78

Krcmar M[1], Krofta L[1], Grohregin K[1], Feyereisl J[1]
1. *Institute for the care of mother and child*

MRI SUBTRACTION ANALYSIS OF SYMPTOMATIC PRIMIPARAS AFTER VAGINAL DELIVERY WITH PELVIC ORGAN PROLAPSE WITHOUT VISIBLE PELVIC FLOOR INJURY

Hypothesis / aims of study

Levator ani muscle injury as well as fascial defects have already been identified as the factors seriously contributing to the development of female pelvic prolapse. Magnetic resonance imaging (MRI) in our large group of primiparas (n=110) confirmed such hypothesis. Nevertheless we found a specific subgroup of patients without the evidence of musculofascial trauma, however suffering from clinically relevant stage of prolapse. We performed a subtraction analysis followed by creation of 3D MRI guided model of this cohort trying to identify the cause of such finding. Aims of our work were: 1) to assess the incidence of distortion of normal pelvic floor anatomy in symptomatic patients with no signs of musculo-fascial trauma in magnetic resonance imaging, 2) explanation of mechanisms leading to development of severe pelvic organ prolapse in such patients and 3) construction of 3D MRI guided model of their pelvic floor anatomy

Study design, materials and methods

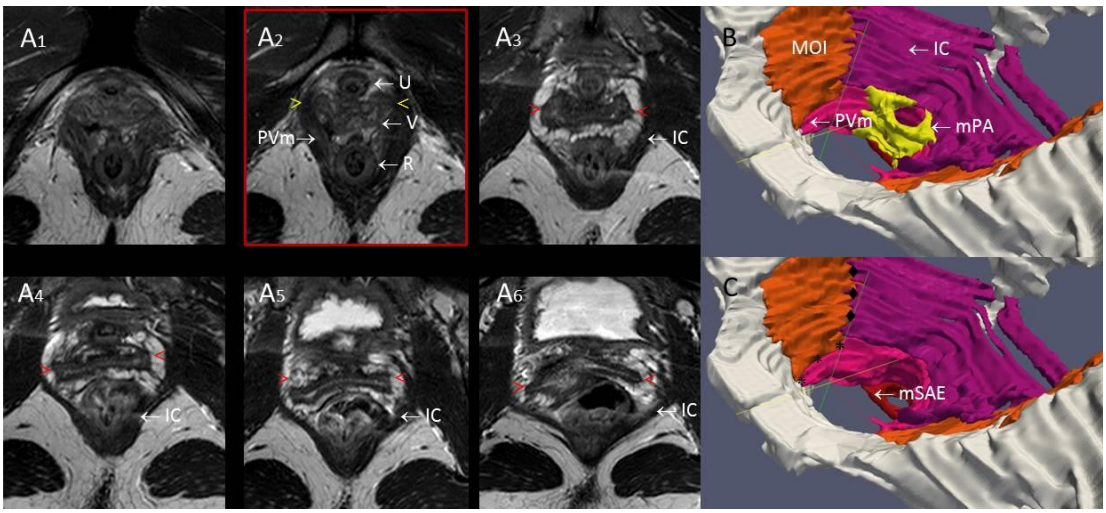
This is a part of retrospective observational study of primiparas in fertile age suffering from pelvic floor dysfunction following first vaginal delivery. A total number of 110 women with signed informed consent were included in the study. All the patients were first examined according to POP-Q system. In all patients we performed dynamic MRI scan (supine position,1,5 T, slice thickness 4mm, gap 1mm) in axial, coronal and sagittal projections. All scans have been evaluated independently by two researchers. We observed the severity of musculus levator ani injury (MLAI) according to classification system of deLancey. The defect of lateral vaginal attachment to the pelvic sidewall (architectural distortion-AD) has been marked as present or not present without knowing the severity of prolapse by the examiner. In 8 patients we haven´t been able to identify the signs of muscular and/or fascial injury, so we performed new MRI scans in those patients (3T, slice thickness 2mm, gap 0mm) and reanalysis of this subgroup, investigating the same parameters. The obtained values were evaluated with parametric and non-parametric test using SPSS® program, Version 19. Furthermore we created 3D models of pelvic floor in those patients using Slicer® 4.3 and Paraview®.

Results

The mean age at delivery was 32,1 years (range 20-38), mean age at examination 33,9 years (range 24-38), mean BMI 23,1 (range 20-31) kg/m^2 and mean neonatal birth weight was 3640 gr (range 2820-4420). 87,5% of the patients delivered spontaneously, 12,5% with forceps. Most common symptom was pelvic organ descent (75%) stage II and more in all compartments (50% in anterior, 12,5% in middle and 62,5% in posterior compartment), followed by stress urinary incontinence (12,5%). Levator ani muscle injury as well as fascial defects were revealed in upper levels of pelvic floor (ileoccocygeal portion of levator ani muscle) in all cases. At 3D models we observed pathological position of this muscle portion with dorsal displacement in all patients (Fig.1).

Fig. 1: A1-A6: 3T axial MRI scans. A2: scan at the level of lig. arcuatum pubicum, with normal pubovisceralis muscle complex (PVm). Open yellow arrows (<) demonstrate normal vaginal shape. A2-6: scans above plane A2, where abnormal musculus illiococcygealis shape is visible. Open red arrows (<) demonstrate abnormal vaginal shape. B: MRI based 3D modelling of the bony pelvis and muscle (MOI- obturate internal muscle, IC- illiococcygeal muscle, PVm- pubovisceral muscle complex, mPA- puboanalis muscle). C: ∗ normal PVm connection, ♦ IC dorsal displacement.

Fig. 1



Interpretation of results

In specific cases we are not able to demonstrate musculofascial abnormalities in MRI, whose are typical for pelvic prolapse at the level of arcuate ligament. However, we can prove the defects in upper levels with the help of modern 3T MRI imaging.

Concluding message

MRI based 3D pelvic modelling refines the understanding of pelvic dysfunction, however more detailed studies are needed

Disclosures

Funding: PRVOUK-32 Research supporting grant from 3rd Faculty Of Medicine, Charles University, Prague **Clinical Trial:** Yes **Public Registry:** No **RCT:** No **Subjects:** HUMAN **Ethics Committee:** Local Ethics Committee of Institute For The Care Of Mother and Child **Helsinki:** Yes **Informed Consent:** Yes