

PREOPERATIVE MEASUREMENT OF THE BLADDER WALL THICKNESS MAY BE USEFUL TO PREDICT POSTOPERATIVE IMPROVEMENT OF OVERACTIVE BLADDER SYMPTOMS IN PATIENTS WITH OVERACTIVE BLADDER ASSOCIATED WITH PELVIC ORGAN PROLAPSE.

Hypothesis / aims of study

It has been reported that ultrasonography shows increased urinary bladder wall thickness in patients with overactive bladder (OAB) [1]. Transvaginal mesh (TVM) surgery is performed for patients with pelvic organ prolapse (POP); OAB symptoms that were present preoperatively improve with the surgery in some patients, while they become worse in other patients; in yet others, OAB symptoms appear *de novo* after the surgery. It is considered that anatomic dislocation of the urinary bladder or the urethra causes OAB in patients with POP. The possible causes of OAB appearing *de novo* after surgery are the presence of subclinical OAB or response to the insertion of the mesh as a foreign substance. While OAB symptoms often show changes after surgery, few reports have discussed the association between the degree of urinary bladder wall thickening by TVM surgery and the severity of OAB symptoms.

In this study, we measured the urinary bladder wall thickness before and after TVM surgery and evaluated the changes in the Overactive Bladder Symptom Score (OABSS).

Study design, materials and methods

The subjects were patients undergoing TVM surgery for POP, who had provided informed consent for participation in this study. Patients undergoing posterior TVM alone for rectal tumor were excluded from the study.

We evaluated the OABSS and measured the urinary bladder wall thickness by ultrasonography before and 6 months after the surgery. The urinary bladder wall thickness was measured at three points on the bladder, namely, the anterior wall, trigone, and dome of the bladder. Ultrasonography was performed transvaginal using a 7.5-MHz probe; the examination was performed when approximately 200 mL of urine was pooled in the bladder.

Results

Among the patients enrolled in the study, 38 patients, with a mean age of 68.3 ± 7.3 years, were evaluable. The type of surgery performed was anterior TVM in 24 patients, anterior and posterior TVM in 10 patients, and total TVM in 4 patients. The OABSS improved in 28 patients (73.7%), showed no change in 6 patients (15.8%), and became worse in 4 patients (10.5%). In all patients, significant improvement of the Q1 (Daytime frequency) and Q3 (Urgency) scores as well as the total score was observed (Table 1). Also in all patients, the bladder wall thickness reduced after the surgery at the anterior wall and dome of the bladder, while no change was observed at the trigone (Table 2). Subgroup analysis after classifying the patients into a responder group (showing improvement of the OABSS) and non-responder group (showing no change or worsening of the OABSS) revealed that in the responder group, the urinary bladder wall thickness decreased significantly after the surgery at the anterior wall and dome of the bladder, while no change of the wall thickness was observed at the trigone; on the other hand, in the non-responder group, no significant change of the urinary bladder wall thickness was observed at any of the three sites on the bladder (Table 3). Moreover, at any given site, the urinary bladder wall thickness before surgery was greater in the non-responder group as compared with that in the responder group (Table 4).

Table.1 Changes in the OABSS in all patients

| OABSS | Pre-OP | Post-OP | Pvalue |
|--------------------------|---------|---------|---------|
| Q1. Daytime frequency | 0.9±0.7 | 0.3±0.5 | <0.0001 |
| Q2. Nighttime frequency | 1.3±0.8 | 1.1±0.9 | 0.2343 |
| Q3. Urgency | 2.0±1.6 | 1.0±1.5 | 0.0020 |
| Q4. Urgency incontinence | 1.0±1.5 | 0.5±1.1 | 0.0702 |
| total score | 5.1±3.3 | 2.8±2.8 | 0.0004 |

Table.2 Changes in the urinary bladder wall thickness in all patients

| Bladder wall thickness | Pre-OP | Post-OP | P value |
|------------------------|---------|---------|---------|
| Anterior (mm) | 5.7±1.2 | 4.8±1.4 | <0.0001 |
| Trigone (mm) | 6.1±1.3 | 6.3±2.2 | 0.5485 |
| Dome (mm) | 5.8±1.1 | 5.0±1.3 | 0.0001 |

Table.3 Comparison of the bladder wall thickness before and after surgery between patients showing improvement and deterioration of the OABSS

| Bladder wall thickness | OABSS-responder | | | OABSS-non responder | | |
|------------------------|-----------------|---------|---------|---------------------|---------|---------|
| | Pre-OP | Post-OP | P value | Pre-OP | Post-OP | P value |
| Anterior (mm) | 5.7±1.3 | 4.5±1.2 | 0.0007 | 6.6±1.0 | 5.8±1.5 | 0.1386 |
| Trigone (mm) | 5.7±1.3 | 5.7±2.1 | 0.6571 | 7.0±0.9 | 7.6±2.1 | 0.1731 |

| | | | | | | |
|-----------|---------|---------|--------|---------|---------|--------|
| Dome (mm) | 5.6±1.1 | 4.7±1.2 | 0.0012 | 6.7±1.0 | 5.9±1.5 | 0.0663 |
|-----------|---------|---------|--------|---------|---------|--------|

Table.4 Comparison of the bladder wall thickness before OABSS surgery between responders and non-responders

| Bladder wall thickness of Pre-OP | OABSS-responder | OABSS-non responder | P value |
|----------------------------------|-----------------|---------------------|---------|
| Anterior (mm) | 5.7±1.3 | 6.6±1.0 | 0.0278 |
| Trigone(mm) | 5.7±1.3 | 7.0±0.9 | 0.0045 |
| Dome(mm) | 5.6±1.1 | 6.7±1.0 | 0.0001 |

Interpretation of results

No significant change in the bladder wall thickness at the trigone was observed, not only in the non-responder group, but also in the responder group, which may be attributable to bladder wall thickening resulting from adhesions developing as a result of the mesh insertion during surgery. However, in the responder group, even though the bladder wall thickness at the trigone increased after the surgery, that at the anterior wall and dome of the bladder decreased. This finding suggested that, in terms of OAB symptoms, the efficacy of correcting the anatomical location of the bladder by surgery exceeds the adverse effect of the surgery on the bladder wall thickness (thickening in response to mesh insertion at the trigone). Therefore, it was considered that the bladder wall thickness at the anterior wall and dome of the bladder measured preoperatively are useful as markers of improvement of the OABSS associated with POP.

Although it was difficult to obtain accurate cutoff values due to the small sample size in this study, the incidence of symptom deterioration or *de novo* appearance of OAB following POP surgery may be high in patients with bladder wall thickening exceeding a certain level.

Concluding message

Preoperatively measured bladder wall thickness may be a marker to predict improvement of the OAB symptoms postoperatively in patients with OAB associated with POP.

References

1. World J Urol 2013;31:1093-1104

Disclosures

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