The performance of the ductus venosus pulsatility index (DV-PI) assessed during the first trimester to predict gestational adverse outcomes

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Objective

(1) To describe the distribution of the DV-PI values in relation to the measurement of central tendency and variance; (2) To analyze the association between DV-PI value with gestational adverse outcomes: chromosomal defects in the fetus and/or in the neonate; fetal malformation and cardiac defects without chromosomal abnormalities; and fetal death.

Methods

This is an observational, cross-sectional, descriptive and analytic study. It includes all consecutive cases, of single and dichorionic twin pregnancies that underwent nuchal scan from 11 weeks to 13 weeks+6 days with DV-PI measurement between January 1, 2013 to December 31, 2017, with known pregnancy outcome. A ROC (receiver operator characteristic) curve was built to determine the performance of the test to each outcome of interest described by area under curve (AUC) and 95% confidence (CI) interval.

Results

Our final sample consisted of 1622 cases with the following outcomes: 23 fetal deaths, 35 fetuses with malformation diagnosed by ultrasound (including 9 cardiac defects) and 3 fetuses with chromosomal defects identified by karyotyping. We had only 3 confirmed aneuploidy cases in our sample and we could not observe significant association with increased DV-PI. The final sample had a mean value of 1.00 (0.909-0.909), median value of 0.98 (0.97-0.99), minimum value of 0.18, maximum value of 2.93 and 95th percentile of 1.36 (1.32-1.43). For the abnormal cases we observed a mean of 1.22 (1.008-1.438), median of 1.00 (0.96-1.08), minimum value of 0.35, maximum value of 2.59 and 95th percentile of 1.84 (1.43-2.59). The 95th percentile for the normal group was 1.35 (IC95%: 1.32-1.42). The observed AUC (95% CI) for each outcome: chromosomal abnormalities: 0.52 (0.50 --0.55); fetal malformation: 0.52 (0.41 - 0.62); congenital cardiopathy: 0.54 (0.33 - 0.76); fetal death: 0.55 (0.43 - 0.67) and combined outcome: 0.54 (0.46 – 0.62).

Conclusion

In this study sample there was no association between the DV-PI abnormality and the adverse gestacional outcomes of interest. The small number of intereste outcome may influence the lack of association.