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Do patients benefit from Ross procedure even in long-term ?

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Introduction:
Ross procedure (ROSS) is a type of specialized aortic valve operation, where diseased aortic valve is replaced with the person's own pulmonary valve and a homograft placed in pulmonary position.
Patients:
Between years 1997-2010, 48 patients (31M/17F, mean age 12.9±5.3 years) with aortic valve malformation underwent ROSS at our institution: in 29 (60.4%) patients surgery was performed due to predominantly aortic regurgitation (AR) and in 19 (39.6%) due to predominantly aortic stenosis (AS). 16 (33.3%) patients had a history of previous aortic valve (catheter or surgical) intervention (6.8±4.2 years prior ROSS).
Methods:
In prospective follow-up (FU) repeated clinical evaluation and echocardiographic measurements were performed. Proximal aorta diameters (annulus, sinuses, ascending aorta) and aortic valve function; as well as pulmonary conduit function were evaluated. Need of reintervention, aortic dilatation and regurgitation were analyzed; differences between AR and AS groups were statistically evaluated.
Results:
Short-term hemodynamic effect: in AR group left ventricle dilatation decreased significantly ($p<0.0001$) by 3 months after procedure; on the contrary in AS group left ventricle hypertrophy remained unchanged ($p=0.52$).
Long-term evaluation: at mean 8±3.6 years of FU, freedom of reintervention was 87.5%. Reintervention was needed in 6 (12.5%) patients (in 4 because of pulmonary homograft stenosis / in 2 because of aortic regurgitation), mean 6.9±3.4 years after ROSS.
In patient with FU >5 years a higher incidence of aortic root dilatation ($p=0.017$) and pulmonary homograft stenosis ($p<0.0003$) was found. Severe pulmonary regurgitation was more often present in patients who underwent ROSS at age >10 years ($p=0.0058$).
In AR group compared to AS - higher incidence of aortic regurgitation ($p=0.01$) and aortic annulus dilatation ($p=0.023$) was found. Systemic hypertension was a risk factor for ascending aorta dilatation ($p=0.04$). Pre-operative aorto-pumonary disproportion (>3mm) and pulmonary valve dimension did not effect long-term aortic dilatation or regurgitation.
Conclusions:
Ross procedure has a good short-term benefit and low need for reintervention. On the other hand, aortic dilatation and pulmonary conduit dysfunction can be expected to progress with time and may be the main cause for further reintervention. Patients with previously regurgitant lesion tend to more severe aortic dilatation and new aortic regurgitation.