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Experience with percutaneous perforation of the pulmonary valve in neonates with pulmonary atresia and intact interventricular septum

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Pulmonary valvuloplasty may promote RV growth in neonates with pulmonary atresia and intact ventricular septum (PA). Percutaneous valve perforation and dilatation represents an alternative to surgery.
The aim of this study was to assess results and outcomes after percutaneous pulmonary valvuloplasty in neonates with PA.
Material and Methods: All patients with PA selected for percutaneous procedure (perforation and dilatation) were included in the study. Procedures were performed under general anesthesia, mechanical ventilation, prostaglandins infusion, under echocardiographic guidance. Anatomic lesions, type of procedure, short and mid-term outcomes were recorded.
Results: From 2003 to 2011, 13 patients with PA and intact septum underwent 15 percutaneous procedures for perforation and subsequent balloon dilatation of the pulmonary valve, at a mean age of 3.6 days and mean weight of 3.1 kg (2.1 to 3.9kg). RV was tripartite in 6, bipartite in 8 and unipartite in 1. Four procedures failed to perforate the valve, 2 of them underwent a second and successful procedure. Eleven procedures were successfully performed, with a 5 to 8mm balloon size (mean 6.5, median 6mm). Pericardial effusion occurred in 2 cases, requiring emergency surgery in 1. No death occurred during procedure. Five patients (38.5%) underwent subsequent aorto-pulmonary shunt and 2 had ductus arteriosus stenting (15.4%), 2 to 35days after procedure (mean 12.4days), because of persistent significant hypoxemia. Four iterative percutaneous pulmonary valve dilations were performed (30.7%), 6 days to 11 months after first procedure. Two patients died at 4 days and 8 months of age. All 11 survivors (85%) have biventricular anatomy with no (2 cases), mild (8 cases) or moderate (1 case) RV hypoplasia, at 1 month to 8 years follow up (mean 3.5years).
Conclusion: Percutaneous pulmonary valve perforation is an effective procedure in neonates with pulmonary atresia and intact septum. Although short-term aorto-pulmonary shunt is needed in half of the cases, biventricular heart anatomy may be expected in long-term follow-up.