

CAN LEVATOR AVULSION BE DIAGNOSED BY 2D TRANSLABIAL ULTRASOUND?

Hypothesis / aims of study

Childbirth-related trauma to the puborectalis muscle is common and associated with female pelvic organ prolapse (1). It can be diagnosed by palpation (2), but Magnetic resonance imaging and 3D pelvic floor ultrasound seem more repeatable (3). However, both methods are not universally available. On principle it should be possible to assess the puborectalis muscle with 2D ultrasound, using a parasagittal translabial approach. In this study we tested validity and reproducibility of this new method for diagnosing levator trauma by 2D translabial ultrasound.

Study design, materials and methods

75 women seen in a tertiary urogynaecological unit were examined for major levator trauma ('avulsion injury') by palpation, 2D and 3D ultrasound (US) with a GE Kretz Voluson 730 expert system. For 2D US we used an oblique parasagittal translabial approach to line up the main transducer axis with the fiber direction of the puborectalis muscle. Care has to be taken to perform a full parasagittal sweep of the hiatus since appearances similar to those in Figure 1 A may result if the transducer is not angled sufficiently laterally. 2D ultrasound assessment of the levator muscle for this study was performed after a minimum training period of 3 months for both operators. The operator using 2D US was blinded against all other findings. A test- retest series for 2D assessment of the puborectalis muscle was conducted in 35 patients. Cohen's kappa was used to test for agreement between methods and observers.



Figure: 2D parasagittal oblique views of the puborectalis muscle obtained by translabial ultrasound (A showing an avulsion on the patient's right, marked by a *, B an intact muscle on the patient's left). Image C shows a tomographic representation of the puborectalis muscle in the same patient, with the avulsion evident in most slices (marked by *).

Results

The mean age of patients was 54 years (range 26-82), median vaginal parity was 2 (range 0-9), with 67/75 women having given birth vaginally. Presenting complaints were stress incontinence (69%), urge incontinence (55%) and prolapse symptoms (53%). Avulsion defects were found in 28%. Agreement between observers for the diagnosis of avulsion by 2D US was 87%, equating to a Cohen's kappa of 0.56 (CI 0.33- 0.80). Agreement between tomographic 3D US and 2D US was 87%, with a kappa of 0.61 (CI 0.45-0.77). Agreement between palpation and 2D US also showed a kappa of 0.61 (0.45- 0.77). In this small series the commonly observed association between prolapse and levator ani defects was only significant for 3D tomographic US (X2 test, P= 0.024).

Interpretation of results

Avulsion of the puborectalis muscle can be diagnosed with 2D Ultrasound, using an oblique parasagittal translabial approach. The finding of a discontinuity between the hyperechogenic muscle and the pelvic sidewall is moderately reproducible and agrees moderately well with palpation and 3D US. However, it seems less reproducible than 3D ultrasound or magnetic resonance imaging, and it is less strongly associated with anterior compartment prolapse, suggesting reduced validity in comparison to tomographic 3D ultrasound.

Concluding message

Levator trauma can be visualized with simple 2D B mode ultrasound, a technology that is universally available in hospital environments, and frequently utilized by clinicians in their rooms, both in the developed and in the developing world. While the method is less reproducible and probably also less accurate than the current gold standards, 3D tomographic ultrasound and magnetic resonance imaging, it may still prove to be valuable in clinical practice, especially when used to confirm findings obtained on vaginal palpation.

References

1. Obstetrics & Gynecology 2007;109(2):295-302
2. Int Urogynecol J 2008; DOI 10.1007/s00192-008-0575-1
3. Br J Obstet Gynaecol 2006; 113: 225-30

<i>Specify source of funding or grant</i>	Australian Women and Childrens Research Foundation
<i>Is this a clinical trial?</i>	No
<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	No
<i>This study did not require eithics committee approval because</i>	this project was part of a parent study that was approved by the local Ethics Committee
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	No