

Ross Procedure in Children and Young Adults: 21 years of follow-up

Pluchinotta F.R. (1), Varrica A. (2), Piazza L. (1), Arcidiacono C. (1), Saracino A. (1), Giamberti A. (2), Pome' G. (2), Reali M (2), Fernandez J. (1), Giugno L. (1), Micheletti A. (1), Negura D. (1), Butera G. (1), Chessa M. (1), Carminati M. (1), Frigiola A. (2)

Department of Pediatric Cardiology and Adult Congenital Heart Disease, IRCCS Policlinico San Donato, Milan, Italy (1)

Department of Cardiac Surgery, IRCCS Policlinico San Donato, Milan, Italy (2)

Background. The Ross procedure is used to treat aortic valve disease in children. The advantages include autograft growth, long-term durability, and avoidance of anticoagulation. Long-term follow-up of Ross procedure in infancy is limited.

Methods. We performed a retrospective analysis of prospectively collected data in a population of patients younger than 18 years who underwent Ross operation at Policlinico San Donato between January 1994 and December 2015. Echocardiographic, surgical and clinical data, including survival and need for reoperations, were obtained and analyzed.

Results. A total of 136 patients underwent a Ross procedure at a median age of 11 years (range 27 days to 17,9 years). Twenty patients (15%) were infants and pre-school children. The indication for the Ross procedure was aortic valve stenosis, regurgitation or both, which was observed in 34, 55 and 11% of patients respectively. Seventy-three patients (54%) had a bicuspid aortic valve. Seventy-two patients (53%) had previous surgical procedure for associated congenital malformations or interventional procedure on the aortic valve. Fifteen patients (11%) underwent Ross-Konno procedure to relieve a left ventricular outflow tract obstruction. Concomitant surgical procedures were performed in 10 patients (7%), 5 of whom underwent resection of subaortic membrane. Mean follow-up was 8 years (range 6 days to 20.5 years). There were 3 late deaths and 1 heart transplant. Twenty patients underwent reoperation after the Ross procedure. At 20 years the freedom from right ventricular outflow tract reintervention was 88%, and the freedom from autograft reintervention was 77%. On average, patients were reoperated 7.8 years (range 5 months to 18 years) after the Ross procedure. The most common indications for surgical reintervention were isolated failure of the neo-aorta in 11 cases (55%), regurgitation and/or stenosis of the pulmonary conduit in 11 patients (55%). The surgical technique used is strongly related to the risk of reoperation in the follow-up.

Conclusions: The long-term outcomes of the Ross procedure in children and young adults are favorable. The low incidence of neo-aorta and pulmonary homograft dysfunction at 20 years demonstrate that the Ross procedure is an attractive option for the treatment of aortic valve disease in children and young adults.