

3D ULTRASOUND OF THE PUBORECTAL MUSCLE BEFORE AND AFTER VAGINAL DELIVERY.

Hypothesis / aims of study

The aim of the study was to evaluate the influence of vaginal childbirth on the integrity of the puborectal muscle with the help of real-time 3D ultrasound. The puborectal muscle is a key structure for support of the female pelvic organs. Its defect function can cause pelvic organ prolapse and/or urinary incontinence. The major cause of trauma to the puborectal muscle is vaginal delivery. During descent of the head, the muscle has to stretch to more three times its resting length. As has been shown by others, the unilateral or bilateral avulsion of the puborectal muscle is a fairly common complication of vaginal childbirth.

Study design, materials and methods

We examined 20 primigravid women in the third trimester and on the third day after vaginal delivery (Table 1). The transperineal 3D ultrasound examination was performed and the data were evaluated afterwards in the 4D view[®] software. The VCI (Volume Contrast Imaging) mode with slice thickness 3 millimeters was used for analysis. We evaluated the integrity of the puborectal muscle on both sides, the quality of the images and the presence of hematomas.

Results

The examination prior to delivery did not show any abnormal anatomy of the examined region. We found four (20%) unilateral defects and one (5%) bilateral puborectal avulsion after the delivery. The bilateral defect was after forceps delivery, the other defects occurred after normal uncomplicated vaginal deliveries, where only a left mediolateral episiotomy was performed and the birth weight did not exceed 3700 g. In our series, 25% of women suffered an injury of a major muscle of pelvic floor. No defect was diagnosed during delivery and did not show any connection with the episiotomy.

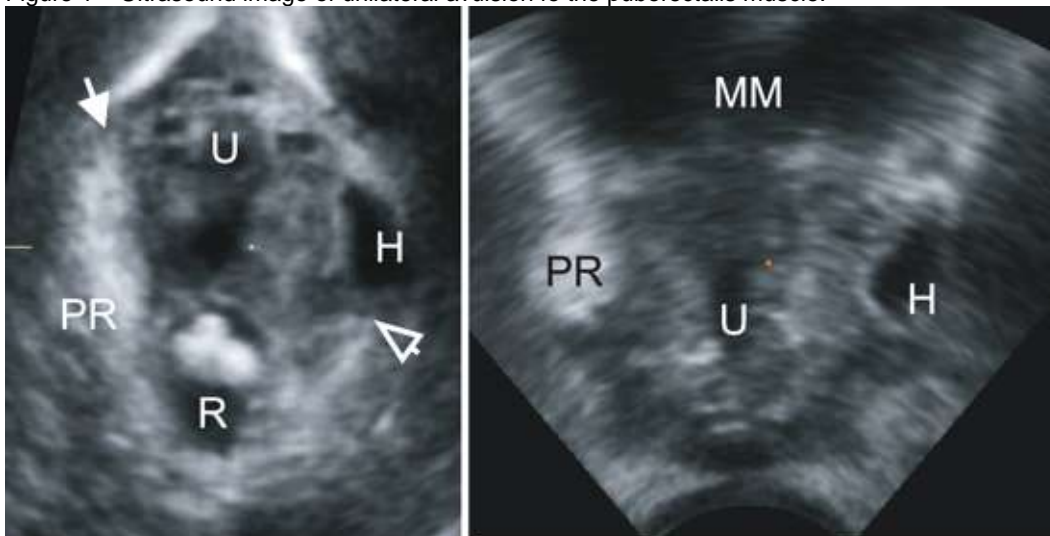
Interpretation of results

The vaginal delivery is know risk factor for urinary incontinence and pelvic organ prolapse. It may result in major structural trauma to the levator ani, tears and thinning of the endopelvic fascia or in neurologic injury. The muscle trauma can be either major avulsion of the muscle from its insertion to the bones, some partial tears in the course of the muscle or there can be more discreet stretch injury (altered microarchitecture of the muscle with lost of active fibers and pronounced fibrotization). The structure and function of the levator ani muscle has so far only been adressed marginally in daily practice. The possibility to describe major levator injury and include this knowledge into diagnostic and therapeutic algorithms can make our treatment more specific and, hopefully, more efficient.

Concluding message

3D ultrasound can detect major birth trauma to the puborectal muscle. The puborectal muscle avulsion is usually not recognized during the delivery and does not cause immediate problems for the patient.

Figure 1 – Ultrasound image of unilateral avulsion fo the puborectalis muscle.



Transversal (left) and coronal (right) image of unilateral puborectal avulsion. The open arrow shows the anterior end of the damaged muscle. The full arrow shows the normal insertion of the puborectal muscle to the public bone. U – urethra, R – rectum, PR – puborectal muscle, H – hematoma, MM – urinary bladder.

Table 1

	n = 20	units
Epidural anesthesia	60%	
BMI before pregnancy	22,3 (SD 2,7)	kg/m ²
BMI at delivery	27,5 (SD 3,2)	kg/m ²
Infant birth weight	3412 (SD 312)	g
First stage length	389 (min. 135, max. 805)	minutes
Second stage length	22 (min. 5, max. 79)	minutes
Infant head circumference	34,4 (SD 1,1)	cm

SD – standard deviation, BMI – body mass index

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DISCLOSURES: NONE

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

HUMAN SUBJECTS: This study was approved by the Ethics Committee of the UPMD and followed the Declaration of Helsinki Informed consent was obtained from the patients.