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MOBILITY OF THE PERINEAL BODY BEFORE AND AFTER CHILDBIRTH

Hypothesis / aims of study

The perineal body is a complex fibromuscular mass between the terminal ends of the urogenital and gastrointestinal system. It is an important structure which often is injured during labour. It is believed to play a role in pelvic organ prolapse (1). In a study using magnetic resonance imaging, women with pelvic organ prolapse have more perineal body descent, a larger levator hiatal diameter, and a more vertically oriented levator plate angle (2). Vaginal delivery is likely to increase the mobility of perineal body and anorectal angle. The aim of this study was to determine changes in the mobility of perineal body and anorectal angle before and after delivery using pelvic floor ultrasound.

Study design, materials and methods

We enrolled 200 nulliparous women attending the antenatal clinic of a tertiary care hospital from November 2006 to March 2008. Inclusion criteria included an uncomplicated singleton pregnancy, age over 18 years, and no previous pregnancy to more than 20 weeks gestation. All women were seen at 36-38 weeks gestation and at 3-6 months postpartum. Written informed consent was obtained at the first appointment. All women underwent an interview and 4 dimensional pelvic floor ultrasound (US), after voiding, in supine position with both knees flexed and both ankles close to the patient's buttocks. We used a GE Voluson 730 expert system with 8-4 MHz volume transducer. Ultrasound volume at rest and on maximal Valsalva were obtained for each patient both at 36-38 weeks gestation and 3-6 months postpartum. The data were analysed at the later date using proprietary software and blinded against all clinical data. Delivery and post delivery data were collected from the hospital database and patients' records. This study was a sub-analysis of an ethics- approved parent project.

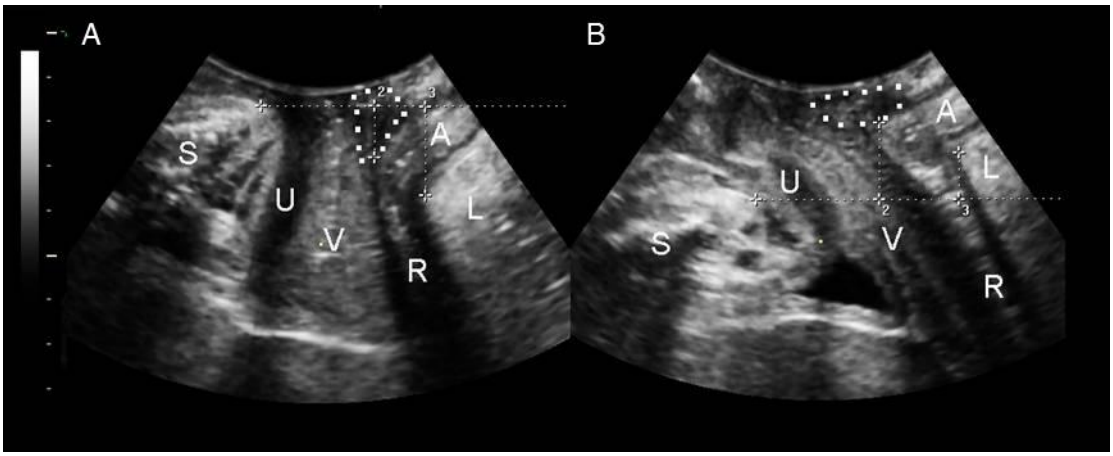

Figure 1: Translabial ultrasound assessment of perineal body structure and mobility at rest (A) and on Valsalva (B). S= symphysis pubis, U= urethra, V= vagina, R= rectum, A= anal canal, L= levator ani. The approximate location of the perineal body is outlined by a dotted line.

The following ultrasound parameters for the perineal body and the mobility of the anorectal angle were measured in midsagittal plane:

1. Mobility of perineal body apex relative to inferior symphyseal margin.
2. Mobility of perineal body apex relative to plane of minimal hiatal dimensions.
3. Mobility of anorectal angle relative to inferior symphyseal margin.
4. Craniocaudal diameter of perineal body at rest.
5. Perineal body area at rest.

A test-retest series was performed on 20 ultrasound volume datasets, with good repeatability shown for 1) and 3) (Intraclass correlations 0.74 [CI 0.46-0.89] and 0.76 [0.49- 0.90]). Parameters 2 and 4 were poorly repeatable (ICC 0.28 and ICC 0.15), and perineal body area showed moderate repeatability (ICC 0.56 [CI 0.10- 0.82]). We therefore decided to focus on parameters 1 and 3.

Results

Mean age at the time of first assessment was 26.2 years (range 18.1 - 45) with mean body mass index of 31.5 (22.1 -56.5). The mean gestation at first assessment was 37.2 weeks with mean gestational age at delivery of 40 weeks. Mean neonatal birth weight was 3483.5 grams. Of 200 women seen antepartum, 157 returned for postnatal assessment at a mean of 5 months. Eighty-five had normal vaginal deliveries, 14 had vacuum, 9 had forceps,12 had a prelabour cesarean section (C/S), 29 had C/S in first stage of labour, and 8 had a C/S in second stage. Of 108 patients who delivered vaginally, 40 had sustained a perineal tear, and 30 patients had an episiotomy. Of 200 women, 89 had an epidural block during labour, and in 76 cases labour was augmented with syntocinon. Median length of first stage of labour was 390 minutes, of the second stage was 54 minutes.

After delivery, perineal body mobility had increased significantly from 18.24 mm to 21.25 mm ($P<0.001$). The mobility of the anorectal angle also increased significantly from 17.13mm to 20.65 mm ($P<0.001$). Table 2 provides a breakdown of ante- and

postnatal findings for different delivery modes, with a clear relationship between vaginal delivery and increased measures of perineal mobility. A significant correlation was found between these measures and levator hiatal area on Valsalva both before and after delivery (Pearson's correlation coefficients between 0.323 and 0.454, all P<0.001).

Parameter	**Cesarean section (n=48)**	**NVD (n=85)**	**Vacuum delivery (n=14)**	**Forceps delivery (n=9)**
Perineal body mobility antepartum (mm)	17.22	18.97	18.93	15.78
Perineal body mobility postpartum (mm)	18.05	22.39	26.76	19.02
P	0.508	0.008	<0.001	0.129
Anorectal angle mobility antepartum (mm)	15.25	18.20	18.17	15.40
Anorectal angle mobility postpartum (mm)	17.94	21.94	23.71	18.19
P	0.034	0.003	0.032	0.371

Table 1 : Antepartum and postpartum mean mobility of perineal body and anorectal angle in relation to mode of delivery (paired t-test). NVD= normal vaginal delivery.

The degree of documented perineal trauma in the vaginal delivery group did not affect the mobility of both perineal body and anorectal angle (P=0.51 and 0.73 respectively). There was no association between length of first and second stage of labour and mobility of both perineal body and anorectal angle. Epidural block, augmentation and episiotomy were not associated with mobility of both perineal body and anorectal angle.

Interpretation of results

While its exact extent is often difficult to determine, it is possible to assess the position of perineal body and its mobility, as well as mobility of the anorectal angle, with acceptable repeatability by translabial ultrasound. Childbirth increases mobility of both perineal body and anorectal angle, and the degree of change varies with delivery mode. The mobility of both perineal body and anorectal angle are associated with levator hiatal dimensions. Perineal tear, episiotomy, epidural block during labour and syntocinon augmentation were not associated with postpartum mobility of perineal body and anorectal angle.

Concluding message

Ultrasound parameters of mobility of both perineal body and anorectal angle are reproducible. Vaginal delivery increases the mobility of both structures. Perineal mobility may be partly determined by distensibility of the levator hiatus.

References

1. Clin Anat 2002;15:321-34
2. Am J Obstet Gynecol 2006;194:1427-33

Specify source of funding or grant	**N/A**
Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**SWAHS HREC**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**