Usefulness of the 4 chamber view and colour Doppler in detection of cardiac anomalies in the first trimester
Shettikeri A, Acharya V, Radhakrishnan P
Bangalore Fetal Medicine Centre, Bangalore, India

Objective
The aim of this study was to examine the feasibility and role of examining the 4 chambers of the heart with the use of colour Doppler in detecting major cardiac defects at the routine 11 – 13+6 weeks / NT scan in an Indian population.

Methods
This study included all the fetuses with major cardiac defects detected at 11 – 13+6 gestation from January 2007 to December 2014 across three major fetal medicine units in India. When a cardiac defect was suspected on the transabdominal scan, this was confirmed by transvaginal scan. Fetal cardiac examination was performed by FMF certified fetal medicine specialists who are trained to perform fetal echocardiography. Examination of the heart in the first trimester included demonstration of the four chamber view in an apical position, demonstration of equal filling of the ventricles and crossover of the aorta and the pulmonary artery by color flow mapping.

Results
We had a 13, 192 first trimester scans, of which 197(1.5%) had structural defects detected in the first trimester. Of these 197 first trimester defects 38(19.2%) were cardiac defects. Of the 38 cardiac defects, 29(72%) were isolated cardiac defects and 9(28%) were associated with extracardiac abnormalities. The aneuploidies accounted to 5/12(41.6%) in the isolated group and 2/4(50%) in the 'associated with' group. Increased Nuchal Translucency (NT) was seen in 18(47.3%) of them as an isolated marker. Increased NT with Tricuspid Regurgitation (TR) was seen in 9(23.6%). TR as an isolated marker was seen in 2(5.2%) babies. The NT was normal in 9(23.6%). Of the 38 first trimester cardiac defects 32(86%) had four chamber abnormalities and 4(10.8%) had outflow tract abnormalities. 25(34%) fetuses which were labeled as “normal” at the first trimester scan apparently were found to have cardiac defects at the second trimester anomaly scan, most of which were outflow tract abnormalities. There were about 5(6.9%) cardiac defects at the third trimester scan and 4(5.5%) cardiac abnormalities were detected postnatally.

Conclusion
FT cardiac scan is feasible in majority of the fetuses. Four chamber view and outflow tract visualization can be achieved in more than 95% of the fetuses. Colour flow Doppler improves the efficacy of visualization of the flow across the atrioventricular valves and hence confirm the patency of the two atria and two ventricles and the crossover of two outflow tracts. Transabdominal and transvaginal scans were used to make an accurate diagnosis. Most importantly, experience in 2nd trimester fetal echocardiography ensures a better detection of cardiac anomalies in the first trimester.