The Changes of Voiding Pattern After Midurethral Sling Between Pure Stress Urinary Incontinence and Stress Urinary Incontinence With Overactive Bladder Group

Sun Wook Kim, Woo Hyun Kim, Byung Il Yoon, Yong-Hyun Cho, Dong Wan Sohn
Department of Urology, Yeouido St. Mary's Hospital, The Catholic University of Korea College of Medicine, Seoul, Korea

Purpose: The purpose of this study is to compare changes in voiding pattern after midurethral sling surgery (MUS) between the stress urinary incontinence (SUI) group and the overactive bladder (OAB)+SUI group.

Materials and Methods: From January 2008 to February 2011, a retrospective survey was conducted of 225 female patients who had been diagnosed with SUI and undergone MUS. The subjects were divided into the SUI group and the OAB+SUI group. Changes in the overactive bladder symptom score (OABSS) and American Urological Association-Symptom Index (AUA-SI) before and three months after the MUS were compared.

Results: Of the 225 patients, 165 patients (73.3%) were classified as SUI group, and 60 patients (26.7%) were classified as OAB+SUI group. The mean age of the subjects was 54.7 years (range, 31–80 years), and the mean age of patients was 53.9 years (range, 34–80 years), and 56.8 years (range, 31–78 years) in the SUI group and OAB+SUI group. In SUI group, voiding symptom and storage symptom among the AUA-SI were significantly increased (p < 0.05). OABSS were slight increased, but was statistically insignificant (p=0.847). In OAB+SUI group, voiding symptom score and OABSS showed a significant increase (p < 0.05), but storage symptom score showed an insignificant increase (p=0.790).

Conclusions: OAB may occur in approximately 18% of SUI patients who undergo MUS surgery, and voiding dysfunctions with deteriorated voiding symptom and storage symptom may also occur. The deteriorated OAB was shown in 45% of SUI patients with OAB after the surgery.

Keywords: Midurethral sling; Overactive bladder; Stress urinary incontinence; Urge incontinence

INTRODUCTION

Female stress urinary incontinence (SUI) is a disease that negatively affects personal life style and health-related quality of life. It has been reported to have a prevalence of 21.0%–22.9% in Korean middle-aged women [1,2]. Mixed urinary incontinence (MUI) is a disease accompanying urgency urinary incontinence (UUI) and SUI, and accounts for 36.4%–63% of total patients with urinary incontinence [2,3]. MUI has been known to more negatively affect the quality of life compared to pure SUI [3]. Since the introduction of Tension-free vaginal tape (TVT) surgery, midurethral sling surgery (MUS) has been mainly used for the treatment of SUI patients due to its advantages such as relatively simple and less invasive technique, less complications, and better efficacy [4]. Although the success rate of MUI is lower than that of SUI, Rezapour and Ulmsten [5] reported that MUS as a primary treatment method was...
effective in the treatment of MUI.

The mechanism of MUS is to prevent urinary leakage by providing the urethra with dynamic kinking when abdominal pressure increases [6]. Theoretically, MUS does not cause voiding dysfunctions such as weak stream, hesitancy, urgency, and straining. However, many studies reported that voiding dysfunctions such as decreased postoperative Qmax and increased postvoid residual (PVR) volume were observed [7]. In addition, it was reported that persistent symptoms or the occurrence of new symptoms were shown in 11%–45% of urinary incontinence patients who had undergone MUS [8,9]. There was a chance for overactive bladder symptom to be developed after MUS surgery on pure SUI patients in the clinical field. On the other hand, there was also feasibility for SUI patients with overactive bladder symptom to improve the conditions of symptom. MUI is generally defined as a case of having both UUI and SUI. However, cases of having both urgency and SUI seem to be more frequently seen in clinical practices. Accordingly, the authors divided the subjects into the SUI group and the OAB+SUI group, and compared changes in voiding pattern after MUS between the SUI group and the OAB+SUI group.

MATERIALS AND METHODS

This study was conducted on 225 female patients who had been diagnosed with SUI and undergone MUS, and who were followed-up for 3 months or longer of those who visited the Department of Urology of The Catholic University of Korea, Yeouido St. Mary’s Hospital from January 2008 to February 2011.

The study was retrospectively conducted via the analysis of patient’s medical records, medical interview on the current health status of the patients, and survey, after approval from the Institutional Review Board (SC12RISI0020). The subjects were divided into the SUI group and the OAB+SUI group. Patients with complaint of involuntary loss of urine on effort or physical exertion (e.g., sporting activities), or on sneezing or coughing were assigned to the SUI group, whereas patients with SUI accompanied with overactive bladder symptom which defined as urinary urgency, usually accompanied by frequency and nocturia, with or without UUI, in the absence of urinary tract infection or other obvious pathology, were assigned to the OAB+SUI group [10]. Patients who had anticholinergic medication before the surgery or who received previous conservative treatments excluded from the subjects. Changes in the overactive bladder symptom score (OABSS) and American Urological Association-Symptom Index (AUA-SI) before and after the surgery were compared between the SUI group and the OAB+SUI group. In addition, AUA-SI was analyzed by categorizing questionnaires related to voiding symptoms (questions No. 1, 3, 5, and 6) and storage symptoms (questions No. 2, 4, and 7).

The mean age of the subjects was 54.68 years (range, 31–80 years). All patients underwent preoperative examinations including disease history taking, physical examination, urinalysis, urine culture, 1-hour pad test, Q-tip test, daily voiding check, uroflowmetry, and the measurement of the residual urine amount, and OABSS. In addition, the AUA-SI was assessed to examine the storage symptom and voiding pattern of the bladder before and after the surgery. Most patients underwent general anesthesia or spinal anesthesia before the surgery, whereas some patients underwent monitored anesthetic care (MAC) as a preoperative treatment, followed by local anesthesia of the surgery area. The surgery using outside-in transobturator tape (TOT) procedure via transobturator route was conducted.

The OABSS and AUA-SI were measured before the surgery and 3 months after the surgery in each group, and the changes in voiding pattern before and after treatment was observed by comparing the preoperative and postoperative scores in each group.

A statistical analysis was conducted using PASW Statistics 18.0 (SPSS Inc., Chicago, IL, USA). An independent t-test, and paired t-test were conducted for back-testing. If p < 0.05, it was considered statistically significant.

RESULTS

Of the 225 patients, 165 patients (73.3%) were classified as SUI group, and 60 patients (26.7%) were classified as OAB+SUI group. The mean age of the subjects was 54.7 years (range, 31–80 years), and the mean age of patients was 53.9 years (range, 34–80 years), and 56.8 years (range, 31–78 years) in the SUI group and OAB+SUI group (p < 0.05). In addition, there was no significant difference between these two groups in terms of symptom period, mean body index, mean 1-hour pad test, and mean Q-tip test (Table 1). The mean preoperative and postoperative AUA-SI were shown to be 0.96 points (range, 0–6 points) and 2.23 points (range, 0–4 points), respectively, in the SUI group. When the voiding symptom (questions No. 1, 3, 5 and 6) among the AUA-SI were compared, the mean preoperative and postoperative scores were shown to be 0.71 points (range, 0–2 points) and 2.31 points (range, 0–4 points), respectively, which showed a significant increase (p < 0.05). In addition, when the storage symptom (questions No. 2, 4, and 7) among the AUA-SI was compared, the

| Characteristic                  | SUI group (n=165) | OAB+SUI group (n=60) | p-value |
|--------------------------------|------------------|----------------------|---------|
| Age (y)                        | 53.7±10.9        | 56.8±10.7            | 0.0775  |
| Symptoms period (y)            | 7.9±5.3         | 8.1±5.1              | 0.8007  |
| Body mass index (kg/m²)        | 24.5±3.4        | 24.1±2.1             | 0.3944  |
| 1-Hour pad test (g)            | 21.7±12.5       | 23.1±14.8            | 0.4807  |
| Q-tip test (*)                 | 36.1±11.8       | 37.5±11.4            | 0.4280  |

Values are presented as mean±standard deviation.

SUI, stress urinary incontinence; OAB, overactive bladder.

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mean preoperative and postoperative scores were shown to be 0.25 points (range, 0–1 points) and 0.65 points (range, 0–3 points), respectively, which showed a significant increase (p < 0.05) (Fig. 1). The mean preoperative and postoperative OABSS were shown to be 0.80 points (range, 0–3 points) and 0.90 points (range, 0–4 points), respectively, which showed a slight increase, but was statistically insignificant (p=0.847) (Fig. 2).

Meanwhile, the mean preoperative and postoperative AUA-SI were shown to be 8.55 points (range, 4–12 points) and 11.15 points (range, 2–16 points), respectively, in the OAB+SUI group. When the voiding symptom (questions No. 1, 3, 5, and 6) among the AUA-SI was compared, the mean preoperative and postoperative scores were shown to be 1.90 points (range, 0–8 points), and 3.85 points (range, 0–11 points), respectively, which showed a significant increase (p < 0.05). In addition, when the storage symptom (questions No. 2, 4, and 7) among the AUA-SI was compared, the mean preoperative and postoperative scores were shown to be 6.65 points (range, 3–9 points), and 7.3 points (range, 4–10 points), respectively, which showed an insignificant increase (Fig. 3). The mean preoperative and postoperative OABSS were shown to be 6.45 points (range, 4–11 points) and 6.60 points (range, 2–9 points), respectively, which showed a significant increase (p < 0.05) (Fig. 4). When the postoperative overactive bladder symptom was compared, OAB symptom newly occurred in 30 patients (18%) of the SUI group. Meanwhile, in the OAB+SUI, there were 27 patients (45%) that complained aggravated conditions of OAB symptoms after surgery. Among them, 12 patients (20%) had reported that they newly developed
voiding dysfunction was occurred after TOT surgery due to its advantages such as relatively simple technique, good outcome, and less complications. Its surgical mechanism bring no change to the urethra in the case of normal abdominal pressure, and prevent SUI by providing the urethra's dynamic kinking in the case of increased abdominal pressure. Although it does not theoretically induce voiding dysfunction such as weak stream, hesitancy, urgency, and straining [6], many studies reported that voiding dysfunction was observed in patients with SUI who underwent MUS.

Jang et al. [6] reported that when MUS was conducted on 156 patients with SUI, three patients (1.9%), 2 patients (1.3%), and 7 patients (4.5%) complained of weak stream, residual urinary sensation, and frequency, respectively, and that voiding dysfunction occurred in the total 12 patients (7.7%). Salin et al. [7] reported that when MUS was conducted on 100 patients with SUI, five patients (5%) complained of urinary retention and 6 patients (6%) complained of hesitancy, slow stream, and feeling of incomplete emptying, and that voiding dysfunction occurred in the total 11 patients (11%). Kim et al. [11] have reported that voiding dysfunction was occurred after TOT surgery due to postoperative edema of bladder neck or urethra. Most of them were temporary and actually started to improve as time passed by. In this study, when the voiding symptom among the AUA-SI was compared, the mean score was shown to be 0.71 point before the surgery and 2.23 points after the surgery, which showed a significant increase. 82% of the pure SUI patients in this study complained aggravated conditions of voiding symptom after surgery, and 49% had reported aggravated conditions of storage symptoms. In addition, 35% of patients had one point more on the OABSS. Compared to previous studies, the result of this study showed a higher rate of voiding dysfunction. In the previous studies, voiding dysfunction was assessed according to objective criteria such as maximal flow rate, PVR, postoperative urodynamic study finding. Meanwhile, in this study, voiding dysfunction was assessed according to the patient’s subjective symptoms. In addition, the previous studies were conducted 6–12 months after the surgery, whereas this study was conducted three month after the surgery, which showed a difference in study conduct time. Thus, the aforementioned two factors are likely to have contributed to the difference in the results between the previous studies and this study.

DISCUSSION

MUS is most commonly used for the treatment of SUI due to its advantages such as relatively simple technique, good outcome, and less complications. Its surgical mechanism bring no change to the urethra in the case of normal abdominal pressure, and prevent SUI by providing the urethra’s dynamic kinking in the case of increased abdominal pressure. Although it does not theoretically induce voiding dysfunction such as weak stream, hesitancy, urgency, and straining [6], many studies reported that voiding dysfunction was observed in patients with SUI who underwent MUS.

Kim et al. [11] have reported that voiding dysfunction occurred in the total 12 patients (1.1%), and 7 patients (4.5%) complained of weak stream, residual urinary sensation, and frequency, respectively, and that voiding dysfunction occurred in the total 12 patients (1.1%), and 7 patients (4.5%) from OAB+SUI group that had vaginal erosion after the surgery. Furthermore, all of them were solved by conservative treatment such as antibiotics therapy. Other than them, there was no complication after surgery including acute urinary retention, mesh exposure, urinary tract infection, and would infection.

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assessment of postoperative voiding dysfunction, a prospective study is further required via the analysis of objective tests such as urodynamic study in addition to the conduct of the survey. As no mechanism of MUS in the treatment of voiding dysfunction and MUI that occur after urinary incontinence surgery has been established yet, further follow-up and studies are additionally required.

CONCLUSIONS

When implementing MUS on patients with SUI, 18% of the patients newly developed OAB symptoms 3 months after the surgery as well as voiding dysfunction that aggravated voiding symptom or storage symptom. In addition 45% of the SUI patients with OAB complained aggravated condition of OAB symptoms 3 months after surgery. Therefore, it seems to be required to provide additional medicine treatment as well as special concern on sensitive bladder after the surgery especially for patients with urinary incontinence.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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