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# PROLAPSE ASSESSMENT BY ULTRASOUND: HOW EASY IS IT TO TEACH AND DO?

Hypothesis / aims of study

Transperineal ultrasound has emerged in recent years as a useful diagnostic tool in the assessment of pelvic floor dysfunction. It has the advantage of low cost, non-invasiveness, absence of ionizing radiation, high equipment mobility and dynamic imaging capability. Proprietary software provides excellent post-processing capabilities. However, the method requires not just suitable equipment, but also substantial training. This latter factor is crucial for the development and uptake of the method since teaching opportunities are very limited to date. We undertook this study to evaluate the effectiveness of training in the quantification of prolapse by translabial ultrasound and to determine correlations with clinical examination obtained by a trainee after one week's training.

Study design, materials and methods

This is a cross-sectional retrospective study involving the datasets of 206 patients seen between January and December 2010 at one tertiary urodynamic centre. Patients underwent an interview, a clinical examination for ICS POP-Q staging and 4D pelvic floor ultrasound, supine and after voiding, as previously described (1). The resulting 4D ultrasound datasets were subsequently investigated by a subspecialty trainee with very limited prior ultrasound experience with the help of the postprocessing software 4D View v 10.0 (GE Kretz Ultrasound, Zipf, Austria). Volume datasets were analyzed blinded against all clinical data.

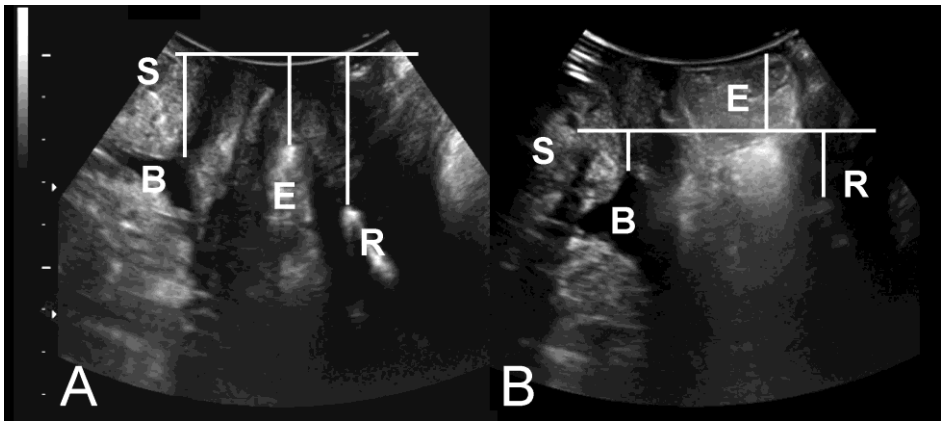


*Figure 1: Prolapse assessment by translabial ultrasound, as seen in the midsagittal line. Image A shows appearances at rest, image B on maximal Valsalva. There is bladder descent to 1 cm above the symphyseal reference line and an enterocele to 2 cm below this line.*

Pelvic organ descent was determined by measuring the most dependent part of the bladder, the cervix and small bowel/rectal ampulla relative to the inferior margin of the symphysis pubis (see Figure 1) as previously described (2). We serially tested agreement between the trainee and a senior co-author on three consecutive days, using Intraclass correlation coefficients. Correlation between ICS POP-Q staging and ultrasound measurements for the anterior and posterior compartments were analysed using Minitab v13 (Minitab, State College, PA, USA).

Results:

After an initial training session of 10 cases, 3 test-retest series were undertaken between the first and one of the senior authors, within the first five days of training. Repeatability of measurements was tested with Intraclass correlations (single measurement, absolute agreement definition), on series of 20 patients assessed on Day 2, Day 3 and Day 4 of training (see Table 1), We did not initially perform a test-retest analysis for the central compartment and excluded it from the analysis since the vault is often impossible to assess, and the uterus difficult to identify when high, even for experienced operators. This was confirmed when we performed a test-retest series on central compartment descent at the conclusion of 5 weeks of training, which yielded an ICC of 0.309 (-0.066- 0.626).

| Days of training | Intraclass correlation (anterior compartment) | Intraclass correlation (posterior compartment) |
|---|---|---|
| **Day 2** | 0.696 (0.381 - 0.867) | 0.588 (0.200 - 0.815) |
| **Day 3** | 0.703 (0.388 - 0.873) | 0.415 (0.023 - 0.723) |
| **Day 4** | 0.894 (0.748 - 0.957) | 0.662 (0.320 - 0.852) |

Table 1 – Intraclass correlation during the 1st week of training. There was no significant bias between the two examiners.

After obtaining satisfactory inter-observer repeatability the trainee then reviewed the ultrasound datasets of all 206 patients, blinded against all other data. 151 patients (73%) complained of stress urinary incontinence, the same number of urge urinary incontinence. 98 patients (48%) complained of prolapse symptoms. 117 patients (57%) had a significant cystocoele noted on examination, 14 (9%), a significant uterine prolapse and 132 (64%) significant posterior compartment prolapse (>= ICS POP-Q stage II). On urodynamics, 134 patients (66%) had SUI, 57 patients (28%) had DO and 50 patients (25%) had voiding dysfunction.

In order to validate the method and allowing comparisons with previously published data, we determined associations between trainee ultrasound findings and clinical examination (ICS POP-Q staging). Figure 2 shows ANOVA analysis for anterior and posterior compartments. In both instances we found a highly significant association (both P< 0.0001).

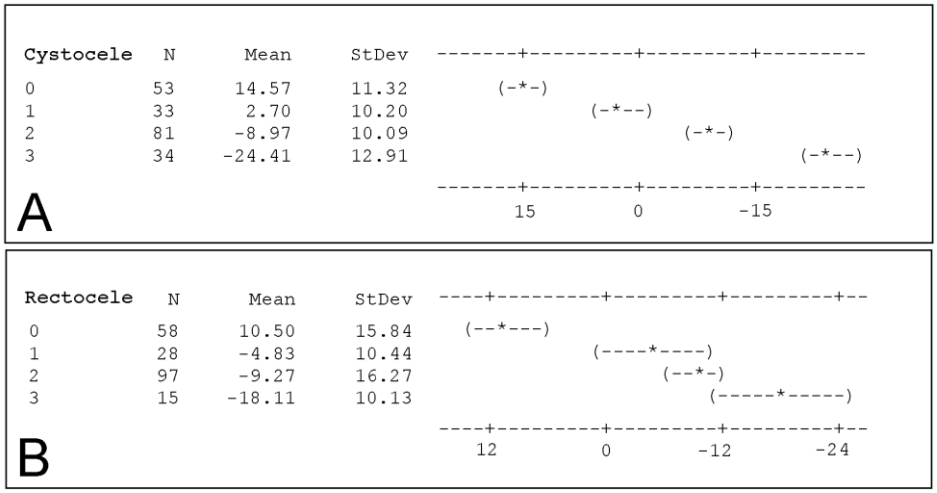


*Figure 2: ANOVA of clinical cystocele staging against bladder descent (A) and rectal descent (B) on Ultrasound, measured against the inferior symphyseal margin. Both P< 0.0001.*

Conclusion:

With minimal training conducted within a few days, a trainee is able to identify anterior and posterior compartment prolapse on ultrasound accurately and quantify organ descent against the reference of the inferior symphyseal margin with a high degree of repeatability and to a degree that is strongly correlated with clinical examination findings. Central compartment descent is more difficult to assess and teach. This is consistent with our experience in training over 50 individuals to date. Most ultrasound parameters obtained by postprocessing can be taught to an acceptable standard of repeatability within one week.

References

1. Dietz HP (2011) Pelvic Floor ultrasound in prolapse: what's in it for the surgeon? Int Urogynecol J 22:1221-1232
2. Dietz HP, Haylen BT, Broome J (2001) Ultrasound in the quantification of female pelvic organ prolapse. Ultrasound in Obstetrics & Gynecology 18 (5):511-514

Disclosures

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