

DYNAMIC MR IMAGING BEFORE AND AFTER PELVIC RECONSTRUCTION SURGERY FOR PATIENTS WITH PELVIC ORGAN PROLAPSE

Hypothesis / aims of study

To compare dynamic MRI measurements pre- and postoperative for patients with pelvic organ prolapse (POP) and to preliminary study the MRI imaging characteristic of the artificial surgical implants for pelvic reconstruction surgery.

Study design, materials and methods

1) 20 patients with clinical diagnosis of pelvic organ prolapse were included. They all underwent dynamic MRI before pelvic reconstruction surgery. Dynamic MRI was repeated 4-6 months after surgery. 2) All images were obtained using a GE scanner (1.5T GE Signa). Static T2 TSE were obtained at 5 mm/5 mm on coronal, axial and sagittal sections, with a field of view of 320, matrix 512 x512, TR 5500/TE 150, 2 NEX, and 3.2 minutes acquisition time per plane. Dynamic MRI was performed using a fast spin echo sequence. The slices were obtained at 5 mm/5 mm, with a field of view of 320, matrix 256_256, TR 3500/TE 80, 2 NEX, and 80 seconds acquisition time per plane. 3) We compared: A) the widest anterior-posterior dimensions of levator hiatus (LH1), B) the widest transverse diameter of levator hiatus (LH2), C) levator hiatus area (LHA), D) left iliococcygeal angle (ICA-L), E) right iliococcygeal angle (ICA-R), E) levator plate angle(LPA) at rest and on maximal straining before surgery, on maximal straining before surgery and after surgery. 4) We study the MRI characteristic of the artificial surgical implants for total pelvic reconstruction surgery.

Results

1) LH1 and LH2 are longer on maximal abdominal pressure than at rest before ($P=0.008, 0.023$), after surgery, LH1 and LH2 change slightly when on maximal abdominal pressure ($P=0.566, 0.275$). 2) LHA is $19.94\pm 3.87\text{cm}^2$ at rest, and $25.03\pm 6.62\text{cm}^2$ on maximal straining before surgery, after surgery, LHA on maximal straining is smaller than that before surgery, but larger than that at rest before surgery. 3) ICA-L and ICA-R augment obviously when increasing abdominal pressure before surgery ($P=0.000, 0.000$), they augment slightly after surgery, but it is also significant ($P=0.000, 0.000$). 4) LPA at rest, on maximal straining before surgery and on maximal straining after surgery are $41.3\pm 11.1^\circ$, $50.4\pm 11.8^\circ$ and $46.1\pm 10.0^\circ$, respectively. 5) The posterior two straps look like two dots symmetrically to the middle line on axial plane, and the straps appear at five scans continuously at 5-mm intervals from the level of inferior aspect of the pubic symphysis and downward; on sagittal sections they look like a tube arises from sheetlike iliococcygeus and then drill out of the skin.

Interpretation of results

1) Patients showed larger iliococcygeal angle and larger levator plate angle when on maximal abdominal pressure, and the displacement of pelvic organs was prevalent before surgery. After operation, both two angles change slightly when on straining, and pelvic organs almostly revert to the normal position. 2) The posterior straps of the polypropylene mesh can be recognized easily with low signal intensity, surrounding with high signal intensity of fat tissue; the anterior two straps and the middle two straps were difficult to recognize, their signal intensity was similar to the surrounding tissue.

Concluding message

Dynamic MR imaging is helpful in evaluation of the morphology and function of pelvic floor pre- and postoperative. It is a feasible way for the diagnosis of pelvic organ prolapse and it is feasible to evaluate the effect of the operation.

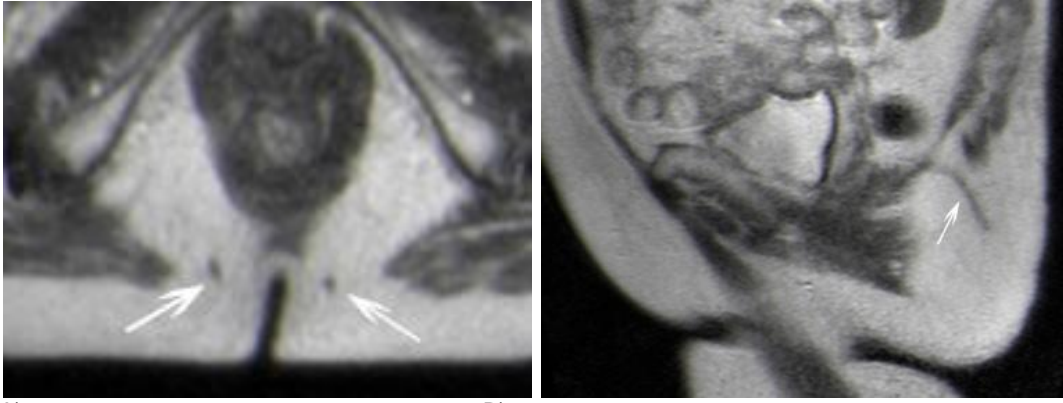
References

- 1) Am J Obstet Gynecol 2006; 194(5): 1427-33.
- 2) J Gynecol Obstet Biol Reprod (Paris) 2001; 30(8): 753-60.
- 3) Ultrasound Obstet Gynecol 2006, 27(6): 687-92.

Table :

	At rest (Before surgery)	Maximal Straining (Before surgery)	Maximal Straining (After surgery)	P ₁	P ₂	P ₃
LH1(mm)	58.80±7.29	65.20±7.26	60.007±5.71	0.008	0.016	0.566
LH2(mm)	43.00±4.68	48.40±9.09	44.80±5.56	0.023	0.139	0.275
LHA(cm ²)	19.94±3.87	25.03±6.62	21.20±3.90	0.005	0.032	0.311
ICA-L(°)	33.3±6.4	48.9±12.1	44.0±7.3	0.000	0.130	0.000
ICA-R(°)	34.6±5.2	50.2±13.4	43.3±6.3	0.000	0.043	0.000
LPA(°)	41.3±11.1	50.4±11.8	46.1±10.0	0.016	0.217	0.163

(LH1: the widest anterior-posterior dimensions of levator hiatus; LH2: the widest transverse diameter of levator hiatus; ICA-L: left iliococcygeal angle; ICA-R: right iliococcygeal angle; LPA: levator plate angle; P₁: the comparison of rest and maximal Abdominal pressure; P₂: the comparison of before and after surgery on maximal abdominal pressure; P₃: the comparison of at rest before surgery and on maximal straining after surgery)



A) B)
 Figure: A) A axial section of the lower pelvic floor showing the emergent straps ,which are symmetrical, and the size is consilient with the implanted straps. B) A sagittal section some 2cm deviate from midsagittal pelvis showing the straps have drilled throuth the ileococcygeus.

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<i>Is this a clinical trial?</i>	Yes
<i>Is this study registered in a public clinical trials registry?</i>	No
<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	Yes
<i>Specify Name of Ethics Committee</i>	The Fuzhou General Hospital Ethics Committee
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	Yes