

186

Validity of clinical assessment tools to evaluate involuntary PFM contractions during coughing

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Objective:

In clinical practice an involuntary PFM can be assessed by different tools such as visual inspection (VIP), palpation (PA), and transperineal ultrasound (US). An involuntary PFM is described as a contraction that precedes an intra-abdominal pressure rise, e.g. during coughing and can be present or absent. Although reliability of PFM strength assessment has been evaluated and clinically established, there is still a lack of consistency in evaluating an involuntary PFM.

The aim of this study was to compare outcome measures and strength of association between the above described evaluation tools.

Study design, materials and methods

One hundred forty-nine nulliparous women (mean age 26.3 years), without a history of pelvic floor dysfunction confirmed by a German validated questionnaire, were included.

The participants performed 3 series of three maximal expulsive coughs. During these coughs, different evaluation tools were used. To identify a present involuntary PFM, we followed the outcome measures defined by the terminology report of IUGA/ICS; during inspection no perineal downward movement should occur, during palpation, a PFM must be recognized and US was used to assess a cranioventral bladder neck displacement. All measurements were done in the standing and supine position.

Measurement tools were statistically compared using the Pearson chi-square test or the Fisher exact test and the strength of association was reported with the phi coefficient (Φ).

Results

In the evaluation of an absence of PFM in the supine and standing position, we found a high (83.2% and 96.4%) agreement between US, PA and VIP, but in the evaluation of a presence of PFM, the agreement between measurements were very incoherent. In the standing position, the agreement between US and PA was 58.3% and for VIP 16.7%. In supine position 33.3% for PA and 22.2% for VIP. The agreement between PA and VIP was 25% in the standing position and 100% in the supine position (table 1).

References

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Table 1: Cross-tables includes numbers and total sum of absence or presence evaluated involuntary PFM measured inspection (VIS), palpation (PA) and ultrasound (US) 0=present, 1=absent PFM

| Cough St | | | Cough Sup | | | Cough St | | | Cough Sup | | |
|-----------|-----|-----------|-----------|-----------|-----------|-----------|-----|-----------|-----------|-----|-----------|
| Palpation | VIP | total sum | Palpation | VIP | total sum | Palpation | VIP | total sum | Palpation | VIP | total sum |
| 1 | 0 | | 1 | 0 | | 1 | 0 | | 1 | 0 | |
| 7 | 5 | 12 | 5 | 20 | 25 | 2 | 10 | 12 | 2 | 7 | 9 |
| 3 | 6 | 9 | 11 | 11 | 22 | 2 | 7 | 9 | 2 | 7 | 9 |
| 18 | 119 | 137 | 2 | 122 | 124 | 5 | 132 | 137 | 5 | 132 | 137 |
| 19 | 121 | 140 | 11 | 116 | 127 | 20 | 120 | 140 | 20 | 120 | 140 |
| 25 | 124 | 149 | 7 | 142 | 149 | 7 | 142 | 149 | 7 | 142 | 149 |
| total sum | 22 | 127 | 149 | total sum | 22 | 127 | 149 | total sum | 22 | 127 | 149 |

The results showed a significant association between ultrasound and palpation during coughing in the standing position and a significant association between palpation and inspection in both the standing and supine position. However, the strength of association was weak due to the large alterations in agreement between measurements (table 2). Remarkable was the unexpectedly low number of identified PFM in all 3 measurements. The participants were healthy nulliparous subjects, so a higher rate of involuntary PFM response would be expected.

Table 2: P-Values of Pearson chi-square test / Fisher exact test (indicated by *) and phi coefficients of the VIP, PA and US in supine and standing position.

| | | Cough supine | | Cough standing | |
|----|--------------------|--------------|-----------|----------------|-----------|
| | | VIP | Palpation | VIP | Palpation |
| US | P-Value | 0.622* | 0.130* | 0.100* | 0.001* |
| | Φ coefficient | 0.053 | 0.133 | 0.167 | 0.329 |
| PA | P-Value | <0.000* | | 0.002* | |
| | Φ coefficient | 0.413 | | 0.325 | |

VIP visual inspection of the perineum, no downward movement
 PA PFM palpated with vaginal palpation
 US perineal ultrasound for cranioventral bladder neck displacement defined as positive values in both the x- and y-axis (no displacement = positive)

Conclusion

Although the results showed a significant association between US and palpation and between palpation and visual inspection, there is a lack of consistency in identifying the presence of an involuntary PFM. There may be a need to re-evaluate outcome measures or tools to identify an involuntary PFM.