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Effect of mid-urethral sling surgery on sleep quality and quality of life in the treatment of stress urinary incontinence

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ABSTRACT

Objectives: This study aims to evaluate the effect of surgical outcomes on quality of life and sleep quality following stress urinary incontinence (SUI) surgery.

Materials and Methods: Patients diagnosed with SUI and treated with a mid-urethral sling were evaluated retrospectively. Fifty-six patients aged 40-75 years who had a follow-up period of more than 12 months, could not be treated conservatively, and had not previously undergone anti-incontinence or urogynaecological surgery were included in the study. Demographic findings of the patients and the pelvic examination were performed. The patients were evaluated preoperatively and postoperatively using the incontinence quality of life scoring system (I-QOL), Pittsburgh sleep quality index (PSQI), and cough stress pad test.

Results: A success rate of approximately 93% was achieved, with an objective cure in 46 patients (82.1%) and a subjective cure in six patients (10.8%). Statistically significant improvements were found in the patients postoperative I-QOL and PSQI scores. According to Spearman correlation analysis, there was a correlation between I-QOL and PSQI (r=-0.974). In women 65 years and older, the duration of incontinence symptoms was significantly longer (p<0.001); frequency of persistent incontinence (p=0.026) and incontinence episodes were evaluated as during sleep and/or spontaneous (p=0.011).

Conclusion: There is a relationship between quality of life and sleep quality in women with SUI. It was determined that surgical treatment significantly improved the quality of life and sleep quality of women with SUI.

Keywords: Stress urinary incontinence; quality of life; Pittsburgh sleep quality; mid-urethral sling; coughing stress ped test

INTRODUCTION

Urinary incontinence (UI) is not only characterised by urinary symptoms; it also directly affects a women quality of life, social life, and physical and mental health.[1] UI can cause sexual dysfunction, anxiety, depression, sleep disorders, and falls due to frequent awakening at night, which is associated with morbidity and can even lead to fractures.[2,3] It has been reported that women with UI have more sleep disorders than the general

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population in the same age range.[4] Sleep disorders seriously affect quality of life. Objective and subjective measurements are used for the clinical evaluation of UI.[5]

Lifestyle modifications to strengthen the pelvic floor muscles, pessary exercises, electrostimulation, and medical treatment options have been suggested in the literature as conservative approaches to UI.[6] In surgical treatment, transvaginal tapes (TVTs) (the first generation of synthetic slings) were developed as mid-urethral slings to achieve retropubic suspension with 80% cure rates.[7] In 2001, Delorme[8] described tension-free transobturator tapes (TOTs) (the second generation of slings) due to complications with TVTs. However, because of severe complications associated with the TOT technique, the first tissue fixation system (TFS) was described in 2005.[9] The TFS technique was found to have a higher cure rate and lower complication rate than TOT.[10] Single-incision mini-slings (SIMS) have become the most popular surgical method in recent years; they provide fixation of the mid-urethral tape to the obturator internus muscles at the level of the bilateral tendinous arch through a single incision.[11]

This study aims to evaluate the effect of surgical outcomes on quality of life and sleep quality in patients who were operated on with the mid-urethral sling technique due to stress urinary incontinence (SUI). Our hypothesis is that there is relationship between sleep and quality of life in patients with SUI.

MATERIALS AND METHODS

Patients diagnosed with SUI and treated with a mid-urethral sling were evaluated retrospectively. Patients with overflow incontinence, mixed and urge incontinence, overactive bladder, or genital prolapse; patients who had previously undergone anti-incontinence or urogynaecological surgery; and patients for whom preoperative urodynamic evaluation could not be performed were not included in the study. The inclusion criteria were as follows: age 40-75 years, at least 12 months follow-up, Valsalva leak point pressure <60 cm H_2O in the urodynamic evaluation, and not able to be treated conservatively. Fifty-six patients who met the inclusion criteria and attended their last follow-up appointments were included in the study.

Each patient's age, body mass index (BMI), smoking status, parity, gravida, menopausal status, chronic systemic diseases, and marital status were obtained from her medical records. Regarding urogynaecology, the patients were asked about incontinence symptoms, and pelvic examination, urodynamics, and pelvic ultrasonography were performed. Patients were evaluated preoperatively and postoperatively using the incontinence quality of life instrument (I-QOL), Pittsburgh sleep quality index (PSQI), and supine cough stress pad test (CSPT).[10,12,13]

The I-QOL is a questionnaire that consists of 22 question evaluated in three sections: avoidance and limiting behaviour, psychosocial impact, and social embarrassment.[12] Each question has five answers with values from 0 to 5, which adds up to a total score of 0-110. The higher the score, the better the quality of life. The PSQI consists of 24 question.[13] The 18 scored questions of the scale consist of seven components, which include subjective sleep quality (component 1), sleep latency (component 2), sleep time (component 3), habitual sleep efficiency (component 4), sleep disturbance (component 5), sleeping medication use (component 6), and daytime dysfunction (component 7). Each of the seven components is assigned a score of 0-3 points, which provides a total score of 0-21. The sleep quality of those with a score of 5 or less is considered "good", while a score above 5 indicates "poor" sleep quality. A PSQI score above 5 indicates that the person has severe problems in at least two components of sleep. For the CSPT, the patient is given a sanitary pad of known weight and asked to cough 10 times while standing. Then, the pad is weighted again; values below 0.5 grams are considered normal, while values above 0.5 grams are considered abnormal.

All operations were performed as previously described by a single surgeon (AAS) in the lithotomy position.[10,14] Surgically, two anchors attached to an adjustable sling were placed on the lower surface of the pubovaginalis/pubourethral ligament/muscle complex just behind the urogenital diaphragm (perineal membrane). An 18-gauge rigid Foley catheter was tightened until the tape made contact with the urethra and did not indent.[10,14]

Postoperative CSPT was performed to evaluate the success of the operation. If the patient's supine CSPT was negative and urinary incontinence was reported to have improved, the surgical outcome was considered an objective cure. If the patient reported improved urinary incontinence but the supine CSPT was positive, the surgical outcome was considered a subjective cure. The absence of a change in incontinence after surgery was considered a failure.[10,14] Postoperative complications, if any, as well as urinary retention and groin pain, were assessed.

Statistical Analysis

The data were evaluated using the IBM SPSS Statistics, Version 23.0 (IBM Corp., Armonk, NY, USA) program. The Shapiro-Wilk test was used to evaluate the distribution of the data. Student's t-test was used for normally distributed data, and the Mann-Whitney U test was used for non-normally distributed data in comparing groups. The Wilcoxon test was used to evaluate dependent groups that did not show a normal distribution. The chi-square test, Fisher's Exact test, and the Fisher-Freeman-Halton test were used to evaluate categorical variables. A p-value of <0.05 was considered statistically significant for all tests.

RESULTS

The demographic data of the patients are shown in Table 1. Forty percent of the patients had a history of one or more additional systemic diseases. A statistically significant improvement was found in the patients postoperative I-QOL and PSQI scores (Table 2). According to Spearman correlation analysis, there was a correlation between postoperative I-QOL and PSQI (r=-0.974) (Figure 1). The rates of being married and sexually active were higher in patients under 65 years of age (p=0.028). For patients 65 years and older, the duration of incontinence symptoms was significantly longer (p<0.001); frequency of persistent incontinence (p=0.026) and incontinence episodes were evaluated as during sleep and/or spontaneous (p=0.011).

The surgical outcomes were classified as follows: Four failures, six subjective cures, and 46 objective cures (Table 3). The preoperative PSQI scores of the patients with failure and subjective cure were "poor". Duration of incontinence symptoms five years or longer, frequency of persistent incontinence, and incontinence episodes were evaluated as during sleep and/or spontaneous (Table 3).

Two patients with surgical failure did not accept an additional surgical intervention due to advanced age and comorbidities; follow-up treatment was continued with oral antimuscarinic therapy. For the other two patients with failure, a retropubic TVT operation was performed in which the mesh was excised 12 and 15 months after the first operation due to mesh erosion.

There were no additional intraoperative complications. Anchor detachment was not observed in any of the patients. Urinary retention occurred in four patients in the early postoperative period and was managed with catheterization. Seven patients had the complaint of groin pain during the first six months; this complaint resolved in five of the patients within six months. The two (3.5%) patients with ongoing groin pain were those whose surgery was deemed a failure due to mesh erosion and who underwent revision surgery. The two patients with mesh erosion were postmenopausal, had a smoking history, had a BMI higher than 30 kg/m^2, and had multiple systemic diseases, such as diabetes mellitus.

Table 1. Demographic results

Variables	n (%)
Age (years)	69.5±8.4 (range; 40-74)
BMI (kg/m^2)	27.8±3.2 (range; 20.9-35.9)
Follow-up (months)	30.4±10.9 (range; 14-60)
Gravida*	4 (3-5)
Parity*	3 (2-4)
Previous childbirth (parity ≥1)	54 (96.5%)
Marital status (married, sexually active)	38 (68%)
Menopause status	35 (62.5%)
Smoking habit	32 (57%)

BMI: body mass index; mean ± SD; * median (IQR); SD: standard deviation; IQR: interquartile range

Table 2. Preoperative and postoperative evaluation of incontinence quality of life instrument and Pittsburgh sleep quality index

Variables	Preoperative	Postoperative	p
I-QOL	59±20.2	75.4±22.8	<0.001
PSQI	12.6±6.3	10.1±5.8	<0.001

I-QOL: incontinence quality of life instrument; PSQI: Pittsburgh sleep quality index

DISCUSSION

We achieved a 93% success rate in objective (82.1%) and subjective (10.8%) cures after SUI surgical treatment with our 30-month follow-up results. Sivaslioglu et al.[10,14] reported in their study that the objective cure rates were better in the SIMS group than in the TOT group at three and five year follow-up appointments. The objective cure rate was 83% in the SIMS group and 75% in the TOT group at 5-year follow-up appointments.[10,14] Several large meta-analyses compared the results of SIMS, TOT, and TVT.[15,16] There were no differences between surgical techniques in terms of objective cure, but SIMS surgery was reported to be safe and effective, with fewer perioperative complications.[15-17]

Sivaslioglu et al.[10] observed postoperative groin pain in one-third of TOT patients but none in the SIMS group at their 5-year follow-up appointments. Similarly, Masata et al.[18] reported that the

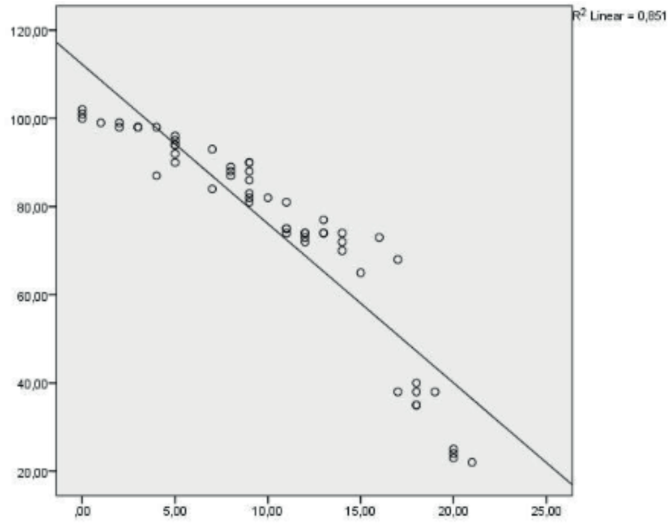

Figure 1. Correlation analysis between incontinence quality of life instrument and Pittsburgh sleep quality index

Table 3. The relationship between surgical cure rate and incontinence symptoms and sleep quality

Variables		n (%)	Objective cure 46 (82.1%)	Subjective cure 6 (10.8%)	Failure 4 (7.1%)	*p*
Preoperative CSPT	Negative	26 (46.4%)	24	2	0	0.123
	Positive	30 (53.6%)	22	4	4	
Postoperative CSPT	Negative	46 (82.1%)	46	0	0	<0.001
	Positive	10 (17.9%)	0	6	4	
Preoperative PSQI	Good (0-5)	10 (17.9%)	10	0	0	0.515
	Bad (6-21)	46 (82.1%)	36	6	4	
Postoperative PSQI	Good (0-5)	16 (28.6%)	30	0	0	0.137
	Bad (6-21)	40 (71.4%)	16	6	4	
Duration of incontinence symptoms (years)	1-3	17 (30.4%)	17	0	0	0.016
	3-5	14 (25%)	13	0	1	
	>5	25 (44.6%)	16	6	3	
Frequency of Incontinence	Occasionaly	8 (14.3%)	8	0	0	0.120
	Sometimes	10	10	0	0	
	Generally	13	12	0	1	
	Persistent	25	16	6	3	
Incontinence episodes	During sleep or/and spontaneous	13	3	6	4	<0.001
	During physical activity	32	32	0	0	
	Urinating to prevent incontinence	11	11	0	0	

CSPT: cough stress pad test; PSQI: Pittsburgh sleep quality index

mini-sling group had lower intensity and shorter postoperative pain than the TVT group. In the present study, there was groin pain in seven patients within the first six months, but it only persisted beyond six months in two patients. The two patients with persistent groin pain had mesh erosion (3.5%), and their complaints regressed after excision. In the literature, mesh erosion rates similar to this study have been reported in mini-sling groups (3.37-4.3%).[15,17,19]

It has been reported that the risk of UI increases by one-third in overweight individuals and almost doubles in obese patients. The risk is also higher in postmenopausal patients.[20,21] Consistent with the risk factors defined in the literature, 40% of the patients in this study had one or more additional diseases. Also, 62.5% were postmenopausal, and the sample mostly consisted of overweight patients with a mean BMI of 27.8 kg/m^2.[20,22] In addition, 57% of the patients had a history of smoking. Possible patient-related factors associated with mesh erosion in this study included smoking habits, advanced age, high BMI, and additional systemic diseases.

Some studies have focused on the surgical treatment of UI and its impact on mental health. Rosenzweig et al.[23] reported that successful surgical treatment significantly improved tension and sleep disturbances, while unsuccessful results significantly worsened UI-related depression and sleep problems. Stoffel et al.[24] reported that UI symptoms are a risk factor for depressive symptoms. In the present study, patients with more severe and long-standing symptoms had higher rates of failure or subjective cure after surgical treatment, and it was observed that their quality of life and sleep quality did not improve. Four patients with postoperative failure had persistent SUI symptoms; postoperative I-QOL and PSQI scores worsened rather than improved.

Although quality of life scores may improve, sleep quality may worsen after UI surgery, especially in older women.[25,26] In a study in which UI patients were treated medically, although there were no significant differences in PSQI total scores after treatment, it was found that there was some improvement in PSQI scores.[27] In the present study, there was an improvement in postoperative PSQI scores; in particular, the sleep quality of six patients showed a transition from poor to good. This suggests that, although improving UI symptoms improves quality of life, sleep quality may not improve due to different factors that affect sleep.

In our study, the mean postoperative I-QOL score increased, indicating a better quality of life after surgery. It has been

reported that UI is associated with poor sleep quality and sleep disorders, and sleep dysfunction increases as the frequency of UI increases.[4,25] In particular, nocturia is one of the most common reasons for waking up at night. It has been shown that there is a relationship between nocturia and poor sleep quality.[28,29] Patients with more severe urinary symptoms had a much lower quality of life and worse sleep quality. In the present study, as the women's I-QOL decreased, there was an accompanying deterioration in all sleep-related parameters and sleep quality, increased use of sleeping pills, and greater daytime dysfunction. Thus, the correlation analysis indicates that there is a close relationship between I-QOL and PSQI, suggesting a strong relationship between poor sleep quality and poor quality of life.

Study Limitations

Some limitations of this study should be addressed. There were fewer patients in this study compared to some larger studies on this topic. The lack of a control group that underwent a different type of surgery and had long-term follow-up results is another limitation. In addition, the results cannot be generalised because all of the patients had serious enough urinary symptoms to warrant surgery, the ages were not homogeneous, and other diseases affecting sleep, such as obstructive sleep apnea syndrome and restless legs syndrome, could not be diagnosed. Another limitation is that other life scores, such as depression and anxiety scores, were not evaluated.

CONCLUSION

This study found a close relationship between quality of life and sleep quality in women with SUI. It was determined that surgical treatment significantly improved the quality of life and sleep quality of the women with SUI. However, women with severe and prolonged SUI symptoms may not experience improved sleep quality and quality of life despite surgical treatment.

ETHICS

Ethics Committee Approval: The study protocol was approved by the Institutional Review Board at the Tokat Gaziosmanpaşa University (21-KAEK-152).

Informed Consent: Informed consent was obtained from all individual participants included in the study. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Peer-review: Externally peer-reviewed.

Contributions

Concept: A.A.Ö., A.A.S.; Design: A.A.Ö., A.A.S.; Data Collection and/or Processing: A.A.Ö.; Analysis and/or Interpretation: A.A.S.; Literature Search; A.A.Ö.; Writing: A.A.Ö., A.A.S.

DISCLOSURES

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