We measured fetal cardiac function in 25 recipient twins with hypoplastic left heart syndrome.

**Objectives:** The evaluation of fetal left ventricular (LV) and right ventricular (RV) functions by 2D echocardiography is challenging. Velocity vector imaging (VVI) is an angle independent speckle tracking technique and it can assess regional and global myocardial strain. It is unknown whether the LV and RV function of the fetus with hypoplastic left heart (HLHS) have already changed in the uterus. This study is to evaluate the regional and global fetal LV and RV strain in HLHS using VVI.

**Methods:** 60 healthy fetuses and thirty HLHS fetuses were enrolled for the echocardiographic study. They were divided into two groups according to their gestational age (the second trimester: 20–22 weeks and the third trimester: 30–34 weeks) respectively. Digital dynamic four-chamber views were collected and restored for offline analysis. The regional and global LV and RV myocardial strain and T2P global strain were measured.

**Results:** 1) In the normal fetus from the second to the third trimester, there were statistically significant decrease in RV global and regional strain; no statistically significant changes were observed in global and regional strain of LV; 2) as for the HLHS fetus from the second to the third trimester, there were statistically significant decrease in both LV and RV global and regional strain; 3) compared with normal groups, during the second trimester, there were significant decrease in LV global regional strain in HLHS group, but the RV strain was unchanged. During the third trimester, significant decrease in both LV and RV global regional strain was observed. Inter- and intraobserver variability was not significant.

**Conclusions:** Left and right ventricular mechanics of HLHS fetus are different from normal fetus. Prenatal abnormalities in myocardial deformation may be responsible for inefficient cardiac performance and output. These differences precede the imposition of undue loading condition as a consequence of surgical palliation and may offer clues to the development of heart failure at a later stage. VVI may be a useful tool to assess fetal cardiac function.

**OP21.04 Assessing fetal cardiac function using pulse Doppler and tissue Doppler in recipient twins of Twin–twin transfusion syndrome**

K. Ozawa1, R. Sugiyabashi2, S. Wada2, H. Sago1

1Center for Maternal-Fetal and Neonatal Medicine, National Center for Child Health and Development, Setagaya, Japan; 2Center for Maternal-Fetal and Neonatal Medicine, National Center for Child Health and Development, Tokyo, Japan

**Objectives:** We evaluated fetal cardiac function using pulse Doppler and tissue Doppler in recipient twins of Twin–twin transfusion syndrome (TTTS) before and after fetoscopic laser photocoagulation (FLP) of the communicating vessel.

**Methods:** We measured fetal cardiac function in 25 recipient twins who underwent FLP for TTTS between June 2014 and February 2015. We measured the myocardial performance index (MPI) using pulse Doppler and the S’, E’ and E/E’ using tissue Doppler in the left and right ventricles. The measurements just before FLP was compared with those 1, 7 and 14 days after FLP.

**Results:** The median CHOP score was 4 (range, 1–11). The left MPI before and 1, 7 and 14 days after FLP were 0.56 ± 0.10, 0.48 ± 0.07 (p = 0.002), 0.54 ± 0.06 (n.s.) and 0.56 ± 0.10 (n.s.) respectively. The right MPI before and 1, 7 and 14 days after FLP were 0.73 ± 0.18, 0.56 ± 0.12 (p < 0.001), 0.59 ± 0.11 (p = 0.001) and 0.59 ± 0.11 (p = 0.001) respectively. The left S’ before and 1, 7 and 14 days after FLP were 3.1 ± 0.6 cm/s, 4.0 ± 1.1 cm/s (p < 0.001), 3.8 ± 0.8 cm/s (p < 0.001) and 4.0 ± 0.7 cm/s (p < 0.001) respectively. The right S’ before and 1, 7 and 14 days after FLP were 3.9 ± 0.7 cm/s, 5.1 ± 1.4 cm/s (p < 0.001), 4.9 ± 0.8 cm/s (p < 0.001) and 4.9 ± 0.9 cm/s (p < 0.001) respectively.

The left E/E’ before and 1, 7 and 14 days after FLP were 11.2 ± 5.0, 11.1 ± 2.7 (n.s.), 10.2 ± 4.9 (p = 0.05) and 9.6 ± 2.5 (n.s.) respectively. The right E/E’ before and 1, 7 and 14 days after FLP were 10.9 ± 3.4, 11.7 ± 3.8 (n.s.), 10.8 ± 3.6 (n.s.), and 9.0 ± 2.2 (p = 0.005) respectively.

**Conclusions:** On the first day after FLP, the MPI decreased in the right ventricle and the S’ increased in both ventricles. Systolic function of recipient twins might improve immediately after FLP. E/E’ in the right ventricle decreased on the 14th day after FLP. Diastolic function in the right ventricle of recipient twins might improve subsequent to the improvements in systolic function.

**OP21.05 Free angle M-mode echocardiography in evaluation of left ventricular systolic function of fetuses in second and late trimester by mitral annular displacement (MAD)**

B.W. Zhao, J. Qiu, X. Guo, W. Zhou, B. Wang, M. Pan

Department of Diagnostic Ultrasound and Echocardiography, Sir Run Run Shaw Hospital, Zhejiang University College of Medicine, Hangzhou, China

**Objectives:** To measure mitral annular displacement (MAD) by conventional M-mode echocardiography and free angle M-mode echocardiographic measurements respectively in the normal second and third trimester fetuses and to analyse the differences between the two methods and to explore the correlation of MAD with gestational age and routine parameters for evaluation of fetal left ventricular function.

**Methods:** Totally 233 fetuses of gestational age (GA) at 18 to 39 weeks were enrolled. MAD was measured respectively by conventional M-mode (MADCM) and free angle M-mode echocardiography (MADFM). Tissue Doppler imaging (TDI) was used to measure mitral annulus early diastolic peak velocity (Em), late diastolic peak velocity (Am) and peak systolic velocity (Sm). The correlation between the two methods for measurement differences and the correlation between MAD and other routine echocardiographic parameters were investigated.

**Results:** The MADCM was (5.69 ± 0.91) mm, the MADFM was (6.78 ± 1.31) mm (P < 0.05). MADCM and MADFM were found correlated with GA and showed a significant positive correlation (P < 0.01), MADCM and MADFM also demonstrated positive correlation (P < 0.05) with Em, Am and Sm and MADFM performed better correlation than MADCM. MAD did not correlated with LVFS (P > 0.05). No significant difference was found between MADCM and MADFM in fetuses with favorable apical four chamber (P > 0.05), however significant difference was found between MADCM and MADFM in fetuses with unfavorable apical four chamber (P < 0.05).

**Conclusions:** In comparison with the traditional M-mode echocardiography, MAD obtained with free angle M-mode echocardiography has higher accuracy and repeatability in evaluation of fetal left ventricular systolic function.