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MULTIPLANAR ANALYSIS OF LEVATOR ANI MUSCLE DAMAGE IN MAGNETIC RESONANCE IMAGING

<u>Hypothesis / aims of study</u>
Magnetic resonance imaging (MRI) is the most accurate method displaying the pelvic floor trauma following vaginal delivery and its relationship to pelvic floor dysfunction. We compared MRI scans in two groups of primiparas with the aim to assess the appearance of musculo-fascial defects in different planes of female pelvis.

<u>Study design, materials and methods</u>
This is an unicentric, retrospective and observational study of two groups of primiparas. Group A consists of women suffering from pelvic floor dysfunction following first vaginal delivery; group B consists of women without any pelvic dysfunction symptoms after first vaginal delivery. All the patients with were first examined according to POP-Q system. In all patients we performed dynamic MRI scan (supine position, 1,5 and 3 T, slicing 2-4mm, gap 1mm) in axial, coronal and sagittal projections. All scans were evaluated independently by two researchers. We observed the severity of levator ani injury (MLAI) in two planes. Axial scans were used for evaluation of pubovisceral muscle complex (PMC) according to deLancey´s classification, for Ileococcygeal muscle complex (ICM) we used the similar system. The fascial defects were marked in same levels as muscular components. Morphology of sacrouterine ligaments (SUL) was scored according to Umek´s classification. As a measure of musculo-fascial status we analysed following biometric parameters in sagittal scans: levator plate angle (LPa) and the angle between SCIPP line and the line connecting distal part of S5 and posterior aspect of uterine cervix (USa); all parameters at rest and Valsalva. All data showed normal distribution so we used ANOVA a t-test, SPSS® program, Version 19 for statistic evaluation

<u>Results</u>
Group A contains 91 patients, group B consists of 33 patients. The mean age at delivery in group A was 31,7 years (20-41), in group B 30,3 (22-36), mean BMI 23,5 in group A (17-36) and in group B 27,4 (22-34). Mean neonatal birth weight was 3486 g (2490-4750) in group A, 3441 g (2760-4230) in group B. Both groups statistically differ only in BMI values. Dominant symptoms in group A were: pelvic organ descent (44%), LUTS (28,6%), dyspareunia (20,9%) and defecatory problems (6,6%). According to POP-Q 23,1% showed no signs of prolapse. Stage I of POP showed 16,5%, stage II 46,2 % and stage III 13,2% patients. Group B was completely asymptomatic with normal POP-Q values. In group A at PCM plane showed 16,7% patients no muscle trauma of LAM, 12,1% minor trauma and 70,3% major trauma. On ICM plane showed 7,1% patients no muscle trauma of LAM, 4,8% minor trauma and 88,1% major trauma. In group A at PCM plane showed 28,9% patients no fascial defects, 23,2% unilateral and 47,8% bilateral defect. On ICM plane showed 11,9% patients no fascial defects, 9,5% unilateral and 78,6 % bilateral defect. Sacrouterine ligaments had normal appearance in 39,3% patients, however 60,7% presented abnormal SUL morphology. Almost all (96,7%) patients with major trauma at PCM plane showed also major trauma at ICM level. Almost all (97,4%) patients with major defects in both PCM and ICM planes showed abnormal SUL appearance. The leading symptom in these patients was prolapse. In group B on PCM plane showed 79,2% patients no muscle trauma, 20,8% minor trauma and 0% major trauma. On ICM plane showed 16,7% patients no muscle trauma, 29,2%minor trauma and 54,2% major trauma. In group B on PCM plane showed 95,8% patients no fascial defects and 4,2% bilateral defects. On ICM plane showed 62,5% patients no fascial defects, 4,2% unilateral and 33,3 % bilateral defect. Sacrouterine ligaments were of normal appearance in 69,6%, however 30,4% of patients presented abnormal SUL morphology. 33,3 % patients with normal MLA at both planes showed abnormal SUL morphology in group B. Levator plate angle (LPa) and the angle between SCIPP line and the line connecting distal part of S5 and posterior aspect of uterine cervix showed (USa) in group A showed statistically significant worse values compared to group B and we also proved the relationship to severity of POP-Q staging.

<u>Interpretation of results</u>
Symptomatic patients had high frequency of musculo-fascial injury opposite to asymptomatic ones. There is no need to investigate ICM in symptomatic patients, because PCM plane informs sufficiently about severity of trauma. Asymptomatic controls with no trauma at PCM plane had in 54,2% defects at ICM plane. In specific cases of symptomatic patients, where we couldn´t demonstrate abnormalities at PCM, we proved the abnormal morphology of SUL. Mobility of uterine cervix and levator plate represent quantitative parameters with correlation to degree of prolapse.

<u>Concluding message</u>
Our study results show, that some group of prolapse patients could have severe LAM trauma on its upper levels, what indicates the need of detailed examination including MRI.

<u>Disclosures</u>
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