Transcatheter interventions in neonates with critical pulmonary stenosis in the era of duct stenting

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Introduction: Critical pulmonary stenosis (CPS) is defined as severe PS in a newborn with cyanosis or signs of low cardiac output at presentation. Pulmonary blood flow is mostly duct dependent. We present our experience with CPS between 2005 and 2014.

Method: 57 patients aged between 2-28 days (median 7 days) underwent pulmonary balloon valvuloplasty (PBV). Duct stenting was performed immediate after in patients that hypoxemia persists (<75%) and had smaller RV and RVOT. In good RV morphology or non-constricted PDA, we waited for one week on prostaglandin (PGE) infusion. If hypoxemia persists longer, stent was implanted.

Results: In 57 patients, 47 of them were duct dependent, 10 of them have significant hypoxemia but duct had been occluded. The procedure was successful in 56 of 57 (98%). In one patient we couldn't crossed the valve and underwent to surgery. Predilation with coronary balloons in 10 and snare assisted technique was needed in two for crossing the valve with the final balloon. 20 newborn needed duct stenting; 14 in the same and 6 in subsequent session. Duct spontaneously occluded in two when waiting on PGE, recanalyzed and stented in one and surgical shunt was performed in another. The mean Z scores and valve diameters in duct stent group were significantly lower for both tricuspid and pulmonary valve than the others'. In one patient in whom pericardial effusion was developed, effusion was drained and the procedure was completed. One patient developed persistent complete heart block; PBV was performed retrograde through the duct while RV pacing. The patient died in spite of successful PBV on the fourth days in intensive care unit. During the follow up (median 57 months), transcatheter reintervention was performed in 9; PBV due to recurrent PS in 5, stent redilation in 3, transcatheter shunt occlusion in one. Surgical interventions were needed in 4; RVOT reconstruction in two, Glenn anastomosis in two. Severe pulmonary regurgitation was seen in two but no need valve replacement yet.

Conclusion: Although additional interventions are not uncommon in early and intermediate time after the procedure, PBV should be the first choice in newborn with CPS.