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PROSPECTIVE VALIDATION OF INTEGRATED TOTAL PELVIC FLOOR (TRANSPERINEAL, TRANSVAGINAL) ULTRASOUND IN PELVIC FLOOR DEFAECATORY DYSFUNCTION BY COMPARISON WITH DEFAECATION PROCTOGRAPHY

Hypothesis / aims of study
The validation of integrated total pelvic floor ultrasound in defecatory dysfunction by comparison with defaecation proctography as the gold standard.

Study design, materials and methods
A prospective study 224 consecutive women (mean age 51 years (range 19 – 87)) presenting to a tertiary pelvic floor unit with defaecatory dysfunction (incomplete evacuation with or without concomitant faecal incontinence).

Each patient underwent integrated total pelvic floor ultrasound and defaecation proctography. Integrated total pelvic floor ultrasound was performed in accordance to previously published methods (1). Defaecation proctography was performed with rectal paste and small bowel oral contrast. Each scan was performed and interpreted by a pelvic floor clinical fellow, clinical scientist or clinical nurse specialist blinded to symptoms and corresponding imaging. Each report was verified by a blinded surgical consultant with a specialist interest in pelvic floor dysfunction.

The presence and size/grade of rectocoele, enterocoele, intussusception, dyssynergy and poor propulsion was recorded for both modalities. Uterine descent was noted for integrated total pelvic floor ultrasound. Incomplete evacuation, a trapping rectocoele and seepage of paste at rest was noted for defaecation proctography.

Results
Mean time between integrated total pelvic floor ultrasound and defaecation proctography was 10 days (median 6, range 0 – 104, inter quartile range 0 – 14.5).

Integrated total pelvic floor ultrasound showed; 130 rectocoeles, 72 enterocoeles, 47 with intussusception, 118 cystocoeles,13 uterine descent, 46 with dyssynergy and 101 with poor propulsion.
Defaecation proctography showed: 110 rectocoeles (63 caused trapping barium paste), 72 enterocoeles, 155 with intussusception, 14 with dyssynergy, 139 with poor propulsion, 61 with incomplete evacuation and 77 with seepage of paste.
Ultrasound when compared to proctography had a sensitivity and specificity for; rectocoele - 75% and 58%, enterocoele - 54% and 75%, intussusception - 30% and 83%, dyssynergy - 29% and 80% and poor propulsion - 55% and 72%.

Rectocoele: There was a moderate positive correlation between rectocoele measurements (correlation R coefficient 0.54 ($p<0.0001$)). Agreement for measurement of rectocoele depth with the two modalities was fair (intraclass correlation coefficient 0.47, 95% limits of agreement -2.63 to 1.66, 95% confidence interval -0.63 to -0.34). Agreement for classification of rectocoele (small (<2cm), moderate (2 – 4cm), large (>4cm)) was moderate (Cohen's kappa 0.44).
Rectocoeles causing barium trapping on proctography were larger (unpaired T tests - proctography $p = 0.02$; ultrasound $p = 0.003$) and more likely to be seen on both transvaginal and transperineal ultrasound than only one view (Fishers exact $p=0.007$). Those with seepage of barium paste during defaecation proctography were significantly likely to have a rectocoele which was larger on transperineal ultrasound than defaecation proctography ($p=0.03$).

Enterocoele: There was a positive correlation for grading of enterocoele (Spearman's Rho 0.33, 2-sided $p<0.0001$). Agreement for grading enterocoele on transperineal ultrasound compared to defaecation proctography was fair (weighted Cohen's Kappa 0.26).

Intussusception: There was a positive correlation between grading on ultrasound and proctography (Spearman's Rho 0.28, 2-sided $p<0.0001$). Agreement grading was fair (weighted Cohen's Kappa 0.24). Specificity increased with increasing grade.

Patients with incomplete evacuation on proctography were more likely to display a higher grade of intussusception on ultrasound than defaecation proctography ($p=0.01$). Those patients with poor propulsion on posterior transvaginal ultrasound were significantly more likely to display a higher grade of intussusception on defaecation proctography than ultrasound ($p= 0.02$).

Functional Aspects: Those with dyssynergy or poor propulsion ultrasound were more likely to display incomplete evacuation on defaecation proctography (dyssynergy $p=0.03$, poor propulsion $p=0.001$). When possessing any dyssynergy and/ or poor propulsion on integrated total pelvic floor ultrasound, the positive predictive value of displaying dyssynergy, anismus and/ or incomplete evacuation on defaecation proctography was 82% (negative predictive value 47%, sensitivity 56%, specificity 76%).

Multiple pathologies: There were 123 women with multiple pathologies on integrated total pelvic floor ultrasound (i.e. 2 or more of; rectocoele, enterocoele, intussusception, cystocoele or uterine descent) and 69 women with multiple pathologies on defaecation proctography (i.e. 2 or more of; rectocoele, enterocoele or intussusception).

Interpretation of results

If an enterocoele, intussusception, dyssynergy or poor propulsion are on ultrasound they are likely present on proctography. If there is no rectocoele on ultrasound it is unlikely to be present on proctography.

This study assumes proctography is 100% accurate, not necessarily the case; studies comparing ultrasound with clinical findings are required.

Though there was positive correlation for rectocoele measurement between the two modalities there was a bias toward rectocoele appearing larger on proctography and 95% of the differences lay between -2.63 and 1.66 which means the difference for an individual could be from -2.63 to 1.66cm. Ultrasound cannot be relied upon to measure exact rectocoele size.

In those with incontinence (i.e. seepage of paste during proctography) ultrasound may confer an advantage as it allows soft tissue visualisation without the need to retain contrast. If a rectocoele is seen on transvaginal and transperineal ultrasound it is more likely to cause barium trapping on proctography; this may indicate the rectocoele is more clinically relevant than if only seen on one view.

The presence of any dyssynergy or poor propulsion on ultrasound has a high positive predictive value for a functional abnormality on proctography.

Integrated total pelvic floor ultrasound facilitates the diagnosis of multiple pathologies more readily than defaecation proctography. This may be advantageous as women presenting with defaecatory dysfunction often possess concomitant anterior and middle compartmental pathology (2).

Concluding message

Integrated total pelvic floor ultrasound is a reliable alternative for proctography though due to our lack of confidence and experience we may use it as a screening tool. The presence of pathology during ultrasound examination means that defaecation proctography is also likely to demonstrate pathology. We have previously shown the clinical utility of PFUS is as reliable as proctography and as we increase our numbers and confidence PFUS may be proved to be a reliable alternative to proctography.

References

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