Mid-term Results of Tissue Engineered Valvular Grafts for Pulmonary Valve Replacement in Pediatric Patients and Young Adults.

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I. INTRODUCTION

Graft degeneration is a major cause of reoperation in young patients after pulmonary valve replacement. Glutaraldehyde fixed or cryopreserved grafts lack the potential to growth. Here we present the mid-term results of implantation of tissue engineered pulmonary homografts (TEPH) compared to glutaraldehyde-fixed bovine jugular vein (BJV) and cryopreserved homografts (CH).

II. METHODS AND RESULTS:

Thirty-seven patients with TEPH in pulmonary position were consecutively evaluated during the follow-up (up to 5 years) including medical examination, echocardiography and MRI. These patients were matched according to age and pathology and compared to BJV (n=34) and CH (n=56) recipients. In contrast to BJV and CH groups, echocardiography revealed no increase of transvalvular gradient, cusp thickening or graft degeneration and normal ventricular function in DPH group during the entire follow-up. Over time, TEPH valve annulus diameters converged towards normal z values.

Five-year-freedom from explantation was 100% for TEPH; 93 ± 4% and 91 ± 4% for BJV and CH conduits respectively.MRI was performed in matched 17 recipients of DPH and 20 BJV with longer follow up (>2 years). Mean age of the patients was 12.7 ± 6.1 years old in DPH and 13.0 ± 3.0 in BJV, with a follow-up time of 3.7 ± 1.0 and 2.7 ± 0.9 years respectively. Despite lower implantation age and longer observation time, the mean transvalvular gradient was significantly lower in TEPH group (11mmHg) comparing to BJV group (23.2 mmHg). Regurgitation fraction was 14% ± 3 and 4% ± 5 in TEPH and BJV group respectively. In 3 TEPH recipients moderate regurgitation was documented postoperatively and remained unchanged during the entire follow-up.

III. CONCLUSION

Tissue engineered fresh allograft valves showed superior performance comparing to conventional homografts and xenografts and exhibited increased durability, graft remodelling and adaptive growth.