

806

Automatic analysis of ovary perfusion quantification with dynamic contrast enhanced MR imaging (DCE-MRI)

P. Lombillo¹, D. Moratal¹, D. Monleón², L. Martí-Bonmati³, I. Blanquer⁴, C. Álvarez⁵, B. Celda²; ¹Electronics Engineering Department, Universitat Politècnica de València, Valencia, Spain, ²Departamento de Química Física, Universitat de València, Valencia, Spain, ³Radiology Department, Hospital Quirón, Valencia, Spain, ⁴Universitat Politècnica de València, Valencia, Spain, ⁵Unidad de Reproducción, Institut Valencià de la Infertilitat, Valencia, Spain.

Purpose/Introduction: To verify the feasibility of pharmacokinetic modelling of the ovary using Dynamic Contrast Enhancement Magnetic Resonance Imaging (DCE-MRI), in order to map normal values of Ktrans, kep and ve parameters.

Subjects and Methods: Institutional review board approved this study, and patients gave written consent. Six patients (control subjects) (age range: 22-27) were scanned using a DCE-MRI sequence and Gd-DTPA-BMA as contrast agent. A specially tailored FFE high temporal and spatial resolution sequence (50 images/slice, 24 slices) was used over a 1.5 T Philips Intera scanner. Automatic pump injection was used to minimize Gd-DTPA-BMA error rate injection. Pharmacokinetic modelling was carried out using an ad-hoc software entitled OPERA (Organ Perfusion Analyzer), developed using MATLAB 7.1. Signal intensity curves were analyzed using OPERA, fitting them to a Tofts' model in order to determine Ktrans, kep and ve parameters. Parametrical images were composed and a statistical analysis was performed over the results.

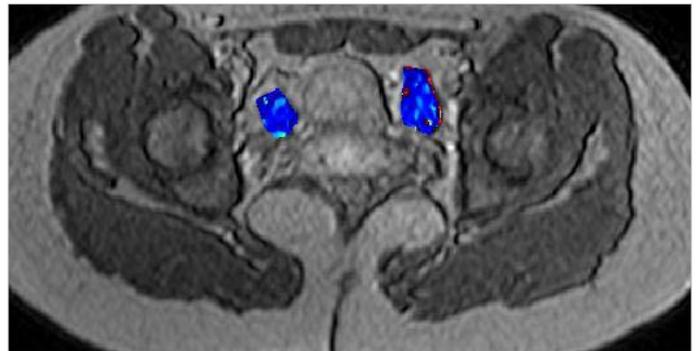
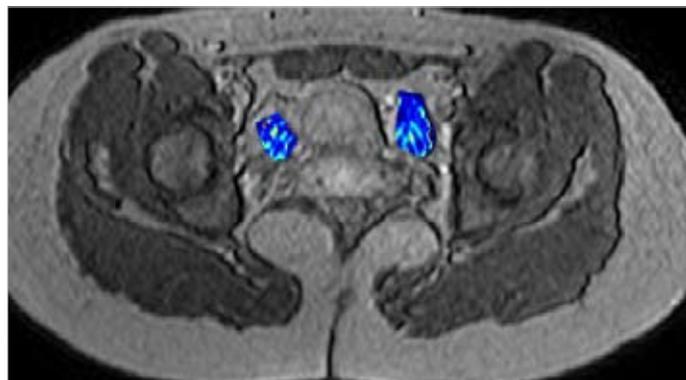
Results: Twelve ovary were analyzed over 6 patients and no statistical differences were found among them, Ktrans (48,82±6,30 ml/min/100ml of tissue), kep (76,86± 13,38 ml/min/100ml of tissue) and ve (0,687± 0,062 a.u.).

K_{trans} parametrical image of 2 normal ovaries.

k_{ep} parametrical image of 2 normal ovaries.

Discussion/Conclusion: OPERA allows an easy study management using DICOM3.0 standard, easy ROI definition, several models to fit with, 3 different computational ways to calculate the fits, numerical and parametrical image results, several tools to verify its reliability, image filters and optimization parameter setting tools.

We expect to improve results using motion error correction with a non-rigid coregistration algorithm under development.



807

Usefulness of MRI of pelvic floor in a multi-ethnic nulliparous female population

J. J. Czechowski¹, D. Rizk²; ¹Al Ain Teaching Hospital, Radiology and Clinical Imaging, Al Ain, Abu Dhabi, United Arab Emirates, ²Obstetrics and Gynecology, FMHS, UAE University, Al Ain, Abu Dhabi, United Arab Emirates.

Purpose: Female pelvic floor disorders are caused by structural defects in the connective tissue and muscles that support pelvic organs. Variation in pelvic floor or bony pelvis dimensions in different ethnic groups may be another possible mechanism. Our purpose was to use MRI to determine dynamic pelvic morphology in healthy women of different ethnic origin. According to literature; large levator hiatus, large pelvic diameters, more vertical pelvic inclination, long vagina, greater cervical descent, less anteversion of uterus, are of a few factors predisposing for pelvic floor disorders.

Material and Methods: Pelvic floor anthropometry, pelvic inclination and angle of uterine version were measured using MRI (1.5 T GE System) in nulliparous, young volunteers from five ethnic groups (N=11 X 5; Emirates other Arabs, Filipinos, Indians/Pakistanis and Europeans/Caucasians).Measurements at rest and following Valsalva maneuver were compared with Caucasians as the reference group.

Results and discussion: Caucasians were significantly taller (p<0.0001) than other women. Their levator hiatus was significantly longer than Emirates (p=0.03) and wider than Filipinos (p=0.04). Their vagina was significantly longer than Filipinos (p=0.04) and levator-vaginal angle significantly greater than other groups(p=.0001) and cervical descent significantly less than Emirates (p=0.00001) and other Arabs(p=0.03).Levator hiatus measurements were significantly correlated to subject's weight and height. Caucasians had the longest transverse diameter of the pelvic inlet (p=0.002) and greatest uterine version (p=0.002) compare to other women. Their pelvic inclination was significantly more vertical than Indians/Pakistanis (p=0.04). Most pelvimetric measurements were significantly correlated to subject's weight and height.

Conclusions: Pelvic floor and bony pelvis dimensions, pelvic inclination and angle of uterine version are different in healthy, nulliparous females of Caucasian and non-Caucasian origins.