Tricuspid valve replacement with a fresh antibiotic preserved tricuspid homograft

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Abstract

Prosthetic replacement of valves in children is limited by size constraints of the prosthesis and lack of growth potential. In specific situations like infective endocarditis, valve preservation is near impossible and in such instances alternatives are hard to get. Furthermore, in the tricuspid position the long-term results of both mechanical and bioprosthesis are not optimal. We used an innovative method in a small boy with tricuspid valve endocarditis by using a tricuspid homograft in the tricuspid position.

Keywords: Tricuspid valve; Heart valve; Allograft

1. Case report

A three-year-old boy presented with recent onset dyspnea on exertion. Echocardiography showed a small perimembranous ventricular septal defect (VSD) and healed infective endocarditis of the tricuspid valve. Most of the valve leaflets were destroyed and there was severe tricuspid regurgitation. Surgery was performed through a midline sternotomy. Cardiopulmonary bypass was instituted with aorto bicaval cannulation. Right atriotomy was done and the valve leaflets were found to be severely affected by infective endocarditis (Fig. 1a) and had to be excised. The VSD was closed directly. A fresh antibiotic preserved homograft tricuspid valve obtained from a recipient heart (18 years old) (Fig. 1b), the smallest leaflet (posterior) and its subvalvular apparatus was excised and the remaining valve sutured in place with the largest leaflet oriented anteriorly. The homograft papillary muscles (two in number) were also re-implanted, one sutured to the native septal papillary muscle and another sutured to the inferior surface of the right ventricle (RV) (Fig. 2a). The site of insertion of the papillary muscle was chosen with the leaflet edge held at the level of the annulus, where the papillary muscle reached the RV free wall without tension. Intraoperative testing showed a competent valve (Fig. 2b). The valve orifice was two standard deviations (S.D.s) more than that required for the patient’s size. Postoperative echocardiography showed trivial tricuspid regurgitation. At nine months follow-up, the child is doing well with no homograft dysfunction.

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and the absence of any significant data on long-term followability, requirement for a careful technique of implantation of five more cases, respectively. Nozar and Miyagishima independently reported two and position was by Pomar and Mestres in 1993. 

Do not require anticoagulation, may have growth potential and re-operation free survival (b) Saline test showing competent homograft valve. 

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The first report of a mitral homograft in the tricuspid position was by Pomar and Mestres in 1993 [5]. Subsequently, Nozar and Miyagishima independently reported two and five more cases, respectively [6, 7]. In spite of their advantages, homograft use is limited by the lack of availability, requirement for a careful technique of implantation and the absence of any significant data on long-term follow-up of performance and outcome. The largest experience thus far has been published by Kalangos et al., who reported their experience in eight children with rheumatic tricuspid valvulopathy who underwent homograft replacement of the tricuspid valve over a period of 10 years [8]. All their patients were alive with normally functioning homografts at a mean of 56 months follow-up and none of them required re-operation for homograft dysfunction or degeneration. In Mestres’ experience in the adult population, none of the patients showed evidence of homograft degeneration at six years follow-up [9]. One of the patients in their series even underwent successful repair of the mitral homograft affected by infective endocarditis [10]. 

The technique of implantation needs careful attention. The orientation of the valve should be done properly to achieve optimal coaptation. The use of an additional ring is optional. The posterior papillary muscle should be implanted within the RV inferior wall to reduce the risk of disruption of the papillary muscle that can otherwise occur and cause acute prosthetic dysfunction [6].

3. Conclusion

Homograft valve in the tricuspid position is an attractive option in children who need replacement of the tricuspid valve. Anticoagulation can be avoided and published evidence shows that this valve does not undergo degeneration in the long run.

References