

control subjects were excluded from any cardiac events. The serum samples were collected from the patients after the admission to the hospital. A sandwich-like ELISA assay was established with human cTnI and anti-human IgG to detect the serum level of autoantibodies against cTnI. The level of the autoantibodies was expressed as the relative absorbance of optical density and the level exceeds 3XSD was defined as positive. After the patients were discharged from the hospital, a follow-up from 3 months to 6 months was performed.

Results The levels of the autoantibodies were 0.49 ± 0.10 for control subjects, 0.72 ± 0.38 for patients with MI and 0.55 ± 0.24 for patients with CHF. Among 38 MI and 59 CHF patients, eight were positive (8/38) and nine were positive (9/59), respectively. During the follow-up period, one patient died and one patient underwent MI again in the eight positive patients with MI. Among 59 CHF patients, 34 patients finished follow-up investigation. Three of the seven positive CHF patients were death whereas only two of the 27 negative CHF patients were death. The life quality decreased in the positive CHF patients compared with that in negative CHF patients.

Conclusion The present study suggested that the level of autoantibodies against cTnI could be a worse prognostic marker in patients with MI or CHF. The underlying mechanism remains to be illustrated.

Related Subjects: Imaging in Cardiovascular Disease (Radiology, Ultrasonography, Nuclear Medicine, CT, MRI)

e0684 RIGHT VENTRICULAR EJECTION FRACTION FURTHER DECREASES IN HEART TRANSPLANTED HT PATIENTS WHEN REJECTION OCCURS

doi:10.1136/hrt.2010.208967.684

Chen Haiyan, Pan Cuizhen, Chen Changyu, Fang Xiaoyan, Chen Hao, Wang Chunsheng, Shu Xianhong. *Department of Echocardiography, Zhongshan Hospital, Fudan University, Shanghai Institute of Cardiovascular Diseases*

Objective To investigate the shape and function of right ventricles in patients who received heart transplantation (HT) using single-beat real-time three-dimensional echocardiography (sRT-3DE).

Methods 60 healthy volunteers (40 male, mean age 43.69 ± 14.81 years) and 31 HT patients [27 male, mean age 40.10 ± 14.67 years] were enrolled consecutively as Normal controls and the HT group, respectively. All the participants received routine echocardiography as well as sRT-3DE by SIEMENS SC2000 to get parameters concerning morphology and systolic function of the right ventricle. All the HT patients received endomyocardial biopsy within 3 months before or after the echo exams and the HT group was further divided into the rejection group (HTr) and the non-rejection group (HTn) according to the endomyocardial biopsy results as well as the long term group (HTl) and the short term group (HTs) based on the post-operation length (cut point: 1 year), respectively. HTn was also divided into a long term group (HTnl) and a short term group (HTns) to rule out the influence of rejection on post-operation length.

Results 1. Right ventricular stroke volume and right ventricular ejection fraction (RVEF) were significantly different among the groups and the difference values progressively decreased. (Right ventricular stroke volume: Con vs HTn vs HTr was 56.18 ± 23.72 vs 36.08 ± 10.94 vs 26.22 ± 9.84 ($p < 0.0001$); RVEF: Con vs HTn vs HTr was 62.09 ± 7.18 vs 51.04 ± 7.58 vs 35.86 ± 9.86 , $p < 0.00001$). 2. When taking the influence of rejection into consideration, none but RVEF proved to be a stable and sensitive indicator.

Conclusions sRT-3DE can quickly assess shape and systolic function of right ventricle. RVEF was the most stable and sensitive among all the RV-related and LV-related indicators and is a promising indicator in the clinic follow-up of HT patients.

e0685 EVALUATE RIGHT VENTRICULAR SHAPE AND FUNCTION IN PATIENTS WITH ATRIAL SEPTAL DEFECT BY SINGLE-BEAT REAL-TIME THREE-DIMENSIONAL ECHOCARDIOGRAPHY SRT3DE

doi:10.1136/hrt.2010.208967.685

Chen Haiyan, Pan Cuizhen, Zhou Daxin, Chen Fadong, Shu Xianhong. *Department of Echocardiography, Zhongshan Hospital, Fudan University, Shanghai Institute of Cardiovascular Diseases*

Objective The current study was the first in China to investigate the value of single-beat real-time three-dimensional echocardiography (sRT-3DE) in assessing the shape and function of right ventricle in Patients with Atrial Septal Defect (ASD).

Methods 33 healthy volunteers (11 male, mean age 41.15 ± 17.49 years) and 18 ASD patients (six male, mean age 34.67 ± 19.50 years) were enrolled. All the participants received routine echocardiography. sRT-3DE by SIEMENS SC2000 was performed in all to evaluate parameters concerning morphology and systolic function of participants' right ventricle. All the parameters were indexed by body surface area. Further correlative analysis was calculated between right ventricular parameters and right heart pressures by cardiac catheter as well as right ventricular parameters and body surface area-indexed maximum diameter of ASD (I_{ASD}). 21 participants (15 controls and six ASD patients) were randomly selected to explore the inter-observer agreement of this novel technique.

Results Rt-3DE was successful in all participants, even in patients with large right ventricle volume up to 250 ml. Statistic analysis showed the technology has good inter-observer correlation, (EDV_{RV} : ICC 0.891 (95% CI 0.731 to 0.956); ESV_{RV} : ICC 0.737 (95% CI 0.731 to 0.893)) Indexed right ventricular end diastolic volume ($IEDV_{RV}$) and end systolic volume ($IESV_{RV}$), indexed right ventricular systolic volume (ISV_{RV}) and right ventricular ejection fraction (RVEF) were greater in the ASD group than in controls ($p < 0.001$, $p < 0.01$, $p < 0.001$, $p < 0.05$). $IEDV_{RV}$, $IESV_{RV}$ and ISV_{RV} had positive relations with pulmonary artery pressures, especially pulmonary artery diastolic pressure measured by cardiac catheter ($r = 0.61$, $r = 0.79$, $r = 0.83$, all $p < 0.05$) and I_{ASD} ($r = 0.57$, $p < 0.05$; $r = 0.6$, $p < 0.01$; $r = 0.55$, $p < 0.05$ respectively). At the same time, they had negative relations with LVEF ($r = -0.47$, $r = -0.5$, $r = -0.52$; all $p < 0.05$).

Conclusions Left-to-right shunt in ASD patients may lead to an aggressive increase of pulmonary artery pressure and right ventricular volume. The enlargement of right ventricle increases right ventricular contraction and affects the morphology and function of left ventricle. sRT-3DE is a unique new modality to precisely and stably evaluate right ventricular changes in ASD patients.

e0686 EVALUATION OF LEFT ATRIAL SYSTOLIC FUNCTION IN PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY OR HYPERTENSIVE LEFT VENTRICULAR HYPERTROPHY BY STRAIN RATE IMAGING

doi:10.1136/hrt.2010.208967.686

Wu Tian, Guo Ruiqiang, Chen Jinling, Zhou Qing. *Department of Ultrasound, Renmin Hospital of Wuhan University, Wuhan, China*

Objective To explore the value of strain rate imaging in detecting left atrial systolic function in patients with hypertrophic cardiomyopathy (HCM) or hypertensive left ventricular hypertrophy (HLVH).

Methods There were three groups in this study, the group of HCM, HLVH and control, each group had 30 cases. Left atrial diameter, interventricular septal thickness, posterior left ventricle thickness, peak E and A of mitralis were measured by conventional echocardiography. Left atrial fractional shortening (LAFS) was calculated.

Tissue velocity imaging of all patients and controls were accepted in apical two, four and long axis chamber views. Strain rate (SR) imaging was performed on all cases, peak atrial systolic left atrial SR (LASRa) were measured at each segment (septal, lateral, posterior, anterior, and inferior walls of left atrium), mean LASRa was calculated by averaging data in all segments.

Results Compared with controls, LAFS and mLASRs of HCM and HLHV were significantly higher ($p < 0.05$). Moreover, LAFS and mLASRs of HCM were significantly higher than HLHV ($p < 0.05$). mLASRa correlated positively with LAFS of HCM and HLHV respectively ($r = 0.81, 0.88; p < 0.01, 0.01$).

Conclusions The change of left atrial function of HCM and HLHV presented as pump function increased, especially of HCM, which may take some clinical information to identify these two diseases.

e0687 THE APPLICATION OF VECTOR FLOW MAPPING IN QUANTITATIVE ASSESSMENT OF REGIONAL MYOCARDIAL FUNCTION IN CAD PATIENTS

doi:10.1136/hrt.2010.208967.687

Xu Mingjun, Zhang Mei, Zhang Yun. *Cardiovascular Department, Qilu Hospital, Shandong University*

Background Until now, the study of regional infarct and ischaemic myocardial function in patients with coronary atherosclerotic heart disease is still mainly focused on the abnormal wall motion, how the blood flow dynamics affected by the regional abnormal wall motion in CAD patients is remains unknown. The purposes of the present study are to investigate the blood flow dynamics adjacent to the regional ischaemic and infarct myocardial segments, to explore the correlation between the blood flow dynamics and wall motion and to explore sensitive indexes showing blood flow dynamics change caused by abnormal wall motion in CAD patients.

Methods 43 CAD patients were enrolled in our study. Velocity Vector Imaging technique was used to evaluate the wall motion so as to classify the myocardial segments as normal, ischaemic and infarct by systolic peak strain. Vector Flow Mapping (VFM) technique was performed to show the blood flow dynamics in the heart chamber. The blood flow volume heading towards or against the apex in different periods of a heart beat and the time to every peak flow were measured.

Results Compared to normal group, systole Q+ is higher ($p < 0.01$), diastole Q+ is lower ($p < 0.01$), T2 is shorter ($p < 0.01$) in ischaemic group. Compared to non-infarct group, systole Q+ is higher ($p < 0.05$), diastole Q+ is lower ($p < 0.01$), T2 is shorter ($p < 0.05$) in infarct group. There are correlations between indexes derived by VFM and Velocity Vector Imaging technique. Systole Q+ is a better index, when the cutoff value reaches 25.32 and 28.046; it has a high sensitivity and specificity for differentiating ischaemic and infarct segments.

Conclusion VFM is a novel noninvasive tool to assess the blood flow dynamics and can be used to evaluate the cardiac function.

e0688 INTRAVASCULAR ULTRASOUND CRITERIA FOR THE ASSESSMENT OF THE FUNCTIONAL SIGNIFICANCE OF INTERMEDIATE CORONARY ARTERY STENOSIS

doi:10.1136/hrt.2010.208967.688

Cheng Xunming, He Guoxiang, Liu Jianping, Tong Shifei. *Department of Cardiology, Southwest Hospital, Third Military Medical University & Chongqing Institute of Interventional Cardiology*

Introduction In recent years, intravascular ultrasound (IVUS) has evolved as a valuable adjunct to angiography. IVUS allows precise tomographic measurement of lumen area and plaque size, distribution and, to some extent, composition. It is essential in clinic deci-

sion making. Myocardial fractional flow reserve (FFR_{myo}) is a special index of the functional severity of coronary stenosis. Although the application of FFR_{myo} to assess intermediate coronary lesion is widely performed in some centers in developed countries, its use in China was lagged. Because it is relatively expensive to measure FFR_{myo} , it will be beneficial to save the expenses and to short operation time if CAG and IVUS criteria could be clinically used as tools to discriminate functional significant of intermediate stenosis.

Materials and methods In 46 lesions of intermediate severity (eg, 40% to 60% diameter stenosis) we assessed 1. by pressure wire: myocardial fractional flow reserve (FFR_{myo} , index of functional significance), and 2. by IVUS: minimal lumen cross-sectional area (MLA) and percent area stenosis at the lesion site. Receiver operating characteristic curve analysis was performed to establish the best cut-off values of IVUS indexes (ie, MLA and percent area stenosis) that were most predictive of $FFR_{myo} < 0.75$.

Results FFR_{myo} in 46 lesions of angiographic intermediate stenosis ($49 \pm 11\%$) was significantly lower than it was in angiographic normal artery (0.83 ± 0.15 vs 0.97 ± 0.02 , $p < 0.01$). 14 lesions (30%) were functionally critical (eg, $FFR_{myo} < 0.75$). By regression analysis, percent area stenosis had a significant inverse correlation with FFR_{myo} ($r = -0.68$, $p < 0.01$). MLA showed a significant positive relation with FFR_{myo} ($r = 0.63$, $p < 0.01$). By receiver operating characteristic analysis, we identified a IVUS area stenosis $\geq 65\%$ (sensitivity 100%, specificity 72%), a minimal lumen cross-sectional area $\leq 4 \text{ mm}^2$ (sensitivity 93%, specificity 77%) to be the best cut-off values to fit with $FFR_{myo} < 0.75$.

Conclusion IVUS area stenosis $\geq 65\%$ and minimal lumen cross-sectional area $\leq 4 \text{ mm}^2$ reliably identified functionally critical intermediate coronary stenosis.

e0689 ECHOCARDIOGRAPHIC CHARACTERISTICS OF LEFT VENTRICULAR NONCOMPACTION WITH PAPILLARY MUSCLES INVOLVEMENT

doi:10.1136/hrt.2010.208967.689

Jiang Lan, Xie Mingxing, Wang Xinfang, Yuan Li, Lu Xiaofang, Li Lin. *Department of Ultrasonography, Tongji Medical College Huazhong University of Science and Technology*

Objective To assess the ultrasonic characteristics of the left ventricular noncompaction with papillary muscles involvement.

Methods We reviewed the echocardiographic findings in eight patients having left ventricular noncompaction with papillary muscles involvement at our hospital. We performed transthoracic echocardiography including standard parasternal (short and long axis), apical (two-chamber, three-chamber and four-chamber), and nonstandard parasternal views for all these patients. The left ventricular segments involved in noncompaction, the mitral papillary muscles and the mitral valve were the key observation. When the transthoracic echocardiography of four patients were not satisfactory, contrast echocardiography was used.

Results In all 8 patients (5 of them with severe mitral regurgitation, two with hypertrophic cardiomyopathy), the myocardium of the left ventricular segments involved in noncompaction were consist of two layers: a thin, compacted epicardial and an extremely thickened endocardial layer with prominent trabeculations and deep recesses, mitral papillary muscles involved in whole or in part, the myocardium of the papillary muscles looked like moth-eaten, appearance of blood flow from the ventricular cavity into the intertrabecular recesses both in the noncompaction myocardium and papillary muscles as visualised by colour Doppler imaging. With contrast enhancement in four of eight patients, the left ventricular endocardial borders were clearly outlined, and contrast microbubbles filled into the intertrabecular recesses both in the noncompaction myocardium and papillary muscles.