

Aortic isthmic flow in fetuses with Ebstein's anomaly and/or tricuspid valve dysplasia.

Peyre M.(1), Lachaud M.(1), Mendez Santos A.(1), Berger A.(1), Brisebois S.(1), Thomas Chabaneix J.(2), Raboisson M.J(1).

Sainte-Justine University Hospital Center, Montreal, Canada (1)

Hôpital Cardiologique du Haut Lévéque, Pessac, France (2)

Introduction: Ebstein's anomaly and/or tricuspid valve dysplasia (TVD) associated with tricuspid insufficiency has a poor outcome during fetal life. Pre natal echocardiographic parameters based on right chambers size and right ventricular flow are helpful but have varying degrees of sensitivity to predict pre/neonatal outcome. Systolic flow in the aortic isthmus is the result of the balance between left and right ventricular flow and should be affected by lower right ventricular output seen in significant tricuspid regurgitation.

Objective: to evaluate isthmic systolic index (ISI) as a predictor of severity in a population of foetuses with Ebstein's anomaly or TVD and tricuspid regurgitation.

Methods: thirty nine echocardiograms of 21 fetuses (9 Ebstein's anomalies, 12 TVD) diagnosed between January 2010 and June 2017 were reviewed. ISI was calculated on isthmic aortic waveforms as peak systolic velocity/end-systolic velocity and compared to a population of 83 normal fetuses matched for gestational age. Isthmic flow index ($IFI = (\text{systolic flow} - \text{diastolic flow}) / \text{systolic flow}$) was also calculated as well as right ventricular output. A sub group of 6 fetuses with hydrops, intrauterine or perinatal death were defined as group 1 and compared to the 15 other fetuses (group 2) as well as to the normal population.

Results: two pregnancies were interrupted in group 1 versus 4 in group 2. Overall survival at hospital discharge was 48%. At 21 weeks of gestation ISI was significantly higher for fetuses in group 1 compared to normal population (0.12 ± 0.06 versus 0.18 ± 0.06 , $p=0.02$). At the same gestational age, IFI was increased in group 1 compared to group 2 (0.79 ± 0.36 versus 0.54 ± 0.28 , $p=0.01$). At 30 weeks of gestation, ISI was higher in fetuses with Ebstein's anomaly/TVD than in normal population (0.10 ± 0.40 versus 0.08 ± 0.14 , $p=0.04$) and right ventricular output was lower in group 1 compared to group 2 (78.1 ± 11 versus 341.8 ± 20.3 , $p=0.01$).

Conclusion: decreased right ventricular output in case of significant tricuspid regurgitation could lead to left ventricular preponderance at the level of the aortic isthmus. Isthmic flow indexes could be interesting additional prognosis factors in this at risk situation.