

PELVIC FLOOR HIATAL AREA IN PREGNANT WOMEN DURING REST, CONTRACTION AND VALSALVA: INTER-RATING AGREEMENT STUDY OF TRANSABIAL ULTRASONOGRAPHY MEASUREMENTS

Pascon Barbosa V¹, Cristina Rodrigues R², Baldini Prudencio C¹, Grous Gabini L¹, Oliveira Guilen R¹, Bittencourt Morgenstern Magyori A¹, Kenickel Nunes S¹, Affonso Pinheiro F¹, Isaias Sartorão Filho C¹, Vieira Cunha Rudge M¹, Mércia Pascon Barbosa A¹, Rodrigues Pedroni C³
1. Department of Gynecology and Obstetrics, Botucatu Medical School, Universidade Estadual Paulista (UNESP), Brazil, 2. Department of Physical Education, Institute of Biosciences of Rio Claro, São Paulo State University (UNESP), Rio Claro, São Paulo, Brazil, 3. Department of Physiotherapy and Occupational Therapy, Faculty of Philosophy and Sciences, São Paulo State University (UNESP), Marília, São Paulo, Brazil

HYPOTHESIS / AIMS OF STUDY

Hypothesis/aims of study: During pregnancy, the muscles, bones, fascia and ligaments that support the pelvic organs may be affected, influencing functions such as sexuality, urination and evacuation and leading to pelvic floor dysfunction (PFD) (1). Ultrasound is recommended by the International Continence Society and the International Urogynecological Association to obtain a detailed assessment of the pelvic floor (PF) considering the capacity for relaxation and distension of the muscles, especially during pregnancy(2). In addition, the accurate assessment and measurement of the hiatal area and inter-rater agreement is essential to ensure the reproducibility of the measurements(3). Therefore, the aim of this study was to evaluate, using three-dimensional transabial ultrasonography (3D-USTP), the agreement in the measurement of the hiatal area of the levator ani muscle in pregnant women during rest, contraction and Valsalva.

STUDY DESIGN, MATERIALS AND METHODS

Study design, materials and methods: The study protocol was approved by the Research Ethics Board (CAAE: 82225617.0.0000.5411) and all volunteers signed an Informed Consent Form. The study included 57 pregnant women, from 24 weeks of gestation, who underwent PF evaluation using three-dimensional transabial ultrasonography (3D-USTP) to analyze the hiatal area at rest and during contraction and Valsalva. The volume analysis was performed by two independent examiners in order to investigate the inter-rater agreement of the measurements.

RESULTS

Results: The analyses were performed in Excel (v12.2.7) and SPSS (v18.0). Normality was tested by Shapiro-Wilk, and inter-rater agreement was assessed by Bland-Altman. The paired t-test was used to verify bias between examiners (p = 0.05). No significant difference was found in the analysis of the hiatal area at rest between examiners. A significant inter-rater difference was found in the hiatal area measurements obtained during contraction of the PF muscles and Valsalva maneuver.

INTERPRETATION OF RESULTS

Interpretation of results: This is, to our knowledge, the first study to evaluate inter-rater agreement of ultrasound images of the pelvic floor of pregnant women, during rest, contraction and distension. Our results show that measurements of the hiatal area of the levator ani muscle have high reproducibility, with good reliability at rest, without significant systematic bias between examiners, according to Bland-Altman analysis. This suggests that, when examiners have similar training and experience, there is no significant variation in the results. Thus, when involving multiple raters, it is crucial to ensure inter-rater reliability to maintain measurement accuracy and clinical relevance. The study also highlights the importance of accurate assessment of the hiatal area, aiming at the prevention of pelvic floor disorders and appropriate treatments to improve women's quality of life.

CONCLUDING MESSAGE

Concluding message: The study demonstrated inter-rater agreement in the analysis of the hiatal area at rest, but identified bias in the analysis of measurements obtained during contraction and valsalva.

FIGURE 1

Table 1. Measurements related to the area of the levator ani hiatal at rest, contraction and valsalva measured by each examiner.

	Examiner 1	Examiner 2	p
Hiatal Area at Rest (cm ²)	10.4±2.5	11.1±2.6	.082
Hiatal Area in Contraction (cm ²)	8.5±1.8	9.6±2.2	.000
Hiatal Area in Valsalva (cm ²)	11.1±2.9	12.8±2.9	.000

Table 1. Measurements related to the area of the levator ani hiatal at rest, contraction and valsalva measured by each examiner.

FIGURE 2

Table 2. Related measurements of contractility, distensibility and mobility of the levator ani hiatal area at rest, contraction and valsalva measured by each examiner.

	Examiner 1	Examiner 2	P
Contractility (%)	-16.1±14.6	15.1±9.1	.624
Distensibility (%)	8.1±17	13.4±18.5	.076
Mobility (%)	30.9±22.5	34.4±24.1	.355

Table 2. Related measurements of contractility, distensibility and mobility of the levator ani hiatal area at rest, contraction and valsalva measured by each examiner.

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