



Contents lists available at ScienceDirect

## Taiwanese Journal of Obstetrics &amp; Gynecology

journal homepage: [www.tjog-online.com](http://www.tjog-online.com)

## Original Article

Impact of the mid-urethral sling for stress urinary incontinence on female sexual function and their partners' sexual activity<sup>☆</sup>Sheng-Mou Hsiao<sup>a, b, c</sup>, Ho-Hsiung Lin<sup>a, b, \*</sup><sup>a</sup> Department of Obstetrics and Gynecology, Far Eastern Memorial Hospital, Banqiao, New Taipei, Taiwan<sup>b</sup> Department of Obstetrics and Gynecology, National Taiwan University College of Medicine and the Hospital, Taipei, Taiwan<sup>c</sup> Graduate School of Biotechnology and Bioengineering, Yuan Ze University, Taoyuan, Taiwan

## ARTICLE INFO

## Article history:

Accepted 1 August 2018

## Keywords:

Mid-urethral sling procedure

Sexual function

Transobturator route

Stress urinary incontinence

## ABSTRACT

**Objective:** To assess the impact of the transobturator mid-urethral sling (MUS) procedure on female sexual function and their partners' sexual activity.**Materials and methods:** Sexually active women with stress urinary incontinence who underwent a transobturator MUS procedure at the Department of Obstetrics and Gynecology of two medical centers were prospectively enrolled. All participants and their partners were required to complete questionnaires before surgery and 3 months after surgery.**Results:** Eighteen women undergoing both the transobturator tape (TOT) procedure (n = 14) and the tension-free vaginal tape obturator (TVT-O) procedure (n = 4) were enrolled. The female sexual function index scores did not differ between the baseline and postoperative data. However, the overactive bladder symptom scores improved significantly 3 months after surgery. Patients also had an improvement in their arousal score after TOT procedures; however, there was no between-group difference in the post-treatment changes in the arousal scores. Thirteen partners completed their questionnaires at both the baseline and postoperative phases. Fifty-four percent (7/13) of partners stated that sexual intercourse improved after surgery, and 46% (6/13) described no change after surgery. In addition, no change in pain level due to vaginal narrowing or dryness after surgery was observed. Only one partner noticed the tape during intercourse and complained of pain due to the tape.**Conclusion:** Although most female sexual function remains unchanged after the transobturator MUS procedure, a significant percentage of partners in the study felt that their sexual activity improved after surgery.© 2018 Taiwan Association of Obstetrics & Gynecology. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

Mid-urethral sling (MUS) procedures include the retropubic and transobturator routes. The tension-free vaginal tape (TVT) operation for female stress urinary incontinence (SUI) was first introduced by Ulmsten and Petros in 1995 and became widely adopted shortly thereafter [1]. An alternative to the TVT procedure, known as the transobturator tape (TOT) outside-in technique, was

developed by Delorme to reduce intraoperative complications related to penetration of the retropubic space [2].

A vertical midline vaginal incision is performed in the middle third of the urethra passing through the thickness of the anterior vaginal wall in the MUS procedure [2]; thus, the MUS procedure may affect the 'G' spot. The 'G' spot is a supersensitive and densely innervated area for sexual excitement in some women and is located in the anterior vaginal wall [3,4]. A decrease in clitoral blood flow and sensation in the clitoral and anterior vaginal wall region has been noted after the MUS procedure [5,6]. Disruption of autonomic innervation of the vaginal wall had also been observed in the TVT procedure [7].

The female sexual response cycle can be divided into four phases: desire, arousal, orgasm and resolution [8]. Arousal refers to the subjective sense of sexual excitement and pleasure from sexual stimulation [8,9]. Orgasm refers to the peaking of sexual pleasure

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and release of sexual tension, with rhythmic contractions of the perineal muscles and reproductive organs [8]. Lubrication (e.g., the formation of transudate) is also generated from vasocongestion after sexual stimulation and enables painless vaginal penetration during sexual intercourse [10].

Aside from one article about retropubic MUS that reported deteriorated sexual function after surgery [11], most articles reported improved [12–18] or unchanged [19–23] female sexual function after MUS. The impact of the MUS procedure on sexual function is an important factor for preoperative consultation. Thus, the primary objective of this study was to assess female sexual function after the transobturator MUS procedure.

Although partners had reported either no difference in pain during sexual intercourse [24] or improvement in pain levels after the MUS procedure [17,18], pain during sexual intercourse might occur after the procedure [20,25] due to vaginal narrowing [24,25]. Thus, the secondary objective of this study was to assess the women's partners' sexual activity after the MUS procedure.

## Materials and methods

Between November 2009 and December 2012, sexually active women with stress urinary incontinence who underwent an MUS procedure, including Monarc TOT (American Medical Systems, Minnetonka, MN, USA) and Gynecare TVT-obturator (Ethicon, Somerville, NJ, USA) procedures at the Department of Obstetrics and Gynecology of two medical centers, were invited to participate in this study. The study was approved by the research ethics committees of these two hospitals.

All enrolled women provided written informed consent and were required to complete the Urogenital Distress Inventory (UDI-6) [26], Incontinence Impact (IIQ-7) [26], Overactive Bladder Symptom Score (OABSS) [27], Female Sexual Function Index (FSFI) [28] and modified Male Sexual Activity Questionnaire [29] before surgery and the UDI-6, IIQ-7, OABSS, FSFI and modified Male Sexual Activity Questionnaire [29] 3 months after surgery. Those women without postoperative 3-month follow-up were excluded from the outcome analysis.

The UDI-6 and IIQ-7 are used to assess the impact of urinary incontinence on health-related quality of life [26]. The OABSS, which represents the sum of daytime frequency, nighttime frequency, urgency and urgency incontinence symptoms, is used as a severity assessment for overactive bladder syndrome [27]. The FSFI includes six domains: desire, arousal, lubrication, orgasm, satisfaction and pain [28]. Higher FSFI scores represented greater positive effects on sexual function.

The Male Questionnaire for sexual activity, developed by Elzevier et al. [24] and Lemack et al. [30], is used to evaluate male sexual activity before and after surgery for SUI. The modified Male Sexual Activity Questionnaire [29] is modified from the above questionnaire [24,30] and includes the following questions: (1) How would you describe having sexual intercourse after the treatment (better than before the treatment, worse than before the treatment, or no difference between before and after the treatment)? (2) Did you experience vaginal narrowing during sexual intercourse? (3) Did you experience vaginal dryness during sexual intercourse? (4) Did you feel the tape and experience pain during sexual intercourse?

The Wilcoxon signed-rank test is a nonparametric test used for comparison of paired samples. McNemar's test was used for comparison of paired samples with nominal data. STATA software (Version 11.0; Stata Corp, College Station, Texas, USA) was used for the statistical analyses. P values <0.05 were considered statistically significant.

**Table 1**

Comparisons of variables of lower urinary tract symptoms and female sexual function between baseline and 3 months after mid-urethral sling procedures (n = 18).

Variables	Baseline	3 months after surgery	<sup>a</sup> P
UDI-6	7.5 ± 4.3	1.9 ± 3.0	0.0003
IIQ-7	7.9 ± 6.0	2.5 ± 4.1	0.0002
OABSS	6.4 ± 4.9	2.9 ± 2.7	0.003
FSFI			
Desire	2.3 ± 0.8	2.4 ± 0.7	0.71
Arousal	2.4 ± 0.7	2.7 ± 0.9	0.07
Lubrication	3.2 ± 1.1	3.2 ± 1.3	0.79
Orgasm	3.1 ± 1.0	3.0 ± 1.3	0.76
Satisfaction	3.0 ± 1.2	3.5 ± 1.3	0.25
Pain	3.5 ± 1.2	3.4 ± 1.7	0.48
Average score	2.9 ± 0.8	3.0 ± 1.1	0.61

Values are expressed as the mean ± standard deviation.

FSFI = female sexual function index; IIQ-7 = the Incontinence Impact Questionnaire short form; OABSS = Overactive Bladder Symptom Score; UDI-6 = Urogenital Distress Inventory.

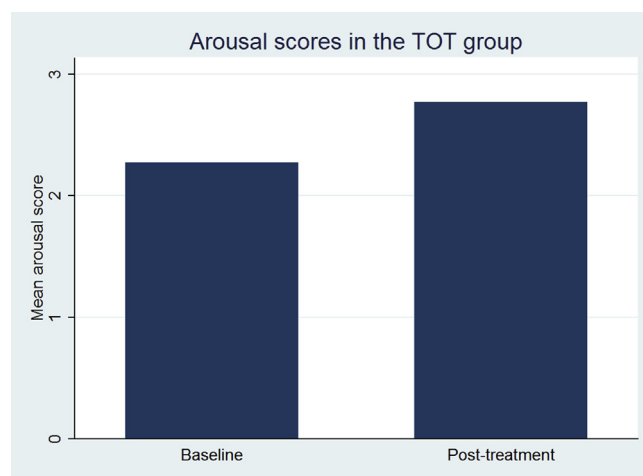
<sup>a</sup> By the Wilcoxon signed-rank test.

## Results

Eighteen women (10 women from one hospital and 8 women from the other) were enrolled in this study. The median age was 48 years old (25–75 interquartile range = 43–53 years). Fourteen women underwent Monarc TOT procedures, and four women underwent TVT-obturator (TVT-O) procedures. The UDI-6, IIQ-7 and OABSS scores were significantly improved 3 months after surgery (Table 1). However, the FSFI subscores and total scores did not differ between the baseline and postoperative data (Table 1).

Patients had an improvement in UDI-6, IIQ-7, OABSS and FSFI arousal scores after TOT procedures (Fig. 1). However, there was no difference in the changes after surgeries between the TOT and TVT-O groups (Table 2).

Thirteen partners completed both baseline and postoperative partner questionnaires [29]. Fifty-four percent (7/13) of partners stated that sexual intercourse was better after the MUS procedure than before it, and 46% (6/13) described no difference between before and after the MUS procedure (Fig. 2, Table 3). No difference was seen in the experience of vaginal narrowing or dryness between baseline and after the surgery (Table 3). Additionally, only



**Fig. 1.** Mean arousal scores of the female sexual function index between baseline and 3 months after the transobturator tape (TOT) outside-in procedure (2.3 ± 0.7 vs. 2.8 ± 0.8, P = 0.01, n = 13).

**Table 2**

Comparisons of baseline and the changes in lower urinary tract symptoms and female sexual function after surgeries between the TOT and TVT-O groups (n = 18).

Variables	Baseline			<sup>a</sup> Change		
	TOT (n = 14)	TVT-O (n = 4)	<sup>b</sup> p	TOT (n = 14)	TVT-O (n = 4)	<sup>b</sup> p
UDI-6	8.6 ± 5.0	6.5 ± 4.2	0.45	−6.7 ± 4.9**	−5 ± 3.8	0.56
IIQ-7	8.2 ± 6.2	6.8 ± 5.7	0.63	−5.4 ± 3.8**	−5.3 ± 5.8	0.52
OABSS	6.7 ± 5.0	5.5 ± 5.2	0.57	−3.8 ± 4.1*	−2.8 ± 3.0	0.57
FSFI						
Desire	2.2 ± 0.9	2.8 ± 0.3	0.31	0.2 ± 0.5	−0.5 ± 0.7	0.052
Arousal	2.3 ± 0.7	2.9 ± 0.7	0.10	0.5 ± 0.8*	−0.4 ± 1.4	0.32
Lubrication	3.1 ± 1.2	3.3 ± 0.4	0.86	0.3 ± 1.3	−0.8 ± 1.8	0.27
Orgasm	2.9 ± 0.9	3.8 ± 1.0	0.10	0.2 ± 1.1	−1.3 ± 2.0	0.16
Satisfaction	2.9 ± 1.4	3.2 ± 0.3	0.54	0.4 ± 1.5	0.1 ± 0.8	0.81
Pain	3.4 ± 1.3	3.6 ± 1.2	0.81	0.2 ± 1.1	−0.7 ± 3.0	1.00
Average score	2.8 ± 0.9	3.3 ± 0.5	0.40	0.3 ± 0.8	−0.6 ± 1.6	0.33

Values are expressed as the mean ± standard deviation.

FSFI = female sexual function index; IIQ-7 = the Incontinence Impact Questionnaire short form; OABSS = Overactive Bladder Symptom Score; TOT = transobturator tape; TVT-O = tension-free vaginal tape – obturator; UDI-6 = Urogenital Distress Inventory.

<sup>a</sup> Changes are calculated as the subtraction of pretreatment values from post-treatment values and expressed as the mean ± standard deviation. Comparison of data before and after surgery is performed using the Wilcoxon signed-rank test.\*: P < 0.05, \*\*: P < 0.01.<sup>b</sup> By the Wilcoxon rank-sum test.

one partner felt the tape during intercourse and complained of pain because of the tape (Table 3).

## Discussion

In this study, we did not observe any difference in the improvement of female sexual function 3 months after the transobturator MUS procedure (Table 1) except for a significant improvement in the arousal score for the TOT procedure (Fig. 1, Table 2). These findings are similar to the findings of many studies in Asia [19–22], which differ from studies conducted in Western countries [12–17]. Age-related complaints (e.g., decreased lubrication and orgasmic difficulties) have been suggested as potential contributors to postoperative sexual dysfunction [31]. In addition, racial differences might partly explain the differences in the changes of postoperative sexual function between the studies [32,33]. Nonetheless, Ko et al., in one South Korean study, reported that female sexual function deteriorated 3 months after the TOT procedure but that sexual function was regained at 6 months and improved at 12 months [18]. Some patients might suffer from dyspareunia or sexual dysfunction after vaginal mesh surgery [34,35]. Although the transobturator MUS procedure includes the

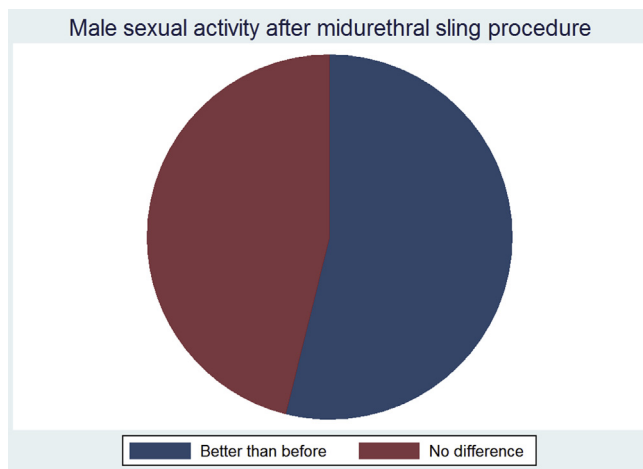
insertion of a mid-urethral mesh tape and a vertical midline vaginal incision, which may affect the ‘G’ spot, our results support the finding that the transobturator MUS procedure has no significant negative impact on overall female sexual function.

In this study, we found that 54% (7/13) of partners felt that their sexual intercourse became better than before the MUS surgery (Fig. 2, Table 3). Berglund et al. reported that most of the couples could openly discuss sexual matters with their partners and were satisfied with their sexual life, and more than half of the interviewed men reported an increase in sexual desire one year after their partners' operation for SUI [31]. Ko et al. also reported that significant improvements were observed in sexual relationship, quality of sex life, partner's affection during sex, and communication about sex after TOT surgery for SUI [18]. Narin et al. reported that both women's and their partners' sexual life were improved after TOT surgery [17]. Schettino et al. also found that 80.9% of female patients reported an improvement in the sexual function of their male partners after TVT-O surgery [36]. Although the transobturator MUS procedure includes a mid-urethral mesh tape insertion in the anterior vaginal wall, which might impede vaginal penetration theoretically, according to our results, the transobturator MUS procedure seems not to negatively affect male sexual activity.

There was no change in the experiences of vaginal dryness or vaginal narrowing during intercourse between baseline and after surgery in our study (Table 3). Elzevier et al. also reported that there were no changes in pain due to vaginal dryness after the MUS procedure [24]. It is worth mentioning that in this study, one partner experienced tape-related pain during intercourse (Table 3). Elzevier et al. also reported that one of 75 partners experienced tape-related pain during intercourse [24].

In this study, we also observed significant improvement of OABSS scores (Table 1), which means that the transobturator MUS procedure might improve overactive bladder symptoms. Many articles observed an improvement of overactive bladder symptoms after the MUS procedure [37,38]. Low incidence of obstructive and de novo symptoms and prevention of urine entering the urethra at raised abdominal pressure might explain the phenomenon of improved overactive bladder symptoms after the MUS procedure [38].

Our study has several limitations, one being our sample size. The prospective study design, however, might improve our study's reliability. In addition, our transobturator MUS procedure definition includes both TOT and TVT-O procedures. The TOT procedure had been reported to result in more sexual dysfunction than the



**Fig. 2.** Male sexual activity at 3 months after the mid-urethral sling procedure (better than before: 46% vs. no difference: 54%, n = 13).

**Table 3**

Comparisons of variables of the Male Sexual Activity Questionnaire between baseline and 3 months after the mid-urethral sling procedure (n = 13).

Variables	Baseline	3 months after surgery	<sup>a</sup> p	3 months after surgery		<sup>b</sup> p
				TOT (n = 11)	TVT-O (n = 2)	
Male sexual activity						
Better than before		7 (54)	—	6	1	1.00
No difference		6 (46)	—	5	1	—
Worse than before		0 (0)	—	0	0	—
Vaginal narrowing during intercourse	1 (7)	0 (0)	1.00	0	0	—
Vaginal dryness during intercourse	3 (23)	3 (23)	1.00	2	1	0.42
Pain during intercourse related to the tape	—	1 (7)	—	1	0	1.00

Values are expressed as number (percentage).

TOT = transobturator tape; TVT-O = tension-free vaginal tape-obturator.

<sup>a</sup> By McNemar's test.<sup>b</sup> By Fisher's exact test.

TVT- O procedure [24], but there was no difference in the changes after surgery between the TOT and TVT-O groups in this study (Table 2).

In conclusion, although most female sexual function remains unchanged after the transobturator MUS procedure, a significant percentage of partners in the study felt that their sexual activity became better after surgery.

## Funding

Far Eastern Memorial Hospital.

## Conflict of interest

None.

## Acknowledgments

This study was funded by Far Eastern Memorial Hospital (FEMH-99-D-035).

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