

Long-term results of Ross procedure in a population-based follow-up

Kallio M. (1), Pihkala J. (1), Mattila I. (2)

Department of Pediatric Cardiology, Children's Hospital, University Hospital of Helsinki and University of Helsinki, Helsinki, Finland (1); Department of Pediatric and Transplantation Surgery, Children's Hospital, University Hospital of Helsinki and University of Helsinki, Helsinki, Finland (2)

Introduction: Ross procedure is commonly used in children requiring aortic valve replacement. The growth potential of the autograft and possibility to avoid anticoagulation therapy makes this procedure preferable for small patients. The purpose of this study was to evaluate long-term outcomes of Ross procedure in a nationwide follow-up.

Patients and methods: This retrospective study involved all children treated with Ross procedure in Finland between 1994 and 2009. The clinical records were reviewed for demographic and anatomical characteristics, Ross operation data, surgical history, and status at the latest follow-up. The median follow-up time was 11.5 (range 2.4-19.2) years.

Results: Fifty-one patients underwent either Ross (n=37) or Ross-Konno (n=14) procedure at a median age of 4.8 (range 0.02-16.3, 13 infants <1 year) years. Concomitant procedures (e.g. mitral valve surgery, VSD closure or aortic arch reconstruction) were performed in 17 (33%) patients. Before Ross operation, 28 (55%) patients had undergone aortic valve procedure and 4 patients had endocarditis. The indication for Ross procedure was aortic valve stenosis, regurgitation or mixed in 29%, 24% and 47% of patients, respectively. Early (<30d) mortality was 5.9% (15.4% in infants) and late mortality 7.8% (30.8% in infants). During the follow-up, 20 reinterventions were needed in 16 (31%) patients. Two (3.9%) patients underwent heart transplantation. The most common (50%) cause for reintervention was pulmonary homograft stenosis, which was treated with valvuloplasty (n=1), transcatheter pulmonary valve replacement (n=3) or surgical homograft replacement (n=6). At the last follow-up, mild to moderate aortic root dilatation was reported in 52% of patients, and two (5%) patients had undergone reconstruction of the ascending aorta. Trivial autograft valve regurgitation was commonly seen, but only one patient developed severe autograft regurgitation requiring mechanical valve replacement 15.9 years after Ross operation. Overall freedom from reintervention was 88% at 5 years and 80% at 10 years.

Conclusions: In long-term follow-up after Ross procedure, the most common reason for reintervention is pulmonary homograft stenosis. Aortic root dilatation and autograft valve regurgitation are relatively common but rarely lead to reinterventions before adulthood. In our center, Ross procedure has provided good long-term results in this challenging group of pediatric patients.