Interventional closure of secundum type atrial septal defect in children with a bodyweight less than 10kg: Indications, feasibility and outcome

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Background / Objectives: Interventional device closure of secundum type atrial septal defect (ASD) in children can be performed safely at the age of 2-4 years. Aim of our study was to evaluate indications, feasibility, periprocedural complications, and outcome of interventional ASD closures in very small children with a bodyweight less than 10kg.


Results: In 25 children (13 male) 24 successful interventional ASD device closures were performed at a median age of 1.2 years (0.2–2.8) and a bodyweight of median 7.5 kg (4.6–9.9). RV volume overload was present on echocardiography in 24 patients, resulting in a Qp/Qs of mean 1.7 (± 1). Clinically 9 (36%) pts presented with failure to thrive. 8 (32%) were past preterm infants with bronchopulmonary dysplasia (BPD). In 12 pts a genetic syndrome (Trisomy 21 in 9 pts, 36%) was present. In more than 2/3 of the pts (n=18, 72%) pulmonary hypertension (PAH) was suspected on echocardiography. Haemodynamic evaluation revealed baseline PVR of mean 3.8 WU/m² (± 6.7) and mean PAP 25 mmHg (± 10). ASD size was mean 8.1 mm (± 2.7) with a ratio of bodyweight/defect-size of median 0.87. Mean femoral sheath size used was 7 Fr (± 1.5) and ASD closure devices of 10 mm (± 3 mm), procedure time 84 min (± 34), fluoroscopy time 13 min (± 7). There were no periprocedural complications, postinterventionally prolonged femoral bleeding (n=1) and femoral venous thrombosis (n=1) occurred. Median follow-up was 0.5 years (0.1-6) showing complete closure of ASD with no residual shunt in all 24 pts. All pts showed regression of PAH measured by echocardiography, one pt still being treated with sildenafil.

Conclusions: Interventional ASD closure in children weighing less than 10kg can be performed without any additional risks and shows a favorable outcome with a slight device oversizing in defect sizes up to 8mm. Defect sizes in these small children, which comply with the bodyweight of the patient in kg, mostly can be addressed successfully with a percutaneous device closure. Indications for early closure are co-morbidities as BPD, failure to thrive or suspected PAH on echocardiography. As these pts do benefit significantly from the procedure, there are no restrictions to withhold timely procedures from this specific group.