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Title: THE PREDICTIVE VALUE OF HYPERMOBILITY AND URETHRAL CLOSURE PRESSURE IN THE DIAGNOSIS OF FEMALE STRESS URINARY INCONTINENCE

Aims of Study

The value of the urethral pressure profile (UPP) has been debated for over two decades. It seems to have a role in predicting failure after surgery (1) but predictive values are poor, and it is influenced by a variety of confounding factors (2). The UPP does not provide a measure of severity of Genuine Stress Incontinence (GSI), does not correlate with success of surgery, and does not distinguish GSI from other causes of incontinence (3). Xray or ultrasound imaging of leakage and/ or hypermobility is the other main modality used in the diagnosis of GSI. The imaging of hypermobility has also been criticized for its low positive predictive value (4,5). There is no agreement regarding the relationship between hypermobility and severity of stress incontinence (6,7). Recently, it has been shown that urethral closure pressure is independent of bladder neck hypermobility (8). We intended to define the relative predictive value of the two factors for the diagnosis of GSI.

Methods

275 consecutive patients with symptoms of lower urinary tract dysfunction underwent urodynamic evaluation. After completing a detailed history, multichannel urodynamics using microtransducer catheters, including a resting urethral pressure profile, were performed. Imaging was undertaken with fluoroscopy and translabial ultrasound, the latter after bladder emptying and supine. Findings were evaluated by the first author (unaware of urodynamic data). Of the original 275 datasets, 179 were left after excluding incomplete data (n=11), patients with previous pelvic surgery or radiotherapy (n=64) and with evidence of urethral kinking on ultrasound (n= 21). Statistical analysis was performed using minitab ^{TM} (v 12) and SPSS ^{TM}.

Results

Genuine Stress Incontinence (GSI) was urodynamically confirmed in 145 patients (81%). On average the bladder neck descended 2.65 (SD 1.03) cm on Valsalva, the retrovesical angle on stress was 159 (SD 29) degrees, the proximal urethra rotated 55 (SD 32) deg., average MUCP was 45 (SD 22) cm H2O. Functional urethral length was 1.87 (SD 0.54) cm. Tab. 1 shows the association of hypermobility and UPP data with GSI. Figure 1 combines odds ratios for both bladder neck descent and MUCP into a 2-dimensional plot. Logistic regression analysis yielded the formula odd = exp(-0.134+0.144*bnd-0.022*mucp). As evident from the formula, bladder neck hypermobility is the stronger predictor of GSI. Both MUCP and hypermobility combined give odds ratios between <0.2 and >100. However, only 29% of the overall variation in the diagnosis of GSI was explained by bladder neck descent and 12% by urethral closure pressure as determined by Nagelkerke R squared tests on univariate analysis.

	GSI	no GSI	p
RVA (Valsalva)	165 (23) deg	135 (35) deg	<0.000001
Prox. urethral rotation	60 (31) deg	36 (27) deg	=0.000068
Bladder neck descent	28.7 (9.2) mm	17 (9.4) mm	<0.000001
MUCP	42 (20) cmH2O	58 (28) cm H2O	=0.000132
Functional length	1.8 (.5) cm	2.0 (.6) cm	=0.072447

Table 1: Association of hypermobility and resting UPP with GSI (n= 179).

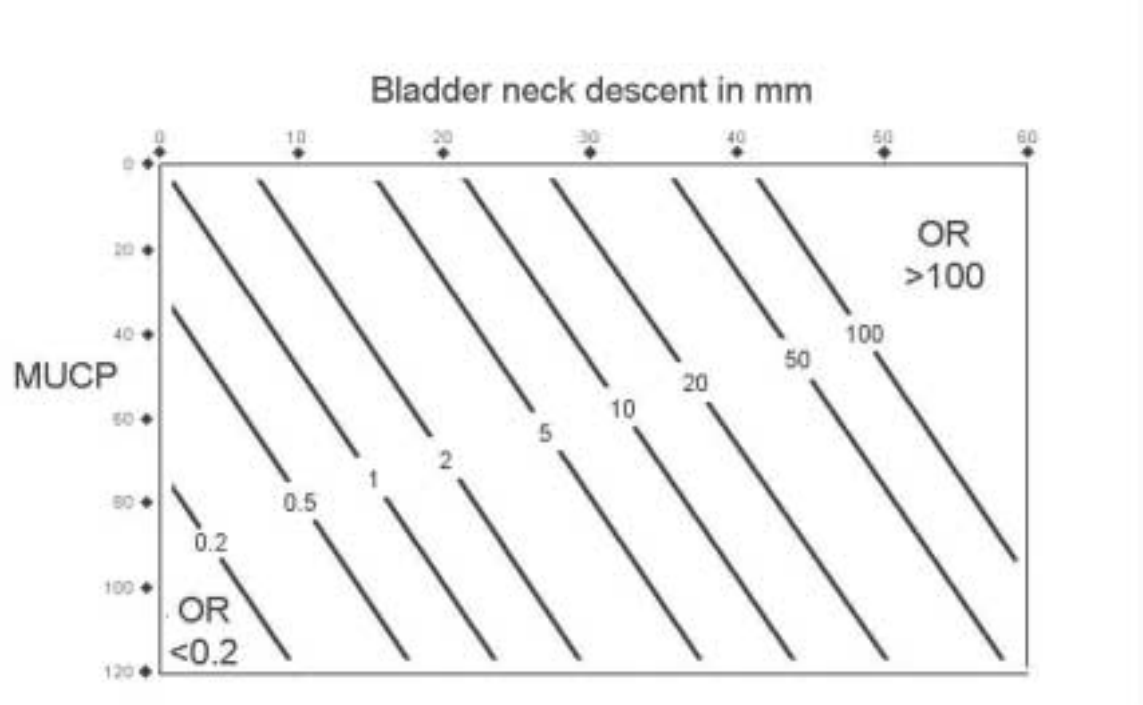

Fig. 1: Odds ratios for GSI using hypermobility and maximal urethral closure pressure

Conclusions

This study was designed to define the relative contribution of bladder neck hypermobility and urethral function to the likelihood of being diagnosed with Genuine Stress Incontinence on urodynamic testing. Both hypermobility and closure pressure were good predictors of GSI, with the former showing the stronger relationship. The high odds ratios and ROC characteristics of the two factors support the contention that they are the main determinants of stress urinary incontinence in the female.

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