



Sexual Function Before and After Mid-Urethral Sling Procedure for Stress Urinary Incontinence

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Abstract

Purpose We aimed to assess the effect of TOT procedure on sexual function and quality of life in sexually active patients. **Materials and Methods** Forty-one patients with SUI aged 18–70 years participated in this study during 2015–2019. Sexual function was evaluated by Female Sexual Function Index (FSFI), Incontinence Impact Questionnaire (IIQ-7) and Urogenital Distress Inventory Questionnaire (UDI-6) prior to TOT surgery and six months after surgery. **Results** The mean IIQ-7 and UDI-6 scores were significant lower after surgery ($P < 0.001$). The mean FSFI score was 22.69 ± 5.48 prior to surgery and 29.79 ± 4.12 in the sixth month after surgery ($P < 0.001$). We found significant changes in all FSFI domains except for pain. Two patients complained of new dyspareunia after surgery. There was also a direct significant correlation between education and sexual function improvement in terms of desire ($P = 0.031$). **Conclusion** TOT can significantly enhance sexual function with low rate of complications in patients with SUI.

Keywords Mid-urethral sling · Sexual function · Stress urinary incontinence · Trans-obturator tape · Urinary incontinence

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Background

Urinary incontinence is a very common complication affecting quality of life with major economic impacts on the health system [1, 2]. Population studies have shown that urinary incontinence is more common in women (10%). The prevalence of the disease dramatically increases with age, being approximately 40% in women over 70 years. Different studies have reported different prevalence rates, ranging from 25 to 45% [3]. The most prevalent types of urinary incontinence are stress urinary incontinence (SUI), including the leakage of urine with the rise in the intra-abdominal pressure, urgency urinary incontinence (UI), involving the leakage of urine due to urgency, irritable and overactive bladder and mixed urinary incontinence, which is a combination of the two previous urinary incontinence types. SUI accounts for 52–65% of incontinent cases in women aged 30–60 years [4]. About 28% of women with incontinence, report a breakdown in sexual health. Incontinence in old women reduces self-care and leads to depression [5]. Factors that exacerbate the effects of SUI in women with sexual health problems include old age, menopause, severe prolapse of uterus and more deliveries [6]. Approximately 25% of patients with UI report sexual dysfunction [7].

Severe incontinence causes libido reduction and vaginal dryness, as well as sexual dissatisfaction [8, 9]. Studies have also reported dyspareunia or pain during sexual intercourse, which is more frequent in patients with urinary incontinence compared with healthy individuals [10].

Since the introduction of mid-urethral sling surgery including trans-obturator tape (TOT) and tension-free vaginal tape (TVT), it quickly became the treatment of choice owing to its minimal invasive nature, high success and acceptable complication rates [11]. We aimed to evaluate the effect of TOT procedure on sexual function and quality of life in sexually active patients.

Materials and Methods

In this study, we evaluated SUI in patients undergoing TOT surgery in a referral center during 2015–2019. The study protocol was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (SBMU). The research process was completely explained to the patients, and informed consent was obtained. Inclusion criteria were 18–70 years of age, stress urinary incontinence, consent for TOT surgery for UI and active sexual function. Patients who

had at least one sexual intercourse during the three months prior to surgery were considered as sexually active. Exclusion criteria were malignancies, history of surgery in the pelvic region, vaginismus, high risk sexual behaviors and sexual dysfunction in the patient’s partner, confirmed psychiatric disease and use of drugs that affect sexual function. Patients’ demographic information such as age, number of deliveries, menopause status, education and underlying diseases were recorded. Urodynamic studies have been done for all patients (Fig. 1). Patients’ sexual function was assessed using the Female Sexual Function Index (FSFI), Incontinence Impact Questionnaire (IIQ-7) and Urogenital Distress Inventory questionnaire (UDI-6) prior to TOT surgery. The Persian versions of these questionnaires have been previously validated [12, 13].

The FSFI is a written instrument with six subscales and a total score that measures desire, arousal, lubrication, orgasm, satisfaction and pain (dyspareunia). After adjustment in the score of each domain, the total score is obtained from the sum of the scores of each subscale, which is in the range of 2–36.

The researchers completed the questionnaires via interviewing patients. Three questionnaires were completed for the first time when SUI surgery was confirmed, and the

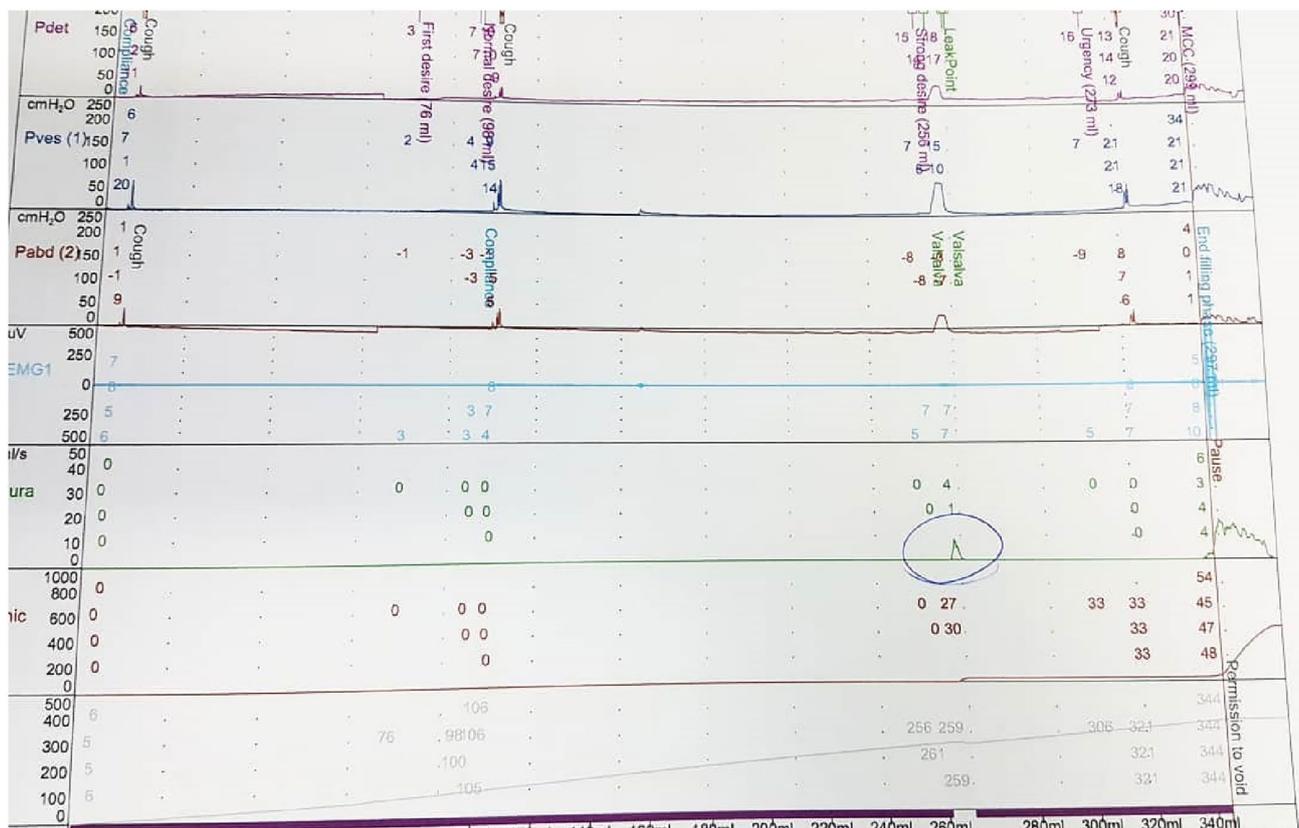


Fig. 1 Urodynamic evaluation of a representative patient

patients were then admitted to the hospital for TOT surgery. All patients underwent surgery with one experienced urologist who preferred TOT over TVT procedure. In the TOT surgery, the urethra was first freed through a vaginal incision 1 cm below the meatus up to one-third of the middle urethra; afterwards, the tape was passed through the obturator foramen by guiding special handles through small incisions made in the groin at the level of the clitoris. Next, urethra and tape stretching were adjusted and incisions were sutured.

Six months after surgery, the patients once again completed the FSFI, IIQ-7 and UDI-6 questionnaires. Following data collection, statistical analysis was performed using SPSS software version 25 (IBM, NY, USA). Fisher's exact test was used to measure the ratios and Mann-Whitney test was utilized for nonparametric statistical data survey. Paired *t*-test evaluated the score of questionnaires pre- and post-surgery, and ANOVA test controlled the confounding factors. $P < 0.05$ were considered as statistically significant.

Results

In this study, the sexual function of 41 patients with SUI was assessed before and after TOT surgery. The mean \pm SD age of the patients was 47.65 ± 5.7 , and their mean body mass index (BMI) was 26.15 ± 3.1 . All patients were sexually active prior to the surgery, and they started their sexual function six months after the surgery (Table 1).

The patients completed IIQ-7 and UDI-6 questionnaires after the TOT surgery. As shown in Table 2, the mean score of both questionnaires was significantly lower after surgery compared with the pre-surgery score ($P < 0.001$). The FSFI questionnaire was completed by patients before surgery and six months after. The mean \pm SD FSFI score was 22.69 ± 5.48 before surgery and 29.79 ± 4.12 after surgery (Fig. 2).

Table 1 Clinical and baseline characteristics of patients

Patients' characteristics	Mean \pm SD or frequency (%)
Age (years)	22.69 ± 5.48
BMI (kg/m^2)	29.79 ± 4.12
<i>Education</i>	
Illiterate	10 (24.3%)
High school	24 (58.5%)
College degree	7 (17.2%)
Number of deliveries	2.7 ± 1.4
<i>Comorbidity</i>	
Hypertension	11 (26.8%)
Diabetes mellitus	13 (31.7%)
Menopausal	16 (39%)

Table 2 IIQ-7 and UDI-6 scores of the patients before and after TOT

	Before surgery	After surgery	<i>P</i> value
IIQ-7	13.26 ± 3.91	2.01 ± 2.41	< 0.001
UDI-6	6.91 ± 2.89	2.73 ± 1.95	< 0.001

As shown in Table 3, patients exhibited significant changes in all FSFI questionnaire subscales except for pain. They did not undergo significant changes in pain scale after surgery ($P = 0.09$). SUI improved in all patients, no mesh erosion was detected in the subjects, and only two participants complained of new dyspareunia after surgery.

There was direct significant correlation between education and sexual function concerning desire ($P = 0.031$), meaning that sexual function improved more significantly in women with a higher level of education.

Discussion

SUI is an undiagnosed issue in women that leads to various disorders [14]. The prevalence of this complication varies based on the definition of incontinence in different populations. Anatomical or neurological disorders, medication, alcohol abuse or cultural factors may cause sexual dysfunction in women. Female sexual dysfunction is more common in women with pelvic floor disorders and UI as compared with the healthy female population [15, 16].

SUI can reduce self-confidence and lead to anxiety in women. Fear of incontinence during sexual intercourse can have negative impacts on women's sexual function [17]. There are several therapeutic approaches for treating incontinence, one of which is mid-urethral sling procedure which includes TOT and TVT. TOT surgery is now widely used for SUI treatment [18]. Based on the literature, different results have been associated with the improvement of female sexual function after correction of incontinence with the TOT procedure.

In the present study, the sexual function of 41 patients with SUI was assessed before and after TOT surgery. FSFI, IIQ-7 and UDI-6 questionnaires were used to assess the patients' sexual function. There was a statistically significant difference between pre-surgery and post-surgery scores in IIQ-7 and UDI-6 questionnaires. Also, patients showed significant changes in all subscales of the FSFI questionnaire except for pain.

Oglak et al. reported significant differences in the scores of FSFI, IIQ-7 and UDI-6 questionnaires before and after TOT. Patients also showed significant changes in all subscales of the FSFI questionnaire [19]. Narin et al. found that patients had a significantly altered sexual function following TOT. The participants completed FSFI, IIQ7 and

Fig. 2 Comparison of pre- and post-operative scores of the questionnaires (FSFI, IIQ-7 and UDI-6). The score of FSFI questionnaire increased significantly ($P < 0.001$) and the score of questionnaires IIQ-7 and UDI-6 decreased significantly ($P < 0.001$). Significant changes were observed in all domains of FSFI questionnaire except for pain

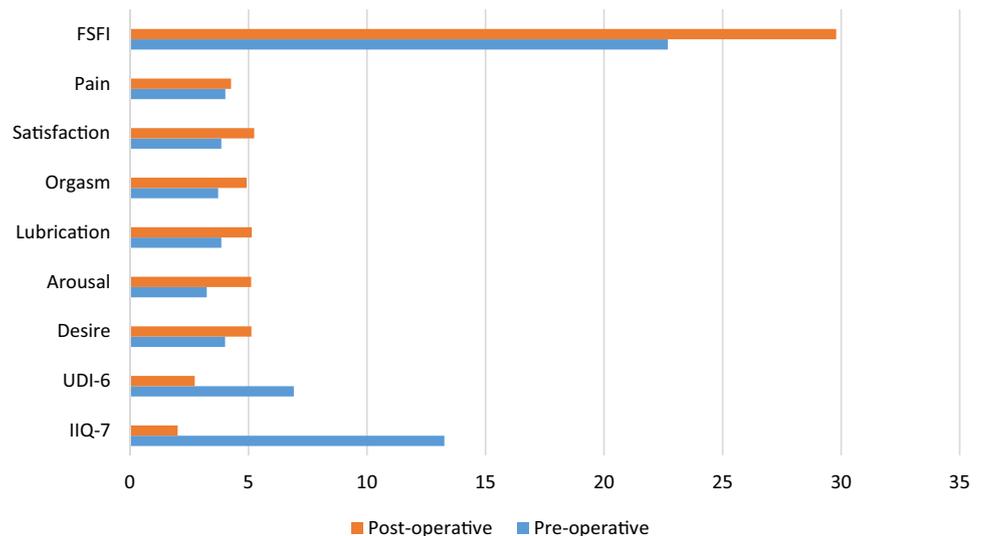


Table 3 Comparison of FSFI scores of the patients before and after TOT

Domain	Before surgery	After surgery	T score	P value
Desire	4.01 ± 1.42	5.12 ± 1.51	4.87	<0.001
Arousal	3.24 ± 1.80	5.11 ± 1.59	7.04	<0.001
Lubrication	3.85 ± 1.21	5.14 ± 1.17	6.94	<0.001
Orgasm	3.72 ± 1.65	4.92 ± 1.75	4.52	<0.001
Satisfaction	3.85 ± 1.68	5.24 ± 1.62	5.39	<0.001
Pain	4.02 ± 0.72	4.26 ± 1.08	1.71	0.009
Total FSFI	22.69 ± 5.48	29.79 ± 4.12	9.45	<0.001

UDI6 questionnaires before TOT surgery and three months after surgery. The changes in all three questionnaires were reported to be statistically significant [20], which is in line with our results. Tuncer et al. found that TOT was better than Burch colpo-suspension procedure in patients with SUI. Furthermore, unlike the FSFI questionnaire, there was a significant difference in the scores of IIQ7 and UDI6 questionnaires in TOT-treated patients before and after the operation ($P = 0.157$). Only the difference in scores of “desire domain” after surgery was significant [21] because of the improved coital incontinence in these patients after surgery. Hiasu et al. observed significant changes in IIQ7 and UDI6 scores after TOT in patients with UI. However, they showed very few changes in the FSFI questionnaire [22].

The incidence of new dyspareunia after SUI surgery in this study was 4.8% (2 patients), which was lower than other studies. The reason might be attributed to the patients’ follow-up only for six months, which may not be enough for mesh erosion (an important cause of dyspareunia).

Normal vulvovaginal structure and adequate mucus secretion by nerve stimulation are essential for normal female sexual function [23]. Sexual function may be affected by

complications of the SUI surgery process. It is possible that the TOT process damages the vascular and nervous structures and worsens the sexual function. One study showed that TOT caused more sexual dysfunction compared with tension-free vaginal tape, which was ascribed to vaginal narrowing [24]. Meanwhile, Weber et al. found that the decrease in vaginal dimension was neither significant nor associated with the changes in sexual function [25]. Caruso et al. examined the effect of TVT and TOT on clitoris blood flow by Color Doppler Ultrasound. They reported that contrary to TOT, TVT had a negative effect on clitoris blood flow [26]. Additionally, anatomical evaluation of TOT process showed that mesh was not in contact with neurovascular structures [27]. Serati et al. also demonstrated that the sexual dysfunction caused by complications such as damage to the dorsal clitoris nerves, loss of genital area sensation, dyspareunia and vaginal narrowing after TOT surgery was often related to the technical errors in mesh placement [28].

In the current study, it was found that patients with higher academic degrees were more able to improve their sexual function in terms of desire, which is similar to other studies [29].

The important limitations of our study were the single point evaluation of patients six months after surgery and the lack of long-term follow-up to assess their sexual function. In conclusion, the impact of mid-urethral sling procedure on female sexual function is still controversial. Based on our knowledge, the present study is the first to investigate this type of incontinence surgery on female sexual function in Iran. TOT procedure significantly changed the score of the FSFI questionnaire. With the exception of pain, significant changes also occurred in all subscales of the questionnaire. Therefore, it can be concluded that TOT surgery is capable of significantly enhancing sexual function in patients with SUI.

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Authors' Contribution All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by SA, MA and PP. The first draft of the manuscript was written by SA and PP, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Research Involving Human Participants and/or Animals This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1399.246).

Informed Consent The research process was completely explained to the patients, and informed consent was obtained.

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