

Cardiovascular Imaging (Radiology, Ultrasound, Nuclear Medicine, CT, MRI)

GW25-e1058

The Database Establishment of Fetal Congenital Heart Malformation and the Preliminary Investigation of its Clinical Application

Gao Junxue, Li Yuntao, Yang Zhenjuan, Pei Qiuyan
Peking University People's Hospital

Objectives: To build the database of anatomical ultra-thin cross-section images of the fetal hearts with different congenital heart disease (CHD) and investigate its clinical application preliminarily.

Methods: 40 cases of fetal heart samples induced labor with different kinds of CHD in the second trimester were cut transversely with 60 μ m layer thickness. Every section was macroshot to build the database of anatomical ultra-thin cross-section images.

Results: Images in the databases displayed fetal heart structures clearly. After importing them into the three-dimensional (3D) software, the following functions can be realized: (1) Based on the original database of transverse section, the database of sagittal and coronal section can be rebuilt. (2) Original and rebuilt database can be displayed continuously and dynamically, and rotated in arbitrary angle. They also can be displayed synchronously. The functions above make the database reappear sections and 3D anatomy characteristics of different kinds of fetal CHD and virtualize fetal echocardiography (FECG).

Conclusions: 40 cases cross-section databases of different kinds of fetal CHD were established. The database library of fetal CHD can also be established by accumulating cases, in which sonographers and students can grasp the anatomical features of fetal CHD and virtualize FECG via centralized training or distance education.

GW25-e2496

In Vivo Detection of Macrophages and Observing the Effect of Atorvastatin on Vulnerable Atherosclerotic Plaque using USPIO-enhanced Magnetic Resonance Imaging in Rabbits

Qi Chunmei¹, Deng Liangrong², Li Dongye², Wu Weiheng¹, Zhang Tao³, Zhang Yu⁴
¹Department of Cardiology, the Second Affiliated Hospital of Xuzhou Medical College, ²Department of Cardiology, Xuzhou Medical College, ³Department of magnetic resonance imaging, the Second Affiliated Hospital of Xuzhou Medical College, ⁴Laboratory of Molecular and Biomolecular Electronics, South-east University

Objectives: The challenge for imaging methods which are non-invasive is to enable identification of the vulnerable plaque (VP) before the occurrence of cardiovascular and cerebrovascular complications. The aims of this study were to determine if ultra-small super paramagnetic iron oxide (USPIO) can identify VP and if atorvastatin can inhibit VP progression enhancing the stability of atherosclerotic plaques. Meanwhile we will analysis the role of Matrix metalloproteinase-9 (MMP-9), soluble CD40 ligand (sCD40) that closely relate with vulnerable atherosclerotic plaques.

Methods: Rabbits VP model were successfully built through a hyper cholesterolemia diet combine with adenovirus-carrying p53 injecting into the aortic segments. Magnetic resonance imaging (MRI) sequences and USPIO-enhanced MRI in the rabbits were obtained. At the first day and before sacrifice, the serum was collected for measuring up MMP-9, sCD40 and many other serum indicators. The expression of MMP-9 and sCD40L were respectively determined by enzyme-linked immunosorbent assay (ELISA).

Results: VP appeared as areas of hyper-intensity on USPIO-enhanced MRI, especially T2*-weighted sequences, with signal strength peaking at 96 hours. MMP-9 and sCD40L levels in group B were significantly higher than those in groups A and C ($P < 0.05$). It was significantly lowest in group C compared with another two groups ($P < 0.05$).

Conclusions: Based on the successful establishments of the atherosclerotic plaque models, USPIO-enhanced MRI and pathological markers that are effectively predictive of plaque ruptures. Serum MMP-9 and sCD40L shows close relationships to plaques stability. They release is probably due to the active inflammatory process. Atorvastatin reduces the inflammatory responding and stabilizing vulnerable plaques and also decreasing the concentration of MMP-9 and sCD40L. Perhaps, the high concentration of serum indicators can forecast the instability of atherosclerotic plaques.

GW25-e0295

Gender differences in types and frequency of coronary artery anomalies in 10457 Chinese adults detected by 320-slice computed tomography

Liu Jinlai, Li Suhua, Luo Yanting, Dong Ruimin, Zhu Jieming, Chen Lin
Department of Cardiology, the Third Affiliated Hospital, Sun Yat-sen University, Tianhe Road, Guangzhou 510630, China

Objectives: Although most coronary artery anomalies (CAAs) are thought to be benign, some of them can cause sudden death, syncope, severe arrhythmia, myocardial infarction and heart failure. In addition, CAAs are major challenges during

conventional angiography, since they might increase the fluoroscopy time, catheters used and complications during the procedure. The study aimed to investigate the gender differences in types and frequency of coronary artery anomalies (CAAs) in Chinese adults who underwent 320-slice coronary computed tomography.

Methods: The author assessed retrospectively the records of 10,457 consecutive patients (5837 males and 4620 females) who underwent 320-slice coronary computed tomography for any reason. CAAs were divided into 4 subgroups: (1) Anomalies of origination; (2) Anomalies of intrinsic coronary arterial anatomy; (3) Anomalies of termination (fistula); (4) Number anomalies. Types and frequency of CAAs were calculated and compared between the males and females.

Results: The incidence of CAAs was 35.75% (3738 of 10457, including 2165 males and 1573 females) in total, including 64 (0.62%) subjects with anomalous origin of coronary artery, 3646 (34.87%) individuals with anomalies of intrinsic coronary arterial anatomy (3466 with myocardial bridge, 129 with coronary hypoplasia, 43 with aneurysm, 7 with intercoronary communication, and 1 with atresia), 24 (0.23%) cases with fistula, and 4 (0.04%) patients with number anomalies. No gender differences were presented in most of CAAs in Chinese adults ($P > 0.05$), except myocardial bridge ($P < 0.01$) and anomaly of LCX originating from the right sinus of Valsalva (sV) ($P = 0.027$), which occur more frequently in the males than females.

Conclusions: 320-slice computed tomography is a non-invasive technique to provide important information for accurate diagnosis of CAAs and planning patient management. The present study indicates that no gender differences were showed in most of CAAs in Chinese adults, except myocardial bridge and anomaly of LCX originating from the right sV, which occur more frequently in the males than the females.

GW25-e1431

The myocardial systolic and diastolic function assessment of patients with coronary slow flow phenomenon by quantitative tissue Doppler and two-dimensional speckle tracking imaging

Li Yijia, Ma Ning, Zhang Chun, Li Rongjuan, Xue Jingli, Yang Jiao, Yang Ya
Beijing An Zhen Hospital affiliated to Capital Medical University

Objectives: To analyze the myocardial systolic and diastolic function of patients with coronary slow flow phenomenon by quantitative tissue Doppler and two-dimensional speckle tracking imaging.

Methods: This study consecutively enrolled 124 patients with coronary slow flow phenomenon (CSFP) and 134 control subjects with angiographically normal coronary flow detected by coronary angiography from March 2008 to September 2013. Fifty-seven patients amount them were enrolled in imaging processing and analyzing by using the quantitative tissue velocity imaging (QTVI), Tei index and two-dimensional speckle tracking imaging to find out the systolic and diastolic dysfunction in CSFP group and control group. Comparison of continuous variables between the two groups was performed using independent-samples t test respectively.

Results: The Sa peak, mSa, Ea peak, and mEa of QTVI wave in six loci of mitral annulus were similar in CSFP group and control group. The Aa peak and mAa were higher in CSFP group ($P < 0.05$), and the Ea/Aa and mEa/mAa in CSFP group were partly lower compared with control group ($P < 0.05$). The mitral valve flow spectrum peak E ratio the Ea peak of lateral wall, posterior wall, and Anterior interventricular septal and E/mEa were significantly higher in CSFP group ($P < 0.05$). The isovolumic contraction time (IVCT), isovolumic relaxation time (IVRT) and Tei index were higher in CSFP group ($P < 0.05$). The S, E, A peaks of QTVI wave in 18 segments of left ventricle wall were no significant difference, and E/A were lower in basal segment of lateral wall and anterior wall ($P < 0.05$). The strain, mSRe peak and mSRa peak of strain rate wave were similar in two groups. The mSRs peak of strain rate wave was lower in basal segment of lateral wall and posterior wall in CSFP group ($P < 0.05$). The mSRe/mSRa in basal segment of lateral wall and apical segment of inferior wall were lower in CSFP group ($P < 0.05$). There were no significant differences in the longitudinal displacement between two groups, while the transversal displacement in middle segment of posterior interventricular septum, basal segment of lateral wall and basal segment of anterior wall in CSFP were higher than control group ($P < 0.05$).

Conclusions: The combination of QTVI technology and 2D speckle tracking imaging could prompt that the left ventricular diastolic and systolic dysfunction were exist simultaneously in CSFP patients, and the combination was helpful to build a more comprehensive assessment of cardiac function, to certify the existence of microcirculation dysfunction in patients with CSFP.

GW25-e1574

Two/three-dimensional echocardiography in the assessment of long-term prognosis in patients with pulmonary arterial hypertension

Sun Lingyue, Shen Jiayan
Department of Cardiology, Renji Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China

Objectives: This study was to investigate the relationship between cardiac diastolic dysfunction and outcomes in patients with pulmonary arterial hypertension (PAH). Furthermore, this study would clarify the potential effect of three-dimensional echocardiography (3D-echo) on prognostic value in patients with PAH.

Methods: Patients, which were confirmed by right heart catheterization and diagnosed of WSPH classification I/IV, were received targeted medication (monotherapy or combination medication). Follow-ups were given to all patients every 6 months. 2D/3D-echo parameters, NYHA functional classification, Borg dyspnea score and 6 minute walking distance (6MWD) were recorded. The clinical prognosis of patients