

to describe the outcome of the fetus with VSD after birth in Jiangsu Province, and to identify factors contributing to spontaneous closure (SC) of VSD. We hope to provide a reference for prenatal counseling and clinical decision making.

METHODS A total of 445 fetal patients who had been diagnosed with isolated VSD by fetal echocardiographic in their mother's second trimester were enrolled in this retrospective study at Nanjing Maternity and Child Health Care Hospital and Jiangsu Province Maternity and Child Health Care Hospital between January 2011 and December 2013. Data in ultrasound record contained gestational weeks, mother's age, fetal heart rate, width of aorta and pulmonary artery, location and diameter of the defect, direction of the shunt. Questions in the interview contained: whether the defect was closed, specific time of the SC, current treatment, gender, birth weight, whether premature birth existed, whether there were infection or metabolic disease during pregnancy, with or without a family history of heart disease.

RESULTS Effective follow-up was 257 cases, 44 cases received termination of pregnancy, 213 infants were born. 8 cases died after birth, 205 cases survived, among which 19 cases underwent clinical surgery, 24 cases were still not closed, SC occurred in 110 children (49 closed during pregnancy, and 61 closed postpartum). The post-natal death, children underwent surgery and children with unclosed defects were classified as group 1, along with defects closed postpartum and during pregnancy were classified as group 2 and 3 respectively. The comparison of echocardiography results showed significant differences ($P < 0.05$) in the following data: defect diameter (3.422 ± 0.972 , 2.426 ± 0.599 , 2.292 ± 0.479 mm), birth weight (3.095 ± 0.774 , 3.174 ± 0.535 , 3.499 ± 0.532 kg), defect location, direction of blood flow through the defect. When SC used as a state variable and the defect diameter as test variables, we get a receiver operating characteristic curve: area under the curve is 0.842, Cut-off value is 2.55mm. Binary logistic regression analysis showed that birth weight is a protective factor, while defect diameter is a risk factor for SC. The probability of SC was described by the equation: probability = $(1 + \exp[-2.125 - 0.176 * \text{birth weight} + 1.393 * \text{diameter}])^{-1}$. We examine children with VSD from January to March in 2014 according to the probability formula, 19 out of 23 children were in line with forecasts.

CONCLUSIONS A. by using statistical analysis, cut-off value of the defect diameter were 2.55mm in predicting the rate of SC in children with VSD who were diagnosed in their mothers' second trimester, the smaller the defect was, the more likely SC will happen. B. greater birth weight, male fetuses, muscle defect, full-term infants has higher probability of SC; C. defect without bloodstream detection were easier to close.

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Comparative Study of Echo and Cardiovascular Cast in Fetus with CoA or IAA

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OBJECTIVES The coarctation or interruption of aortic arch is a rare kind of congenital malformation of great vascular, always combined with multiple cardiac malformation. The echocardiography can display the abnormal structure of the inner hear cavity, excluding the great vascular lesion, especially the isthmus and the conjunction of descending aorta and PDA. Our research is to assess the sonographical features of fetal CoA or IAA with the comparative study of echo and cardiovascular cast.

METHODS All the 3 cases of CoA or IAA diagnosed by fetal echocardiology were made into cardiovascular cast. First we peel the umbilical vein from the abdominal wall, injected the mixture of heparin and perfusate slowly with low tension, then we got the cardiovascular cast. The models display the space configuration of heart cavity and the location relationship of great vessels. These datas compared with the sonographical features, we can get the point of abnormalities according to the cardiovascular cast.

RESULTS The 3 cases of fetal CoA or IAA all confirmed by fetal echocardiology and heart sample cast. Two cases were CoA, the characteristic findings include:

- (1) the coarctation of the ascending aorta and arch, with narrow diameter (0.14cm) and reverse flow;
- (2) aortic valve and mitral valve stenosis, two ventricular outlet confirmed by the cardiovascular cast, which showed the aorta on the anteriorly left with the pulmonary artery on the posteriorly right, combined with HLHS;
- (3) the left and right PA crossover each other up and down.

The another case was IAA, the characteristic findings include:

- (1) the echocardiology showed severe constriction(0.17cm) or interruption of aortic arch, the cavity and flow of descending aorta was not evident, the cast demonstrated the IAA with type A, interrupted between the PDA and left sub clavicular artery;
- (2) large VSD (Taussing-Bing), pulmonary artery dilated;
- (3) also with the crossover PA.

CONCLUSIONS Fetal echocardiology as the only observation way to the congenital heart disease, is still uncertain with the diagnosis to the morphological and location features of the great vessels. The combination of cardiovascular cast and fetal echocardiology would improve the specificity and veracity of fetal CHD diagnosis.

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Flow field changes of right ventricle in diastole pre- and post-operation in patients with atrial septal defect by vector flow mapping

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OBJECTIVES In this study, we apply a novel echocardiographic method, vector flow mapping (VFM), to assess the flow field changes of the right ventricle in diastole pre- and post-operation in patients with ASD, investigating its value in the evaluation of hemodynamic changes ASD patients.

METHODS 20 patients with secundum ASD were enrolled as patient group, while 20 healthy volunteers were chosen as controls group. The characteristics of flow field pre- and post-operation were analyzed by vector, streamline and vortex modes, separately. The parameters including diastolic peak velocity(Vp), diastolic peak flow(Fp) and diastolic Q+(DQ+) at basal, mid and apical segments of the two groups were also recorded and compared with VFM.

RESULTS Compared with normal group, the ASD group had intensive but disordered vector and stream lines and vortexes with more area below the tricuspid leaflets in diastolic right ventricle before operation. After operation, the line intensity and direction consistence were recovered and the vortexes were reduced to some degree, but still different from the normal group. The Vp, Fp and DQ+ in each segment of right ventricle after operation were also lower than those before ASD closure, but higher than control group ($P < 0.05$).

CONCLUSIONS The flow field hemodynamics of the right ventricle in ASD patients was recovered after operation, but still not back to normal in the short time. The vector flow mapping could be used in the postoperative hemodynamic monitoring and follow-up.

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Analysis research of fetal echocardiography in the diagnosis of fetal coarctation and its ultrasonic hemodynamics

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OBJECTIVES Analyze the fetal echocardiography in the diagnosis of fetal coarctation and its ultrasonic hemodynamics and to explore the clinical application of fetal echocardiography in the diagnosis of coarctation.

METHODS From August 2010 to December 2014, 114 fetus diagnosed as coarctation were selected from the 11647 cases of fetus, gestational aged 20 to 38 weeks, with pathologic results or postnatal follow-up results as the gold standard, different fetal echocardiography parameters including the ratio of left and right ventricular diameter (LV/RV), the ratio of pulmonary artery and the aorta (PA/AO), the aortic isthmus, the aortic inner diameter ratio (AI/AO and AI/DA), and the velocity ratio (PA_v/AO_v , AR_{vs}/DA_{vs} , AR_{vd}/DA_{vd} , $MCA_{vs}/inUA_{vs}$, $MCA_{vd}/inUA_{vd}$, $MCA_{RI}/inUA_{RI}$, $MCA_{PI}/inUA_{PI}$, $MCA_{vs}/exUA_{vs}$, $MCA_{vd}/exUA_{vd}$, $MCA_{RI}/exUA_{RI}$, $MCA_{PI}/exUA_{PI}$), were selected to evaluate the diagnostic value of each above index in the diagnosis of coarctation.

RESULTS 144 cases of fetus were included in this study, in which 53 cases were successful followed-up, including 22 cases with coarctation and 31 cases without coarctation. The ROC curve of different indexes were drawn and the results showed that the AUC of the inner diameter ratio (LV/RV, PA/AO, AI/DA, $MCA_{vd}/inUA_{vd}$, $MCA_{RI}/inUA_{RI}$, $MCA_{PI}/inUA_{PI}$) were > 0.5 , which had certain diagnostic accuracy ($P < 0.05$). The consistency of any single ratio was relatively low, when the number of the ratio increased to 3, the Kappa value was 0.687 ($P = 0.000$); and increased to 4, the Kappa value was 0.649 ($P = 0.000$). If any six indexes were taken as criteria, any positive index was taken as