

Predictors of coarctation of the aorta in left-right asymmetry of the 2nd trimester

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Background: Predicting neonatal coarctation of the aorta in left-right asymmetry is still challenging.

Objectives

To identify absolute cardiac dimensions predicting neonatal coarctation in fetuses diagnosed during the 2nd and who had repeated echoscan during the 3rd trimesters, and if the evolution of measurements and L-R ratios could improve the accuracy to predict coarctation.

Materials and Methods

Over a period of 5 years, all fetuses diagnosed with ventricular and great vessels disproportion diagnosed before 28 weeks, followed during the 3rd trimester (34 weeks), and delivered at our institution were included into the study. All cardiac measurements were expressed in Z-score and L-R ratio were calculated. The postnatal outcome was the presence of a coarctation or not. Logistic regression analysis was used to identify the predictors of coarctation of the aorta.

Results: 109 at-risk fetuses were included of whom 72 (66%) developed coarctation. The Z-score values predicting coarctation were for the absolute values: ascending aorta ≤ -1.66 , aortic isthmus ≤ -2.8 , and mitral valve ≤ -1.34 . The L-R ratios associated with coarctation at 2nd and 3rd trimester echoscans were respectively: TV (tricuspid valve)/MV (mitral valve) > 1.46 ($p = 0.024$) and TV/MV > 1.60 ($p = 0.021$); PV (pulmonary valve)/AV (Aortic valve) > 1.76 ($p = 0.004$) and PV/AV > 1.55 ($p < 0.001$); RV (Right ventricle)/LV (left ventricle) > 1.31 ($p = 0.0015$) and RV/LV > 1.45 ($p = 0.24$). A growth rate of the aortic isthmus ≤ 0.1 mm/week, of the transverse aortic arch ≤ 0.05 mm/week, and of the MV ≤ 0.3 mm/week were associated with coarctation ($p = 0.028$; $p = 0.0083$ and $p = 0.0003$, respectively). Finally, a delta Z-score between the 3rd and the 2nd trimester for the MV ≤ 0.88 , the LV end-diastolic dimensions ≤ -1.83 , and the aortic isthmus ≤ -1.08 predicted neonatal coarctation ($p = 0.0015$; $p = 0.0211$ and $p = 0.013$, respectively).

Conclusion: A multiple prediction parameters model and dynamic of cardiac dimensions during pregnancy may improve the prediction of neonatal coarctation in 2nd trimester L-R asymmetry.