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Decellularized fresh aortic homografts for aortic valve replacement in children: Initial experience with the ARISE valve

Schmiady M.(1,3,6), Dave H. (1,3), Valsangiacomo E. (2,3), Greutmann M. (4), Santos Lopes B. (4), Kuen H.P. (5), Kretschmar O. (2,3), Hübler M. (1,3)
1 Division of Congenital Cardiovascular Surgery, University Children`s Hospital Zurich, Switzerland
2 Division of Paediatric Cardiology, University Children`s Hospital Zurich, Switzerland
3 Children's Research Centre, University Children's Hospital Zürich, Switzerland
4 Division of Grown Up Congenital Heart Diseases, University Hospital Zürich, Switzerland
5 Centre for Congenital Heart Disease, Pediatric and Adult Cardiology, Luzerner Kantonsspital, Lucerne, Switzerland
6 Department of Cardiovascular Surgery, University Hospital, Zurich, Switzerland

Introduction
Valve replacement remains the last therapeutic option for patients with severe aortic valve dysfunction not amenable for valve repair. Ross Procedure has been the preferred procedure for aortic valve dysfunction, owing to its excellent haemodynamic profile, no need for anticoagulation and a belief that it adapts with growth. Despite this, long-term results reporting significant incidence of aortic root dilatation, not so insignificant neo-aortic valve dysfunction and the newly acquired pulmonary valve disease have fueled development of alternative concepts. Decellularized fresh aortic homograft (ARISE) have been proposed as an alternative. Here, we report our preliminary results of aortic valve replacement (AVR) using ARISE valved conduits in children.
Methods
After obtaining informed consent (Sep 2016 – June 2017), 9 patients (5 male) with a median age of 8.7 years (3.1 - 18.3) underwent aortic valve replacement using ARISE valves. Median ARISE Z-value at implantation was 1.4 (-0.3 – 3.4). In three patients concomitant other procedures were performed. Echocardiography and magnetic resonance Imaging were used for pre-and postoperative evaluation. The implantation involved root replacement using proximal and distal continuous sutures and coronary button reimplantation.
Results
The handling and haemostatic properties of the ARISE valves were satisfactory. All patients survived the operation and are alive at a median follow-up of 8.1(3.5-15) months. The valves were well accepted by all recipients without clinical signs of haemolysis. All patients received acetyl salicylic acid postoperatively for one year.
Peak postoperative gradient remained stable with a median of 3.5 (2-9) mmHg at last follow-up. While 3 patients had mild neo-aortic regurgitation (AR), the remaining valves had none/trivial AR. The Z value of the ARISE valve remained stable at follow-up. Freedom from reoperation and reintervention was 100 % at a median follow-up of 8.1(3.5-15) months.
Conclusion
Initial experience with the use of the ARISE valve is promising. It has raised hopes of a viable alternative to the Ross Procedure in children. Whether this concept leads to alleviation of the early risks and long-term morbidity associated with the Ross Procedure and actually demonstrates favorable remodeling with somatic growth of the young patient is what only time will tell.