Early Ross-Konno surgery for treatment of critical aortic stenosis

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Background:
Newborns with critical aortic stenosis (CAS) suffer from severe left ventricular (LV) hypertrophy and dysfunction. Interventional aortic valve dilation usually leaves significant increased LV myocardial stress. Early aortic valve replacement may allow improved LV recovery and long-term outcome.

Aim:
To review our experience with neonatal RK surgery

Patients:
Between October 2000 and January 2013, 22 children with CAS (median age: 17d (7-547d); median weight: 3.03 kg (2.18-9.2 kg)) underwent early RK surgery in our institution. Hypoplastic or interrupted aortic arch was additionally corrected in 9 patients, 5 of them had a VSD closure. Severe endocardial fibroelastosis (EFE) was present in 8 neonates. Seven patients had a fetal, 16 patients a postnatal aortic valve dilation. A 12 mm Contegra valve was used as a right-sided conduit in 6 patients, homografts from 8-14 mm in 16 children. Median follow-up was 5,5 years (1,0-12,3 years).

Results:
Early mortality was 3/22 (14%), there was no late mortality. 1 patient required a pacemaker due to complete heart block, 1 patient had a mitral valve replacement. Conduit replacement was necessary in 9 patients after a median period of 2,2 years (0,6 – 11 years), 3 patients needed a second replacement median 3,3 years (2,5-4,1years) later. Neo- aortic valves showed excellent function without a gradient. No aortic regurgitation was seen, grade I in 14 patients. Aortic valves showed good growth (median z-score after 3 years: 1,92; range: -0,6-2,94), valve function remained stable, however z-scores of the aortic sinuses were significantly larger (median 2,77; range: 0,79-4,51; p<0,0001). Out of 8 patients with severe EFE and LV Dysfunction, there were 2 neonatal deaths, LV SF improved significantly from median 11,8% (5-23%) to 30,7% (10-41%). PA pressures were normal in all.

Operative procedure:
The pulmonary artery (PA) and pulmonary valve are excised. The aorta is divided well above the coronary ostia and is excised with the hypoplastic valve. Konno-procedure was performed to enlarge the aortic anulus in all children. The pulmonary autograft is implanted in aortic position and the coronaries are reconnected to the autograft. In 16/22 patients a homograft was used as pulmonary conduit and in 6 children a Contegra-conduit.

CONCLUSION: In neonates and young children with CAS, early RK seems to be a safe and effective treatment to unload the LV and to allow recovery of LV function. Early conduit replacement may be necessary. Neo-aortic valve showed good growth and function, but dilatation of neo-aortic sinuses may occur and may become a concern in the future.

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