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 concerned 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 unclassified defects组成 group 1, 19 cases were confirmed as group 1, along with defects closed during pregnancy 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 (3.42±0.972, 2.426±0.599, 2.929±0.479mm), birth weight (3.995±0.774, 3.174±0.774, 2.496±0.529kg), 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[-2.125-1.76*(birth weight-1.393)]). We examine children with VSD from January to March in 2014 according to the probability formula, 10 out of 124 cases were closed spontaneously.

**CONCLUSIONS** A, by using statistical analysis, cut-off value of the defect diameter was 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.

**GW26-e3558** Comparative Study of Echo and Cardiovascular Cast in Fetus with CoA or IAA

Liu Hong, Mingxing Xie
Department of Ultrasound, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Hubei Province Key Laboratory of Molecular

**OBJECTIVES** The coarctation or interruption of aortic arch is a rare kind of congenital malformation of great vessel, 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, and the differences to normal fetuses.

**METHODS** All the 3 cases of CoA or IAA diagnosed by fetal echocardiography were cut 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 data 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 echocardiography 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 echocardiography 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 echocardiography 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 echocardiography would improve the specificity and veracity of fetal CHD diagnosis.

**GW26-e3559** Flow field changes of right ventricle in diastole pre- and post-operation in patients with atrial septal defect by vector flow mapping

Jinfeng Liu, Yali Yang
Department of Ultrasound, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Hubei Province Key Laboratory of Molecular

**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 disordered vector and streamline lines and vortexes with more area below the tricuspid leaflets in diastolic right ventricle before operation. After operation, the line intensity and direction consistency 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.

**GW26-e3577** Analysis research of fetal echocardiography in the diagnosis of fetal coarctation and its ultrasonic hemodynamics

Zhuo Chen, Yihua He
Beijing Anzhen Hospital, echocardiography department

**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/AO, AR/DA, AR/DA, MCAp/inUAPI, MCAp/inUAPI, MCAp/inUAPI, MCAp/inUAPI, MCAp/inUAPI, MCAp/inUAPI, MCAp/inUAPI) 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, MCAp/inUAPI, MCAp/inUAPI) 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...
**CONCLUSIONS** Fetal echocardiography technology has diagnostic value to the fetal aorta, middle cerebral artery and diagnostic significance of umbilical artery blood flow ratio was obviously higher than that of large arteries diameter ratio parameters, hints of ultrasoundography on diagnosis of aorta just according to the change of big blood vessel diameter, at the same time should also pay attention to the fetal head cycle to the placental circulation. Law of hemodynamic findings can provide guidance for fetal echocardiography.

GW26-e4836
Congenital interrupted inferior vena cava: a rare risk factor for deep venous thrombosis
Xiaoli Wang, Rongqin Zheng
The Third Affiliated Hospital of Sun Yat-sen University

**OBJECTIVES** To explore the clinical feature of congenital interrupted inferior vena cava (IVC) with deep venous thrombosis (DVT).

**METHODS** Patients with DVT due to congenital interrupted inferior vena cava were enrolled. Clinical and ultrasonography, CT, MRI finding were analyzed retrospectively.

**RESULTS** Three patients were identified (two man and one woman) between 2000 and 2015. Age at diagnosis was 17, 26, 28 years respectively. One patient presented with swelling and tenderness of right crus. The other two patients presented with left fossa iliaca pain and lower limbs swelling and one of them had dyspnea, tachypnea. None of them had an underlying coagulopathy or precipitating factors including immobilization, surgery, oral contraceptive pills (OCs), trauma, and malignancy. Vascular ultrasound and computed tomography (CT) scan/MRI suggested DVT. All patients underwent inferior vena cava (IVC) angiography (TTE) in infants.

**CONCLUSIONS** In young patients with an idiopathic DVT, vascular ultrasound and CT scan/MRI should be performed to evaluate the venous system and rule out the rare possibility of an IVC anomaly.

GW26-e4426
Transcatheter intervention of mesh-like ASD under TTE in infants
Silin Pan,1* Zhen Bing,1,2 Benzhen Wang,1 Kuiiliang Wang,1 Guoying Huang1,2
1Qingdao Women and Children’s Hospital, Qingdao University; 2Children’s Hospital, Fudan University

**OBJECTIVES** To evaluate the availability transcatheter intervention of mesh-like atrial septal defect (ASD) under transthoracic echocardiography (TTE) in infants.

**METHODS** 27 cases with mesh-like ASD were enrolled in our group between September 2007 and December 2012, 11 boys and 16 girls, 6 months to 11 months (median 8.9 months), bodyweight varying from 6 kg to 11 kg (median 8.6 kg). 2 patients associated with pulmonic stenosis. The diagnosis was confirmed by intraoperative angiography and TTE. Echocardiography aimed at establishing the delivery pathway and determining the plasticity of the implanted occluders, especially to help to select the proper hole to implant the occluder.

**RESULTS** 26 cases underwent successful transcatheter intervention with one occlude each without residual shunt. The implanted occluder reclosed with normal plasticity after being released. The other one was converted to surgical repair after implantation for high-degree atrioventricular block.

**CONCLUSIONS** Transcatheter intervention of mesh-like ASD under TTE in infants can safely work. Echocardiography plays a key role in establishment of delivery pathway and definitive occluder releasing during transcatheter intervention of these patients.

GW26-e4766
A case-control study on risk factors of calcific aortic valve disease in a Chinese population
Dingji Zhu, Qichun Zeng, Yunyi Zheng, Jingshui Hua, Dingli Xu
Department of Cardiology, Nanfang Hospital, Southern Medical University

**OBJECTIVES** Calcific aortic valve disease (CADV) is one of the leading cardiovascular diseases and affects a large number of old people. We found that 12.8% of people older than 45 years suffered from CADV. However, the pathogenesis and risk factors of CADV in the Chinese population remains unclear. In this study, we collected clinical data and analyzed the risk factors for CADV.

**METHODS** The case-control study was performed in 2894 subjects (age: 45) who had been examined in the Department of Cardiology in Nanfang Hospital from 2005 to 2012. These subjects were divided into two groups according to echocardiography results: CADV group (n = 1374) and control group (n = 1520). Detailed data on the patients were collected and evaluated by univariate and multivariate logistic regression analyses.

**RESULTS** A total of 2894 subjects were enrolled in this study. In CADV group, 1374 patients (51.7%) suffered from calcific aortic valve stenosis, 918 of 1374 patients (67%) suffered from calcific aortic valve insufficiency, 154 of 1374 patients (11%) suffered from both calcific aortic stenosis and aortic valve insufficiency, and 278 of 1374 patients (20%) suffered from aortic valve calcification without calcific aortic stenosis or aortic valve insufficiency. To screen out the candidates of risk factors, a univariate factor logistic regression analysis was used to analyze the clinical data in CADV group and control group. The results showed that gender (P = 0.003, OR = 0.797), age (P = 0.000, OR = 1.196), aortic atherosclerosis (P = 0.000, OR = 1.68), BMI (P = 0.000, OR = 0.896), eGFR (P = 0.000, OR = 0.947), CT (P = 0.000, OR = 1.034).

GW26-e0697
Transcatheter paravalvular leakage intervention—a new alternative for open surgery?
Jian Yang, Yang Liu, Xiaofeng Li, Wensheng Chen, Shiqiang Yu
Department of Cardiovascular Surgery, Xining Hospital

**OBJECTIVES** To evaluate the safety and efficacy of transcatheter intervention of paravalvular leakage (PVL) after prosthetic valve replacement.

**METHODS** From September 2011 to April 2015, 38 patients of paravalvalve leakage after prosthetic valve replacement underwent interventional therapy. There were 30 male and 8 female, with mean age = 50.8±13.4 (23-76) years old. 23 patients were diagnosed as aortic PVL, 14 patients were diagnosed as mitral PVL and 1 patient was diagnosed as tricuspid PVL. Previously, 35 patients underwent mechanical valve replacement and 3 patients had tissue valve replacement, with 12 patients had a history of previous infective endocarditis. There were 4 cases of NYHA heart function= II, 20 cases= III, and 14 cases= IV. The period of time between transcatheter intervention and previous operation was 3.7±4.2 years, with PVL regurgitation volume =101±5.7 ml. Transcatheter intervention was carried out in the catheterization laboratory or hybrid room with the patient under local anesthesia or general anesthesia. By puncturing femoral artery and implantation of different congenital heart disease devices, the aortic PVL were occluded interventionally. Follow-up evaluation included peri-operative mortality, complications and postoperative residual shunt. The average follow-up time was 21 months (1-38 months).

**RESULTS** All the patients were successfully treated with transcatheter intervention and the success rate of transcatheter intervention was 100%. 1 patients was implanted with 3 occluders, 5 patients were implanted with 2 occluders with the other 32 patients had one occluder each. In total, there were 8 muscular venular septal defect occluders, 12 patent ductus arteriosus occluders and 25 vascular plugs. The average operation time was 92.8±27.2 min, and the DSA radiation time were 20.3±12.2 min, with average hospitalization time of 7.5±4.9 d. The main post-operative complications included 3 cases transferred to open surgery (7.9%), 2 cases of hematuria needing dialysis (5.3%) and 3 cases of hematuria (7.9%). During the follow-up, there was no new death. PVL regurgitation volume decreased to 1.1±0.7 ml (p<0.05) with improved heart function.

**CONCLUSIONS** The traditional treatment of paravalvular leakage under valve replacement need thoracotomy, extracorporeal circulation, and open surgery. There was great trauma, high risk and many complications. Transcatheter intervention of PVL has the advantages of simpler and safe approach, less trauma, shorter time of hospitalization, faster post-operative recovery and lower treatment cost. This method is one of the new technologies in the field of minimally invasive cardiac surgery in recent years. By improving operation skills, choosing individualized occluders and treatment of early hemolytic complications, the success rate and long-term effect of interventional therapy can get further improved. Transcatheter paravalvular leakage intervention could be a new alternative for open surgery.

RHEUMATIC AND VALVULAR HEART DISEASE

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