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THE VALUE OF ENDOVAGINAL AND TRANSPERINEAL ULTRASOUND IN DETECTING ANAL SPHINCTER DEFECTS

Hypothesis / aims of study

Endosonographic evidence of trauma to the external (EAS) and internal anal sphincter (IAS) is predictive of faecal incontinence following obstetric anal sphincter injuries (OASIS) [1]. Currently anal endosonography is regarded as the gold standard for imaging of both the EAS and IAS. However, it requires specialised equipment and a trained operator. Therefore, attention has recently focused on more readily available radiological techniques. Although the anal sphincter can be visualised using convex and linear transperineal as well as endovaginal transducers, their sensitivity and specificity in detecting sphincter lesions remains to be established. The aim of this study was to determine the sensitivity and specificity of transperineal (TPU) and endovaginal (EVU) ultrasound in the detection of sphincter defects as diagnosed by endoanal ultrasound (EAU).

Study design, materials and methods

All women attending the perineal clinic between January 2009 and March 2010 following OASIS as well as those suffering with bowel problems were invited to participate. After obtaining informed consent, TPU and EVU were performed with the patient in supine position. This was followed by EAU with the patient in left lateral position. All ultrasound examinations were performed by an investigator experienced in imaging of the anal sphincter, using the B&K Viking 2400 system with the Type-2050 endoanal probe, a Type-8802 transperineal probe and a Type-8806 endovaginal probe. The endovaginal probe was placed on the posterior fourchette. TPU was performed by placing the transperineal probe in a transverse fashion on the perineum, in the midline. By changing both probe's inclination the anal canal was visualised from the level of the puborectalis until the ring of the subcutaneous level of the EAS. For all 3 ultrasound modalities 2D images of the anal sphincter were taken at 3 levels: the deep (proximal), superficial (mid) and subcutaneous (distal). Additionally for the endoanal ultrasound 3D images were stored. The images of the different ultrasound modalities were analysed separately and independently by two of the authors, who were blinded to each others results. The two outcomes were compared and where there was discrepancy one of the senior authors arbitrated. EAU was considered the gold standard test for detection of anal sphincter defects. Sensitivity and specificity for detecting anal sphincter defects were calculated for EVU and TPU.

Results

A total of 153 women were included with a mean age of 32 years (SD 5.6). The reasons for visiting the perineal clinic was routine follow up, at a mean of 13 weeks, after sustaining OASIS in 88 (57.5%), subsequently pregnant following OASIS in 50 (33%) (44 antenatal and 6 postnatal) and seeking help for bowel symptoms 15 (10%). On endoanal ultrasound a defect was found in 43 women (28%): 40 (26%) had a defect of the EAS and 24 (16%) of the IAS. Of the 153 patients one did not have transvaginal ultrasound as the probe was not available at the time of examination. This patient had no defect on EAU and was excluded from analysis. Analysable images (interpretation possible) were available in 137 (90%) of the deep level, in 122 (80%) of the superficial level, and in 93 (61.2%) of the subcutaneous level. Therefore we decided to analyse the presence of defects based on at least one available and analysable level of the EAS combined with an analysable IAS. This was the case in 132 (89%) women. Agreement for EVU and EAU is shown in Table 1. Analysable TPU images for the deep level were available in 125 (82%), for the superficial level in 121 (79%) and for the subcutaneous level in 83 (54%). There was at least one level of the EAS analysable in 127 (83%) and both the IAS and EAS were analysable in 121 (79%). Agreement for TPU and EAU is shown in Table 2.

Interpretation of results

To date this is the largest study comparing TPU and EVU to 3D EAU for detecting anal sphincter defects. Previous comparative studies with 3D EAU and TPU showed sensitivities of 50% and 83% [2, 3]. However to the best of our knowledge there are no studies comparing EVU and 3D EAU. The 2D TPU and EVU probes are more widely available and the technique is less invasive and more acceptable to patients. However, the limitation of both the latter techniques is that they do not provide symmetrical radial images and this affects accurate interpretation. We found that visualisation and interpretation of the external anal sphincter can be difficult with both TPU and EVU especially at the more distal levels. Therefore we compared the presence of defects in the anal sphincter when at least one level of the EAS and the IAS were adequately visualised. Adequate images were not obtainable in 21% and 11% on TPU and EVU respectively.

Concluding message

Endoanal ultrasound using a rotating probe is the validated gold standard in the identification of anal sphincter defects. However this is not available universally and anal sphincter imaging has also been performed using conventional probes. Our comparative study has shown that if EAU is unavailable TPU and/or EVU can be useful in identifying normality, but it is not always possible to identify an underlying sphincter defect.

Table 1: Sensitivity and specificity of endovaginal ultrasound

		EVU defect	EVU intact	EVU not analysable	Sensitivity of EVU	Specificity of EVU
Any defect	EAU defect	15	16	12	48%	85%
	EAU intact	15	86	8		
EAS	EAU defect	9	21	10	30%	96%

defect	EAU intact	4	98	10		
IAS defect	EAU defect	8	10	6	44%	89%
	EAU intact	12	102	14		

Table 2: Sensitivity and specificity of transperineal ultrasound

		TPU defect	**TPU intact**	**TPU not analysable**	**Sensitivity of TPU**	**Specificity of TPU**
Any defect	EAU defect	17	10	16	63%	86%
	EAU intact	13	81	16		
EAS defect	EAU defect	14	10	16	58%	90%
	EAU intact	10	87	16		
IAS defect	EAU defect	7	8	9	47%	90%
	EAU intact	11	95	23		

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