



Evaluation of Lower Urinary Symptoms Following Vaginal Reconstructive Surgery for Prolapse and Urinary Incontinence

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Abstract

Background: Urinary incontinence (UI) may be associated with symptoms of overactive bladder (OAB) that may persist after anti-incontinence surgery.

Objectives: The present study was performed to evaluate the effect of prolapse and anti-incontinence reconstructive surgery in women who had the symptoms of OAB and UI at the same time.

Methods: This descriptive cross-sectional study was performed on 56 women with OAB symptoms and stress UI (SUI)/urgency UI (UUI) with or without prolapse who were candidates for restorative and anti-incontinence surgery. At baseline, urinary symptoms, including urinary frequency, nocturia, SUI, and UUI, were recorded. Patients who finally underwent vaginal reconstructive surgery with anti-incontinence surgery were assessed for urinary symptoms six months after the operation.

Results: A total of 28 patients underwent transobturator tape (TOT) surgery, of whom 23 patients were subjected to other anti-incontinence surgeries and 5 patients underwent restorative surgeries. There was no significant difference between the two groups (TOT and others) in terms of age, body mass index, number of deliveries, history of medical problems, and history of surgery or cesarean section. The urinary frequency and nocturia before surgery were observed in 46 (82%) and 20 (36%) patients, respectively, which were not significantly different between the two groups. Before the study, occult UI was observed in 2 patients (4%), UUI in 3 patients (5%), SUI in 18 patients (32%), and mixed UI in 33 patients (59%). Nocturia was completely improved in all 20 patients. Urinary frequency was partially or completely improved in 41 patients (89%), which was not significantly different between the two groups ($P=0.051$). Overall, 53 patients (95%) had partial or complete improvement in UI, which was not significantly different between the two groups ($P=0.058$). Both patients with occult UI and all three patients with UUI were completely improved. Sixteen out of 18 patients (89%) with SUI were completely improved and the other 2 patients were partially improved. Thirty patients (91%) with mixed UI had a complete or partial recovery that was not significantly different between the two groups ($P=0.137$).

Conclusion: The findings of the present study showed that six months after anti-incontinence or reconstructive surgery, nocturia in all patients and urinary frequency in 89% of patients improved partially or completely. Various forms of UI partially or completely improved in 95% of patients, as well.

Keywords: Anti-incontinence surgery, Hyperactive bladder, Stress incontinence, Urgent incontinence, Urinary incontinence

1. Background

Urinary incontinence (UI) is defined as loss of bladder control or involuntary urination with stress, urge, mixed, overflow, or functional types (1). Stress UI (SUI) occurs when the urinary sphincter is weakened and does not work properly. Clinically, patients will face involuntary loss of urine during increased abdominal pressure, laughing, coughing, exercise, and physical activity (2). Urge UI (UUI) is the result of excessive activity of the detrusor muscle of the bladder (3). The typical patient complaint in these cases is the involuntary loss of urine with a feeling of great urgency to urinate while having a limited time to reach an appropriate toilet. Urgent UI is characterized by urinary frequency, nocturia, and incontinence (2). Mixed UI (MUI) is observed in patients with both stress and urge characteristics.

Overactive bladder (OAB) is one of the most common disorders of the lower urinary tract, which is defined as urinary urgency with or without incontinence. This disorder is considered responsible

for UUI with involuntary contractions of the detrusor during bladder filling (4), in the absence of some factors, such as infection, metabolic disorders, or pathological factors, including neurological diseases. The prevalence of OAB symptoms in women is estimated at 16.9% in the USA and 16.6% in six European countries (5).

Although pharmacotherapy is one of the most common methods for the treatment of OAB symptoms (3), if UI exists, especially SUI or MUI, the patient may not respond to drugs properly. If the first-line support treatments for SUI, including lifestyle changes and pelvic floor muscle strengthening exercises, are not effective, surgery may be needed. The most common and effective type of surgery is the retropubic tension-free vaginal tape and transobturator tape (TOT) procedure (6). These techniques are currently considered the gold standard for the treatment of SUI, which is associated with high improvement rates and long-term results (7, 8). However, few studies have been dedicated to investigating the effect of this type of surgery in cases

with OAB symptoms in the context of SUI or MUI.

2. Objectives

Therefore, the present study was conducted to investigate the effect of vaginal prolapse and anti-incontinence surgery on OAB symptoms in women with OAB symptoms and UI at the same time.

3. Methods

3.1. Study design and Participants

This descriptive cross-sectional study was conducted in 2016-2018 on women who were referred to Mahdih Hospital, Tehran, with urinary symptoms of OAB and SUI/UUI with or without prolapse who were candidates for restorative and anti-stress incontinence surgery. On the other hand, pregnant or lactating women, those with acute or chronic urinary infection, uncontrolled diabetes, and neuropathy, or women with bladder outlet obstruction due to stones or tumors were excluded from the study. Patients were selected in order of referral.

3.2. Ethical considerations

The research followed the Declaration of Helsinki principles. The Ethics Committee of Shahid Beheshti University of Medical Sciences, Tehran, Iran, approved this study. The Institutional Ethical Committee at Shahid Beheshti University of Medical Sciences approved all study protocols (IR.SBMU.MSP.REC.1400.485). Accordingly, informed consent was obtained from all participants before any intervention.

3.3. Measurements

Using a checklist, the patient's age, history of deliveries, and history of diseases and surgeries were recorded. In addition, the presence and severity of urinary symptoms (e.g., urinary frequency and nocturia) and UUI or SUI were asked and recorded. The severity of UI was recorded based on a visual scale. Afterward, the patients were subjected to systemic, genital, and neurological examination and their degree of prolapse was determined based on the Pelvic Organ Prolapse Quantification system. In patients who finally underwent reconstructive surgery along with anti-incontinence surgery (in the form of TOT or other incontinence surgery methods), six months after the surgery, the presence of urinary symptoms (urinary frequency and nocturia and UUI or SUI) and the severity of symptoms were investigated by phone or face-to-face interview, and the effect of surgery on urinary symptoms was questioned.

3.4. Statistical analysis

SPSS 25 software was used for data analysis.

Qualitative variables were described using frequency and percentage, while quantitative variables were presented as mean and standard deviation. To analyze the data, the Chi-square test and independent sample t-test were conducted. A $p < 0.05$ was considered statistically significant.

4. Results

4.1. Characteristics of the patients

A total of 28 patients underwent TOT surgery, of whom 23 patients were treated with other anti-incontinence surgical methods (Kelli's knot and Breech) and the other 5 patients were subjected to reconstructive surgeries. The range and mean age of the patients were 36-79 years and 51 ± 9 years, respectively. In addition, the range and average of the patients' body mass index (BMI) were 18.8-41.9 kg/m^2 and 28.6 ± 4.2 kg/m^2 , respectively. There was no significant difference in terms of age and BMI between the two groups of TOT surgery and other surgical methods ($P > 0.05$, Table 1). Most of the patients had a history of natural vaginal delivery. Twenty-three patients (41%) had a history of medical diseases, including dyslipidemia, hypertension, or heart disease, and 21 patients (38%) had a history of surgery or cesarean section. There was no significant difference between the two groups in terms of the number of natural vaginal delivery, history of medical diseases, surgery, or cesarean section (Table 1).

4.2. Patient complaints

The main complaint of the patients for surgery was only urinary symptoms in 13 patients (23%) and urinary symptoms along with anatomical problems and vaginal mass in 43 patients (77%). Anatomical problems and vaginal mass were significantly higher in the group of other surgeries ($P < 0.001$). There was no significant difference between the two groups in terms of urinary symptoms and the type of UI (Table 2). In 33 patients with MUI, the type of UI was mostly SUI in 13 patients (40%), UUI in 12 patients (36%), and both SUI and UUI equally in 8 patients (24%).

4.3. Improvement rate of urinary symptoms and UI

Six months after the surgery, nocturia was improved in all patients. In 41 patients (89%), the urinary frequency was completely or partially improved, which was not significantly different between the two groups ($P = 0.051$). In general, 53 patients (95%) had complete or partial improvement of UI, which was not significantly different between the two groups ($P = 0.058$, Table 3).

4.4. Improvement rate of UI according to its type

Both patients with occult UI underwent TOT surgery, which improved completely after surgery. Out of three patients with UUI, two patients underwent reconstructive surgeries and one patient

was subjected to other incontinence surgeries, all of whom improved completely. In patients with SUI, nine patients underwent TOT surgery, and all of them improved completely. Out of the other nine patients, seven patients were completely cured, while two

patients were partially cured. Table 4 tabulates the rate of improvement of MUI after the surgery. In addition, 30 patients (91%) had complete or partial improvement, which was not significantly different between the two groups (P=0.137).

Table 1. Comparison of demographic characteristics and patients' history

	TOT surgery (n=28)	Other surgeries (n=28)	All (n=56)	P-value
Age, year	51±6	51±12	51±9	0.832*
BMI, kg/m ²	28.3±4	28.8±4.5	28.6±4.2	0.677*
Delivery No.	2 times or less	9 (32%)	18 (32%)	0.930**
	3 or 4 times	15 (54%)	14 (50%)	
	5 times or more	4 (14%)	5 (18%)	
Medical history	12 (43%)	11 (39%)	23 (41%)	0.786**
History of surgery or cesarean	9 (32%)	12 (43%)	21 (38%)	0.408**

BMI: Body mass index, TOT: Transobturator tape surgery

*Independent t-test, **Chi-square test

Table 2. Comparison of frequency of urinary symptoms and incontinence between the two groups preoperatively

	TOT surgery (n=28)	Other surgeries (n=28)	All (n=56)	P-value*
Frequency	20 (71%)	26 (93%)	46 (82%)	0.136
Nocturia	11 (39%)	9 (32%)	20 (36%)	0.577
Urinary incontinence	Occult	2 (7%)	0 (0%)	0.170
	Urgent	0 (0%)	3 (11%)	
	Stress	9 (32%)	9 (32%)	
	Mixed	17 (61%)	16 (57%)	

TOT: Transobturator tape surgery

*Chi-square test

Table 3. Comparison of improvement of urinary frequency and incontinence between the two groups 6 months postoperatively

	Improvement	TOT surgery (n=28)	Other surgeries (n=28)	All (n=56)	P-value*
Urinary frequency	None	3 (15%)	2 (8%)	5 (11%)	0.051
	Partial	16 (80%)	15 (58%)	31 (67%)	
	Full	1 (5%)	9 (34%)	10 (22%)	
Urinary incontinence	None	3 (11%)	0 (0%)	3 (5%)	0.058
	Partial	1 (3%)	5 (18%)	6 (11%)	
	Full	24 (86%)	23 (82%)	47 (84%)	

TOT: Transobturator tape surgery

* Chi-square test

Table 4. Comparison of mixed incontinence improvement status between two groups 6 months postoperatively

Improvement	TOT surgery (n=17)	Other surgeries (n=16)	All (n=33)	P-value*
None	3 (18%)	0 (0%)	3 (9%)	0.137
Partial	1 (6%)	3 (19%)	4 (12%)	
Full	13 (76%)	13 (81%)	26 (79%)	

TOT: Transobturator tape surgery

*Chi-square test

5. Discussion

In our study, all patients with nocturia improved. Urinary frequency improved completely or partially in 89% of patients. In addition, three patients with UII improved completely. Sixteen out of 18 patients (89%) with SUI improved completely, whereas the other 2 (11%) improved partially. Patients with MUI had complete or partial recovery in 91% of cases.

Tahseen and Reid in the UK investigated changes in OAB symptoms and UII in 58 patients undergoing TOT surgery for SUI and MUI and reported that at a median follow-up of 13 months, TOT was associated

with complete or partial improvement in 79% of patients (9). Katsumi and Rutman published a review study on predicting the improvement of OAB symptoms after sling surgery in women with MUI. They reported that after sling surgery, the condition of patients with MUI whose predominant symptoms were urgency and UII was worse than that of patients with symptoms of SUI. However, OAB symptoms improved after sling surgery. Regarding the type of sling, they stated that the TOT sling was the most effective treatment for OAB and UII (10).

Liang et al. investigated the outcome of SUI and OAB symptoms after TOT procedures in 109 patients

with urodynamically confirmed SUI, three months and one year after the surgery. They reported that persistent SUI was present in 6.4% of patients 12 months postoperatively. The most common symptom of OAB was urinary frequency in 54.1% of patients, followed by UUI in 42.3%, urgency in 42.2%, and nocturia in 33% of cases, most of whom resolved within 3 and 12 months after the operation. Finally, they stated that in women diagnosed with SUI, simultaneous symptoms of OAB were common, and most of them could be resolved within 3 to 12 months after the surgery (11). The results of our study demonstrated that, in general, anti-incontinence and restorative surgeries were effective in improving all types of incontinence.

Consistent with our findings, Alessandro Digesu et al. investigated the changes in OAB symptoms in 93 patients undergoing anterior wall surgery and reported that one year after the surgery, urinary frequency, urinary urgency, and UUI disappeared in 60%, 70%, and 82% of patients, respectively. In addition, an anatomical correction was done and the quality of life improved. Finally, they stated that the repair of the anterior wall of the vagina could be effective in improving the symptoms of OAB; however, there is a need to conduct further studies with a longer follow-up period (12).

In our study, symptoms of OAB did not develop postoperatively in cases who only had SUI, while Rogowski et al. assessed 113 cases of TOT and reconstructive surgery, and reported incidence rates of 19.5% and 15.5% for OAB and SUI after the surgery, respectively (13).

It can be concluded that although the prevalence of OAB symptoms in SUI is high, prolapse and anti-incontinence surgeries are able to improve numerous urinary symptoms in patients. However, careful selection of eligible patients for this type of surgery can increase the improvement and patient satisfaction. Among the limitations of our study, we can mention the small sample size and the short follow-up period. It is recommended to carry out further multicenter studies with a larger sample size and longer follow-up period. Conducting such studies, in addition to a better investigation of the effect of anti-incontinence surgeries on OAB symptoms, can determine the preferred surgical methods for these patients.

Although the results of our study showed that in patients with UI and OAB, surgery was associated with the reduction of OAB symptoms, the cross-sectional and descriptive nature of the study and the small sample size were the most important limitations of this study. Therefore, further prospective studies are recommended to investigate the effect of surgery on OAB symptoms in patients with UI.

6. Conclusion

The findings of the present study revealed that six

months after anti-incontinence or reconstructive surgeries, nocturia in all patients and urinary frequency in 89% of patients recovered completely or partially. All three patients with UUI recovered completely. In addition, 16 out of 18 patients (89%) with SUI recovered completely and 2 patients (11%) recovered partially. In addition, 91% of patients with MUI had complete or partial recovery. Therefore, it seems that in patients with urinary symptoms or UI, surgery can reduce the symptoms of patients and eliminate UI in most cases.

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Footnotes

Conflicts of Interest: The authors declared no conflict of interest.

Author's contributions: Conceptualization: SAF, TJ, Methodology: SAF, TJm Validation: SAF, TJm Formal Analysis: SAFm, Investigation: SAF, TJ, Resources: SAF, Data Curation: SAF, Writing-Original Draft Preparation: SAF, Writing-Review and Editing: SAF, TJ, Supervision: TJ, Project Administration: SAF, TJ, Funding Acquisition: FM

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