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Impact of tension-free vaginal tape on sexual function: results of a prospective study

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Abstract The purpose of this study was to prospectively assess the impact of a TVT insertion for the treatment of stress urinary incontinence (SUI) on coital incontinence and overall sexual life. Sexually active women with pure SUI and without concomitant pelvic organ prolapse scheduled for TVT procedure completed a sexual function questionnaire at baseline and 6 months after surgery. Fifty-three patients were enrolled. Preoperatively 23 (43.4%) women experienced urine leakage during intercourse, 21 (91%) during penetration and 2 (9%) on orgasm. The objective cure rate for SUI was 98%. Coital incontinence was cured in 20 of 23 patients (87%). Thirty-three (62.2%) women reported no change in sexual function after surgery and 18 (34%) reported an improvement. Of the latter, 17 (94%) were of those cured from coital incontinence. No significant difference in the incidence of dyspareunia was found postoperatively. Two patients (3.8%) reported intercourse to be worse following surgery, one because of a vaginal erosion and one cited de novo anorgasmia as the main reason.

Keywords TVT · Stress urinary incontinence · Sexuality · Sexual function

Introduction

The impact of urinary incontinence on an individual's life extends well beyond the more evident physical and physiologic sequelae. In the wide spectrum of psychosocial problems associated with this disorder, the impact on women sexual function has received little attention in the medical literature for long time. Recently, some

investigators provided evidence that female urinary incontinence may adversely affect the quality of sexual life [1–5], with at least one in four women reporting that urine leakage impairs their ability to have sexual relations [3]. Beside the direct interference of urinary tract symptoms with sexual activity (i.e., coital incontinence), the emotional distress, altered self-esteem and embarrassment might represent additional contributors to sexual dysfunction in patients attending urogynecology clinics.

Although in incontinence treatment trials quality of life has been promoted increasingly as an outcome domain that should be assessed [6], most prospective studies have failed to focus on cure rates of coital incontinence [7, 8] and sexual complaints at baseline and after surgical therapy [9, 10].

Urethrosuspension using a tension-free vaginal tape (TVT) currently represents the treatment of choice for urodynamic stress incontinence (SUI). Despite the multitude of reports on the objective and subjective outcomes of this minimally invasive procedure, very few studies have addressed the impact of TVT on sexuality. Small series evaluating the sexual well being before and after TVT placement showed conflicting results, with a reported deterioration of sexual function after surgery ranging from 3 to 20% of cases [8, 11–14]. The retrospective design of some studies, the heterogeneity of urodynamic diagnosis, the performance of concurrent surgical procedures other than TVT, the coexistence of urinary incontinence and pelvic organ prolapse and differences in the evaluated outcome measures preclude any definite conclusion on this issue.

The purpose of this study was to prospectively evaluate the effect of TVT procedure on coital incontinence and overall sexual function in a selected group of women with pure SUI.

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Materials and methods

Between January 1, 2002 and June 30, 2004 sexually active patients referred to the Urogynecologic Clinic of

Table 1 Sexual function questionnaire

Questions	Possible answers
How frequently do you have sexual intercourse?	Daily; 1–3 times a week; 1–3 times a month; Less than once a month
Does fear of incontinence restrict your sexual activity?	Never; Seldom; Sometimes; Usually; Always
Does fear of embarrassment because of incontinence restrict your sexual activity?	Never; Seldom; Sometimes; Usually; Always
Do you leak urine when you have sexual intercourse?	Never; Seldom; Sometimes; Usually; Always
Does the leakage occur during orgasm or penetration?	During penetration; On orgasm; During penetration and orgasm
Do you feel pain during sexual intercourse?	Never; Superficial; Deep; Both
How often are you able to achieve orgasm?	Never; Seldom; Sometimes; Usually; Always
Overall, how would you describe your sexual life after surgery? ^a	Unchanged; Improved; Worsened

^aThis item was included only in the questionnaire administered after surgery

our department and scheduled for a TVT procedure were enrolled in the study. The study was approved by the local Ethical Research Committee.

Preoperative evaluation included medical history, physical examination, urinary voiding diary, urine analysis and complete urodynamic testing. Multichannel urodynamic studies included uroflowmetry, cystometry, urethral pressure flowmetry, and establishment of Valsalva leak point pressure. Stress test, according to Ferrari classification [15] was used to assess the severity of stress incontinence. All procedures and all definitions correspond to those of the International Continence Society [16, 17]. Indication for surgery was considered only urodynamically proven stress incontinence, without signs of overactive bladder at urodynamics. Exclusion criteria were: history of anti-incontinence or any other major pelvic surgery, psychiatric, and neurological disorders, and concomitant vaginal prolapse greater than or equal to degree II using the pelvic organ prolapse quantification (POP-q), as described by the International Continence Society (ICS) [18].

The TVT procedures were all performed by the same experienced surgeon following the technique originally described by Ulmsten et al. [19], except for the type of anesthesia that was general or spinal, in accordance with the anesthesiologic requirements or patient willing. As previously described, in cases carried out under general anesthesia, instead of asking the patient to cough, a manual suprapubic pressure was applied in order to adjust the position of the vaginal tape [20]. A Foley catheter was placed for at least 24 h after surgery. Postoperative urinary retention has been defined in the presence of a failed first voiding trial, while voiding dysfunction has been determined by a residual urine volume more than 150 ml. Patients were considered objectively cured if no incontinence was found on the stress provocation test, performed in both standing, and lying position and at bladder volumes of 200 and 400 ml. All other cases were considered as objective failures. When patients complained postoperative occurrence of urge incontinence symptoms, urodynamic tests were repeated during the follow-up evaluation to rule out de novo detrusor overactivity.

Currently no condition-specific sexual function questionnaire validated by use in the Italian population is

available. In the absence of such a sexual function index for women with urinary incontinence, we used a questionnaire based on the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire developed by Rogers et al. [21]. This multiple-choice questionnaire requests information on the presence and magnitude of coital incontinence, on whether it occurred on orgasm or penetration, and on the impact of incontinence on the patient's sexual functioning (Table 1). Questions were few and kept as simple as possible since the purpose of the study was to reveal to which extent surgery could change overall sexual life, rather than to diagnose sexual psychopathology. The questionnaire was self-administered. Participants were asked to fill out the questionnaires while waiting for the clinical examination after recruitment and at their 6-month follow-up visit. The postoperative questionnaire included a further item on the surgery-related changes in the overall sexual life. A research assistant, who was not involved in patients care, collected all the questionnaires. Both the surgeon and the physician performing the clinical and urodynamic examinations were blinded with respect to questionnaire responses.

Statistical analysis was performed with Epistat 4.0 (Epistat Services, Richardson, TX, USA). Proportions of paired categorical variables were analyzed for statistical significance by using the McNemar test.

Results

During the study period a total of 53 patients were enrolled in the study. The characteristics of the study group are summarized in Table 2. Preoperative urodynamic evaluation revealed a moderate and severe SUI in 17 (32%) and 36 (68%) patients, respectively.

Table 2 Characteristics of the study population

Characteristic	N = 53
Age (years)	51 (34–70)
Parity	2 (0–4)
BMI (kg/m ²)	23 (21–39)
Menopause	28 (52.8%)
Hormone replacement therapy	11 (28.7%)

Data are expressed as median (range) or number (%)

Table 3 Responses to questionnaire at baseline and at the 6-month follow-up visit

	Baseline (N = 53)	After TVT (N = 53)	P-value
Frequency of sexual intercourse			
Daily	0	0	–
1–3 times a week	14 (26.4%)	30 (56.7%)	0.001
1–3 times a month	37 (69.8%)	22 (41.5%)	0.03
Less than once a month	2 (3.8%)	1 (1.9%)	1.0
Fear of incontinence			
Never	25 (47.2%)	36 (67.9%)	0.001
Seldom	8 (15.1%)	14 (26.4%)	0.18
Sometimes	9 (17%)	2 (3.8%)	0.015
Usually	6 (11.3%)	1 (1.9%)	0.12
Always	5 (9.4%)	0	0.06
Embarrassment because of incontinence			
Never	22 (41.5%)	32 (60.4%)	0.002
Seldom	9 (17%)	15 (28.3%)	0.23
Sometimes	16 (30.2%)	6 (11.3%)	0.02
Usually	3 (5.7%)	0	0.25
Always	3 (5.7%)	0	0.25
Coital incontinence	23 (43.4%)	3 (5.7%)	<0.0001
Dyspareunia			
Never	43 (81.1%)	42 (79.2%)	1.0
Superficial	8 (15.1%)	8 (15.1%)	1.0
Deep	2 (3.8%)	3 (5.7%)	1.0
Both	0	0	–
Ability to reach orgasm			
Never	2 (3.8%)	3 (5.7%)	1.0
Seldom	30 (56.7%)	21 (39.6%)	0.05
Sometimes	20 (37.8%)	27 (50.9%)	0.06
Usually	1 (1.9%)	2 (3.8%)	1.0
Always	0	0	–

Data are expressed as number (%)

The TVT insertion was performed in 20 (37.7%) cases under general anesthesia and in 33 (62.3%) under spinal anesthesia. Bladder perforation occurred in two cases (3.8%). In both cases the bladder lesion was identified during the operation and the tape was removed and replaced. No severe bleeding or other intraoperative complications occurred.

The median follow-up time was 12 (6–12) months, with 45 (84.9%) women completing the whole follow-up period. At the last follow-up evaluation 52 patients (98%) resulted objectively cured for SUI. The overall postoperative complication rate was 11.3%: three patients had voiding dysfunction, two women developed a urodynamically proven de novo detrusor overactivity, and in one case a small (3 mm) vaginal erosion with exposure of the vaginal tape was found 1 month after the operation. In the latter case, in accordance with the patient, an expectant management was adopted.

All patients were still sexually active at their 6-month follow-up evaluation. The responses to the questionnaire on sexual activity at baseline and at the 6 months after the operation are shown in Table 3. Participants answered the last question of the postoperative questionnaire reporting that the overall sexual function was unchanged, improved and worsened in 33 (62.2%), 18 (34%), and 2 (3.8%) cases, respectively.

Coital incontinence was cured in 20 out of 23 patients (87%). All patients who were cured of coital

incontinence were objectively cured of SUI. Seventeen out 18 (94.4%) women who reported postoperatively an overall improvement in sexual life were among those who were cured of coital incontinence. One of the two cases complaining urine leakage both during orgasm and penetration improved. The other woman did not report any improvement; both patients were objectively cured regarding SUI.

After TVT insertion no woman who complained of dyspareunia before the operation improved. Painful intercourses, with a worsening of the overall quality of sexual life, occurred de novo in the case complicated by the vaginal erosion. The other woman who stated that sexual function was worst after surgery mentioned an inability to reach orgasm not experienced before TVT procedure. In the latter case during physical examination the bulbocavernous reflex was evoked and the patient retained genital sensation.

Table 4 shows the response to questionnaire of women with coital incontinence. In women with coital incontinence, the frequency of sexual intercourse was increased 6 months after the operation while the fear of coital incontinence or the embarrassment of coital incontinence were significantly reduced. Among patients without coital incontinence, the frequency of sexual intercourse and the fear of coital incontinence were not significantly different at baseline and 6 months after surgery.

Table 4 Responses to questionnaire of women with coital incontinence

	Baseline (N=23)	After TVT (N=23)	P-value
Frequency of sexual intercourse			
Daily	0	0	–
1–3 times a week	4 (17.4%)	12 (52.2%)	0.008
1–3 times a month	18 (78.3%)	10 (43.5%)	0.04
Less than once a month	1 (4.3%)	1 (4.3%)	1.0
Fear of incontinence			
Never	1 (4.3%)	8 (34.8%)	0.01
Seldom	4 (17.4%)	12 (52.2%)	0.04
Sometimes	7 (30.4%)	2 (8.7%)	0.12
Usually	6 (26.1%)	1 (4.3%)	0.06
Always	5 (21.7%)	0	0.06
Embarrassment because of incontinence			
Never	2 (8.7%)	11 (47.8%)	0.004
Seldom	3 (13%)	10 (43.5%)	0.06
Sometimes	12 (52.2%)	2 (8.7%)	0.002
Usually	3 (13%)	0	0.25
Always	3 (13%)	0	0.25
Coital incontinence			
During penetration	21 (91.3%)	1 (4.3%)	< 0.0001
On orgasm	0	0	–
On orgasm and penetration	2 (8.7%)	2 (8.7%)	1.0
Frequency of coital incontinence			
Seldom	2 (8.7%)	1 (4.3%)	1.0
Sometimes	18 (78.3%)	2 (8.7%)	< 0.0001
Usually	2 (8.7%)	0	0.50
Always	1 (4.3%)	0	1.0
Dyspareunia			
Never	17 (73.9%)	17 (73.9%)	1.0
Superficial	5 (21.7%)	5 (21.7%)	1.0
Deep	1 (4.3%)	1 (4.3%)	1.0
Both	0	0	–
Ability to reach orgasm			
Never	2 (8.7%)	3 (13%)	1.0
Seldom	15 (65.2%)	6 (26.1%)	0.01
Sometimes	5 (21.7%)	13 (56.5%)	0.02
Usually	1 (4.3%)	1 (4.3%)	1.0
Always	0	0	–

Data are expressed as number (%)

Discussion

The findings of our study indicate that sexual function improves or is unaffected for most women with pure SUI after TVT procedure.

Conflicting data were previously reported on changes in sexual life after different surgical treatments of SUI, such as anterior colporrhaphy, laparoscopic, and laparotomic Burch colposuspension and a variety of sling procedures [22–24]. Even more inconsistent are the results of the few studies aimed at assessing the impact of TVT placement on sexual activity. A MEDLINE literature search from January 1995 to December 2004, using as search terms “sexual function”, “sexuality”, “tension-free vaginal tape”, “TVT”, and “urinary stress incontinence” alone or in combination identified only five articles that specifically address this issue (Table 5). Several limitations in the methodological quality of these studies do not allow to draw firm conclusions on the basis of their findings: First, most investigations are limited by their retrospective design [11, 13, 14] with the

potentially associated flaws. Second, heterogeneous patients samples were included with respect to the type of urinary incontinence, coexistent advanced pelvic organ prolapse and previous incontinence surgery. The lack of rigorous selection criteria does not allow to differentiate the relative contribution of different pelvic floor disorders in the genesis of sexual complaints. Moreover, patients undergoing concomitant vaginal surgery for genital descensus were not excluded in one study [12]. Finally, the results are difficult to compare because of different methods used to assess, analyze and report sexual function.

In our series nearly all women who reported an improvement of sexual life were those in whom coital incontinence resolved after surgery. It seems therefore plausible that the positive impact of TVT on sexual function is primarily attributable to relief of this distressing condition. This is in keeping with the results of a retrospective study showing a significantly higher proportion of women reporting an improved sexual activity after TVT among those who had experienced coital incontinence than in those who did not [14].

Table 5 Studies addressing sexual function after TVT procedure

Author	Study design	Patients with previous pelvic surgery included	Patients with concurrent surgery included	Comment	Sexually active patients (N)	Prevalence of coital incontinence		Sexual function after surgery		
						Baseline	After TVT	Unchanged	Improved	Worsened
Maaita et al. [11]	Retrospective	Yes	No	–	43	NA	4.6%	72%	5%	14%
Yeni et al. [12]	Prospective	No	Yes	Only premenopausal women	32	28%	6%	No statistical difference in preoperative and postoperative IFSF scores.		
Elzevier et al. [13]	Retrospective	Yes	No	–	65	53.8%	12.3%	72.3%	26.1%	1.6%
Glavind and Tetsche [14]	Retrospective	Not stated	No	TVT + other intravaginal sling procedures	48	49%	17%	60.4%	25%	6%
Mazouni et al. [8]	Prospective	Yes	No	No patients with sexual dysfunction at baseline	55	NA	NA	74.4%	1.8%	23.8%
Present study	Prospective	No	No	–	53	43.4%	5.7%	62.2%	34.0%	3.8%

NA Not available, IFSF Index of female sexual functions

Urinary incontinence during sexual intercourse is an infrequently volunteered symptom [25] with a prevalence ranging from 23 to 56% of incontinent women [1]. Most prospective studies exploring sexual function after incontinence surgery did not deal with coital incontinence or did not distinguish between incontinence on penetration or orgasm. Recently Baessler and Stanton in a retrospective study on 30 women with coital incontinence undergoing Burch colposuspension, reported an overall success rate for coital incontinence of 70%, with a cure rate of 81% when only incontinence on penetration was considered [26]. It is noteworthy that in this series overactive bladder was not an exclusion criterion, and therefore the relative contribution of detrusor instability and SUI in the determinism of coital incontinence is unknown.

Although urine leakage during intercourse is an extremely bothersome symptom, assuming that improvement in sexual well being after surgery is merely attributable to freedom from coital incontinence appears a simplistic view. Female sexual function is a complex multidimensional experience, with several biological, emotional, relational and social aspects. Several investigators found that SUI is significantly associated with sexual complaints, such as dyspareunia and loss of libido, regardless the presence and magnitude of coital incontinence [3, 4]. These findings support the hypothesis that incontinence surgery may improve sexual relations even when it does not directly influence symptoms arising during intercourses.

Our results suggest that the likelihood of a deteriorated sexual function after TVT procedure is minimal, in accordance with previous reports. Conversely, Mazouni et al. [8] found that approximately one in four patient described intercourse as worse than prior TVT placement. However, the total lack of sexual complaints at baseline arise some doubts on the sample selection, since epidemiological studies indicate that sexual dysfunctions is an highly prevalent condition in the general population [27]. Yeni et al. [12] reported a significant postoperative worsening only in the domain score of orgasmic function, suggesting that TVT can adversely affect a women's ability to reach orgasm. It has been suggested that a neuronal or vascular damage to the anterior vaginal wall or clitoral erectil tissue during TVT placement or as a consequence of collagen deposition may interfere with normal response to sexual stimulation. We found a statistically significant reduction in the occurrence of anorgasmia in the subgroup of women with preoperative coital urinary incontinence, however the sample size does not allow to draw definite conclusion on the influence of TVT on orgasm in the whole group.

A limitation of the present study is that we did not use a validated disease-specific sexual function questionnaire that would have provided more in depth information on different aspect of sexual life. The strength of this study is its prospective design and the inclusion of a well-selected homogeneous group of women with pure SUI, all operated by the same surgeon

and clinically evaluated preoperatively and postoperatively by the same investigator.

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