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ANATOMICAL MRI COMPARISON BETWEEN POST-PARTUM AND VOLUNTEER WOMEN IN THE UPRIGHT POSITION.

Aims of Study

Describe and quantify the anatomical differences of the pelvic floor between post-partum patients and normal female volunteers.

Methods

Nine healthy female volunteers and 5 post-partum primiparous participated in this case-control pilot study. The mean age was 32yo (SD 6.6y) for volunteers and 29yo (6.7y) for patients (P = NS). A patient or volunteer was excluded if she had chronic cough or constipation or her body mass index was greater that 30. A volunteer was excluded if she had greater that stage 0 pelvic organ prolapse [1] and/or a positive 1h pad test [2].

Four patients had undergone a spontaneous vaginal delivery of a term vertex infant, non-assisted, without episiotomy and with no greater than a 1st degree tear. One patient had had a forceps delivery with an episiotomy and a 3rd degree tear. All patients were imaged within 48h of delivery. MRI was performed using an interventional open-configuration 0.5 Tesla magnet, allowing positioning in the upright sitting position on a receive/transmit rectangular coil. High resolution coronal and axial T2-weighted images were obtained at rest ((TR/TE (eff) = 3000/108ms, slice thickness 5mm). Dynamic images were then obtained at rest and at maximal valsalva in the mid-sagittal and mid-coronal planes using a specially modified T2-weighted pulse sequence which allowed image acquisition in 4 seconds (TR/TE (eff) = 3000/102ms, slice thickness 10mm) [3]. The valsalva imaging was performed 3 times in each plane and the image depicting maximal strain was used for analysis. Strength of valsalva was monitored using a rectal balloon connected to a column of water graded in centimeters.

Sagittal displacement was measured from a reference line going from the inferior border of the pubis to the sacro-coccygeal line [4]. Axial measurements were taken immediately below the urethro-vesical junction. Coronal measurements were performed at the superior limit of the levator ani and at the junction between the levator ani and anal sphincter, inferiorly.

Results

Valsalva produced a mean intra-abdominal pressure increase of 35 (SD 19.2) cmH_2O in volunteers and 19 (SD 12.9) cmH_2O in patients (P=NS).

Table 1

MRI data	Rest		Valsalva	
	Patients	***Volunteers***	***Patients***	***Volunteers***
Pubis-BN	27.2 mm (SD 2.2)	21.3 mm (SD 4.2) *	29 mm (SD 7.5)	20.5 mm (SD 7.3) †
BN-PCL	4 mm (SD 5.8)	11.7 mm (SD 4.9) *	-9.4 mm (SD 7.2)	-5.3 mm (SD9) †
Total BN descent (valsalva – rest)	N/A		13.4 mm (SD7.2)	17 mm (SD6.6) †

*Legend: BN= bladder neck, PCL= pubococcygeal line, LA= levator ani, mm= millimeters, SD= standard deviation. *P < 0.05 between volunteers and post-partum, †P=NS between volunteers and post-partum.*

Qualitatively, the levator ani in the coronal images, was noted to be more frequently convex up in patients than in controls at rest, where the curvature was either flat or convex down (P= 0.051). No difference was noted in the levator ani curvature with valsalva.

In the axial images, the contour of the levator ani was more often irregular in post partum patients. This was noted only on the left side (P= 0.045, Fisher's exact).

Conclusions

This pilot study demonstrated anatomic differences between normal volunteers and post partum patients. Those differences were present only at rest and not during valsalva, possibly due to the difference in valsalva strengths between the two groups, although such difference did not reach significance.

The irregularity of the left levator ani seen only in post-partum patients is suggestive of a detachment of the levator ani insertion on the pelvic sidewall.

References

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4. Pelvic floor descent in women: dynamic evaluation with fast MR imaging and cinematic display. Rad 1991;179:25-33.