Fetal atrioseptostomy and stenting – what can be achieved?

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OBJECTIVE: HLHS with closed or restrictive atrial septum is fatal condition with mortality rate close to 100%. Fetal intervention has been proposed as the rescue procedure. The aim of this study was to evaluate the indication for fetal atrial septum opening and review the outcome.

METHOD: Since 2011 one team performed 12 fetal interventions in 11 fetuses for opening the interatrial septum. The indication for the intervention was closed foramen ovale in fetuses with HLHS or severe aortic stenosis, with biphasic flow in the pulmonary veins. We evaluated fetal condition after intervention and neonatal outcome.

RESULTS:
6 fetuses had HLHS with closed Fo, 5 closed Fo with critical aortic stenosis and heart failure (AS&HF). 4 of them had aortic valvuloplasty previously (BAV). The mean age of diagnosis was 23 in HLHS and 26 in AS&HF. Atrial balloon septostomy was performed in 3 fetuses. Procedures were not successful, in all atrial septum closed soon after ballooning. One fetus died during 24 hours post intervention, second was life-born with closed IAS, in the third stent was placed. In two fetuses with HLHS the connection between pulmonary vein and SVC was suspected, in one was confirmed after birth, in one disappeared after atrial stenting. In all fetuses after stent placement was immediate improvement of the pulmonary veins flow. There were 2 IUD within 24 hours from interventions. 3 neonates were born prematurely, all died in the early neonatal period despite patent stent (2 HLHS, 1 AS&HF). 6 children were delivered at term, all in good condition. They were operated on within 24 hours - surgical atrioseptectomy was done, in 2 with pulmonary artery banding, in 1 – Norwood procedure. There is just one survivor – the baby with AS&HF.

CONCLUSIONS
Interatrial stenting is technically feasible and successful procedure. Fetuses with severely impaired LV function and closed Fo probably had lethal illness, in which prenatal interventions cannot change the natural history. Careful evaluation of neonatal treatment must be established to understand the poor outcome in spite of successful prenatal therapy.