ABSTRACT

Based on retrospective analysis combined with assessment of histopathological changes the study aimed to determine risk factors of conduit failure, evaluate long-term conduit survival, propose potential ways to improve long-term outcomes, and find out which type of conduit should be preferred in case of primary operation and /or reintervention. We performed a retrospective analysis of a total of 766 records of valved conduit implantation in the right ventricular outflow tract in 590 patients and 249 records of valved conduit secondary and subsequent replacement in 197 patients. The study endpoints were defined as conduit explants; balloon dilatation of the graft (excluding balloon dilatation of left/right pulmonary artery), transcatheter pulmonary valve implantation; heart transplantation, or death of the patient. We also assessed histopathological signs of structural degeneration, degree of cellular preservation, and presence of antigen-presenting cells (APC) in 57 cryopreserved allografts subsequently used for the RVOT reconstruction, and correlated the changes with donor clinical characteristics, cryopreservation times, and allograft types and diameters. Then we studied the microscopical structure of explanted conduits in 24 patients in correlation to the duration of implantation, assessed the degree of degenerative changes, and searched for signs of cellular rejection. As a result, right ventricular outflow tract reconstruction demonstrates good mid-term and acceptable long-term outcomes regardless of the type of conduit implanted. Long-term survival of conduits was adversely affected by the younger age of the recipient, the younger age of the donor, the small size of the conduit at implantation, the use of aortic allografts, underlying congenital heart disease, and the type of surgery. In reoperative RVOT, worse long-term graft survival was associated with the younger age of the recipient at implantation, the small size of the conduit, younger age of the donor and male donor in case of allograft implantation. Allografts before implantation show markedly reduced cellular preservation negatively correlating with the numbers of APC. More preserved allografts may be therefore prone to stronger immune rejection. The microscopic appearance of long-term explanted conduits is often non-specific and signs of cellular rejection are sparse.

KEYWORDS: Right ventricular outflow tract, Allograft, Xenograft, Reoperation, Conduit failure, Antigen Presenting Cells, Cryopreservation, Degeneration, Heart Valve, Histopathology.