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Gasparyan Method of Total Autologous Reconstruction of the Mitral Valve: Case Report

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Abstract

In this case report we present our first clinical experience of total autologous reconstruction of the mitral valve using the technique, described in the experimental study of Dr. Gasparyan. This is a stentless, autologous valve - a very good alternative for the prosthetic valves in those cases when the mitral valve repair is not possible and its replacement is not desirable. This technique of the mitral valve reconstruction is reproducible and 3 months follow up results are encouraging.

Key Words: mitral; valve; reconstruction; mitral reconstruction; autologous pericardium

Technique

Gasparyan technique of total autologous mitral valve reconstruction was used to fix the mitral valve problem of the 56 years-old man, who refused any prosthetic valve implantation[1]. He was presented with severe rheumatic mitral stenosis (valve area = 0,9 cm2, max PG on the valve = 31 mm Hg) with heavily calcified posterior leaflet and aortic insufficiency III degree, complicated with septic endocarditis and treated with antibiotics for 2 weeks. Preoperative echocardiography showed preserved left ventricular function (EF = 64%, LVEDD = 5,64 cm, LVEDV = 156 ml, LVESV = 56,3 ml). Mitral valve templates of different sizes were prepared by our team according to Gasparyan formulas Figure 1A[1]. A piece of pericardium 8 x 10 cm was harvested after the usual median sternotomy and treated with 0,625% glutaraldehyde solution for 10 minutes. Cardiopulmonary bypass was established with aortic and bicaval cannulation. The heart was arrested in diastole by retrograde cold blood cardioplegia. The left atrium was opened through the Waterston groove and the diseased valve was totally excised. The inter-commissural distance of the mitral valve fibrous annulus was measured. Size 36 template was chosen according to the measured inter-commissural distance to tailor the pericardial valve Figure 1B. The newly created pericardial valve was inserted in the native valve position as described by Dr Gasparyan[1]. The pericardial flaps Z1 and Z2 were sutured to the both sides of the antero-lateral papillary muscle head, and the flaps Z3 and Z4 were sutured to both sides of the postero-medial papillary muscle head using two horizontal mattress sutures of 4/0 Prolene (Ethicon, Inc., Somerville, NJ, USA)Figure 1C, 1D. The leaflets were sutured to the annulus along the attachment line, using continuous suture of 4/0 Prolene. The continuity of the posterior leaflet was restored with interrupted sutures of 5/0 Prolene. Carpentier ring of corresponding size (36 mm) was implanted to stabilize the fibrous annulus. Hydraulic probe showed good coaptation of the leaflets with no regurgitant jet Figure 2A.

The aortic valve was also totally reconstructed with autologous pericardium using Dr. Gasparyan formulas for the new valve tailoring[2]. The cross-clamp time was 121 minutes and the bypass time was 180 minutes. Intra-operative TEE revealed trivial regurgitation of the newly created mitral valve. The newly created aortic valve was also competent. Patient was discharged uneventfully on 12th postoperative day. Trans-thoracic echocardiography follow-up 1 and 3 months after surgery revealed trivial regurgitation and peak gradient of 6,67 mm Hg on the newly created pericardial mitral valve Figure 2B. There was no regurgitation on the aortic valve.

Discussion

Total autologous reconstruction of the heart valves is gaining more popularity. Total reconstruction of aortic valve with autologous pericardium was reported by Dr. Duran and Dr. Ozaki[3, 4]. Both groups reported very good mid-term and long-term results. Total reconstruction of mitral valve with autologous pericardium was firstly reported by Dr. Radu Deac back in 1995[5]. He reported 26 months follow up of the 16 patients with normal function of the valves with a mean orifice area of 4,43 cm^2 and a mean valve index of 2,6 cm^2/m^2. So far this was the only clinical report of the total autologous reconstruction of the mitral valve. We report our first clinical experience of the reconstruction using Dr Gasparyan method, described in his experimental study [1]. No clinical experience of this method of total reconstruction of the mitral valve is described in the literature so far. The mitral valve repair is a method of choice for the majority of the

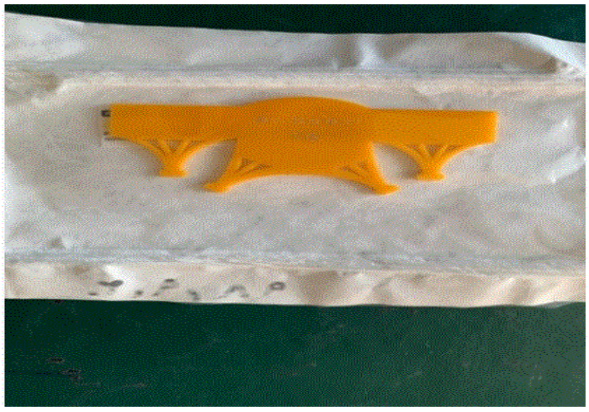

Figure 1A: Mitral valve template (size 36 mm)

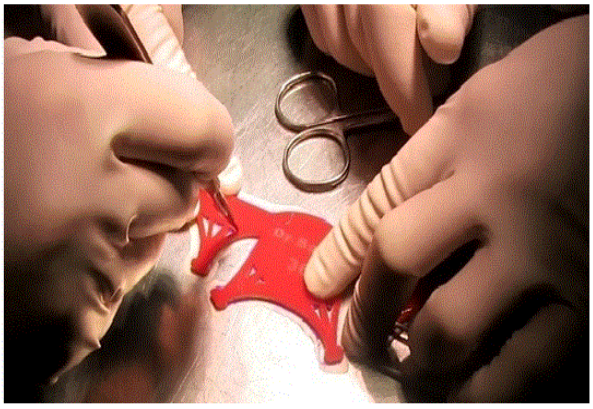

Figure 1B: Fashioning of the new pericardial mitral valve using size 36 template

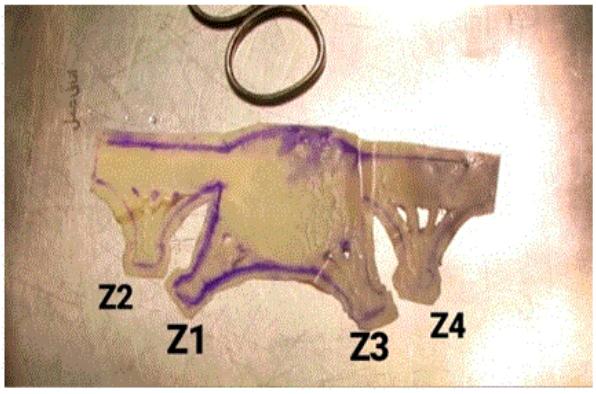

Figure 1C: Final view of the tailored new pericardial mitral valve. Pericardial flaps Z1, Z2, Z3 and Z4 are seen

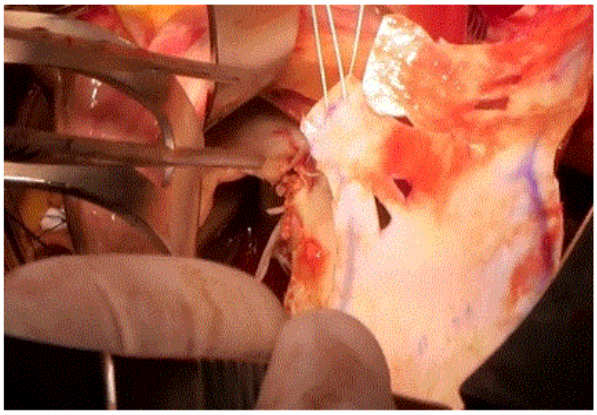

Figure 1D: Suturing of the pericardial flaps to papillary muscles is seen

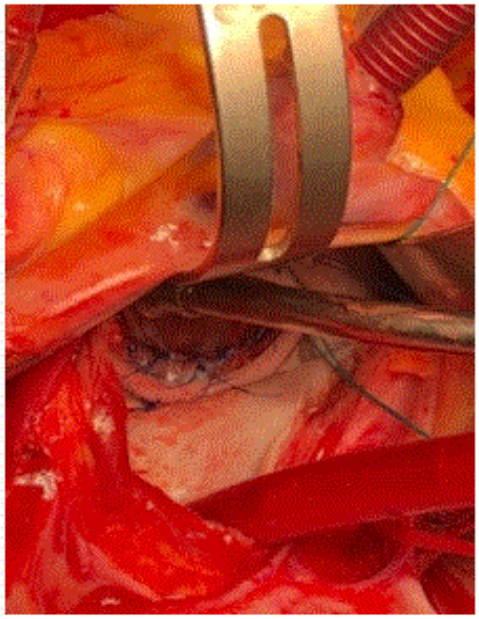

Figure 2A: Final view of the newly created mitral valve. Hydraulic probe showed good coaptation of the leaflets with no regurgitant jet

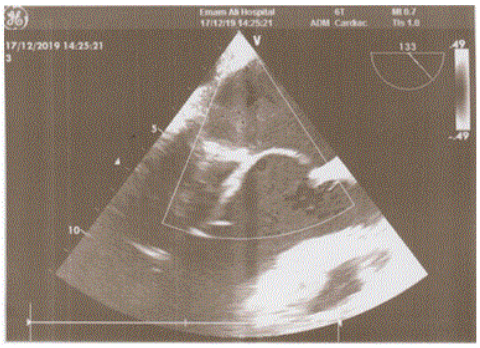

Figure 2B: Follow up echocardiography of the newly created pericardial mitral valve

cases. However, in some cases, like septic endocarditis or severe calcification of the posterior annulus, the valve repair is not possible and its replacement is not desirable, troublesome and even dangerous. Total autologous reconstruction of the mitral valve may be a very helpful option for such cases.

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