

THE PREVALENCE OF MAJOR ABNORMALITIES OF THE LEVATOR ANI IN UROGYNÆCOLOGICAL PATIENTS

Hypothesis / aims of study

The puborectalis muscle is thought to play a major role in pelvic floor dysfunction (1). However, to date assessment has been limited to palpation and magnetic resonance imaging. 3D pelvic floor ultrasound (2) can now also be used to assess levator morphology. While levator trauma has been described on MRI (3), the prevalence of such defects and their clinical relevance remains unclear. This study was designed to define the prevalence of major abnormalities of the puborectalis/ pubococcygeus complex in women referred for urogynaecological assessment.

Study design, materials and methods

207 women referred for Urodynamic assessment underwent imaging with 2D and 3D translabial pelvic floor ultrasound using Medison SA 8000 or GE Kretz Voluson 730 systems with 7-4 Mhz volume transducer, supine and after bladder emptying. All assessments were conducted by the second author. Volumes were obtained at rest, on maximal Valsalva and on levator contraction. Volumes were analyzed by the first author who was blinded against clinical data. Analysis was performed with the software 4D View (Kretztechnik, Zipf, Austria) on a PC.

Levator avulsion was diagnosed in rendered axial volumes if there was a detachment of the muscle from the pelvic sidewall (see Figure). Avulsion was rated as present, absent or indeterminate for both sides separately, and it was only rated as present if the abnormality was detected in all three volumes. Levator atrophy was rated present if there was marked asymmetrical thinning (>50%) of the puborectalis/ pubococcygeus in all volumes, again separately for left and right.

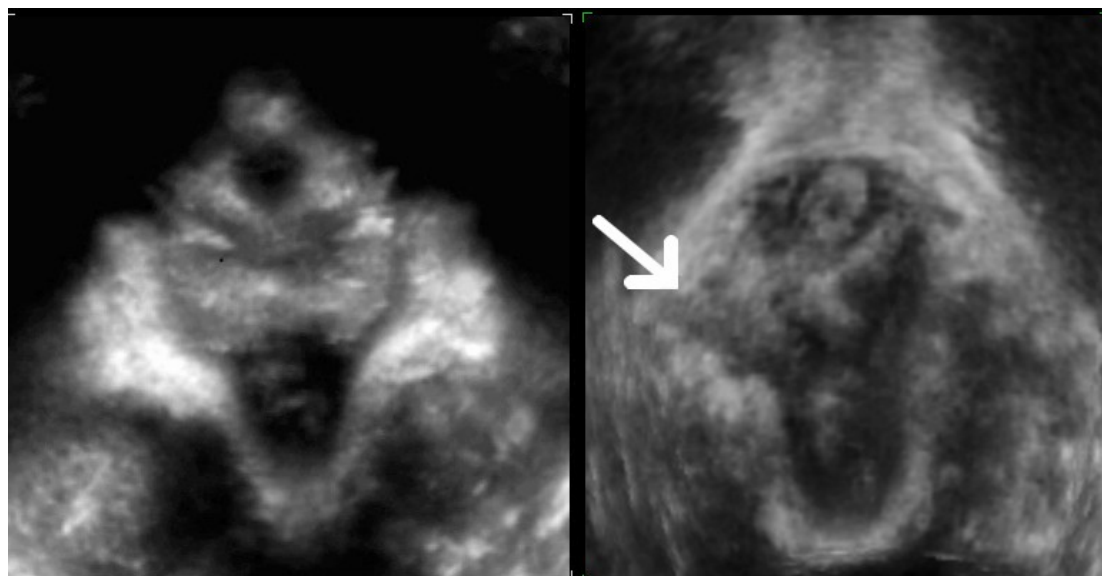


Figure: Normal levator anatomy (left) and detachment/ avulsion of the right m. puborectalis/ pubococcygeus (right, arrow) demonstrated by rendered volumes (axial plane).

Results

Of 207 datasets, eight were excluded due to incomplete clinical data. All results refer to the remaining 199 patients. Mean age was 54 (25-87) years. Median parity was 2 (range 0-7). Patients complained of stress incontinence (76%), urge incontinence (70%), frequency (43%), nocturia (51%) and voiding dysfunction (42%). 16% reported previous anti- incontinence or

prolapse procedures. Clinically, a cystocele was diagnosed in 141 cases (71%), uterine descent in 28 (14%) and a rectocele in 88 (44%).

Major abnormalities of the levator ani were observed in 15 women (7.6%). Levator avulsion or detachment from the pelvic sidewall was seen in 10 cases (5%), and most were on the patient's right (n=8). Marked asymmetry of the levator was observed in 5 cases (2.6%).

There was no correlation between symptoms (stress and urge incontinence) and ultrasound or clinical parameters of pelvic organ descent on the one hand and levator asymmetry/defects on the other hand. Hiatal area and diameters were also determined (see Table).

Parameter	mean	StD
Hiatal ap diameter at rest	51.6 mm	7.3 mm
Hiatal left-right diameter at rest	39.5 mm	6.4 mm
Hiatal area at rest	13.9 cm ²	3.3 cm ²
Hiatal ap diameter on Valsalva	58.2 mm*	9.6 mm
Hiatal left-right diameter on Valsalva	44.9 mm*	6.8 mm
Hiatal area on Valsalva	19.5 cm ² *	6.0 cm ²

Table: Descriptive statistics for dimensions of the levator hiatus at rest and on Valsalva (n=188 to n=193). All measurements on Valsalva were significantly higher than those at rest (all P< 0.001).

Hiatal area was weakly associated with age (on Valsalva, r= 0.16, p= 0.028) and parity (at rest, p= 0.003, on Valsalva, p= 0.016), but not with stress or urge incontinence. When hiatal area was tested against clinical pelvic organ descent, the area at rest correlated with cystocele (p= 0.003) and rectocele grading (p= 0.004) but not with uterine descent. For levator hiatus on Valsalva, this correlation was much stronger (cystocele, p< 0.001, uterine descent p= 0.032, rectocele, p< 0.001). Hiatal area was no higher in women with visible levator defects or marked asymmetry. In fact, there was a weak trend towards women with morphological abnormalities showing a smaller hiatus on Valsalva (19.6 cm² vs. 17 cm², p= 0.097).

Interpretation of results

Major abnormalities of levator anatomy can be demonstrated by 3D ultrasound, with rendered images in the axial plane giving good visualization of the attachments of the puborectalis/pubococcygeus muscles to the pelvic sidewall. Levator avulsion is not common but can be found in a significant minority of women symptomatic of pelvic floor disorders. We found avulsion injury in 5% of this group, and intriguingly, most such defects were detected on the patient's right side (8/10). A smaller number showed evidence of unilateral atrophy (2.6%). There were no correlations between age, parity and symptoms of incontinence on the one hand and abnormalities of levator morphology. However, the dimensions of the levator hiatus correlated with age, parity and pelvic organ descent.

Concluding message

A significant minority of women investigated for pelvic floor disorders seem to suffer from major abnormalities of levator morphology. The clinical significance of such abnormalities remains to be defined.

References

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