

were enrolled. Subjects were classified according to JNC 7 guidelines (normal, systolic BP/diastolic BP < 120/80; pre-hypertension [PH], 120-139/80-89; hypertension stage 1 [H1], 140-159/90-99; hypertension stage 2 [H2], >160/100). Isolated systolic hypertension (ISH; systolic BP > 140, diastolic BP < 80) was additionally categorized. With CCTA, the presence of plaques, severity of stenosis, and plaque types were assessed. Using multiple logistic regression analysis, the adjusted odds ratios (AORs) for plaque, obstructive coronary artery disease (CAD) (luminal stenosis $\geq 50\%$), non-calcified plaque (NCP), and CACS > 100 were assessed according to BP grade.

RESULTS After adjustment for clinical risk factors, the risk of subclinical atherosclerosis, NCP, and CACS > 100 gradually increased from PH stage (all P values for trend < 0.05), while the risk of obstructive CAD increased from the H1 stage (AORs of H1 and H2: 1.70 and 2.33, respectively). In the ISH group, the AOR of subclinical atherosclerosis (1.64) was higher than in the H1 group (1.55), while the AOR of obstructive CAD (2.58) was higher than in the H2 group (2.33).

CONCLUSIONS Coronary atherosclerosis in asymptomatic adults shows a grade-response relationship according to hypertension grade.

GW26-e2130

Demonstration of the Mechanisms of Aortic Regurgitation in Type A Aortic Dissection by Real-time 3D Transesophageal Echocardiography

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OBJECTIVES Aortic valve regurgitation (AR) is frequently associated with type A thoracic aortic aneurysm and dissection (TAAD) and may require surgical intervention. We sought to evaluate the incremental value of real-time 3D transesophageal echocardiography (RT-3D-TEE) to assess the structural substrate and mechanism of AR from TAAD to aid surgical decision making and intervention.

METHODS A total of 63 patients with type A TAAD (normal aortic valve quality) who underwent aortic surgery were studied. Pre-operative RT-3D-TEE was performed using an iE33 system (Philips Medical Ultrasound) to acquire, crop and measure the 3D structures of the aortic valve and root (number of valve cusps, root dimensions, commissures, coaptation, coaptation length, intimal flap, dissection, and valve prolapse). The findings were compared with direct intra-operative inspections.

RESULTS Data acquisition and analysis were successful in 54 patients (86%). Moderate to severe AR necessitating AR surgery occurred in 47 patients (87%). RT-3D-TEE showed three types of structural substrates for AR in type A TAAD: 1) incomplete closure or decreased coaptation length of cusps due to sinus dilation (29+/-2 vs 20+/-1 mm/m2) or dissection (type I)(n= 28); 2) cusp prolapse due to tethering in the intimal flap (type II)(n=22); and 3) diastolic intimal flap prolapse through the aortic valve (type III)(n= 4). The RT-3D-TEE findings correlated well with operative findings (Kappa = 0.87). The Youden index (Sensitivity + Specificity - 1) of RT-3D-TEE findings for AR type I, II and III were 0.93, 0.86 and 0.73, respectively. Surgical strategies (aortic root replacement or modality) for AR type I, II and III were predicted by RT-3D-TEE in the majority of the cases (Kappa=0.92).

CONCLUSIONS Our study suggests the structural substrates of AR in Type A TAAD can be accurately assessed by RT-3D-TEE, which provides qualitative and quantitative data to aid individualized surgical intervention for the aortic root, including valve-sparing aortic root replacement.

GW26-e2133

Impact of intracardiac echogenic focus on second trimester aneuploidy risk assessment in women under the age of 35 years

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OBJECTIVES To estimate whether intracardiac echogenic focus (ICEF) affects the second-trimester combined screening for aneuploidy risk assessment. Retrospective study to evaluate the distribution of aneuploidy risk for four groups of pregnancies: those with ICEF, those without ICEF, those with left-sided ICEF, and those with right-sided or bilateral ICEF. A total of 734 cases.

METHODS Down's syndrome(DS) risk and Edward syndrome(ES) risk were based on second-trimester combined screening. Within DS risk categories (1 in <380, 281-1000, 1001-5000, >5000) presence and absence of ICEF were compared, and so were the left-sided ICEF and

right-sided or bilateral ICEF. Within ES risk categories (1 in <334, 335-1000, 1001-5000, >5000) presence and absence of ICEF were compared.

RESULTS In those at lowest DS risk (1 in >5000), the proportion of fetuses in ICEF group was significantly smaller than that in control (P<0.05). At higher DS risk (1 in <380, 281-1000, 1001-5000), however, the proportion of fetuses in ICEF group was significantly larger than that in control group (P<0.05). At all DS risk categories, the proportion of fetuses in right-sided or bilateral ICEF group was no obvious different from that in left-sided ICEF group (P>0.05). At all ES risk categories, the proportion of fetuses was similar between ICEF group and control group (P>0.05).

CONCLUSIONS Compared with control group, fetuses with ICEF raised higher proportion of high estimated risk of DS

GW26-e0229

Sinus of Valsalva aneurysm extending into left ventricle: combined diagnosis of conventional and live three-dimensional echocardiography

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OBJECTIVES To investigate image features of sinus of Valsalva aneurysm(SVA) extending into left ventricle by conventional and live three-dimensional(3D) echocardiography and evaluate diagnostic value of the two imaging modalities.

METHODS Echocardiographic features of 5 patients with SVA extending into the left ventricle treated at our hospital were reviewed and analyzed retrospectively, and compared with surgical findings. 4 were combined diagnosed by conventional and 3D echocardiography before surgery.

RESULTS The SVA extending into the left ventricle presented a thin-walled saccular lesion with the origin adjacent to the aortic annulus. The aneurysms were observed going back and forth between the aortic root and the left ventricle in 4 with intact interventricular septum, even into the aorta over the annulus level when the aneurysmal origin was wide enough, or between the left and the right ventricles via a ventricular septal defect in another case. In 4 patients with combined diagnosis, either conventional or live 3D echocardiography could clearly delineate the origin, extending position, morphologic change or motility of the aneurysm, complicated aortic valvular lesion (mainly presenting annulus displacement and valve prolapse) and associated obstruction of the left ventricular outflow tract. Furthermore, 3D echocardiography was superior to conventional ultrasound in the indication of the aneurysmal defect and both prolapse of the involved aortic annulus and valve.

CONCLUSIONS The SVA extending into the left ventricle has distinguished echocardiographic features and could be accurately diagnosed by either conventional or live 3D echocardiography. 3D echocardiography is more sensitive to whether ruptured or not and more favorable to evaluate occurrence mechanism of the aortic regurgitation than conventional echocardiography.

GW26-e1089

Value of detecting severe multi-vessel coronary artery stenosis using three-dimensional speckle tracking echocardiography

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OBJECTIVES The aim of this study was to assess the value of three-dimensional (3D) speckle tracking echocardiography(STE) in the detection of severe multi-vessel coronary stenosis at the resting state.

METHODS A total of 101 patients underwent coronary angiography (CAG), two-dimensional (2D) and 3D echocardiography and 3D-STE on the same day. Left ventricular (LV) global longitudinal strain (GLS), global circumferential strain (GCS), global area strain (GAS), and global radial strain (GRS) were quantified by 3D-STE. ROC were computed to determine optimal strain cutoff values to predict severe multi-vessel coronary stenosis.

RESULTS 92 of 101 patients were enrolled and divided into the following three groups by the CAG: severe multi-vessel coronary stenosis group (n=38), severe single-vessel coronary stenosis group (n=17) and controls (n=37). GLS, GCS, GAS, and GRS were significantly decreased compared with the control group (p<0.05); These

parameters of the severe multi-vessel coronary stenosis group were more dramatically decreased. Similar changes were also observed for all four 3D-STE parameters in the severe multi-vessel stenosis group than the severe single-vessel coronary stenosis group, whereas only GLS and GAS had statistically significantly decreased ($p < 0.05$). An optimal GLS cutoff value of magnitude $\leq -11\%$ with 84.2% sensitivity and GAS cutoff value of magnitude $\leq -19\%$ with 91.9% specificity predicted severe multi-vessel coronary stenosis.

CONCLUSIONS Global strain by 3D-STE is useful to detect severe multi-vessel coronary stenosis, wherein GLS and GAS are more valuable indicators.

GW26-e2141

Effects of Persistent Left Superior Vena Cava Connected with Coronary Sinus on Fetal Cardiac Structure and Hemodynamics

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OBJECTIVES To investigate the difference in cardiac structure and hemodynamics between fetuses with simple persistent left superior vena cava (PLSVC) connected to the coronary sinus (CS) and normal fetuses, by using fetal echocardiography.

METHODS Twenty-five fetuses with PLSVC in the 2nd trimester (22W~27W±6d) and 22 fetuses in the 3rd trimester (28W~39W±6d) enrolled in the study. All cases were randomly selected. The control groups were gestational age matched fetuses with a normal heart, including 28 fetuses in the 2nd trimester and 25 fetuses in the 3rd trimester. We measured the parameters of cardiac structure of the four groups: left heart size, right heart size, the ratio of RV/L, RA/LA, foramen ovale diameter, aorta (AO) diameter, aortic isthmus diameter, pulmonary artery (PA) diameter, the ratio of PA/AO, superior vena cava diameter. Hemodynamic parameters were also measured: the flow velocity across mitral valve (MV), tricuspid valve (TV) and foramen ovale (FO). All parameters of PLSVC groups were compared with the normal groups respectively.

RESULTS In the 2nd trimester group, the ratio of RV/LV and PA/AO of the PLSVC fetuses were significantly larger than normal, while the AO diameter, aortic isthmus diameter were smaller than normal ($P < 0.05$). However, in the 3rd trimester group, only the ratio of PA/AO of the PLSVC fetuses was significantly larger, and the aortic isthmus diameter was still smaller than the normal group ($P < 0.05$).

CONCLUSIONS Simple PLSVC connected with CS is associated with structural differences from normal. A dilated CS may have an influence on the development of fetal left heart structures.

GW26-e2282

Prevalence, clinical and echocardiography features of basal septal hypertrophy

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OBJECTIVES Focal hypertrophy of the basal inter-ventricular septum is a well-recognized but poorly understood echocardiographic finding. The prevalence and clinical correlates of basal septal hypertrophy (BSH) has not been well investigated. We investigated the prevalence and clinical and echocardiography features of BSH in a community population.

METHODS Clinical and echocardiography data of 1056 elderly population (mean age 63±9 years, 52% male, and 80% with hypertension) in an urban community of Beijing were analyzed. BSH was defined as the thickness of basal interventricular septum ≥ 1.4 cm and basal septal/mid septal ≥ 1.3 . Data were compared between BSH and non-BSH, and the risk factors of BSH were evaluated.

RESULTS The prevalence of BSH in this population was 7.39% (95%CI: 5.8%-9.0%). BSH was not associated with current cardiovascular diseases ($P > 0.05$). Among common clinical and echocardiography parameters, its correlates in logistic analysis included male, obesity, diabetes mellitus, small end diastolic left ventricular dimension and abnormal left ventricular diastolic function ($P < 0.05$), with OR 0.49 (0.29, 0.83), 1.99 (1.18, 3.37), 2.24 (1.35, 3.72), 0.39 (0.26, 0.59), and 1.96 (1.01, 3.81), respectively.

CONCLUSIONS BSH is common in elderly community population and not associated with cardiovascular diseases. Its risk factors included male, obesity, diabetes mellitus, small end diastolic left ventricular dimension and abnormal left ventricular diastolic function.

GW26-e5389

Stress echocardiography predicts major adverse cardiovascular event after percutaneous coronary intervention in patients with acute myocardial infarction

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OBJECTIVES This study aimed to assess the role of low-dose adenosine stress echocardiography (LDASE) in predicting left ventricular remodeling and the incidence of major adverse cardiovascular event (MACE) after percutaneous coronary intervention (PCI) in patients with acute myocardial infarction (AMI).

METHODS We studied seventy-nine patients with AMI and undergoing successful PCI. LDASE was performed within 1 week after PCI. The patients then were assigned to two groups after LDASE: Improvement group with left ventricular ejection fraction (LVEF) increased $\geq 5\%$, and non-improvement group with LVEF increased $< 5\%$. During 24-month follow-up, the incidence of MACE was compared between two groups and the risk factors of clinical prognosis were identified using logistic regression analysis.

RESULTS The incidence of MACE in improvement group was significantly lower than that in non-improvement group (14.29% vs. 43.24%, $P < 0.05$), whereas Killip classification, LVEF, left ventricular end-diastolic volume (LVEDV) and plasma B-type natriuretic peptide (BNP) level was no difference between two groups after PCI. Logistic regression analysis showed LVEF increase $< 5\%$ and segment improvement ≤ 3 were risk factors of MACE in patient with AMI after PCI.

CONCLUSIONS LDASE has high predictive value for LV remodeling and MACE in patients with acute myocardial infarction after revascularization, which might be helpful in clinical decision-making and risk stratification.

GW26-e0674

The Arterial Stiffness Assessment In An Abdominal Aorta Aneurysm Model Of Rat By Pulse Wave Velocity In Vivo

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OBJECTIVES Arterial stiffness is related to the increased risk of cardiovascular events. Pulse wave velocity (PWV) is the speed of propagation of arterial pressure waves, which is linked to arterial stiffness and is becoming an essential prognostic indicator for cardiovascular disease. Supersonic Shear Imaging (SSI) is a novel non-invasive technique based on remote palpation of biological tissues that can image with very high temporal resolution and quantify the local viscoelastic properties of tissues, which can be applied to measure PWV for arterial stiffness evaluation. In the study, we aimed to demonstrate the feasibility and reproducibility of PWV to monitor the arterial stiffness in a rat abdominal aorta aneurysm (AAA) model.

METHODS AAA was induced using a CaCl₂ model for 4 weeks in order to investigate the utility of PWV for detecting disease. A total of 40 adult male Sprague-Dawley rats (20 each group) were placed under anesthesia and the infrarenal abdominal aorta was treated with saline (control group) or CaCl₂ (AAA group). The aortas were imaged using an ultrasound system (Aixplorer, SuperSonic Imagine) for PWV measurement every two weeks, and the PWV were measured at the beginning of systole (BS) and the end of systole (ES) with display of the standard deviation for each measurement. Aortas were harvested for histological analysis as well.

RESULTS The PWV at BS and ES were significantly increased in the AAA group at week 2 and week 4 compared with control group, ($P = 0.01$, $P < 0.001$, $P = 0.002$, $P < 0.001$). Histological analysis showed that aortic collagen depositions, elastin fibers and smooth muscle cell numbers were reduced in the AAA group, ($P = 0.03$, $P = 0.01$, $P < 0.001$). There was a good correlation between PWV (BS) and PWV (ES) with collagen content respectively, ($r = 0.573$, $P < 0.05$, $r = 0.615$, $P < 0.05$).

CONCLUSIONS PWV is a promising noninvasive technique with the potential to accurately quantify arterial stiffness of vascular disease in vivo. In future clinical applications, it may contribute to the detection of early stages of cardiovascular disease, which may decrease mortality among high-risk patients.