

CHANGES OF THE LOWER URINARY TRACT AFTER SUCCESSFUL TVT OPERATION – ULTRASOUND STUDY

Hypothesis / aims of study

Tension free vaginal tape (TVT) is a widely-used method for the treatment of stress urinary incontinence. To date there are no relevant data about the complex changes of the lower urinary tract after this procedure, although various studies of the mechanism of TVT have been published.

The aim of our study was to evaluate changes of the lower urinary tract after successful TVT operation (especially changes in the mobility of the whole urethra), to evaluate these changes in different mobility types, to evaluate the changes of the proximal urethra (funneling) and of the thickness of the urinary bladder, and to evaluate the relationship between the position and mobility of tape and the mobility of the urethra.

Study design, materials and methods

This prospective study included 52 women with urodynamically proved stress urinary incontinence. Their mean age was 57.2 years (SD=11), mean BMI was 27.5 (SD=4.6), and mean parity was 1.9 (SD=0.6). An ultrasound examination was performed before TVT procedure and approximately 3-6 months after surgery. For the perineal examination a curved array probe 5 (3.5) MHz was used, and the introital examination was performed with sector probe 7 (5) MHz (Acuson 128 XP 10). Before the ultrasound examination the urinary bladder was filled to 300 ml with sterile saline. The measurements were taken in supine position at rest and during maximal Valsalva. Because the anatomical length of the urethra varies, measurements of the urethra were taken at 4 defined points: at urethrovesical junction (UVJ), 17 mm below UVJ (middle of the urethra) and one centimeter above and below this point (upper and lower third). For evaluation of the proximal urethra the distance between the inner edges and depth of visible opening (funneling) was measured at rest and at maximal Valsalva. Thickness of the bladder was measured after emptying at three points (anterior, trigone and dome).

For all women, we examined the changes in position and mobility of the whole urethra during maximal Valsalva maneuver and changes induced by the surgery. The mobility was expressed as vector and direction of the movement from rest to the maximal Valsalva maneuver.

For three mobility groups (women with low, intermediate and high urethral mobility before surgery) we compared the changes induced by the operation and the typical position and mobility of the tape after surgery.

Data were summarized as means and medians, with standard deviation (SD) and quantile range for measures of variability. Depending on the character of the data, either matched pairs t-test or Wilcoxon test were used to evaluate the changes occurring between Valsalva maneuver or induced by the operation. For comparisons between three mobility groups, ANOVA F-test or Kruskal-Wallis test were used where appropriate. The level of significance was set to 0.05. All analyses were performed using statistical software R, version 1.7.1.

Results

Mobility of the urethra before surgery did not differ from values common in incontinent patients as published in previous studies. The position of the urethra at rest is not influenced by the surgery (it is in the same position as before - Fig. 1a). The operation significantly decreased the mobility of all parts of the urethra during Valsalva - Fig. 1b. Women with high mobility before surgery had high mobility afterwards. For the different mobility groups there is no differences in the direction of the preoperative movement during Valsalva maneuver (Fig. 2). The rest position of the tape with respect to the lower urethral segment is the same for all groups; hence preoperation mobility type did not influence the position of the tape (Fig. 2). The absolute changes of the vector of the urethral movement is different according the mobility group (average decrease is 6 mm, for women with low mobility 2-3 mm, intermediate 4-6, high 9 mm). The change of the relative mobility (in percentage) is the same in all groups.

The operation did not influence the proximal urethra at rest and significantly decreased funnelling during maximal Valsalva (width and depth). After the surgery there was a slight increase in the thickness of the bladder wall (anterior and trigone), by 0.64 and 0.73 mm respectively.

Fig. 1. Comparison of the position of the urethra before and after surgery

1a. At rest

1b. At maximal Valsalva

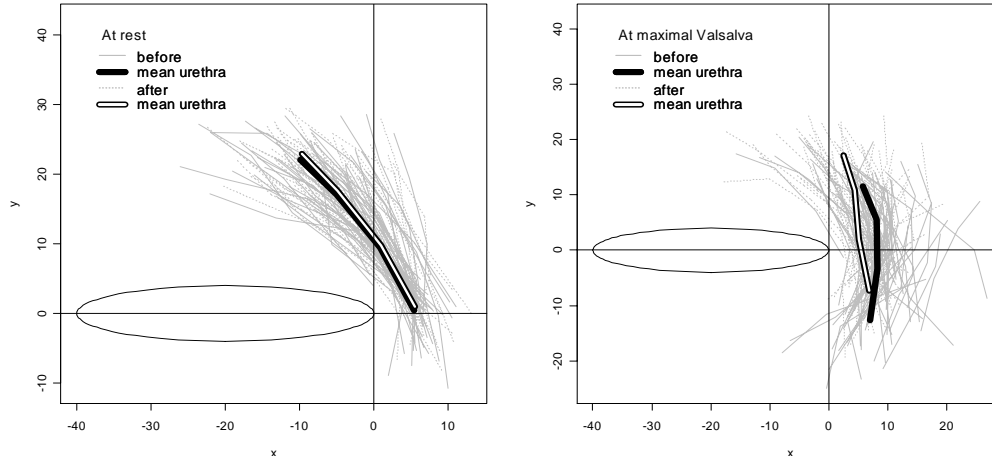
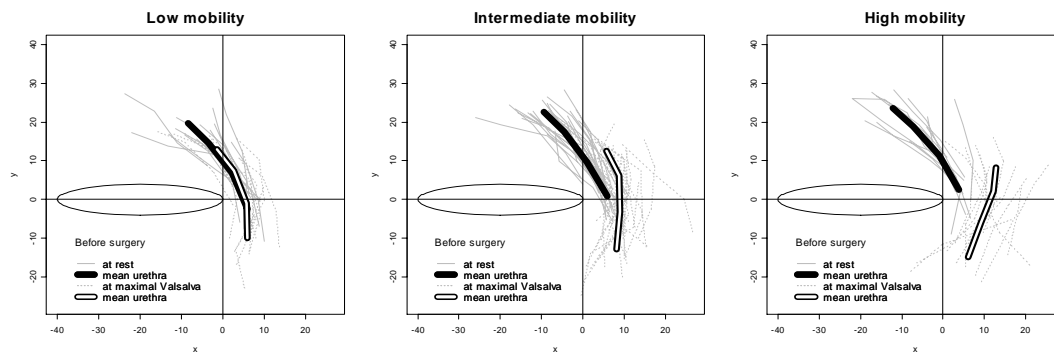
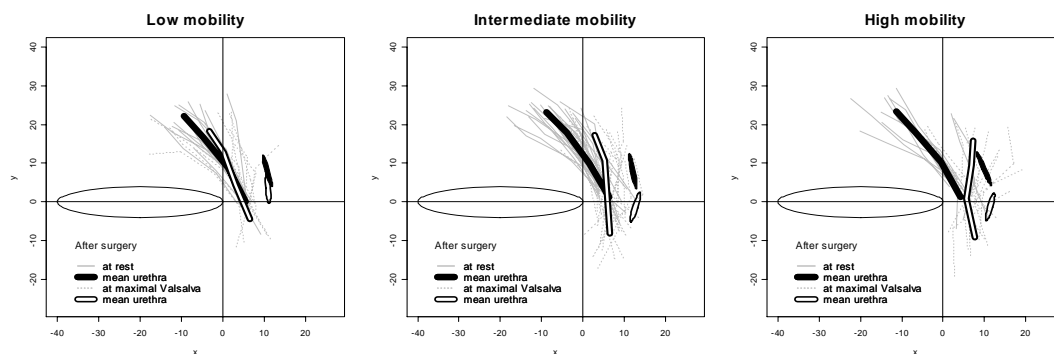


Fig. 2 Before surgery



After surgery



Interpretation of results

Successful TVT procedure did not influence the position and proximal urethra at rest but significantly decreased the mobility of the urethra during Valsalva. The tension of the tape should be different for different patients.

Concluding message

The information about the type of the urethral mobility is important for the surgeon and may increase the success rate of TVT procedure.

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