Ross operation with decellularized xenogenic heart valve for RVOT reconstruction


Objective
The Ross operation is still limited by availability and poor performance of devices for the pulmonary valve replacement. Tissue engineering of valves conduits could offer a solution to this problem.

Methods
After extensive in vitro and preclinical in vivo testing, the Matrix-P™ decellularized xenograft was implanted in 224 patients during Ross operation. Patient’s age ranged from 6 to 76 years. Thirty-five percent received additional procedures, most often coronary artery bypass surgery, mitral valve treatment or ascending aorta replacement. Eighteen patients suffered from acute or subacute native or prosthetic valve endocarditis and eight patients had one or more previous cardiac operations.

Results
Follow up was 100% completed. Five patients (2.3%) died early after surgery. Five late deaths occurred, due to aortic valve endocarditis, pulmonary embolism from deep vein thrombosis, pancreatitis, cancer and sudden death. Reoperation for early distal anastomotic narrowing of the pulmonary artery was necessary in seven patients. In the last 124 patients, the use of a distal anastomosis patch has eliminated this problem. Hemodynamic performance of the neoaortic valve as well as of the pulmonary valve device are excellent. Mean pressure gradient across the aortic valve is 5.8 ± 1.7 mm Hg, while across the pulmonary graft is 3.5 ± 1.1 mm Hg, without any rise up to 4 years.

Conclusions
The Matrix-P™ tissue engineered heart valve makes the Ross operation available to a wide range of patients.

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