



Association of ductus venosus pulsatility index of more than 1.3 with aneuploidies, cardiac and non-cardiac defects at 11-13 weeks' and 18-23 weeks

Shetty N, Robert K, Sahana R, Radhakrishnan P
Bangalore Fetal Medicine Centre, Bangalore, India

Objective

To determine the association of increased ductus venosus (DV) pulsatility index (PI) of more than 1.3 (99th centile) at the 11+0 – 13+6 weeks' scan with aneuploidies, cardiac and non-cardiac defects detected at the 1st and 2nd trimester scans.

Methods

9755 singleton pregnancies who had DV assessment at the 11+0 – 13+6 weeks' scan with completed outcomes from January 2010 to December 2017 were included in the study. All fetuses had detailed first and second trimester anomaly scans at 11+0 – 13+6 weeks' and 18+0 – 23+6 weeks. All the scans were performed according to unit protocol by the Fetal Medicine Foundation (FMF) certified operators for the nuchal translucency (NT) and anomaly scans. The DV PI was measured in all the fetuses at the 11+0 – 13+6 weeks' scan. PI of > 1.3 was considered increased as this was consistently more than the 99th centile at 11, 12 and 13 weeks. Of the 9755 fetuses, 9492 (97.3%) fetuses had normal PI (< 1.3) and 263 (2.7%) fetuses had an increased PI (> 1.3). Further analysis was done to determine the association of increased DV PI with aneuploidies, cardiac and non-cardiac defects detected at the 11+0 – 13+6 weeks' and 18+0 – 23+6 weeks' scans.

Results

Of the 9755 fetuses, DV PI was increased in 263 (2.7%) fetuses, of which 24 (9.1%) had major aneuploidies. 2 fetuses that were terminated for genetic abnormalities were excluded from further analysis. 24/237 (10.1%) and 25/237 (10.5%) euploid fetuses had non-cardiac and cardiac defects detected at the 11+0 – 13+6 weeks' scan respectively. 1 fetus (0.5%) was found to have ambiguous genitalia and 6 (3.2%) had cardiac defects at the 18+0 – 23+6 weeks' scan. 181 (68.8%) fetuses were euploid and had no associated cardiac/ non-cardiac defects. Of the 9755 fetuses, DV PI was below 1.3 in 9492 (97.3%) fetuses, of which 59 (0.6%) had major aneuploidies. 23 fetuses that were terminated for genetic abnormalities were excluded from further analysis. 142/9410 (1.5%) and 50/9410 (0.5%) euploid fetuses had non-cardiac and cardiac defects detected at the 11+0 – 13+6 weeks' scan respectively. 148 fetuses (1.6%) and 37 (0.4%) had non-cardiac and cardiac defects found at the 18+0 – 23+6 weeks' scan. 9033 (95.8%) fetuses were euploid and had no associated cardiac/ non-cardiac defects. The calculated LR for DV > 1.3 , according to our study is 15.2, 6.7, 21 and 8 respectively for aneuploidies, non-cardiac defects at the 11+0 – 13+6 weeks' scan, cardiac defects at the 11+0 – 13+6 weeks' scan and cardiac defects at the 18+0 – 23+6 weeks' scan respectively. There was no significant trend observed for the non-cardiac defects at 18+0 – 23+6 weeks' scan.

Conclusion

DV PI index of > 1.3 during the 11+0 – 13+6 weeks' scan has a significant association with aneuploidies, non-cardiac and cardiac defects detected at the 11+0 – 13+6 weeks' scan. In addition, in euploid fetuses, there is an association with cardiac anomalies detected in the 2nd trimester too. Hence, close fetal surveillance, including fetal echocardiography must be recommended in all fetuses when the DV PI of more than 1.3.