MP3-1

Assessment of cardiac angle in fetuses to predict cases of tetralogy of Fallot and common arterial trunk

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INTRODUCTION: Only one third of cases of Tetralogy of Fallot (TOF) and Common Arterial Trunk (CAT) are diagnosed prenatally. Fetal cardiac axis has been shown to be rotated towards the left in these anomalies. The objective of our study was to evaluate the performance of fetal cardiac angle as a screening tool for the above cardiac anomalies. In addition, we aimed to compare its utility to that of maternal diabetes and smoking which have recently been reported in a review as risk factors for TOF and CAT.
METHODS: The fetal cardiac angle was retrospectively measured using a previously published method on archived images in cases of the above-mentioned cardiac anomalies (N=63). These were compared to a control group with a documented normal postnatal outcome (n= 151). The presence of maternal diabetes and smoking were ascertained from medical records. The karyotype and pregnancy outcome were ascertained in all cases of TOF and CAT. Logistic regression analysis was used to assess the performance of the fetal cardiac angle and maternal history of smoking and diabetes in the prediction of TOF and CAT. The Area under the Receiver Operator Characteristic Curve (AUROC) was calculated to assess the performance of the screening model.
RESULTS: The 63 cardiac anomalies included 58 cases of Tetralogy of Fallot and its variants and five cases of common arterial trunk. The mean fetal cardiac angle was larger in fetuses with TOF and CAT compared to controls (63.5° vs 44.1°, $p<0.0001$). The prevalence of diabetes (6.3% vs 11.9%, chi-square $p=0.2$) and smoking (10% vs 6.9%, chi-square $p=0.4$) was not different between TOF and CAT and controls. In a multivariate logistic regression model, the only predictor of these lesions was the fetal cardiac angle (logit(TOF and CAT)= -11.05 + 0.198 * cardiac angle, $R^2= 0.6$, $p<0.0001$). The AUROC was 0.899 (95% CI, 0.846 -0.951).
CONCLUSIONS: The fetal cardiac angle is an effective screening tool for identification of TOF and CAT.