number of risk factors and the values of atheroclerosis parameters were examined by analysis of covariance (ANCOVA), adjusted with age as a covariate. E raised along with the increasing number of risk factors \((P<0.05)\), \(\beta\) and \(PWV\) decreased firstly then increased \((P<0.05)\), and no significant difference was observed in DC and CC \((P>0.05)\).

Conclusions: Both ultrasound RF-data technique and VTMM can be used to non-invasively and quantitatively assess the carotid artery elasticity. E is a sensitive and direct marker for detecting early stage atherosclerosis, whereas it cannot be achieved immediately. Elastic parameters obtained from ultrasound RF-data technique are less sensitive and yet acquired conveniently.

GW25-e5213

Study on the changes of echocardiography before and after training in volunteers

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Objectives: To investigate the changes of cardiac structure and function by echocardiography before and after 3 km military training in volunteers and explore the potential damage of large intensity training to cardiac structure and function.

Methods: 40 healthy volunteers who aged \((20\pm2.2)\) years old were selected randomly. Detecting the ultrasonic cardiogram and recording the data the day before the training, then the ultrasonic cardiogram was tested and the data was recorded at the 3 km military training which was required to complete in 15 minutes. Finally, those data was compared with each other such as the diameter of left atrium, the diameter of right pulmonary, the thickness of interventricular septal and left ventricular posterior wall, the left ventricular end diastolic diameter and ejection fraction.

Results: (1) After 3 km military training, the ejection fraction \((EF) 65.29\pm2.56\%\) increased markedly \((P<0.001)\) compared with the value \(63.10\%\pm3.65\%\) before the training. (2) The left atrium \((LA) 31.24\pm2.62\) mm after 3 km military training increased significantly \((P<0.001)\) compared with \(29.93\pm2.56\) mm before the training. (3) Compared with \(17.82\pm1.86\) mm before 3 km military training, the right pulmonary artery \((RPA) 20.37\pm1.45\) mm after the training increased obviously \((P<0.001)\). (4) There was no changes in the left ventricular end diastolic diameter (LVEDD), interventricular septal thickness (IVST) and left ventricular posterior wall (LVPW) \((P>0.05)\).

Conclusions: Large intensity training causes a compensatory increase of EF and a enlargement of left atrial. The long-term and repeated large intensity training may lead to pathological changes in cardiac structure and function. Whether the large intensity training will increase the potential damage to cardiac structure and function, we should do the further observing at a long time and consider other factors such as exercise intensity, exercise duration and exercise skills.

GW25-e5260

Prognosis of patients with non-significant coronary stenosis detected by coronary computed tomography angiography

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Objectives: Coronary computed tomography angiography (CTCA) is an important non-invasive diagnostic method, however data regarding prognosis of patients with non-significant coronary stenosis detected by CTCA is rare. The aim of our study was to evaluate the prognostic role of CTCA in patients with non-significant coronary stenosis.

Methods: Patients with suspected coronary artery disease underwent CTCA were enrolled and followed up clinically. Cardiovascular clinical endpoints were defined as MACE including cardiac death, non-fatal myocardial infarction and hospitalization due to chest pain. The relationship between MACE and baseline patient characteristics, stenosis severity and lesion characteristics was evaluated.

Results: A total of 847 patients were enrolled (mean age 61.7±12.7 years and 53.8% men). CTCA results showed normal in 61.3% patients, mild stenosis in 22.2% patients, and moderate stenosis in 16.5% patients. During follow up of 34.5±15.8 months, MACE rate was 2.0%. Multivariate COX hazard regression analysis showed that the severity of lesion in CTCA was the only factor to predict MACE (HR=5.64, 95% CI 2.69-11.87, P<0.001). More MACE occurred in patients with coronary lesions than without coronary lesions \((P<0.001)\).

Conclusions: MACE rate in patients with non-significant coronary stenosis detected by coronary CTCA correlated well with the severity of lesion in coronary CTCA. MACE rate was very low in patients with normal and mild coronary lesion in CTCA.

GW25-e5308

Assessment of Adriamycin-Induced Cardiomyopathy by Strain and Strain Rate Imaging

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Objectives: Adriamycin is a highly effective antineoplastic agent, but it can produce the serious side effects of acute cardiac injury and chronic congestive heart failure. Echocardiography is used as a non-invasive diagnostic technique to visualize morphologic or functional changes in doxorubicin-induced cardiomyopathy. But conventional measures of ventricular function, such as ejection fraction, fractional shortening, are insensitive in detecting early doxorubicin cardiomyopathy. The aim of our study was to validate strain (SR) imaging, new technologies of echocardiographic diagnosis, are more sensitive and yet acquired conveniently.

GW25-e5309

Assessment of Doxorubicin-Induced Cardiomyopathy by Strain and Strain Rate Imaging

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Objectives: Doxorubicin is a highly effective antineoplastic agent, but it can produce the serious side effects of acute cardiac injury and chronic congestive heart failure. Echocardiography is used as a non-invasive diagnostic technique to visualize morphologic or functional changes in doxorubicin-induced cardiomyopathy. But conventional measures of ventricular function, such as ejection fraction, fractional shortening, are insensitive in detecting early doxorubicin cardiomyopathy. The aim of our study was to validate strain (SR) imaging, new technologies of echocardiographic diagnosis, are more sensitive and yet acquired conveniently.

GW25-e8025

Noninvasive Assessment of Microvascular Function in Hypertension by Translational Doppler Echocardiography

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Objectives: The present study aim at investigate the use of translational Doppler echocardiography (TTDE) in coronary flow imaging (CFI) to evaluate the microvascular function in Hypertension.

Methods: 51 patients without significant coronary lesions detected by angiography were divided into two group, as hypertensive group \((n=25)\) and normal control group \((n=26)\). TTDE-CFI and adenosine stress echocardiography were used to measure average peak velocity at baseline and hypervemia, and the coronary flow velocity reserve (CFVR) were calculated.

Results: There were no significant difference in clinical baseline data between hypertensive group and normotensive control group, while blood pressure related parameters were significant higher in hypertensive group \((P<0.01)\). The coronary flow parameters between the two groups was no significant difference in the resting state and adenosine stress state, but CFVR was lower in hypertensive than that in normotensive control group \((2.44\pm0.49 vs 3.33\pm0.40, P<0.0001)\).

Conclusions: The reduction of CFVR is a effective and noninvasive assessment parameters of microvascular function in hypertension.

GW25-e1545

A study on myocardial shear strain by stress and live three-dimensional echocardiography

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Objectives: To evaluate myocardial shear strain by three-dimensional echocardiography.

Methods: 45 healthy volunteers including man 22 and women 23, aged mean \((25.5\pm2.8)\) years were studied. All subjects underwent a multistage symptom limited supine graded exercise protocol on a variable load bicycle ergometer. The entire test was divided into three: pre-, peak, after exercise. (1) Blood pressure (BP), heart rate (HR) and BP-HR (RPP) was measured during rest, peak exercise and recovery stages. Through the apical 4 chamber view, a 2mm pulsed Doppler sample volume was placed at the mitral valve tip, and mitral flow parameters were obtained: peak velocity of early filling (E) and late (A) filling, and ratio of E over A. Furthermore, Doppler tissue imaging was carried out in the four-chamber view at the septal mitral annular level. The peak velocity of myocardial systolic wave (s), early diastolic wave (e) and late diastolic wave (a) were recorded; the e/a and...
E/e ratio calculated. (2) The myocardium under endomyocardial (EN-CS), epicardial (EP-CS) circumferential strain and shear strain (Shear-CS, SCS) at the levels of baseline was measured at rest and exercise respectively using three-dimensional echocardiography. The relative factors of the SCS at isovolumetric contraction time, ejection time and isovolumic relaxation time were analyzed by simple correlation analysis.

Results: Different stages of trial: (1) Systolic blood pressure, heart rate and RPP increased (P<0.01). E peak, a peak, e peak and E/e showed a decreasing trend after increasing (P<0.01). (2) During isovolumic relaxation time, the SCS showed a increasing trend after decreasing (P<0.01; 11.54±4.89, 6.23±3.28 and -0.28±0.02); and during isovolumic contraction time showed a increasing trend after decreasing too (P<0.01; 0.77±1.81, 0.17±2.70 and -0.39±1.70). At end of ejection time, the SCS did not change significantly (P>0.05) (-10.31±6.37, -8.87±7.89 and -9.38±5.71). (3) At the end of isovolumic contraction time and isovolumic relaxation time, the SCS was positive correlated with systolic blood pressure, heart rate and RPP; and was negatively related to E/A and a/e (P<0.01). At end of ejection time, the correlation between those parameters was not statistically significant (P>0.05).

Conclusions: The myocardial shear strain occurred mainly at the end of isovolumic contraction time and isovolumic relaxation time. The three-dimensional echocardiography could be used to evaluate the myocardial shear strain.

GW25-e0811 Multimodality imaging to monitor mesenchymal stem cells for the treatment of myocardial infarction
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Objectives: The aim of this study was to explore a multimodality imaging [ferritin, transfection with fluorescence protein (eGFP), and directly luciferase (FLuc)] to monitor, mesenchymal stem cells (MSCs) in acute myocardial infarction.

Methods: Rat myocardial infarction was established by ligating the left anterior descending coronary artery. A recombinant adenovirus carrying genes of ferritin-eGFP-FLuc was constructed. After transfection 5 x 106 mesenchymal stem cells (MSCs) were transplanted into the anterior wall of the left ventricle (n=16). Untransfected MSCs were transplanted as control group (n=10). Micro magnetic resonance imaging (MRI), fluorescence and bioluminescence imaging were performed. Continuous images of the triple fused reporter gene modalities were performed with bioluminescence imaging at day 14.

Results: High signals in the heart area were observed by micro-MRI, fluorescence and bioluminescence imaging in infarcted rats injected with ferritin-eGFP-FLuc transfected MSCs. No signal was observed in control group. Semi-quantitative analysis showed the gradual decrease in signal in the three imaging modalities. Immunohistochemistry assays showed the location of the ferritin protein expression was the same as the site of MSC specific marker expression, which suggested that ferritin tracked the MSCs in situ.

Conclusions: A multimodality imaging (ferritin-eGFP-FLuc) could be used to monitor transplanted MSCs in acute myocardial infarction.

GW25-e1559 3D myocardial perfusion MRI using SW-CG-HYPR Myocardial perfusion MR at 3.0T with sliding-window conjugate-gradient HYPR for the detection of coronary artery disease
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Objectives: Myocardial Perfusion MR with Sliding-Window Conjugate-Gradient HYPR (SW-CG-HYPR) allows increased spatial coverage, resolution, and signal-to-noise ratio (SNR), and reduced motion artifacts. The purpose of this study was to evaluate the feasibility and diagnostic accuracy of myocardial perfusion MR at 3.0T with SW-CG-HYPR in suspected coronary artery disease (CAD).

Methods: 33 patients (19 men; age 61.5±9 years) with suspected CAD who were scheduled for a primary diagnostic invasive coronary angiography (CA) were scanned at 3.0T and at stress (140 g/kg/min intravenous adenosine) and rest. An ECG-triggered gradient-echo sequence with radial k-space sampling was used for SW-CG-HYPR myocardial perfusion imaging. Image quality was evaluated using a subjective scale (1: poor – 4: excellent) Perfusion analysis of each myocardial segment (except for the apex) was performed using the 17-segment model recommended by the American Heart Association. Quantitative CA served as the reference standard. Significant coronary artery stenosis was defined as a luminal diameter reduction of ≥50%.

Results: The prevalence of CAD was 58% (19/33). All perfusion images were found to be visually interpretable for diagnosis with the average image quality score of 3.7±0.4. Patient-based sensitivity, specificity, and diagnostic accuracy were 95%, 71%, and 85%, respectively. Sensitivity, specificity, and diagnostic accuracy for the detection of coronary stenosis in a specific territory were 95%, 82%, and 88%, respectively.

Conclusions: Myocardial perfusion MR at 3.0T with SW-CG-HYPR is feasible in a clinical population, and has high image quality and diagnostic accuracy in patients with suspected CAD.

GW25-e3260 Evaluation of right ventricular function and influencing factors in patients with connective tissue diseases and pulmonary arterial hypertension (PAH-CTD)
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Objectives: Evaluation of right ventricular function and influencing factors in patients with connective tissue diseases and pulmonary arterial hypertension (PAH-CTD).

Methods: Ninety patients with PAH-CTD (PAH group) and Sixy normal subjects (NOR group) underwent echocardiography to obtain the right ventricular parameters. Results: PAH group compared with NOR group: the ratio of the right ventricular end-diastolic diameter to the left ventricle (R/LV), the right atrium area (RAA), the right ventricular end-systolic area (RVESA), the ratio of the tricuspid peak early diastolic blood flow velocity to the tricuspid annulus early diastolic peak velocity (E/e'), myocardial performance indexes (MPI) were higher (P<0.001, P=0.001, P=0.002, P=0.016), fractional area change (FAC), the tricuspid annulus early diastolic velocity (s'), the tricuspid annulus systolic peak velocity (e') were lower (P<0.008, P=0.001, P=0.001). Logistic regression analysis showed that s;PA; was independent risk factor for decreasing in the right ventricular function, the patients with sPA;>70mmHg associated with a 23.3-fold increase in right ventricular dysfunction compared to the others (P<0.003).

Conclusions: The right ventricular systolic and diastolic function decreased in PAH-CTD patients. which were correlated with the degree of PAH. The FAC, s', s;PA; measured by echocardiography can evaluate the right ventricular function in patients with PAH-CTD.

GW25-e4418 Quantitative evaluation of left ventricle volume and ejection fraction by 320-slice dynamic computed-tomography in comparison with two-dimensional echocardiography
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Objectives: To evaluate diagnostic accuracy and reproducibility of 320-slice dynamic computed tomography (CT) for measuring left ventricular end diastolic volume (EDV), left ventricular end systolic volume (ESV), stroke volume (SV) and left ventricular ejection fraction (EF) during the cardiac cycle, we compared CT with two-dimensional (2D) transhoracic echocardiogram (TTE).

Methods: EDV (ml), ESV (ml), SV (ml) and EF (%) were assessed in 32 consecutive subjects (12 males, 60.0±11.1 years) using retrospective electrocardiogram gated 320-slice CT (Aquilion One, Toshiba Medical) and 2D-TTE (SSD-110, ALOKA). EDV and ESV were selected from the time volume curve. LVEF was calculated as (EDV-ESV)/EDV x 100 (%).

Results: Mean ± standard deviation (SD) of EDV and ESV were significantly larger by CT than 2D-TTE (EDV: 123.9±44.1 vs 99.1±32.5, ESV: 47.9±35.1 vs 34.4±25.7, both P<0.01). LVEF was 65.1%±11.2% by CT, and 67.0%±12.3% by 2D-TTE (P=NS). The correlation coefficients (CCs) between CT and 2D-TTE in EDV, LVEF, and LVEF were 0.90, 0.96 and 0.80, respectively.

Conclusions: 320-slice dynamic volume CT enables direct LV measurements. Absolute value of LV volume by CT was larger than that by 2D TTE. 320-slice dynamic volume CT has positive correlation with 2D TTE and high reproducibility.