgery. Statistically significant changes were observed in all three questionnaire domains of avoidance/limiting behavior, psychosocial impact, and social embarrassment.

Conclusion: Surgical treatment of stress incontinence using the TOT procedure causes bothersome symptoms to subside in the majority of patients, leading to an improvement in their living comfort.

Introduction

Urinary incontinence is a serious social problem. The precise number of patients affected by this condition is unknown, which results from the facts that various definitions of this disorder have been adopted and classification systems are not uniform. As the latest data show, urinary incontinence affects as many as 17–60% of the female population, making it one of the most common chronic diseases (Minassian et al., 2003). Estimates suggest that the number of patients is even larger, but that patients do not report their complaints due to embarrassment and a common belief that incontinence is a natural phenomenon associated with aging. The average incidence of this condition is 27.6% for women, and 10.5% for men (Meyer, 2017). The most frequent type is stress incontinence, which constitutes as many as 50% of all incontinence cases among women (Moroni et al., 2016).

Urinary incontinence is defined as involuntary leakage of urine through the urethra due to dysfunction of the closure mechanism of the bladder. In stress incontinence, this is typically induced by a sudden increase in the intra-abdominal pressure (IAP) (Syan, Brucker, 2016). Other symptoms include enuresis (i.e., urination without the urge), a lack of change in the frequency of micturition compared with the period preceding the disease, and the subsiding of symptoms during sleep. The etiopathogenesis of this

condition has been attributed to factors disturbing the transfer of intra-abdominal pressure to the junction between the urethra and the bladder, and to the proximal urethra (Kołodziejńska et al., 2019).

Factors contributing to urinary incontinence include (Burkhard et al., 2017):

- age
- vaginal delivery
- disturbed innervation of the pelvic floor
- disturbed structure of connective tissue
- hypoestrogenism
- obesity
- chronic pulmonary diseases.

The latest reports indicate that latent urinary incontinence is also extremely common. This is estimated to affect 36–80% of patients with pelvic floor prolapse (Szafranowska, Rogowski, 2018) it is associated with urethral flexion or pressure, potentially leading to micturition disorders. These cause closure of the urethral lumen, and consequently the lack of immediate compression of the bladder, which can trigger urine leakage through the urethra. The symptoms of urinary incontinence in this group of patients thus only occur after surgical reconstruction of the pelvic floor. Currently, reports describing simultaneous surgery for pelvic organ prolapse and urinary incontinence suggest contradictory results. Performing these two procedures at the same time entails a higher number of complications (Khullar et al., 2017). There is no consensus on management of this group of patients. It is, however, certain that the scope of the operation should be decided on with a patient after an interview and physical examination, and after she has been informed of all therapeutic options. Improving the quality of the patient's life should be given priority (Svenningsen et al., 2012).

A definition of quality of life was proposed by the World Health Organization in 1994; it states that QoL is the individual perception of one's own position in life with regard to cultural conditions and the system of values. Factors that have an immediate effect on QoL include somatic health, interpersonal contact, and the community features that are essential for a particular person (Kukielczak, 2012). It is significant that physicians do not currently focus exclusively on extending patients' lives but, also on improving the quality of life. Modern medicine aspires to retrieve patients' QoL from before the disease. Hence, there is increasing interest in the assessment of the QoL of people affected by various diseases (Jankowska-Polańska, Polański 2014).

At present, not only strictly medical goals, but also nonmedical goals, constitute crucial elements of the therapeutic process; these latter include improving patients' well-being and functioning in the physical and social spheres. QoL research is part of a holistic approach (Socha et al., 2011). In medicine, both subjective and objective types of QoL assessment should be performed. Subjective assessment of QoL can be based on questions addressed to patients. Nevertheless, this assessment depends on patients' mental state, likes and dislikes, system of values, personality traits, and so on. Objective QoL assessment,

on the other hand, is usually performed using standardized questionnaires. These are valuable, repeatable instruments that measure patients' QoL and the effectiveness of treatment (Dudzińska et al., 2011).

The aim of this study was to assess QoL in patients with stress incontinence before and after stress incontinence surgery using the TOT method.

Material And Methods

2.1. Design and data collection

The study involved 57 patients from the gynecology ward at the Hospital of the Ministry of Internal Affairs and Administration, Wrocław, who had been diagnosed with stress incontinence on the basis of an ultrasound and interview. Urodynamic examination was performed in cases of doubtful diagnosis. Patients were qualified for surgery based on guidelines from the literature, which include:

- urogynecological history;
- urinalysis;
- physical examination;
- cough trial performed in a lithotomy position;
- evaluation of urethral mobility;
- evaluation of urine retention after micturition;
- transurethral ultrasound;
- urodynamic examination in doubtful cases.

All patients gave their informed written consent to take part in the study prior to entering the project. All participants completed the IIQ-7 and I-QoL questionnaires twice: once upon admission to the ward and twelve months after surgery. Patients were qualified for the study on the basis of the inclusion and exclusion criteria.

The inclusion criteria were:

- stage II and stage III stress incontinence confirmed by ultrasound scan and interview;
- not taking hormone replacement therapy (HRT) before or after the surgical procedure;
- informed written consent of the patient to take part in the project.

The exclusion criteria were:

- women with overactive bladders (OAB) or mixed urinary incontinence (MUI);
- women with urinary tract fistulas;
- women with congenital or acquired defects of the urethra or bladder;

- women with urinary tract infections;
- women taking medicines contributing to an overactive bladder.

All patients qualified to the project underwent the TOT suburethral sling procedure, which decreases urethral hypermobility and consequently eliminates or reduces the number of involuntary urine leakage episodes caused by physical effort. The TOT procedure, proposed by Delorme in 2001, is considered the gold standard in the surgical treatment of stress incontinence, due to its high effectiveness and the small percentage of complications. We used this method because it is as effective as the tension-free vaginal tape approach, but takes half the time (Höfner et al., 2019). The management principles employed during surgery included the following:

- placing a catheter in the bladder;
- incision and dissection of the vaginal mucosa and fascia;
- inserting the tape properly;
- preventing the implants from curling or rolling up;
- avoiding implant infections;
- optimal tension-free sewing of the vaginal walls (Rechberger, Wróbel, 2018).

2.2. Measures

1. *Incontinence Impact Questionnaire (IIQ-7)* is used to assess the quality of life of women with urinary incontinence. The IIQ-7 questionnaire is an abridged version of the IIQ questionnaire, which contains 30 questions. All 7 questions in the IIQ-7 questionnaire concern the impact of urinary incontinence on patients' lives. The questions relate to the ability to do household activities, physical activity, entertainment, travel, leisure and mental health. Each question was rated on a scale of 0 to 3, where 0 - not at all, 1 - a little, 2 - medium, 3 - very. The average score obtained is calculated (Chang et al., 2019). Only the questions answered are taken into account. The average, which ranges from 0 to 3, is multiplied by 33 1/3 to put the results on a scale of 0 to 100. A higher result indicates worse symptoms and poorer quality of life (Lin et al. 2018).

2. *The Incontinence Quality of Life (I-QOL)* questionnaire is a commonly used validated incontinence-specific QoL instrument (Chen et al., 2014). It consists of 22 questions divided into three domains: avoidance/limiting behavior, psychosocial impact, and social embarrassment. Each item can be rated on a five-point scale where 1 = extremely, 2 = quite a bit, 3 = moderately, 4 = a little, and 5 = not at all. The total I-QOL score and three domain scores are calculated by summing the unweighted item scores and transforming them into a 100-point scale where 0 = no problem, and 100 = most severe (Nojomi et al., 2009).

3. Statistical analysis

Statistical analysis was performed using R Project (R Core Team, 2019). The statistical significance of the impact of surgery on the QoL of the patients was verified. For this purpose, the results of the IIQ-7 and I-QOL questionnaires were used; the patients were asked to complete these prior to surgery and twelve months after the surgery. Categorical variables were compared with Fisher’s exact test. The statistical significance of the differences in the scores within each group was tested using the Wilcoxon test for paired samples. The statistical tests were carried out with a significance level of $p = 0.05$.

Results

The project involved 57 women with a diagnosis of stage II and stage III stress incontinence. The mean age of the patients was 70.28 years and the range was 61–87 years. Analysis of the results obtained from the IIQ-7 questionnaire shows that the operation did not significantly affect the improvement of the quality of life of the respondents (Table 1). A detailed analysis of the results of the IIQ-7 questionnaire shows that after surgery, the majority of patients have decreased the frustration felt earlier due to urinary incontinence symptoms (question 7). In addition, after surgery, patients began to undertake physical and recreational activities more often (question 2). The answers obtained in question 1 show that the performed operation also significantly increased the patients' ability to perform home tasks (Table 2).

Table 1
Domain scores of the IIQ-7 questionnaire from women before and after surgery

	before surgery	after surgery	p-value
total score	46.1538 (0–100)	46.1538 (0–96.1538)	0.5303
	48.1605 (24.1045)	44.5221 (26.0864)	
Data are presented as median (range) and mean (standard deviation). n denotes size of each group. Given p-value is for the t - test.			

Table 2
Responses from IIQ-7 questionnaire from women before and after surgery

question	response	before surgery	after surgery	p-value
How strong the ailments affect your ability to do household chores (cooking, housecleaning, laundry)	not at all	1	1	0.2862
	slightly	11	8	
	moderately	10	10	
	greatly	12	3	
How strong the ailments affect your physical recreation such as walking, swimming, or other exercise?	not at all	0	1	0.2314
	slightly	12	4	
	moderately	12	12	
	greatly	15	9	
How strong the ailments affect your entertaining activities (movies, concerts, etc.)?	not at all	1	1	0.7183
	slightly	10	5	
	moderately	11	7	
	greatly	6	7	
How strong the ailments affect your ability to travel by car or bus more than 30 minutes from home?	not at all	1	0	0.6077
	slightly	12	5	
	moderately	7	7	
	greatly	10	8	
Do the ailments affect your participation in social activities outside your home?	not at all	14	6	0.9366
	slightly	7	3	
	moderately	6	4	
	greatly	1	0	
How strong the ailments affect your emotional health (nervousness, depression, etc.)	not at all	1	0	0.8061
	slightly	12	6	
	moderately	11	10	
	greatly	11	8	

Data are presented as subgroups size. Given p-values are for the Fisher's exact test.

question	response	before surgery	after surgery	p-value
How strong the ailments affect your feeling frustrated?	not at all	2	1	0.2042
	slightly	14	3	
	moderately	10	9	
	greatly	12	10	
Data are presented as subgroups size. Given p-values are for the Fisher's exact test.				

In most cases, the I-QOL results also confirmed that the patients' QoL improved after surgery. Statistically significant changes were observed in three questionnaire domains—namely, avoidance/limiting behavior, psychosocial impact, and social embarrassment (Table 3). The majority of statistically significant changes were found in the avoidance/limiting behavior domain (Table 4). A statistically significant change was also observed in the psychosocial impact and social embarrassment domains, though not in all questions (Tables 5 and 6). This may result from the fact that, even prior to surgery, the patients claimed that QoL in these domains was not as important for them as in the avoidance/limiting behavior domain.

Table 3
Domain scores of the IQoL questionnaire from women before and after surgery

	before surgery n = 57	after surgery n = 57	p-value
avoidance and limiting behaviours	35 (0–80) 36.71 (25.72)	22.50 (0–80) 27.92 (25.05)	0.02015
psychosocial impacts	32.22 (2.22–82.22) 35.04 (25.80)	18.89 (0–73.33) 24.48 (21.58)	0.002981
social embarrassment	36 (0–80) 38.13 (25.55)	28 (0–80) 30.07 (27.19)	0.01584
Data are presented as median (range) and mean (standard deviation). Given p-values are for the Wilcoxon test for dependent samples.			

Table 4
Avoidance and limiting behaviours responses from IQoL questionnaire from women before and after surgery

question	response	before surgery	after surgery	p-value
I'm worried that I won't be able to get to the toilet on time	1	18	25	0.03326
	2	7	11	
	3	10	10	
	4	13	2	
	5	12	12	
I am afraid of coughing/sneezing due to urinary incontinence	1	15	22	0.1561
	2	4	10	
	3	12	10	
	4	11	6	
	5	18	12	
I need to control myself when I'm getting up from a sitting position	1	27	39	0.05056
	2	7	7	
	3	12	9	
	4	9	1	
	5	5	4	
I worry about where the toilets are in a new place for me	1	18	26	0.1898
	2	11	14	
	3	10	3	
	4	4	4	
	5	17	13	
It is important for me to be able to use the toilet frequently	1	14	25	0.04097
	2	5	5	
	3	10	6	
	4	17	6	
	5	14	18	

Data are presented as subgroups size. Given p-values are for the Fisher's exact test.

question	response	before surgery	after surgery	p-value
It is important for me to plan every detail in advance because of urinary incontinence	1	20	22	0.3786
	2	10	7	
	3	10	7	
	4	5	12	
	5	15	12	
I have difficulty in resting properly at night because of urinary incontinence	1	25	30	0.7271
	2	8	10	
	3	8	7	
	4	9	5	
	5	10	8	
I have to watch how much fluid I drink due to urinary incontinence	1	17	30	0.08735
	2	8	8	
	3	13	6	
	4	5	6	
	5	17	10	
Data are presented as subgroups size. Given p-values are for the Fisher's exact test.				

Table 5

Psychosocial impacts responses from IQoL questionnaire from women before and after surgery

question	response	before surgery	after surgery	p-value
I feel depressed because of urinary incontinence	1	18	31	0.04457
	2	11	4	
	3	8	9	
	4	8	9	
	5	15	7	
I don't feel comfortable enough to be out of the house for a long time because of urinary incontinence	1	14	29	0.005231
	2	11	2	
	3	8	11	
	4	16	13	
	5	11	5	
I feel frustrated because urinary incontinence restricts me from doing what I like	1	18	31	0.1281
	2	12	8	
	3	12	11	
	4	8	6	
	5	10	4	
Urinary incontinence is "still in my head"	1	19	25	0.7467
	2	7	8	
	3	11	9	
	4	7	7	
	5	16	11	
Urinary incontinence makes me feel sick	1	21	35	0.08521
	2	14	6	
	3	7	6	
	4	8	4	
	5	10	9	

Data are presented as subgroups size. Given p-values are for the Fisher's exact test.

question	response	before surgery	after surgery	p-value
I feel helpless because of urinary incontinence	1	20	29	0.182
	2	13	10	
	3	7	11	
	4	7	3	
	5	13	7	
Urinary incontinence reduces the feeling of joy of life	1	22	27	0.09636
	2	7	14	
	3	10	4	
	4	11	11	
	5	10	4	
Urinary incontinence limits my possibilities of choosing clothes	1	29	37	0.6324
	2	7	5	
	3	9	7	
	4	6	3	
	5	9	8	
I'm afraid of having intercourse because of urinary incontinence	1	32	35	0.1654
	2	8	4	
	3	6	1	
	4	5	1	
	5	9	6	
Data are presented as subgroups size. Given p-values are for the Fisher's exact test.				

Table 6

Social embarrassment responses from IQoL questionnaire from women before and after surgery

question	response	before surgery	after surgery	p-value
I'm afraid that people around me smell urine	1	23	40	0.0001028
	2	9	2	
	3	10	0	
	4	3	6	
	5	15	10	
I am afraid that this problem will increase with age	1	14	23	0.07386
	2	9	8	
	3	7	1	
	4	7	11	
	5	23	17	
I'm afraid of being humiliated because of urinary incontinence	1	19	38	0.00163
	2	15	3	
	3	8	4	
	4	6	3	
	5	12	11	
I'm afraid of uncontrolled urine leakage	1	12	22	0.05753
	2	11	3	
	3	11	6	
	4	11	13	
	5	15	16	
I feel I can't control my bladder	1	14	23	0.3665
	2	13	7	
	3	11	10	
	4	8	6	
	5	14	14	

Data are presented as subgroups size. Given p-values are for the Fisher's exact test.

Discussion

The main purpose of this study was to assess the quality of patients' lives before and after stress incontinence surgery performed by the TOT method. The results demonstrated that the patients' QoL substantially improved after surgery, as in most cases the symptoms that had substantially limited everyday functioning subsided. In their study, Ellerkmann et al. measured the QoL of patients with anterior wall prolapse and urinary incontinence. Both their findings and ours show clearly that urogynecological problems have a great impact on the quality of patients' lives (Ellerkmann et al., 2001). Digesu et al. demonstrated considerable differences in the symptoms associated with pelvic organ prolapse between women with urinary incontinence and those without this health problem. Their study also revealed a weak correlation between vaginal anterior wall prolapse and urinary system symptoms, except for the 'feeling of incomplete emptying of the bladder' and 'effort during urination'. This may be caused by the fact that the bladder outlet is obstructed by the uterus, bladder, or rectum falling out of the skin of the vagina (Digesu et al., 2005).

As stated by Nilsson et al. and Lee, urinary incontinence noticeably lowers women's QoL irrespective of age, and has a negative impact on women's partnerships (Nilsson et al., 2009; Lee, 2005). According to Riss and Kargl, stress incontinence has a great impact on QoL, and should also be taken into account when starting treatment (Riss, Kargl 2011). Bushnella et al. provided evidence that urinary incontinence is not only a simple physiological problem, but also an issue that should be considered in the context of social, physical, and emotional consequences (Bushnell et al., 2005). Some studies show that women with urinary incontinence restrict their physical and social activity for fear of uncontrolled leakage. Further, women with incontinence significantly more often report problems in the sexual sphere; these, however, can be significantly improved by effective treatment (Mallah et al., 2014). Our study confirms this thesis, showing improvement in QoL in this aspect after surgery.

The effect of urinary incontinence on mental health has been examined by Goldacre et al., who provided evidence that women with urinary incontinence are more prone to depression and self-mutilation. Women with advanced symptoms of urinary incontinence suffered from severe depression three times as often as those with mild incontinence. Moreover, the relationship between urinary incontinence and anxiety symptoms is also higher in this group of patients. This problem has a significant impact on women's social life, especially in the case of older patients. Women with pelvic organ prolapse feel humiliated and embarrassed, which frequently leads to withdrawal from family and social life. Some researchers have emphasized that depression and urinary incontinence might be an epidemiology and etiology (Goldacre et al., 2007). Oh and Ku reached the conclusion that there is a strong correlation between urinary incontinence and mental disorders. Although urinary incontinence is not directly linked to death, it causes anxiety, depression, and dissatisfaction with life, which can lead to suicide attempts. The rate of depression in this group of patients is similar to that observed in patients with diabetes, cardiac conditions, and other chronic diseases (Oh, Ku, 2006).

Both this study and those cited above show how important it is to assess the QoL in patients with stress incontinence. Effective treatment not only improves patients' physical well-being by eliminating an anatomical defect, but also positively affects mental health. The results presented here show that healthcare professionals should not only provide surgical treatment but also assess and promote patients' QoL and mental health. It therefore seems necessary to carry out further research in order to develop strategies for the prevention, early diagnosis, and treatment of patients with stress incontinence.

Conclusions

1. Surgical treatment of stress incontinence by the TOT method relieves the majority of patients of bothersome symptoms and improves their QoL.
2. The IIQ-7 and the I-QOL questionnaires are useful instruments that measure the effectiveness of treatment and help patients understand how their QoL improved after surgery.
3. Further research seems necessary to develop strategies of dealing with patients who suffer from stress incontinence and have lower QoL.

Declarations

Declaration of competing interest

All authors declare that they have no competing interests.

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