

USING MRI-BASED DIGITAL 3D SPACE COORDINATE SYSTEM EVALUATE THE SUBTYPE OF CYSTOCELE

Hypothesis / aims of study

Using MRI-based Digital 3D space coordinate system evaluated anatomy change of anterior vaginal wall in patients with cystocele, and identified the subtype of cystocele.

Study design, materials and methods

Ten patients with anterior vaginal prolapse and ten age matched healthy volunteers were enrolled in this study between Aug. 2014 and Dec. 2015. Pelvic floor MRI scan was performed to reconstruct the pelvic floor 3D model. All of the patients and volunteers were requested to do rest, Valsalva and contraction manoeuvres during MRI scan. MRI Imaging of the rest and Valsalva state was imported into the 3D-Slicer software. The outline of bony pelvis, uterus, bladder and rectum were sketched in different colour to build 3D model. Then, these 3D-MRI reconstruction imaging were imported into the Geomagic Studio software (Geomagic Inc, America) for reverse analysis. We compared and measured the space position of the middle and bilateral of posterior bladder wall in rest state and Valsalva maneuver respectively. The imaging of axial, sagittal and coronal section was used.

Results

The characteristics of the participants were given in table 1. There is no difference between two groups. Based on the MRI data of pelvic floor, an ideal 3D model of pelvic floor structure can be obtained. In the control group after Valsalva maneuver, all the points of posterior bladder wall were located above the horizontal line, the score of Y axis is positive. However patient in cystocele group, these points declined to the level below the horizontal line. It means cystocele happened. The lowest point was at the centre of posterior bladder wall cove along the cross-section in 8 cases. In one case, the lowest point was at right side of the cove, and another case was at the bilateral end of the cove. The cove shifted downward in Valsalva maneuver. The drop was more obvious in central part then bilateral part in 2 cases. But, in other 8 cases, the bilateral part was downward more than central part of posterior bladder wall. It means paravaginal defect happened.

Interpretation of results

MRI based 3D visualization of the pelvic floor anatomy can reflect the structure of the pelvic floor. Compared with planar images, 3D model of pelvic organ prolapse is more intuitive and accurate. The displacement of posterior bladder wall can be measured by importing the 3D data to Geomagic Studio software. In cystocele cases with paravaginal defect, the drop was more obvious in bilateral part then central part.

Concluding message

Pelvic MRI can provide clear and reliable information when evaluating the pelvic floor morphology of patients with cystocele, and provide the basis for the accurate treatment plan.

Table 1. Characteristics of volunteers and Patients with cystocele

characteristics	Cystocele group (n=10)	Control group (n=10)	P value
Age (yr)	63.3±9.8	63.2±7.4	> 0.05
Gravidity history	2.6±1.1	2.8±1.1	> 0.05
Parity history	1.9±0.7	1.4±0.5	> 0.05

Disclosures

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