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

Giugno L., Santoro G., Capogrosso C., Gaio G., Palladino M.G., Russo M.G.
Paediatric Cardiology, A.O.R.N. "Ospedali dei Colli", II University of Naples, Naples, ITALY

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.