

APPLICATION OF TRANSPERINEAL ULTRASONOGRAPHY (TPUS) IN WOMEN WITH STRESS URINARY INCONTINENCE. CLINICAL-CONTROLLING EXAMINATION ON OWN MATERIAL.

Hypothesis / aims of study

More and more often the ultrasonographic examination finds diagnostics application in women with stress urinary incontinence (SUI) and pelvic organs prolapse (POP). The literature describes many parameters established ultrasonographically which may have significance in finding the reasons of disorders in the statics of the pelvic floor. The objective of the examination was verification of usefulness of selected ultrasonographic measurements for therapeutic qualification of patients with stress urinary incontinence.

Study design, materials and methods

The examined group consisted of 37 patients qualified in outpatient facilities for surgical treatment of stress urinary incontinence with or without the accompanying pelvic organs prolapse on the basis of interview and physical examination and in selected cases also the urodynamic examination.

A control group was established out of 34 women without stress urinary incontinence, treated solely due to minor gynaecological conditions (e.g. endometrial polyps, cervical dysplasia) or to pelvic organs prolapse.

Mean age in the examined group amounted to 54,1 years (scope 37-69), and BMI 26,2 (scope 20,4-55,8). Mean age in the control group amounted to 55,8 years (scope 28-74), and BMI 27,6 (scope 18,4-54,1).

In regards to age and BMI there were no statistically material differences between the groups.

The study sample size was calculated to achieve the power of 90% for the large effect size between study groups (i.e. $>0,8$).

In the ultrasonographic examination in case of every participant the assessment was given to values of the angles alpha, beta, gamma, RVA (retrovesical angle), BSD (bladder–symphysis distance), occurrence of symptom of funneling of the meatus urethrae internus, rotation of the urethra and also distances and the sum of three measurements of urethra, at rest, during Valsalva manoeuvre and perineal contraction, respectively. Measurements were taken in ultrasonographic 2D images, obtained through application of convex probe to the patient's perineum.

Results were analyzed using the SPSS software (SPSS Inc., Chicago, IL, USA).

The value of $p < 0,05$ was accepted as statistically relevant.

Results

In group of patients with urinary incontinence materially more often than in the control group the occurrence of a symptom of funneling of the meatus urethrae internus during straining

(Valsalva manoeuvre) ($p < 0,001$) was observed. However, differences between the groups were not found at rest. More often the urethral rotation, however without any statistical significance, occurred in patients with stress urinary incontinence than in a continent group (61,8% vs. 45,9%) in controls. No differences were found between examined groups regarding BSD at resting and during perineal contraction. Statistically significant differences in BSD occurred, however, at straining (16,1 vs 20,0; $p = 0,038$) and in the scope of BSD changes at straining and at resting (-15,9 vs -10,2, respectively, in the SUI patients group and in controls; $p = 0,001$).

Comparing the urethral width in both groups (a sum of three dimensions in the proximal, medial and distal parts) it was found that in the incontinent group the urethral width was statistically significantly larger in incontinent women (22,0) than in continent women (22,0 vs 15,4; $p < 0,001$). Analyzing the particular angles of urethra no statistically significant differences were observed between the groups for measurements performed at resting and during perineal contraction. However, in case of alpha, beta and gamma angles the significantly higher values were observed in incontinent patients (116,9; 34,8, respectively and 131,2) than in controls (103,8; 26,6; 121,0) during Valsalva manoeuvre. In case of alpha and gamma angles the differences between these angles measured at straining and at resting was significantly higher in incontinent patients than in controls (for alpha angle: 47,4 vs 35,8; $p = 0,025$ for gamma angle 38,6 vs 27,3; $p = 0,015$).

Interpretation of results

In incontinent women there are significant changes in ultrasonographically determined angles alpha, beta and gamma and BSD distances at performing Valsalva manoeuvre. Also, it is observed that the differences in results of these measurements at resting and at straining are higher than in continent women. It confirms one of the hypothesis of the reasons for urinary incontinence, namely that urine leakage at stress test may be connected with hypermobility of urethra. Particularly significant is the urethral mobility measured as BSD (i.e. distance between the urinary bladder neck and the line conducted along the inferior edge of symphysis pubis in the sagittal dimension) during straining and in the rest. This parameter has significant meaning in the II type of stress urinary incontinence connected with hypermobility of the urethra.

Another parameter of transperineal ultrasonography, which correlates with stress urinary incontinence is the width of the urethra determined at a sum of measurements of the urethra in its three sections – proximal, medial and distal. Increased values of these three measurements in the examined group in relation to control group indicate the possibility of another defect in a lower section of urinary tract and the pelvic floor, affecting the appearance of the symptoms of stress urinary incontinence.

Another measurement which may determine the appearance of the symptoms of stress urinary incontinence is a symptom of funnelling of the meatus urethrae internus. This mechanism is connected with urinary incontinence of the internal urethral sphincter failure type.

Concluding message

Transperineal ultrasonography allows for more precise determination of a defect connected with occurrence of stress urinary incontinence.

Disclosures

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