






The fate of mitral homograft valve prosthesis implanted in tricuspid position

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ABSTRACT

Tricuspid valve surgery is performed less frequently than other heart valve surgeries, and displacement constitutes a very limited portion of these surgeries. Valve selection during the replacement remains controversial. Although bioprosthetic valves are currently the most preferred prostheses, mitral homografts, which are biological materials with proven long-term durability, have also been used for this surgery. Herein, a 35-year-old male patient who underwent tricuspid valve replacement using a mitral homograft with a durability of 18 years was presented. This case highlights the first mitral homograft produced using the country's own resources and implanted in the tricuspid position.

Keywords: Cardiac valve prosthesis, homografts, tricuspid valve.

Surgery for the tricuspid valve (TV) is performed less commonly than for other heart valves. When an operation is required, annuloplasty is usually sufficient in most cases. Therefore, replacements are infrequent.

The selection of valve prosthesis for the TV position remains controversial. The need for lifelong anticoagulant therapy and the difficulty of permanent pacemaker implantation are the limitations of mechanical valves. The risk of degeneration is the only concern associated with the use of bioprosthetic prostheses. Therefore the bioprosthetic valves are the most common preferred prostheses for TV replacement (TVR).^[1] Homograft is another alternative biological solution owing to its long-term durability; however, its availability is a major limitation.

Herein, we presented a patient who underwent TVR with a mitral homograft. Additionally, this case is worth presenting, as it marks the first mitral homograft successfully implanted in the TV position produced from the country's own resources.

clinic. Echocardiography revealed severe tricuspid regurgitation secondary to rheumatic degeneration. The decision to implant a homograft was made because the patient was too young for life-long anticoagulant therapy. Homograft cryopreservation and storage were performed at our institutional homograft bank. It was 33 mm in diameter (measured by a bioprosthetic mitral valve sizer). Tricuspid valve replacement with a mitral homograft was performed using the Doty technique.^[2] Additionally, a 33-mm tricuspid ring (Carpentier-Edwards Inc., Irvine, CA, USA) was implanted for annular stabilization. Intraoperative transesophageal echocardiography showed good function of homograft leaflets without any regurgitation. The postoperative course was uneventful.

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CASE REPORT

A 35-year-old male with symptoms of right-sided heart failure was referred to our

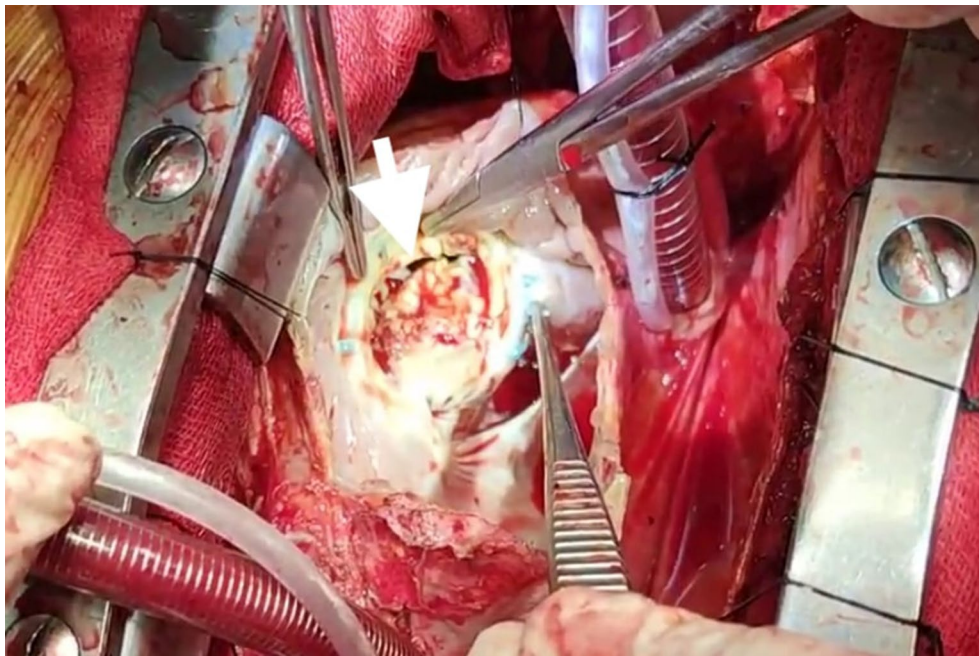


Figure 1. The picture shows a mitral homograft implanted 18 years ago. Heavy calcification is evident, and the white arrow indicates detachment from the ring that was implanted for stabilization.

The same patient was readmitted at 54 years of age with similar symptoms prior to the index operation. Transthoracic echocardiography revealed a heavily calcified homograft in tricuspid position. Severe tricuspid stenosis was detected (maximum transvalvular gradient: 20 mmHg), and the leaflets were immobile. The tricuspid ring was partially detached from the annulus.

Right atriotomy was performed after aorto-bicaval cannulation. The leaflets of the mitral homograft were heavily calcified. The homograft was dislocated anteriorly from the surrounding ring (Figure 1). The ring was explanted, and the remaining calcifications, which extended to the papillary muscles, were removed after removal of the homograft tissue. A 29-mm bioprosthetic valve (Pericarbon; Sorin Biomedica Cardio, Spa Saluggia, Italy) was implanted using 2-0 pledgetted sutures. Postoperative transesophageal echocardiography showed a maximum gradient of 3 mmHg and no regurgitation. The patient was discharged on the seventh postoperative day after an uneventful postoperative period. The patient remained in sinus rhythm. A written informed consent was obtained from the patient.

DISCUSSION

Mitral homograft implantation in the tricuspid position was first performed by Pomar et al.^[3] They reported satisfactory results of TVR in three patients with right-sided endocarditis. In the following years, similar reports showed that a mitral homograft can be an alternative biological solution for TVR in cases of infective endocarditis or degenerated prosthesis.^[4]

Mitral homograft implantation in the tricuspid position is preferred, particularly in pediatric patients, due to its growth potential, low thrombogenicity, and resistance to infection. Nozar et al.^[5] reported satisfactory results, although the surgery was challenging in two pediatric cases. To date, no significant difference in survival and thrombosis between mitral homografts and other bioprosthetic valves has been observed.

A recent study analyzing outcomes in patients under 20 years of age showed better durability, particularly after 10 years.^[6] In our case, the mitral homograft showed a durability of 18 years.

Correct positioning of the leaflets and subvalvular apparatus of the homograft and avoidance of damage to the conduction system are

crucial. Beyond the difficulty of surgical techniques, the most important issue is the limited availability of homograft valves of the desired size and time. Homografts are cost-effective and feasible when the institute has its own bank. The first homograft application in Türkiye was performed at our institution. After the establishment of the country's first tissue bank in 1994, 371 homografts were cryopreserved for 24 years, and only eight of these were mitral homografts.^[7] Three mitral homografts were sent to different centers in Türkiye after the presented case.

In conclusion, homografts have not gained widespread use due to procurement issues. Homografts appear to have high biological and clinical benefits owing to their lower thrombogenicity and higher resistance to infection than mechanical or biological prostheses. There are no solid recommendations for their use due to the lack of studies including larger number of patients and long-term follow-up. This case report offers insight into their long-term outcomes.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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