

Prenatal echocardiography in a “typical” Tetralogy of Fallot.

Kaldararova M., Tittel P., Olejnik P., Masura J.

National Institute of Cardiovascular Diseases – Children’s Cardiac Center, Bratislava, Slovakia

Introduction.

The underlying mechanism in the embryology of tetralogy of Fallot (TOF) is assumed to be the disproportional division of the conotruncus during early development of the heart. Unlike the postnatal definition, prenatally usually no pulmonary stenosis is found, and the diagnosis is described only by a ventricular septal defect with an overriding aorta. The aim of the study was to quantify the aorta and pulmonary artery prenatally in a “typical” TOF.

Patients and methods.

Retrospective study of prenatally diagnosed TOF was performed. Included were only patients with normal-sized ventricles and unobstructed antegrade flow through the pulmonary valve (PV) and ductus arteriosus (DA); excluded were patients with atretic/dysplastic/absent PV or retrograde DA flow. Analyzed were 24 patients in 41 serial examinations; and data were compared with gestational week (GW) matched healthy controls (NORMAL). Analyzed were: aortic (AoV) and PV annulus Z-score according to GW, PV/AoV ratio, aortic arch (AA), DA, DA/AA ratio, right/left ventricular ratio (RV/LV), right/left ventricular wall ratio (RVW/LVW). Fetal echocardiography was performed between 20th-40th GW, with 6-12 week interval (median 9) between exam 1 and exam 2.

Results.

Smaller PV (Z-score<2) in 85.4%; and bigger AoV (Z-score>2) in 53.6% of TOF patients were found. Comparing TOF/NORMAL significant differences were found (median) in: AoV Z-score 2.19/0.61 (P<0.0001); PV Z-score -2.98/-0.3 (P<0.0001); PV/AoV ratio 0.67/1.12 (P<0.0001) with cut-off point 0.9; DA/AA ratio 0.71/0.96 (P<0.0001) with cut-off point 0.85. There was no significant difference in RV/LV or RVW/LVW ratio. No significant differences during serial follow-up in any of the measured parameters were detected.

Conclusions.

Our study confirmed in TOF patients already prenatally a disproportional size of the great arteries, with mildly dilated aorta and a smaller pulmonary artery, and this despite preserved and unobstructed antegrade pulmonary flow. On the contrary to other studies, we did not find any progression of this unfavorable setting during serial follow-up. In prenatal TOF establishing the patient’s own pulmonary artery / aorta ratio enables quick and easy evaluation of the pulmonary artery regardless patient’s size or gestational week. This may be of important prognostic value for the postnatal clinical course and further management.