

## IMPACT OF BIRTH ON LEVATOR MORPHOLOGY WITH 3D ULTRASOUND EARLY POSTPARTUM: A PROSPECTIVE OBSERVATIONAL STUDY

### Hypothesis / aims of study

to evaluate morphology and integrity of levator ani muscle (LAM) with 3D ultrasound soon after vaginal delivery and cesarean section.

### Study design, materials and methods

patients delivered at our department between January-June 2009 were included in this prospective observational study. 3D perineal ultrasound was performed between 48-72 hours postpartum.

Axial plane at level of minimal hiatal dimension was utilized to determine antero-posterior (hAP), latero-lateral (hLL) diameter, area (hA), circumference (hC) of levator hiatus and LAM thickness (1). LAM avulsion was defined as a defect present in at least 3 consecutive tomographic slices above plane of minimal hiatal dimension (2).



### Results:

During study period 200 women after vaginal delivery (group A) and after cesarean section (group B) were enrolled. Group A included 111 (55.5%) patients (99 spontaneous deliveries, 11 vacuum, 1 forceps) and group B included 89 (44.5%) patients (67 elective, 22 secondary cesarean sections). No difference concerning age, BMI, parital status was found.

**Tab.1. Biometrical indices levator ani** (Group A: vaginal delivery, Group B: cesarean section)

	Group A (n=111)	Group B (n=89)	P value
hAP diameter (cm)	6.0 (±0.8)	4.9 (±0.8)	<0.001 <sup>o</sup>
hLL diameter (cm)	4.1 (±0.5)	3.6 (±0.54)	< 0.001 <sup>o</sup>
hA (cm <sup>2</sup> )	14.68 (8.6-24.79)	10.64 (5.8-31.37)	<0.001 <sup>*</sup>
hC (cm)	15.98 (±1.7)	13.55 (±1.8)	<0.001 <sup>o</sup>
Levator thickness right (cm)	0.7 ( 0.38-1.32)	0.67 ( 0.33-1.77)	0.117 <sup>**</sup>
left (cm)	0.69 (0.34-1.8)	0.65 ( 0.31-1.35)	0.222 <sup>**</sup>

**Tab.2 Levator ani defects** (Group A: vaginal delivery, Group B: cesarean section)

	Group A (n=111)	Group B (n=89)	P value
With LA defect	42/111 (37%)	6/89 (6.7%)	<0.001
- Monolateral	28/42(66.6%)	4/6 (66.6 %)	
- Bilateral	14/42(33.4 %)	2/6 (33.4%)	
NO LA defect	69/111 (63%)	83/89 (93.3%)	

Interpretation of results:

All biometrical indices of levator hiatus were higher after vaginal delivery ( $p < 0.001$ ) but not LAM thickness (Tab 1). Presence of LAM defects was significantly higher in group A than in group B, with  $OR = 7.13$  (IC95%:3-16.8)(Tab 2).

In group A, 42 (37%) levator defects were found: 36 (36.3%) after spontaneous and 6 (50%) after operative deliveries.

In group B, 6 (6.7%) levator defects were found: 2 (2.9%) after primary (2 pluriparae), 4 (18%) after secondary sections (4 nulliparae)

Concluding message:

our findings suggest that, in comparison to cesarean section, vaginal delivery modifies and damages LAM; risk of levator trauma after vaginal delivery is more than 7 times higher than after cesarean section. Our data also show that secondary cesarean section has no complete preventive effect on LAM trauma.

References

1. Dietz H.P. Biometry of the pubovisceral muscle and levator hiatus by three-dimensional pelvic floor ultrasound . Ultrasound Obstet Gynecol,2005;25:580-585
2. Dietz H.P., K.L. Shek. Tomographic ultrasound imaging of the pelvic floor: which levels matter most? Ultraosund Obstetr Gynecol 2009; 33:698-703

<b>Specify source of funding or grant</b>	<b>NONE</b>
<b>Is this a clinical trial?</b>	<b>Yes</b>
<b>Is this study registered in a public clinical trials registry?</b>	<b>No</b>
<b>Is this a Randomised Controlled Trial (RCT)?</b>	<b>No</b>
<b>What were the subjects in the study?</b>	<b>HUMAN</b>
<b>Was this study approved by an ethics committee?</b>	<b>Yes</b>
<b>Specify Name of Ethics Committee</b>	<b>Institutional Rewiev Board</b>
<b>Was the Declaration of Helsinki followed?</b>	<b>Yes</b>
<b>Was informed consent obtained from the patients?</b>	<b>Yes</b>