

COMPARISON STUDY OF CLINICAL AND TRANSPERINEAL ULTRASOUND OF FEMALES WITH STRESS URINARY INCONTINENCE AND NORMAL CONTROLS

Hypothesis / aims of study

Stress urinary incontinence and genitourinary prolapse are common problems but etiology of these conditions is not well known. The anterior compartment of the vagina lays the bladder, urethra, uterine, and supportive connective tissue, ligaments muscles that maintain the correct anatomic position of these support, and in case of prolapse and urinary incontinence, hypermobility of urethra is a predictor of stress urinary incontinence especially after normal delivery and maybe because of anterior compartment weakness. There are many trends to determine the etiology and diagnostic methodology of stress urinary incontinence. To assess the reproducibility of transperineal ultrasound for urethral angulations measurement, bladder neck mobility, and bladder neck funneling to predict stress urinary incontinence, we compare clinical and ultrasonographic finding in incontinence patients with normal controls.

Study design, materials and methods

Sixty women (31 incontinent and 29 continent) were enrolled to this case control study from March 2004 to March 2005. Mean age of study group was 45 (range 22-82) and 44.63 (range 20-80) for control group (PV=0.4). Mean of parity were 4.8 (range 1-10) and 4.3 (range 1-9) for case and control groups respectively (PV=0.2). We fill the ICIQ-SF (International Consultation on Incontinence Questionnaire- Short Form) for every one in both groups at female urology clinic of Tabriz University of Medical Sciences. A general physical examination and vaginal exam was carried out in all patients. Incontinence patients underwent standard urodynamic investigation to establish the diagnosis of stress incontinence if necessary, as described by the International Continence Society. Our local ethics committee approved the study program and we explained extensively the examinations for each participant.

In order to evaluate the urethro-vesical junction by transperineal ultrasonography, in the supine position in the comfortably full bladder (200-300cc) a 3.5 MHz probe, covered with a sterile glove, was placed on the sagittal axis of the perineum after gel application. The image was frozen and placed on one side of the screen when the inferior edge of the symphysis pubis, the bladder, urethro-vesical junction and the urethra were visualized. The patient was asked to do Valsalva maneuver and again the image was frozen and placed on the other half of the screen. And the beta angle was detected. The posterior urethro-vesical (beta) angle was described as the angle between the proximal and distal urethral. Perineal ultrasonography was carried out in both groups. In the next step with the same bladder volume and supine position the funneling of bladder neck and bladder base descent was measured by 5MHz probe at the resting and Valsalva maneuver. Student's t test and Mann-Whitney U-test were used to compare differences between the groups using SPSS for windows. A value of $P < 0.05$ was considered statistically significant.

Results

80 % (25/31) of study group had hypermobility of urethra compare with 45 % (13/29) control group in vaginal examination. (PV=0.04) The comparison of perineal sonographic parameters shows that the beta angle significantly was wider in study group than control group at resting and Valsalva maneuver (PV=0.01). The angle between the vertical axis and urethral axis (alpha angle) was found to be significantly different between the study and control groups only on straining ($P < 0.05$). There was a significant relation between cystocele in clinical exam with bladder base descent in Valsalva maneuver (PV=0.00) but no significant different in two groups (PV=0.4). A strong relation was found in bladder neck funneling in study group

(45%) vs control group(17%).(pv=0.003) The sensitivity, specificity, positive predictive values for stress urinary incontinence, when the beta angle was $>130^\circ$ and hypermobility, were 96%vs 80%, 35%vs55% and 75%vs60% respectively. However, the sensitivity, specificity, positive predictive values for funneling of bladder neck was 51%, 72%, and 76% respectively.

Interpretation of results

The main goals of imaging studies in stress urinary incontinence are: evaluation of morphology of lower urinary tract included position of bladder at rest and straining, rotation of alpha and beta angles, bladder neck and bladder base position at rest and Valsalva maneuver, and also differentiation between anatomic incontinence and ISD. Perineal ultrasound is well correlated with clinical findings. hypermobility of urethra has highest sensitivity to diagnosis of stress urinary incontinence but the specificity of bladder neck funneling in ultrasound is more than others, with a 76% positive predictive values

Concluding message

Urethral hypermobility and perineal ultrasound together could be a good predictor for stress urinary incontinence