Is percutaneous patent ducts arteriosus closure a safe and effective alternative to surgery in small infants?

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Background: Although transcatheter closure is nowadays considered treatment of choice of patent ductus arteriosus (PDA), this approach is still challenging in small infants (weight <6 Kg) in whom most of available devices are considered off-label. Aim of this study is to report on feasibility, safety and follow-up results of percutaneous PDA closure in infants weighing <6 Kg in a high-volume tertiary referral centre.

Methods: From April 2000 to December 2013, 22 of the 586 patients (3.7%) submitted to trans-catheter PDA closure at our Institution were <6 Kg. Their mean age and weight were 4.3±2.4 months (range 0-8) and 4.9±0.8 Kg (range 3.1-6), respectively. Indications for the procedure were clinical signs and symptoms of congestive heart failure, left chamber volume overload at echocardiography and/or need of anti-congestive drug therapy. Ductal occlusion was achieved under general anesthesia from venous (n=11), arterial (n=9) or combined approach (n=2). Ductal morphology was conical in 50% (n=11), tubular in 41% (n=9) and window-like type in 9% (n=2) of the cases. Two patients (9%) had associated defects (pulmonary sequestration) that were treated during the same procedure.

Results: The mean PDA diameter was 2.7±1.2 mm (range 1.5–5.5 mm), resulting in moderate pulmonary artery hypertension (mean pressure 28±9 mmHg, range 14-46 mmHg; RV/LV pressure ratio 0.6±0.2, range 0.3-1) and moderate left-to-right shunt (mean QP/QS 2.4±1, range 1.5–4.5). According to the patient’s weight as well as ductal morphology and size, different devices were used [Amplatzer Duct Occluder type I (n=10), Amplatzer Duct Occluder type II AS (n=8) and controlled-release Cook coils (n= 4)]. Procedural feasibility was 100%, with a complication rate of 9% (moderate anemia submitted to blood transfusion in one patient and femoral artery thrombosis in one patient). No fatalities were recorded. Immediate occlusion rate was 36%, rising to 86.3% at the last follow-up control. Echocardiographic follow-up failed to show any significant aortic isthmus or pulmonary artery branches flow abnormalities.

Conclusion: Percutaneous closure of large, symptomatic PDA might be considered feasible, effective and safe also in small, low-weight infants, by choosing the device according to the patient’s profile and ductal anatomy.