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Preliminary study of left ventricular blood flow changes in different age groups using vector flow mapping

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OBJECTIVES We used vector flow mapping (VFM) to detect differences in left ventricular blood flow field parameters in different age groups.

METHODS Study subjects included 80 healthy people (40 men, 40 women, aged 20-59 years) examed in the Third Affiliated Hospital of Sun Yat-sen University from July 2014 to March 2015. They were all nonsmokers. All subjects had no history of heart diseases, normal blood tests and normal resting 12-lead ECGs. All the subjects were divided into four subgroups according to age: 20-29, 30-39, 40-49, and 50-59 years. Each group contained 20 persons (10 men and 10 women). We used an ultrasound apparatus (F75$^®$, Hitachi-Aloka Company, Tokyo, Japan) with a UST-52105 cardiac probe (Hitachi-Aloka). After a conventional echocardiographic examination, an apical four-chamber view was selected to display the mitral valve. Color Doppler sampling volume included the left ventricle, the mitral valve, and part of the left atrium. Dynamic images were obtained and stored for three stable consecutive cardiac cycles. Images were analyzed offline with commercial software (DAS-RS1 version 3.0$^®$, Hitachi-Aloka). The maximum vortex area, maximum vortex intensity, and maximum vortex number were measured during the left ventricular diastolic phase and systolic phase. Data were processed using commercial software (SPSS 19.0$^®$, IBM, Armonk NY, USA). Numerical data are presented as mean ± standard deviation (SD). Differences between groups were compared using one-way analysis of variance and Least-Significant Difference t-tests, with a $P < 0.05$ considered statistically significant.

RESULTS In the diastolic phase, the maximum vortex area in the 50-59-year-old group (490.24 ± 117.94 mm^2), compared with that of the other three groups, was significantly increased ($P < 0.05$). There was a significant difference between the 20-29-year-old group and the 40-49-year-old group (321.46 ± 88.60 mm^2 vs 400.11 ± 100.64 mm^2, $P < 0.05$). There was no significant difference between the 20-29-year-old group and the 30-39-year-old group, or between the 30-39-year-old group and the 40-49-year-old group ($P > 0.05$). In the diastolic phase, the maximum vortex intensity in the 20-29-year-old group (29.55 ± 5.02 m^2/s) compared with that of the other three groups was significantly increased ($P < 0.05$). Between the 30-39-year-old group and the 50-59-year-old group, there was a significant difference (22.17 ± 3.78 m^2/s vs 17.26 ± 6.13 m^2/s, P< 0.05). There was no significant difference between the 30-39-year-old group and the 40-49-year-old group or between the 40-49-year-old group and the 50-59-year-old group ($P > 0.05$). In the diastolic phase, the maximum vortex number significantly differed in all four groups compared with one another ($P < 0.05$). The systolic phase maximum vortex area, maximum vortex intensity, and maximum vortex number showed no significant differences ($P > 0.05$) among the groups.

CONCLUSIONS Some parameters of blood flow field may reflect changes of left ventricular function with age in healthy people.

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The Application and Prognostic Evaluation of STEMI Clinical Pathway in the Treatment of EPCI Patients

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OBJECTIVES Comparing general clinical data, D2B time, prognostic indicators and follow-up indicators of STEMI patients under EPCI before and after the implementation of the CP.

METHODS Dividing the 285 cases diagnosed with acute myocardial infarction by emergency diagnosis and treated with emergency PCI into two groups: the group receiving the CP (2006∼2009) and the group not receiving the CP (2010∼2013), and comparing the two groups in terms of their general clinical data, D2B time, prognostic indicators and follow-up indicators.

RESULTS The average D2B time of the group receiving clinical pathway was obviously reduced ($P < 0.05$) compared to the group not receiving clinical pathway, and the rate of D2B time reaching the standard of the former group is prominently improved ($P < 0.05$). Of the group receiving clinical pathway, the peak value of CK-MB during hospitalization and the incidence rate of intraoperative ventricular fibrillation decreased obviously ($P < 0.05$), the average days of hospitalization shorten obviously ($P < 0.05$), the TIMI Flow Grading after myocardial infarction intervention and the rate of kinetocardiogram LVEF over 50% within one week after surgery enhanced significantly ($P < 0.05$), and the rate of ECG ST-segment falling back by over 50% within 2 hours after surgery and the rate of normal kinetocardiogram LVDD didn't undergo obvious change compared to the other group. Between the two groups, such indicators as the quality of life (EQ-5D and EQ-VAS) in the first year after operation and the rate of regular out-patient review and routine medicine-taking in the first year after operation in the group receiving clinical pathway were significantly improved ($P < 0.05$). As for the incidence rate of MACE within a year after operation, there was no notable difference between the two groups ($P < 0.05$).

CONCLUSIONS The average D2B time of the group receiving clinical pathway was significantly reduced. The peak value of CK-MB during hospitalization and the incidence rate of intraoperative ventricular fibrillation decreased prominently. The average days of hospitalization were significantly shortened. The post-surgery the TIMI Flow Grading after myocardial infarction intervention and the rate of kinetocardiogram LVEF over 50% in the first week after operation both increased significantly. There was no significant change in both the rate of ECG ST-segment falling back by over 50% within 2 hours after surgery and the rate of normal kinetocardiogram LVDD. The quality of life and medication compliance within a year after surgery was enhanced significantly, while the change of the incidence rate of MACE within a year after surgery wasn't notable.

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Optimal cutoff of Waist-to-Hip Ratio for Predicting Cardiovascular Risk Factors among Han Adults in Xinjiang

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OBJECTIVES The optimal cutoff of WHR among Han adults in Xinjiang which is located in the center of Asia was largely unknown. We aimed to explore the relationship between different waist-to-hip ratios (WHR) and cardiovascular risk factors among Han adults in Xinjiang and determine the optimal cutoff of WHR.

METHODS The Cardiovascular Risk Survey (CRS) was conducted from October 2007 to March 2010. 14618 representative participants were selected using of 4-stage stratified sampling method, 5757 Han participants were in the study. The present statistical analysis was restricted to the 5595 Han subjects who had complete anthropometric data. The sensitivity, specificity and distance on the receiver operating characteristic (ROC) curve in each WHR level were calculated. The shortest distance in the ROC curves was used to determine the optimal cutoff of WHR predicting cardiovascular risk factors.

RESULTS In women, WHR levels were positively associated with systolic pressure, diastolic pressure and serum concentration of serum total cholesterol. The prevalence of hypertension and hypertriglyceridemia increased as the WHR increased. The same results were not noticed among men. The optimal WHR cutoffs predicting hypertension, diabetes, dyslipidemia and ≥ 2 of these risk factors for Han adults in Xinjiang were 0.92, 0.92, 0.91, 0.92 in men and 0.88, 0.89, 0.88, 0.89 in women, respectively.

CONCLUSIONS Higher cutoffs for WHR were needed in the identification of Han adults aged ≥ 35 years with high risk of cardiovascular diseases in Xinjiang.

GW26-e4582

Plasma catestatin: a biomarker for ST segment elevation myocardial infarction and unstable angina pectoris?

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OBJECTIVES The aim of this study was to investigate plasma catestatin levels among patients with acute STEMI or unstable angina