

3D-ENDOVAGINAL ULTRASOUND IN THE ASSESSMENT OF THE PELVIC FLOOR STRUCTURES IN NULLIPAROUS AND PRIMIPAROUS WOMEN-A PRELIMINARY STUDY

Hypothesis / aims of study

Ultrasound examination is one of the most promising diagnostic methods in urogynaecology. Development of new equipment substantially improves the capacity of ultrasound examination for visualisation of pelvic structures. Especially, recently introduced transducers with a built-in 3D automated acquisition system with perpendicular beam formation, 360-degree imaging as well as high frequency multiplanar transvaginal transducers seem to be promising novelties for the precise assessment of the pelvic floor. The aim of our study was to check the feasibility of 3D endovaginal US (EVUS) for the assessment of pelvic floor structures and to show the discrepancy in the pelvic floor anatomy between nulliparous and primiparous patients.

Study design, materials and methods

The study group consisted of 11 nulliparous female volunteers (mean age: 35.2±14.2 years; range 17.8-55.9 years) and 10 primiparous women, who underwent vaginal delivery (mean age 49.8±11.4 years; range 22.9- 61.5 years). 3D-EVUS was performed with B-K Medical (Denmark) equipment using a sector 360°rotating transducer with "free-hand" 3-D acquisition and perpendicular beam formation to the urethra (type of probe 2050), which enables an overall view on the pelvic floor. Evaluations included: urogenital hiatus (UGH) area, levator ani morphology and urethral angulation on the coronal plane. Statistical analyses were performed with SPSS 14.0 for Windows.

Results

The mean UGH area in nulliparous patients was significantly smaller in comparison with primiparous women (12.9±1.5cm² vs. 15.2±4.6cm², p = 0.018). The mean distance between pubic symphysis and perineal body was shorter in nuliparous than in primiparous women (35.9±5.5 mm vs. 39.9±8.3mm), but the difference was not statistically significant. The thickness of levator ani muscle, both on the right and left side, was greater in nuliparous than in primiparous women (the left side: 5.3±0.6 mm vs. 3.7±1.0mm; the right side: 5.3±0.6mm vs. 3.2±1.2mm), but the differences were not statistically significant. The mean posterior thickness of levator, obtained on the longitudinal plane, was greater in nulliparous than in primiparous women (4.5±0.5mm vs. 3.3±1.1mm, p=0.02). The angle between the long axis of the urethra and bladder neck on the coronal plane in nulliparous women (2.3°±1.4°) was narrower compared with primiparous women (7.5°±4.6); p=0.03.

Interpretation of results

Our study showed that 3D-EVUS enables the precise visualisation of the female pelvic floor. As expected differences in the anatomy of the pelvic floor between nuliparous and primiparous women were noticed. It is obvious that these findings result from the injury to the pelvic floor occurring during the pregnancy and delivery. However, since the study groups were not matched for age, it is possible that observed differences may, at least in part, be secondary to the process of aging.

Concluding message

Anatomy of the female pelvic floor may be accurately assessed with 3D endovaginal ultrasound. This examination allows to distinguish the differences in the pelvic floor anatomy between nulliparous and primiparous.

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| Specify source of funding or grant | Medical University of Lublin |
| Is this a clinical trial? | Yes |
| Is this study registered in a public clinical trials registry? | No |
| What were the subjects in the study? | HUMAN |
| Was this study approved by an ethics committee? | Yes |
| Specify Name of Ethics Committee | Ethics Committee of the Medical University of Lublin |
| Was the Declaration of Helsinki followed? | Yes |
| Was informed consent obtained from the patients? | Yes |