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Balloon valvuloplasty of critical aortic valve stenosis in the first day of life – an option or treatment of choice?

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Background: Critical aortic valve stenosis carries high risk of mortality and morbidity, therefore it needs urgent diagnosis and treatment. Balloon and surgical valvuloplasty are the optional methods of treatment. The aim of this paper is to report our experience in aortic balloon valvuloplasty in critically ill newborns on the first day of life.
Methods: Between 01/1999 and 08/2013 109 patients underwent BP of critical aortic valve stenosis. Thirty seven newborns, all with prenatal diagnosis, weighting 1.7 to 4.3kg received interventional treatment on the first day of life. Mean pressure gradient and ejection fraction were 40,4 mmHg(10-90mmHg) and 33,8%(10-75%) respectively. 27 patients(73%) had decreased left ventricle contractility. The diameter of the aortic valve annulus ranged from 5mm to 8,5mm(average-7,2mm) and the balloon to annulus ratio ranged 0,95-1,15.
Results: All interventions were successful with reduction of pressure gradient (average 22mmHg,$p<0,001$) and increase in contractility of the left ventricle. 8 patients died early after the intervention. In 1 patient BP was performed during resuscitation, further 2 premature patients were born in 34hbd with low birth weight, 1 of them had prior fetal valvuloplasty. In 1 patient rupture of aortic cusp resulted in significant aortic insufficiency. Due to recurrence of the stenosis and/or insufficiency 8 patients required further surgical intervention 4 to 60 months after initial BP. 3 patients had Ross operation, 5 required Konno-Ross operation. One patient had concomitant plasty of stenosed mitral valve. Because of the small left ventricle 2 patients underwent modified Norwood operation. One patient had ductal stenting with bilateral banding of pulmonary arteries and at the age of 12 months was qualified to biventricular correction.
In the follow-up (4 to 84 months) 18 patients had residual pressure gradient of 18 to 44mmHg, 9 patients have moderate and 9 mild aortic insufficiency.
Conclusions: Balloon valvuloplasty of critical aortic valve stenosis on the first day of life is effective and allows for patient's survival and eventual future surgical treatment. In our department it is a method of choice especially in patients in bad general condition or low birth weight neonates when surgical treatment is associated with high risk of complications.