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THE ASSOCIATION BETWEEN DIFFERENT MEASURES OF PELVIC FLOOR MUSCLE CONTRACTILITY AND FEMALE PELVIC ORGAN PROLAPSE

Hypothesis / aims of study

Pelvic floor muscle (PFM) contractility is clinically evaluated by the use of the modified Oxford Scale[1]. On pelvic floor (translabial) ultrasound (US), a levator contraction can be assessed by comparing hiatal AP diameters at rest and on maximal contraction, or by assessing displacement of the bladder neck on PFM contraction. Female pelvic organ prolapse (FPOP), the most unequivocal clinical manifestation of pelvic floor muscle dysfunction, causes symptoms of a vaginal lump or bulge and is evaluated clinically using a standardized prolapse quantification system (POP-Q)[2], and by sonographic imaging[3]. Hence, we aimed at validating clinical and ultrasound measurements of pelvic floor muscle function against symptoms and signs of FPOP

Study design, materials and methods

Retrospectively, we analysed archived data sets of 772 women seen for symptoms of pelvic floor dysfunction seen at a tertiary urogynecological unit between August 2011 and April 2013. All women had a standardized interview and a clinical examination including POP-Q measurements, modified Oxford scale (MOS) grading, urodynamic testing and 4D translabial ultrasound (US) with volumes obtained at rest, Valsalva and maximal levator muscle contraction [3]. The subjective bother of prolapse was reported by the use of a bother score (VAS) from 0-10, 0 being no bother and 10 the worst imaginable bother. Clinically a significant prolapse was defined as POPQ stage ≥ 2 in any compartment. Significant prolapse on US was diagnosed if there was descent of a cystocele to ≥ 10 mm below the symphysis pubis (SP), uterine descent to ≥ 0 below and/or a rectocele to ≥ 15mm below the SP. At a later date, the first author analysed US volumes at rest and on contraction, measuring the degree of cranioventral shift of the bladder neck (BN) and levator AP diameter reduction [3] on a desktop PC, blinded against all other data. Power calculations were not performed since this was a retrospective study using data obtained in routine clinical practice.

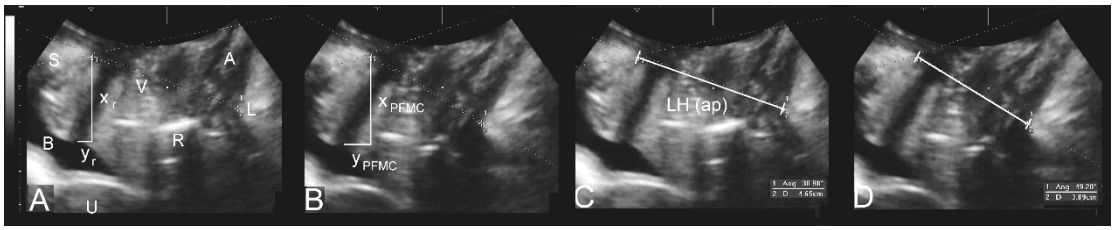

Figure: Determination of pelvic floor muscle contractility by measuring bladder neck displacement (A,B) and reduction in hiatal anteroposterior diameter (C,D). S= symphysis pubis, B= bladder, U= uterus, V= vagina, R= rectal ampulla, A= anal canal, L= levator ani.

Results

During the study period, 772 women were seen, and US volume datasets were available for 750. Datasets from 24 women had to be excluded because we were unable to identify a pelvic floor muscle contraction, leaving 726 women for analysis. Mean age was 56 years (range 18-88), 60.3% were postmenopausal and only 7% (51/725) were currently on HRT. Mean BMI was 29 (range 17-55). Median parity was 2 (range 0-9), 88.7% were vaginally parous. In our study group, 22.2%(161/726) previously had a prolapse or incontinence surgery, and 29.8% (216/726) had had a hysterectomy. Symptoms of prolapse were reported in 51.4% (373/726), and median reported bother was 0.1 (range, 0-10).

On clinical examination (POP-Q) we found a Mean Ba: -0.7, Mean Bp: -1.1, Mean C: -4.4, Mean gh+pb: 7.9. Significant prolapse (>= stage 2) in any compartment was found in 77.1% (560/726). An anterior compartment prolapse was found in 57% (413/725), 11.3% (59/524) had a uterine prolapse, 3.3%(24/726) an enterocele and 55.4% (402/726) posterior compartment descent. On levator palpation, mean Oxford grading was 2.4 (range 0-5). Urodynamic stress incontinence was found in 69% (490/711).
On imaging, significant prolapse was found in 54.6% (389/712); 39.9% (284/712) had a cystocele, 11.8% (84/712) had significant uterine descent and 33.3% (237/712) significant posterior compartment descent. On PFMC, the Mean cranioventral shift on contraction was 7.11 (range 0.32-25.32) mm. Mean AP diameter reduction on contraction was 8.6mm (range 0.3-31.3) mm. All three outcome measures were normally or near- normally distributed on Kolmogorov- Smirnov testing. Results on univariate analysis are given in Table 1.

	Bladder neck displacement	**Reduction in hiatal AP diameter**	**Modified Oxford Grading**
Prolapse symptoms	ns	ns	2.15 (1.0) vs 2.57 (1.1) P< 0.001
POP Bother (0-10)	ns	ns	r= -0.15 P< 0.001
ICS POPQ >= stage 2	ns	8.84 (4.8) vs 7.96 (4.8) P= 0.04	2.25 (1.0) vs 2.74 (1.1) P< 0.001
Significant POP on US	ns	ns	2.18 (1) vs 2.57 (1.1) P< 0.001

Table 1: The association between sonographic and palpatory measures of pelvic floor muscle function versus symptoms and signs of prolapse (n= 726)

Interpretation of results

In this large retrospective study in patients presenting with symptoms of pelvic floor dysfunction, it appeared that digital assessment using the Modified Oxford grading scale was much more strongly associated with symptoms and signs of prolapse than sonographic measures of pelvic floor muscle contractility. This may be explained by the fact that the MOS evaluates not just diaplacement but also contraction strength or force, whereas ultrasound provides measures of displacement only. Whether a given contraction force results in greater or lesser displacement will crucially depend on tissue stiffness or elasticity. Hence, highly elastic tissues (such as in prolapse) may be displaced very substantially by a relatively small force, while stiff tissues (such as in someone with perfect pelvic organ support) may require much greater force for less displacement.

Concluding message

The Modified Oxford scale seems to be a more valid measure of pelvic floor muscle function than bladder neck displacement or reduction of hiatal diameter observed sonographically on pelvic floor muscle contraction.

References

1. Wyndaele JJ, VanEetvelde B (1996) Reproducibility of digital testing of the pelvic floor muscles in men. Arch Phys Med Rehab 77 (11):1179-1181. doi:Doi 10.1016/S0003-9993(96)90144-6
2. Bump RC et al., (1996) The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J Obstet Gynecol 175 (1):10-17
3. Dietz HP (2011) Pelvic Floor ultrasound in incontinence: What's in it for the surgeon? . Int Urogynecol J 22 (9):1085-1097

Disclosures

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