

ARE ANAL SPHINCTER INJURIES RELATED WITH LEVATOR ABNORMALITIES?

Hypothesis / aims of study

Extensive damage of the pelvic floor due to childbirth can lead to anatomical abnormalities such as levator defects and or anal sphincter injuries. 3D/4D Transperineal ultrasound can detect levator abnormalities and can also be used for evaluating defects of the anal sphincter. Little is known about the relation between the sphincter injuries and levator defects and function of the muscle levator ani. This study was designed to investigate the incidence and prevalence of the above, in patients complaining of pelvic organ prolapse and or faecal incontinence.

Study design, materials and methods

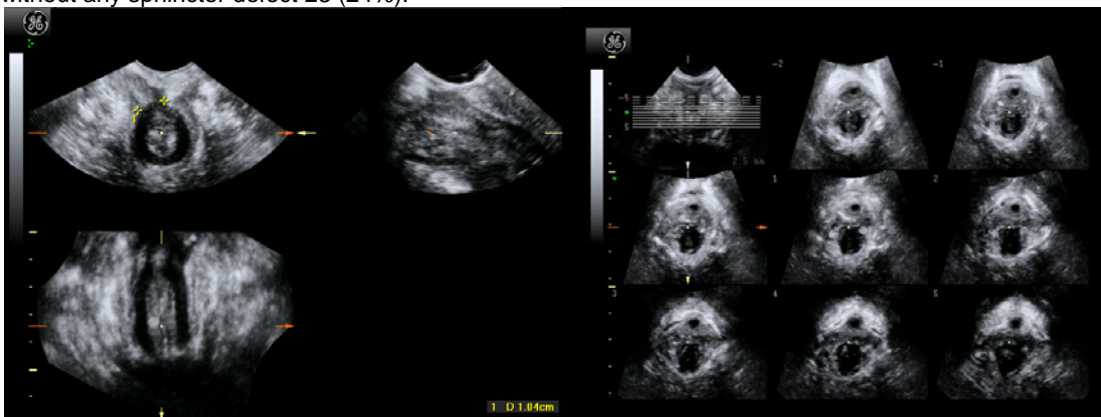
In a prospective observational study patients referred to our tertiary pelvic floor clinic with pelvic organ prolapse symptoms and or faecal incontinence were seen for an interview, clinical examination and 3D/4D transperineal ultrasound. Volumes were obtained in supine position, after voiding using a GE Kretz Voluson 730 Expert system. Volumes were obtained at rest, on pelvic floor contraction and on Valsalva manoeuvre for detecting levator defects, using a real time 4D convex transducer (RAB 4- 8 MHz). Transperineal ultrasound was performed for imaging the anal sphincter complex using a real time 4D micro convex transducer (RNA 5-9 MHz). Analysis of these datasets was undertaken using the software GE Kretz 4D view. Off line analysis was performed with the investigators blinded against the clinical data.

For quantification of the levator defects a Tomographic Ultrasound Imaging (TUI) was used. At the level of minimal hiatal dimension a set of 8 slices with the interval of 2.5 mm, were obtained, from 5 mm below to 12.5 mm above hiatal plane, assessed on maximal levator contraction. Levator defects are defined as an interruption of the levator ani muscle with the pelvic side wall and scored with 0 when there are no defects and with a maximum of 16 when there is a complete bilateral avulsion. Also at this level in the 3D volume the diameter of AP (anterior-posterior), LR (left-right) and area of the hiatus was measured at rest, contraction and Valsalva. The percentage difference (value A rest - value A (contraction or valsalva) divide by value A rest) for contraction was calculated for evaluation of pelvic floor function.

Results

Complete datasets of 164 patients were available. 48 Patients were diagnosed with an anal sphincter injury (29%), which involved either a internal sphincter defect, external or both. There was a significance difference between the differences for the total TUI scores of the levator quantification (max 16). A total TUI score of 10 was found in patients with anal sphincter injuries in contrast with a total score of 7.5 in patients without ($P < 0.001$). No significant differences were detected for AP, LR, hiatal area and the percentage difference of contraction and valsalva.

Of the 48 patients with sphincter defects only 17 were complaining of faecal incontinence (35%), whereas in patients without any sphincter defect 28 (24%).



Figure

Ultrasound of a patient with complaints of urinary and faecal incontinence after her first delivery. On the left a 3D-image of the anal sphincter, with the internal sphincter as a hypo-echoic ring and the external sphincter as an echogenic ring with occult sphincter damage at the 11-o'clock position. On the right the TUI of the levator ani muscle with an partial avulsion on the left (5/8) and a complete avulsion on the right (8/8)

Interpretation of results

3D/4D Transperineal ultrasound is an easy non-invasive method for diagnosing anatomical pelvic floor abnormalities such as levator defects and anal sphincter injuries. Levator abnormalities are related with anterior and central compartment descent. Patients with anatomical defects are at risk for developing pelvic floor disorders. Our study showed a significant correlation for levator defects and anal sphincter injuries. No significant differences were found for hiatal measurements at contraction and valsalva in regards to pelvic floor function suggesting that developing sphincter defect maybe related to different anatomically disintegrity in comparison to patient complaining of anterior or central compartment descent.

Concluding message

Patients with anal sphincter injuries do have significant more defects of the levator ani muscle. Surprisingly, there was no higher incidence of faecal incontinence in this group. Extensive damage of the pelvic floor does not seem to be related with pelvic floor function such as strength of the levator contraction or differences in hiatal dimensions.

References

1. BJOG. 2006 ;113(2):225-30.
2. Obstetrics & Gynecology. 2007.109(2):295-302.
3. Ultrasound Obstet Gynecol. 2007. 29(2):195-204

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CLINICAL TRIAL REGISTRATION: This clinical trial has not yet been registered in a public clinical trials registry.

HUMAN SUBJECTS: This study did not need ethical approval because it is a study about a routine examination and did not follow the Declaration of Helsinki - with approval by the ethics committee - in the sense that no declaration Informed consent was not obtained from the patients.