Prediction of neonatal surgery or catheter based therapy in fetuses with congenital heart defects: Fetal Echocardiographic Score.

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Introduction: There is improved survival and reduced morbidity in certain prenatally diagnosed congenital heart defects (CHD) compared to those with a postnatal diagnosis. On the other hand unnecessary referral brings about needless costs and anguish. The aim of this presentation was to develop a model to predict the probability of neonatal cardiac surgery or catheter based therapy in fetuses with CHD.

Methods: We developed and internally validated a model in a retrospective study from two tertiary centers in women whose fetuses were diagnosed as CHD. Retrospective analysis of ultrasounds and clinical records were performed. The outcome of interest was neonatal cardiac surgery or catheter based therapy. Clinical and ultrasound variables were included in a stepwise backward elimination regression model to predict the outcome. We assessed performance using the area under the curve (AUC) of the receiver operating characteristic (ROC). Standard bootstrapping techniques were used to assess potential overfitting. Results: Between September 1998 and March 2012; 242 patients with prenatal diagnosis of CHD were included, of whom 142 (58.4%) required cardiac surgery or catheter based therapy. Visualization of only one atrioventricular valve, asymmetry of the great arteries and asymmetry of the ventricles were the strongest independent predictors in multivariable analyses. The model predicted the adverse outcomes within 30 days of life (AUC ROC 0.94, 95% CI 0.92 - 0.97). There was no significant overfitting. The model allowed the stratification of the sample into clinically relevant categories. The cutoff point of 0.30 estimated probability determined a positive predictive value of 85.8% and a negative predictive value of 97.5%.

Conclusions: In patients with CHD neonatal surgery or catheter based therapy can be predicted from ultrasonographic fetal heart evaluation by a prediction model and risk score, these may help in decision making regarding prenatal management and referral for birth place.