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TVT AND STRESS URINARY INCONTINENCE: SHOULD WE INCLUDE PATIENTS WITH IMPROVEMENT INTO FAILURE GROUP? (PELVIC FLOOR ULTRASOUND EVALUATION OF THE URETHRAL FUNNELING).

Hypothesis/aims of the study

In the literature there are conflicting data concerning how patients should be evaluated after anti-incontinence procedures. For the evaluation there are used, among others, telephone talk, questionnaires, cough test and pad test. But we still search for better objective measurements (1). Pelvic floor ultrasound (PF-US) is nowadays more often used in the objective assessment of the urogynecological patients. There are data suggesting that PF-US is useful to detect some reasons for failure, as well as the reasons of some of post operative complaints after suburethral sling implantation (2). There are studies which suggest that assessing uretral funneling and urine flow may be helpful to diagnose stress urinary incontinence (3). In our study we tried to find out if evaluation of urethral funneling and urine flow during pelvic floor ultrasound could be helpful to confirm both the stress urinary incontinence (SUI) and the cure after TVT insertion. We also wanted to compare data from cured patients obtained during PF-US with women with improvement and the failures of SUI treatment.

Study design, materials and methods

Our study is a prospective analysis of data collected from 106 female patients who underwent diagnostics, TVT operation and post-operative evaluation. Before the operation stress urinary incontinence (SUI) was confirmed by clinical examination, multi-channel urodynamic testing, 1- h pad test, voiding diary and a ten- point visual analogue scale (VAS). In those patients there was no clinically significant prolapse. TVT was the only procedure performed during the operation. Urethral sphincter function was assessed with urethral profilometry. Maximal urethral pressure (MUCP) was obtained with electronic catheter with an automatic pull- through technique. Preoperative introital ultrasound was performed in a standardized manner. The standardized bladder filling volume was 300 ml. The vaginal probe was placed in the area of the vaginal introitus at the level of the external urethral orifice, exerting minimal pressure. With this probe in position in the patient's body axis, urethral length was measured. Urethral mobility was evaluated during maximal Valsalva as vector. After rotating downwards the probe to optimize bladder neck visualization, urethral funneling and urine flow were evaluated during maximal Valsalva maneuver. The depth and width of the funneling were measured. Relative funneling depth was calculated as percentage of urethral length. TVT was inserted in accordance with 1/3 rule. During the control visit 3- 6 months after TVT operation clinical examination, 1-h pad test, voiding diary and a ten- point visual analogue scale (VAS) were repeated. Pelvic floor ultrasound (PF-sono) was performed with bladder filling of 200-300 ml. TVT position was determined and expressed as percentage of urethral length (tape position). Also the shortest distance between the tape and the longitudinal smooth muscle (LSM) complex of the urethra was measured (tape-urethra distance). Urethral funneling was evaluated with the same technique as the one used on the pre-operative visit. The changes of the sizes of the funneling (width, length and relative length) were calculated according to the formula: preoperative value minus postoperative value. The definition of cure, improvement and failure were similar to propose by Ulmsten (2).

Results

The median age of the study female participants was 60.8 years (range, 47-77), and the group had a mean body mass index (BMI) of 27.2. On the control visit after the operation (3-6 months after the procedure TVT) 91 patients (85,8%) were cured, in 13 (12,3%) we noticed improvement, 2 (1,9%) - were failures. Before the operation there was funneling with urine flow observed in all patients. After TVT implantation there was still observed funneling with urine flow (PF-sono) in all patients with improvement and failures. On the contrary, urine flow was not observed in any cured patient. In 21 cured patients funneling was still observed. In 70 cured women there was no funneling observed.

We compared cured patients with postoperative funneling and with cured ones without postoperative funneling. Preoperative length of the funneling and preoperative relative length of the funneling were longer in women with funneling (16.2 mm vs. 13.6 mm, p=0.016 for length and 50.3% vs. 44.0%, p=0.04 for relative length). Differences in other analyzed parameters were not statistically significant: vector of urethral mobility (20.4 mm vs. 18.6 mm), urethral length (32.4 mm vs. 31.1 mm), preoperative width of the funneling (5.6 mm vs. 5.0 mm), tape position (66.3% vs. 66.0%), tape-urethra distance (4.1 mm vs. 4.3 mm), MUCP (33.7 mmH2O vs. 33.0 mmH2O).

We compared cured patients with resistant postoperative funneling with women with improvement. There were statistically significant differences in tape location: tape position (66.3% vs. 74.4%, p=0.000001), tape-urethra distance (4.1 mm vs. 5.9 mm, p=0.00004) and in change of the urethral funneling length and urethral funneling relative length (5,9 mm vs, -0,1 mm, p=0,046, 17,8% vs. -1,3%, p=0,002). Plus means that postoperative value was higher. There were no statistically significant differences in change of the urethral funneling width (0,3 mm vs. 0,6 mm), vector of urethral mobility (20.4 mm vs. 20.1 mm), urethral length (32.4 mm vs. 31.6 mm), preoperative width of the funneling 95.6 mm vs. 5.5 mm), preoperative length and relative length of the funneling (16.2 mm vs. 15.9 mm, 50.3% vs. 49.4%), MUCP (33.7 mmH2O vs. 35.0 mmH2O).

Comparison between women cured and women with improvement showed statistically significant differences in tape position (66.1 mm vs. 74.4 mm, p= 0.0057) and tape-urethra distance (3.9 mm vs. 5.9 mm, p=0.000000. Statistically significant differences were not observed in vector urethral mobility values (19.7 mm vs. 20.1 mm) and MUCP (34.8 mmH2O vs. 35 mmH2O).

Between patients with improvement (n=13) and failures (n=2) statistically significant differences were found in tape-urethra distance: 5.9 mm vs. 7.1 mm (p= 0.048). The difference in tape position (74.4% vs. 75.8%) was not statistically significant for $\alpha<0.05$.

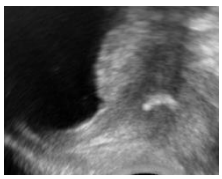
Interpretation of results

Urethral funneling with urine flow was observed during PF-US in all patients: with SUI 2+ before the operation and not-cured (failure and improvement) after TVT. In patients with improvement, as well as in failures, there was no statistically significant change in funneling length and width after TVT. In women cured after TVT implantation we were unable to visualize urine flow during maximal Valsalva, but funneling alone was observed during PF-US in 23% of cured patients. In cured women with postoperative funneling the additional sign of cure was the reduction of the length of the funneling, however the width of the funneling was unchanged. Tape location had no influence on funneling restistance in cured women. On the contrary the comparison of tape location between cured patients with post-operative funneling and not-cured women showed statistically significant differences in the tape location and the tape-urethra distance. We have again confirmed the role of a tape location in stress urinary incontinence cure in women after TVT.

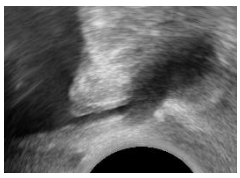
We did not detect factors which may be helpful to predict the resistance of urethral funneling after successful operation. However, in cured women with postoperative funneling preoperative length of the funneling was bigger than in patients without postop funneling.

Concluding message

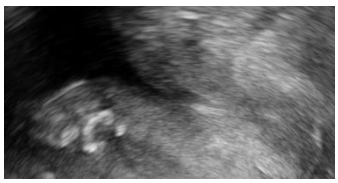
Evaluation of the urethral funneling with urine flow during introital pelvic floor ultrasound in female patients with full bladder before and after TVT insertion seems to be helpful in confirming SUI and in assessing the success or failure of the operation. Results of the study suggest that patients with improvement after TVT insertion should be included in one group together with failures.



a. patient without funneling



b. cured patient with funneling



c. not-cured patient

Fig. 1. Ultrasound pictures of the female patients after TVT implantation.

References

1. Kociszewski J, Rautenberg O, Kuszka A. Can we place tension-free vaginal tape where it should be? The one-third rule. Ultrasound Obstet Gynecol. 2012; 39: 210-214.
2. Staskin D, Kelleher C, Bosch R. et al. Committee 5. Initial Assessment of Urinary Incontinence in Adult Male and Female Patients (5A). Patient-Reported Outcome Assessment (5B) In: Abrams P, Cardozo L, Khoury S, Wein A, editors. Incontinence 4th International Consultation on Incontinence, Paris July 5–8, 2012, 5th edition. Paris: Health Publication Ltd; 2013: 361–428.
3. Harms L, Emons G, Bader W, et al. Funneling before and after anti-incontinence surgery – a prognostic indicator? Part 2: tension-free vaginal tape. Int Urogynecol J Pelvic Floor Dysfunct 2007; 18: 289-294.

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