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LEVATOR DEFECTS IN UROGYNECOLOGICAL PATIENTS – EVALUATION BY TRANSPERINEAL ULTRASOUND

Hypothesis / aims of study

Levator avulsion defects have been suggested as a cause for pelvic floor prolapse [1]. We evaluated a pathological group of urogynecological patients in order to investigate the correlation between levator morphology and pelvic floor pathology.

Study design, materials and methods

Urogynecological patients from our tertiary referral clinic were prospectively assessed for levator defects by transperineal ultrasound. The patients had urogynecological evaluation which included the completion of a standardized pelvic floor questionnaire, physical examination (prolapse grading according to Baden-Walker classification), and multi-channel urodynamic testing (MMS, Holland). In addition, 2D, 3D and 4D transperineal ultrasound was performed in supine position after bladder emptying, using a 4-8 MHz probe (GE Kretz Voluson 730 Expert). Examination was performed at rest, maximal Valsalva, and maximal pelvic floor contraction. Volume datasets were analyzed several weeks to several months after the initial examination in a blinded fashion (GE Kretz 4D View version 5.0). Statistical analysis was performed using SPSS software.

Results

48 consecutive women were analyzed. The median age was 53 (range 23-79). Levator avulsion defects were found in 79% of women, 19% on the right, 8% on the left and 52% bilaterally. In cases of bilateral avulsion, 28% had a larger avulsion defect on the right. Levator ballooning (defined as levator area ≥ 300 mm^2) was observed in 4.5% of women at rest and 46.8% of women at maximal Valsalva. Levator biometric indices are given in table 1. There were weak correlations between levator ballooning at Valsalva and prolapse sensation (r=0.32, 0.04 Fisher exact test) and voiding difficulty (r=0.31 p=0.04), but not with urinary incontinence (r=0.30, p=0.09), urine residual sensation (r=0.27, p=0.08), digitation to void (r=0.1, p=0.6) or digitation to defecate (r=0.15, p=0.4). No correlation was found between levator ballooning at Valsalva and prolapse grading (Baden - Walker staging) of cystocele, rectocele or central prolapse.
We attempted to estimate tissue elasticity by calculating the ratio of the various biometric indices of the levator ani at the genital hiatus between maximum Valsalva and rest. The range and median of those parameters are shown in Table 1. The Valsalva to rest ratio for the anteroposterior diameter, the left to right diameter, and the circumference were consistent. However, the Valsalva to rest ratio for the levator area at the genital hiatus was significantly larger when compared with the other ratios (paired t-tests, Table 1). The Valsalva - Rest ratio for area showed a weak correlation with prolapse sensation (r=0.41, p=0.01 Fisher exact test) but did not correlate with other symptoms of prolapse such as voiding difficulty or incomplete emptying. A weak correlation was also found between this ratio and rectocele grading (r=0.4, p=0.012 - Pearson Chi square) but no correlations were found with anterior or central compartment prolapse.

Table 1: Levator ani biometric indices (expressed in median and range, AP = anteroposterior, LR = left-right)

	AP diameter (mm)	LR diameter (mm)	Circumference (mm)	Area (mm^2)
Rest	62 (44 - 80)	45 (30-63)	174 (138 - 221)	192 (119 - 375)
Valsalva	71 (53 - 86)	53 (36-73)	207.5 (149 - 265)	282 (151 - 526)
Valsalva / rest Ratio	1.12 (0.90 - 1.39)	1.12 (0.88 - 1.55)	1.13 (0.99 – 1.47)	1.37 (0.99 – 2.41)
Paired t–test between Ratios (p value)	AP to LR (0.27) AP to Circ (0.03)	LR to Circ (0.76)	---- ----	AP to Area (0.001) LR to Area (0.001) Circ to Area (0.001)

Interpretation of results

This study found that Levator ani defects are very common among patients with pelvic floor problems. Various biometric parameters were measured at rest and at maximal Valsalva. The ratio between the levator area at maximal Valsalva and at rest was found to correlate well with several prolapse symptoms and physical findings. It is possible that small numbers are responsible for the lack of statistical significance in other parameters. It is also possible that this ratio may represent the tissue elasticity of the levator ani.

Concluding message

Levator pathology is commonly found by transperineal pelvic floor ultrasound in urogynecological patients. The dynamic parameters of the genital hiatus enable us to explore its validity to clinical practice. More research is needed to establish its correlation to patient management and outcome.

References

1. Ultrasound Obstet Gynecol 2007;29:329-334

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HUMAN SUBJECTS: This study was approved by the Human Research Ethics Committee, Chaim Sheba Medical Center and followed the Declaration of Helsinki Informed consent was obtained from the patients.