Case report

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Long-term Result of Surgical Correction of Ischemic Mitral Insufficiency in a Patient with Posterior Basal Post-Infarction Left Ventricular Aneurysm

V.A. Sapunov, S.Y. Boldyrev✉, I.P. Pavlenko

Department of Cardiosurgery No. 2

Scientific Research Institute — Ochapovsky Regional Clinic Hospital of Krasnodar Region Public Health Ministry

167 1 Maya St., Krasnodar, 350086, Russian Federation

✉ **Contacts:** Sergey Y. Boldyrev, Cardiovascular surgeon, Scientific Research Institute — Ochapovsky Regional Clinic Hospital of Krasnodar Region. Email: Bolsy@rambler.ru

ABSTRACT The article presents a long-term result of surgical correction of ischemic mitral valve insufficiency, left ventricle inferior wall reconstruction.

Keywords: left ventricular inferior wall aneurysm, ischemic mitral insufficiency, artificial chordae of the mitral valve

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Affiliations

Vyacheslav A. Sapunov	Cardiovascular surgeon, Scientific Research Institute — Ochapovsky Regional Clinic Hospital of Krasnodar Region; https://orcid.org/0000-0002-3774-1983, Sapunovva@rambler.ru; 34%, concept and design of the study, collection and processing of material, text writing, statistical processing
Sergey Y. Boldyrev	Cardiovascular surgeon, Scientific Research Institute — Ochapovsky Regional Clinic Hospital of Krasnodar Region https://orcid.org/0000-0003-3325-3146, Bolsy@rambler.ru; 33%, research concept and design, editing
Inna P. Pavlenko	Doctor of ultrasound diagnostics, Scientific Research Institute — Ochapovsky Regional Clinic Hospital of Krasnodar Region; https://orcid.org/0000-0002-1681-8371, Innulayp@yandex.ru; 33%, research concept and design, text writing

HLM – heart-lung machine
LVA – left ventricular aneurysm
PBA – posterior basal aneurysm
BW – back wall
IHD – ischemic heart disease
AC – artificial circulation
MI – myocardial infarction
EDD – End Diastolic Measurement
PA – pulmonary artery
PH – pulmonary hypertension
LV – left ventricle
LA – left atrium
MV – mitral valve
MI – mitral insuficiency
MR – mitral regurgitation
LW – lower wall
ALVF – acute left ventricular failure
FL – front leaf
HF – heart failure
EF – ejection fraction

FC – functional class
ECG – electrocardiography
EchoCG – echocardiography

INTRODUCTION

One of the most serious complications of coronary heart disease (CHD) is postinfarction left ventricular aneurysm (LVA), leading to the progression of heart failure (HF), including due to ischemic mitral insufficiency (MI), aggravating the patient's condition and the prognosis of the disease.

Among all LVA, posterior basal aneurysms of the left ventricle (PBA LV) are quite rare and occur in 5–9% of cases [1]. About half of these patients have signs of mitral regurgitation (MR) [1, 2]. The question of the tactics of surgical treatment of patients with LVA and MI is controversial and poorly understood.

The purpose of our publication is to demonstrate the long-term result of complex reconstruction of ischemic MR in combination with PBA LV plasty.

Clinical case

A 63-year-old woman was admitted to our clinic 9 years ago with a diagnosis of "Ischemic heart disease. Exertional angina pectoris of the III functional class (FC). Previous Q + myocardial infarction (MI) of the lower wall of the left ventricle (LW LV) of unknown age. Decrease in global contractility. Secondary dilatation of the cardiac cavities with the formation of an aneurysm of the lower parts of the left ventricle (LV). Insufficiency of the mitral valve (MV)". The patient was diagnosed with high pulmonary hypertension (PH), grade III arterial hypertension, risk 4, circulatory failure grade II B, FC III with attacks of acute left ventricular failure (LVF), bilateral hydrothorax and pulmonary embolism (PE) of the segmental branches on the right (likely associated with atrial fibrillation). On receipt patient has complaints of shortness of breath with minimal physical exertion, discomfort in the region of the heart. On examination, the general condition of moderate severity. From the anamnesis it is known that about a year ago there was an episode of anginal pain, which stopped on its own. The patient did not seek medical help.

On electrocardiography (ECG) cicatricial changes in the LV LW. Echocardiography (EchoCG) showed dilatation of the cardiac cavities, zones of hypokinesis with akinesis of the LV LW and interventricular septum, and a decrease in the LW ejection fraction (EF) to 35%. In the projection of the posterior wall of the left ventricle (LV) – aneurysm 4.0x5.0 cm with a thrombus measuring 3.0x3.5 cm. On MV regurgitation +++. The end diastolic volume is 180 ml, the end diastolic size of the LV is 69 mm, the pressure in the pulmonary artery (PA) is 60 mm Hg. The right heart is not dilated.

Selective coronary angiography revealed occlusion of the circumflex artery with obliterated periphery (Fig. 1, 2), no significant lesions were found in other arteries. When performing left ventriculography (Fig. 3), an aneurysm is visualized.

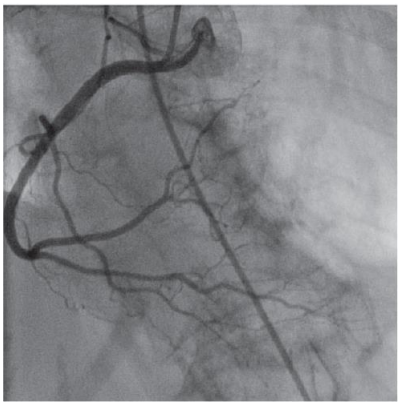

Fig. 1. Coronary angiogram of the patient (right coronary artery)

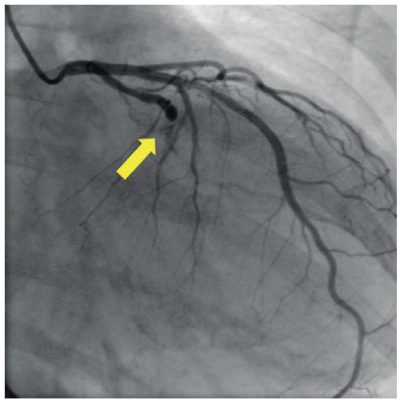

Fig. 2. Coronary angiogram of the patient (the arrow indicates the place of occlusion of the circumflex artery)

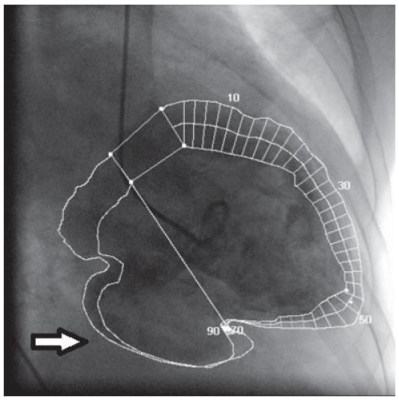

Fig. 3. Ventriculogram of the patient (the arrow indicates the posterior basal aneurysm of the left ventricle)

On August 16, 2011, a patient underwent a planned operation –- thrombectomy, plasty of the LV aneurysm with a xenopericardial patch, prosthetics of the anterior cusp (ACOn August 16, 2011, a patient underwent a planned operation - thrombectomy, plasty of the LV aneurysm with a xenopericardial patch, prosthetics of the anterior cusp (PS) chordae, implantation of the Uniring-30 support ring (Fig.) chordae, implantation of the Uniring-30 support ring (Fig. 4–7).

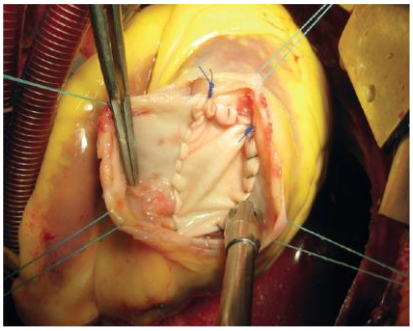

Fig. 4. Plasty of the posterior basal aneurysm of the left ventricle with a xenopericardial patch

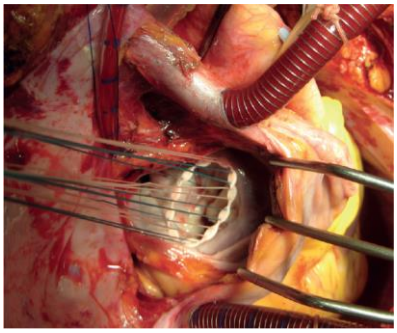

Fig. 5. Implantation of the support ring Uniring-30

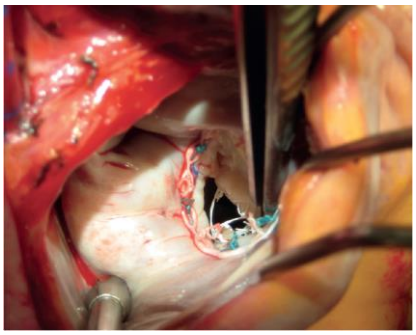

Fig. 6. Prosthetic chords of the anterior wall of the mitral valve

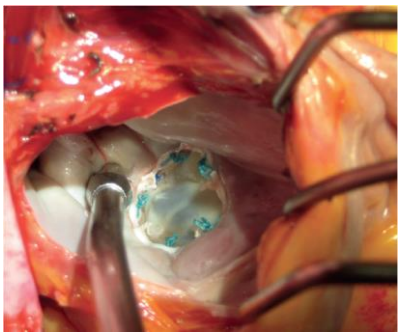

Fig. 7. Water test — coaptation is satisfactory, no regurgitation

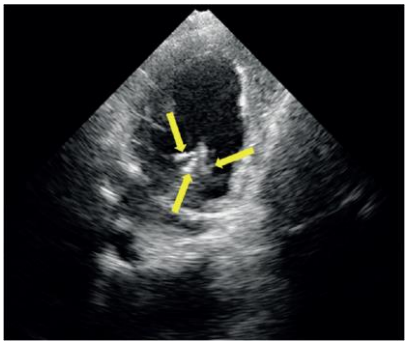

Fig. 8. Echocardiography of the patient: arrows indicate neochords of the mitral valve

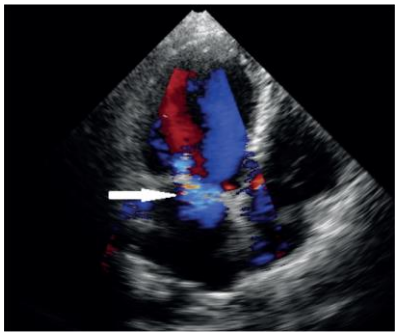

Fig. 9. Echocardiography of the patient: mitral valve regurgitation (arrow)

Features of the surgery

The access to the heart was made through a median sternotomy. Connection of a heart-lung machine (HLM) according to the "aorta-superior vena cava-inferior vena cava" scheme. Antegrade cardioplegia (Custodiol 2 l). Ventriculotomy was performed over 7 cm along the LV LW in the center of the aneurysm. Old blood clots lining the aneurysm cavity were removed. Ventriculoplasty was performed with a xenopericardium patch with 2/0 prolene suture.

Access to the MV through the left atrium according to Carpentier. During the revision, the prolapse of the anterior cusp of the MV (ACMV) into the cavity of the left atrium (LA) was revealed. A set of 4 loops with a Gore-TEX 5/0 thread 16 mm long was formed on a Teflon gasket 4x7 mm. Looped pad was implanted to the posterior medial muscle. Loops (neochord) were fixed to the PC of the MV: two loops in area A2 and 2 loops in area A3. The support ring Uniring-30 was fixed to the fibrous ring of the MV with ten U-shaped sutures. Closure of the atriotomy opening. End of cardiopulmonary bypass (CB) according to the standard technique.

Control intraoperative transesophageal echocardiography revealed residual regurgitation on the MV: at the level of 1.5+ end diastolic dimension (EDD) 59 mm. ФВ составила 42% (рис. 8, 9).

The patient was extubated 6 hours after the end of the surgery. The postoperative period was uneventful, the patient was discharged on the 12th day after surgery with regression of the heart failure clinic and an increase in exercise tolerance. At discharge on echocardiography, moderate MR (1.5+), akinesis zone in the patch area, left ventricular ejection fraction was noted — 45%.

The patient is followed up in our clinic for 9 years after the operation. During the first 5 years, according to echocardiography, no changes in the degree of regurgitation on the MV were noted, EDD 58 mm, left atrium 45–46 mm. On the 7th year of the postoperative period, an increase in MR was noted up to 2+, the pressure in the LA was 30 mm Hg., FE remained the same, about 43%. At the follow-up examination after 9 years, the patient's condition is satisfactory, no complaints. According to EchoCG data: MR 2+, average pressure gradient 4 mm Hg, LA 46 mm (in the same size, without negative dynamics), EDV 58 mm, EF remains within 42–43%, the pressure in the LA is 25 mm Hg. The hypokinesis zones are the same. The right departments are not expanded.

DISCUSSION

LV PBA resulting from transmural infarction of posterior localization due to occlusion of the right or circumflex coronary artery – a rare pathology. LW infarctions are often not diagnosed in a timely manner, patients have a blurred clinical picture, do not resort to hospitalization, and this leads in the future to the occurrence of aneurysms. However, with an increase in the number of regional vascular centers and an improvement in the provision of endovascular care, there is currently a significant decrease in the incidence of postinfarction aneurysms in general and LV PWA in particular.

At the time of the operation, in the presented case, there was a large debt in the provision of primary surgical care to patients with MI in our region. Identification of patients with LV PBA at the primary polyclinic stage is very problematic. ECG diagnostics is not very informative, mainly cardiosclerotic changes in the left ventricle PW are noted. Diagnosis of LV PBA by echocardiography is sometimes not very informative. Coronoventriculography and transesophageal echocardiography can be more accurate diagnostics [1, 3, 4]. The methods of choosing diagnostics are magnetic resonance imaging and single-photon emission computed tomography [1, 5].

The global surgical experience in the treatment of postinfarction LV aneurysms is rather controversial, especially in combination with concomitant procedures, such as correction of ischemic MI [1]. It is believed that in the presence of LV PBA of medium and large sizes (according to the generally accepted gradation) in combination with mitral regurgitation of grade 2–3, it is justified to perform simultaneous LV remodeling and correction of MI. Restoration of LV geometry with the use of a patch is associated with better hemodynamic postoperative data compared with linear plastic, demonstrating an improvement in the sphericity and functional state of the LV. Possible progression of MI in patients who underwent myocardial infarction without correction pushes surgeons to take active actions. Despite the presence of reports by some authors about a decrease in MR against the background of LV remodeling, the risk of MR return remains in such patients in the long-term period [1, 2, 5]. In the presented case, the surgeons, in addition to plasty of the LV PBA, performed a complex reconstruction of the MV. There are discussions in the surgical society regarding the choice of the method of MI correction. For the doctors of the team of the Regional Clinical Hospital No. 1 involved in cardiac surgery, the obvious advantage of plastic surgery over valve replacement is the absence of the need for lifelong intake of anticoagulant drugs, minimization of the risk of thromboembolism, and improvement in the quality of life of patients. The clinic's cardiac surgeons have performed prosthetics of the chords of the AL MV using a formed set of 4 loops with a thread Gore-TEX 5/0. The final stage was implanting a support ring Uniring-30. In the presented clinical case, we observe a persistent positive effect of the

performed operation, the result of which is the absence of signs of heart failure, complaints from the patient. After 9 years, a stable picture of intracardiac hemodynamic parameters was noted (MR 2+, mean pressure gradient 4 mm Hg, LA 46 mm, EDD 58 mm, EF remains within 42–43%, LA pressure 25 mm Hg. The zones of hypokinesis are the same, the right sections are not expanded, given the initially difficult condition of the patient, the presence of high pulmonary hypertension and PE.

CONCLUSION

The presented variant of surgical treatment, studied on echocardiography for 9 years, demonstrates an acceptable result of mitral valve reconstruction with plasty of postinfarction posteriorbasal left ventricular aneurysm.

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