AUCTORES
Globalize your Research

Journal of Clinical Research and Reports
Wiktor Budniak *

Open Access

Case Report

Surgical Treatment of Left Ventricular Pseudoaneurysm - a Case Report

Wiktor Budniak [1]*, Justyna Jaraczewska [1], Remigiusz Tomczyk [1,2]

[1]10th Military Clinical Hospital with Polyclinic in Bydgoszcz, Department of Cardiac Surgery, ul. Powstańców Warszawy 5, 85-681 Bydgoszcz, Poland.

[2]Faculty of Medicine, Bydgoszcz University of Science and Technology, Aleje Prof. S. Kaliskiego 7, 85-796 Bydgoszcz, Poland.

***Corresponding Author:** Wiktor Budniak, 10th Military Clinical Hospital with Polyclinic in Bydgoszcz ul. Powstańców Warszawy 5, 85-681 Bydgoszcz Poland.

Received date: June 12, 2025; Accepted date: June 19, 2025; Published date: June 26, 2025

Citation: Wiktor Budniak, Justyna Jaraczewska, Remigiusz Tomczyk, (2025), Surgical Treatment of Left Ventricular Pseudoaneurysm - a Case Report, *J Clinical Research and Reports*, 20(1); **DOI:10.31579/2690-1919/546**

Abstract

Left ventricular pseudoaneurysm is among the severe and rare complications of acute myocardial infarction caused by rupture of the left ventricular muscle wall with limited bleeding into the pericardium. Mortality ranges between 50-80% within a week without cardiac intervention. The absolute indication for urgent surgical treatment is hemodynamic instability, cardiac tamponade, cardiac arrest. We present the case of a 47-year-old man with a giant post-infarction left ventricular pseudoaneurysm successfully treated with cardiac surgery with good early clinical outcome.

Keywords: left ventricular pseudoaneurysm; diagnosis; surgical repair

1.Introduction

Left ventricular pseudoaneurysm is caused by a limited rupture of the left ventricular wall with extravasation of blood, leading to communication of the ventricle with the pericardium in the form of a limited aneurysm. The aneurysm sac does not contain muscle tissue, it is an organized fibrous tissue adjacent to the pericardium containing clots and communicating with the ventricle. The most common cause is myocardial infarction. Rarer causes include complications from heart surgery, chest trauma, endocarditis and the result of purulent pericarditis or tumor infiltration. It most often occurs between 5 and 10 days after myocardial infarction and often occurs after occlusion of the circumflex coronary artery. In the acute phase, it is a life-threatening condition [1, 2]. Conservative treatment leads to a 50-80% mortality rate in the first week. Early development of the aneurysm within 48 hours of myocardial infarction also reduces survival [3]. Pseudoaneurysms of the left ventricle can cause volume loading of the left ventricle or can be a source of embolism or endocarditis. The most common symptom as well as an indication for urgent cardiac intervention in left ventricular pseudoaneurysm is hemodynamic instability with features of cardiac tamponade. Other symptoms may be nonspecific and individually dependent - chest pain, shortness of breath, syncope, features of heart failure, atrial as well as ventricular arrhythmias. Embolism is rare, but can cause symptoms of stroke, myocardial infarction, limb or internal organ ischemia. The incidence of this complication is very rare and estimated to be less than 0.1% of all patients with myocardial infarction [4]. There are lots of surgical methods to treat this complication.

The aim of our work is to present a rare case of post-infarction pseudoaneurysm of the left ventricle, describe the method of its surgical treatment, and report the early results.

2. Presentation

A 47-year-old man was urgently admitted on August 1, 2024 to the Cardiac Surgery Department of the 10th Military Clinical Hospital from a Specialized Hospital in the province for cardiac treatment of a left ventricular pseudoaneurysm. Coexisting hypertension and hypercholesterolemia. Previously diagnosed and treated at the aforementioned Specialized Hospital. He suffered a NSTEMI myocardial infarction on 8/05/2024. - Coronary angiography showed bivascular disease - coronary angioplasty of the marginal branch infarct artery (OMCx) was performed (Figure 1).

Figure 1: Coronary angiogram after primary PCI OMCx before surgery treatment

Again hospitalized at the local hospital for a second stage of coronary angioplasty of the right coronary artery (RCA). On 29/07/2024, RCA PCI (CTO) was performed with implantation of 3 DES-type stents. During this hospitalization, echocardiography and ventriculography revealed a left ventricular pseudoaneurysm. Transferred to the Department of Cardiac Surgery for surgical treatment. On admission, the condition was stable, without features of heart failure. Preoperative examinations were performed in our department:

Transthoracic echocardiography dated 2/08/2024. – Enlarged left ventricle, hypertrophy of the left ventricular muscle and interventricular septum, impaired total left ventricular systolic function with LVEF of 40%, normal right ventricular systolic function, structure and function of the valves without significant deviations, in communication with the left ventricular lateral wall a pseudoaneurysm measuring 70 x 55 mm (SAX) and 71 x 58 mm (A4C) with gates of about 23 mm wide, through the gates of the aneurysm visible systolic and diastolic flow (Figure 2).

Figure 2: Echocardiography: large left ventricular pseudoaneurysm with free wall rupture

Angio CT of the chest dated 2/08/2024. – Extensive pseudoaneurysm of the anterolateral wall of the left ventricle, measuring approximately 55 x 65 x 90 mm (lumen). Heterogeneous thickness of the aneurysm wall – on the upper side thin (1-2 mm), on the posterolateral side thickened to 19-20 mm (adjacent thrombus?). Width of the aneurysm pedicle (defect in the wall of the left ventricle) – about 35x16 mm (Figure 3).

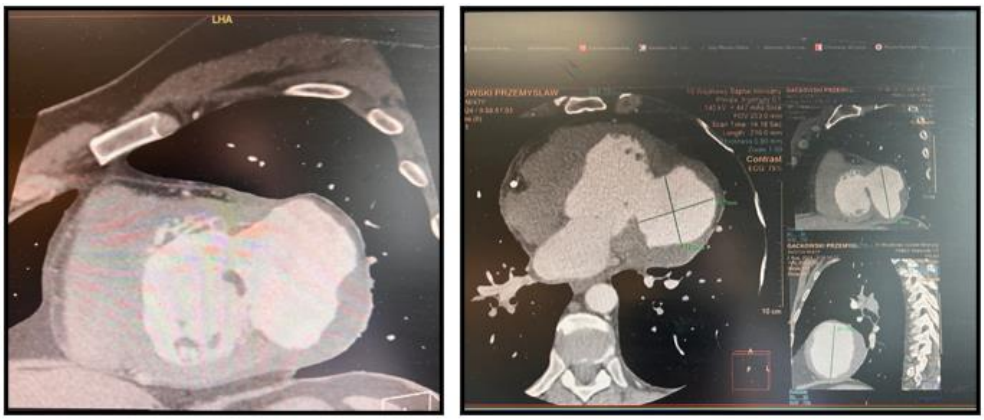

Figure 3: Chest computed angiotomography showing large left ventricular pseudoaneurysm

Surgical treatment was performed on 6/08/2024. From a median sternotomy access, massive adhesions in the heart and pericardium were visualized after opening the pericardial sac. Arterial and venous cannulation through the right femoral artery and vein. Heparin in the due dose. Extracorporeal circulation was connected. Aortic cusp, blood cardia administered once to the aortic pad. After dissection of the left ventricular pseudoaneurysm from epicardial adhesions and dissection, a wall defect measuring approximately 6x7 cm was found (Figure 4).

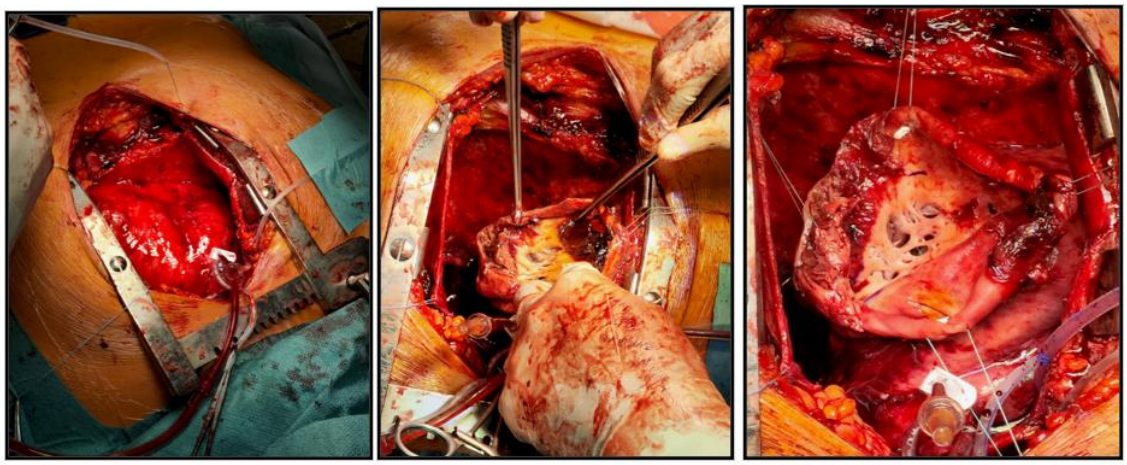

Figure 4: Intraoperative view of large left ventricular pseudoaneurysm

Illustrations of the procedure:

A dacron patch was sewn into the defect site with a 4/0 continuous suture (Figure 5).

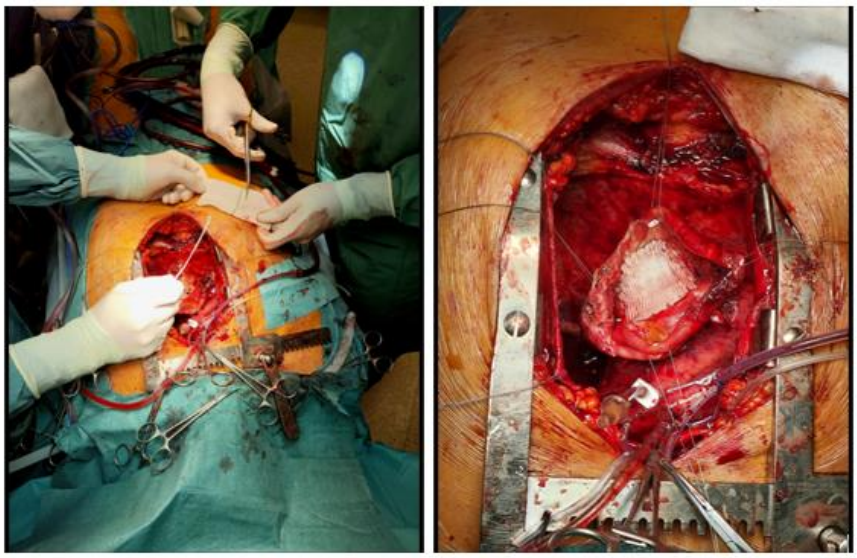

Figure 5: A dacron patch

Then covered with a bovine pericardial patch sewn with a 4/0 continuous suture (Figure 6).

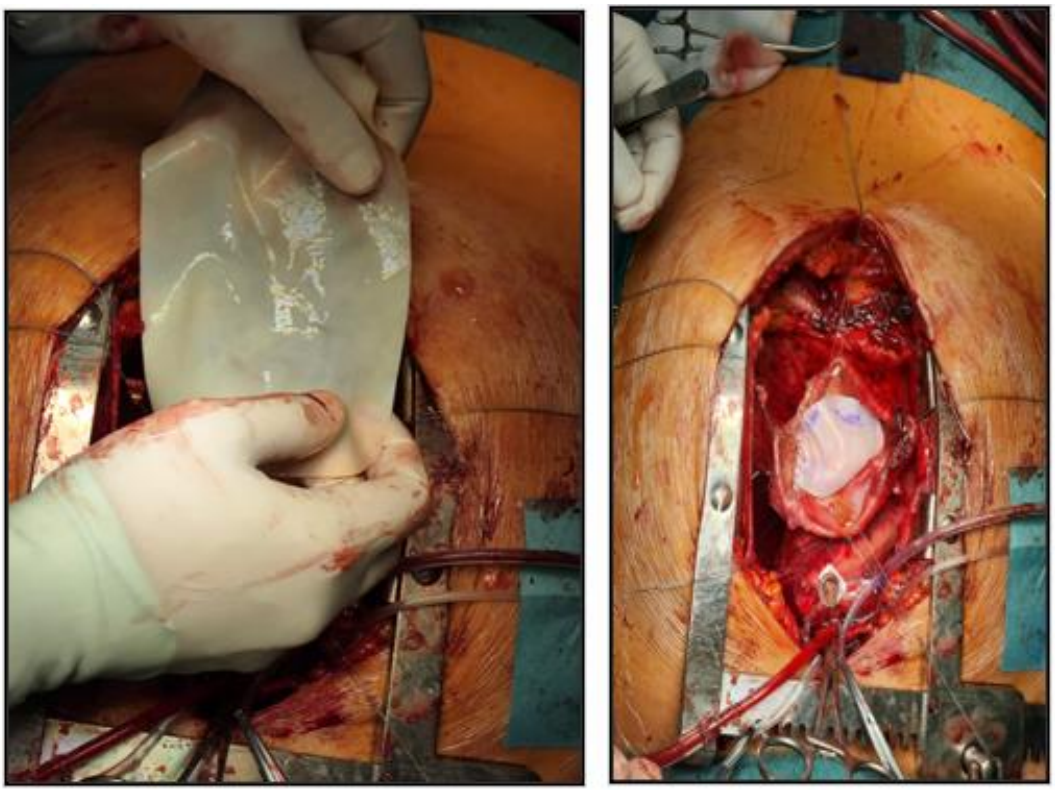

Figure 6: Bovine pericardium patch

The suture lines were reinforced with tissue glue (Figure 7).

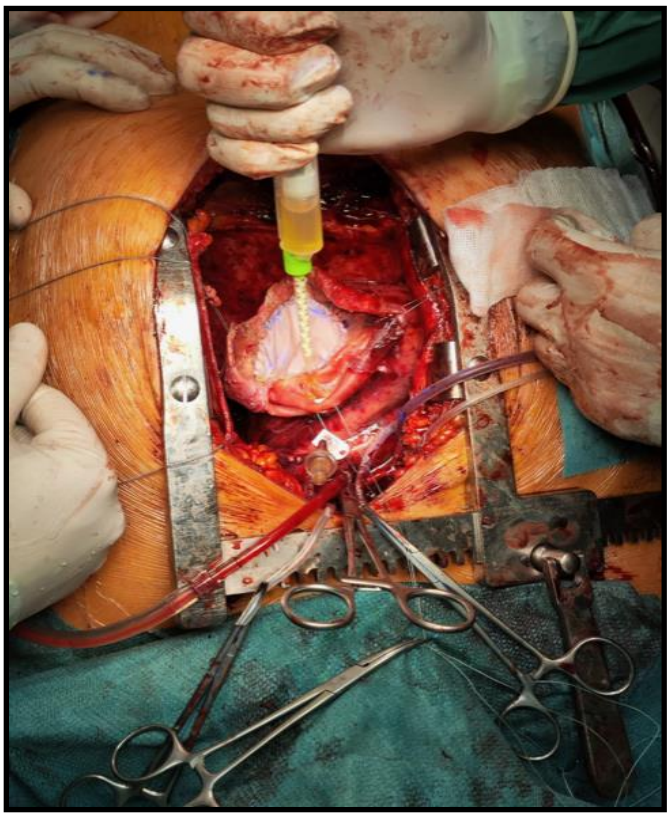

Figure 7: Surgical glue

The aneurysm sac was closed by plication with mattress sutures with two felt strips (Figure 8).

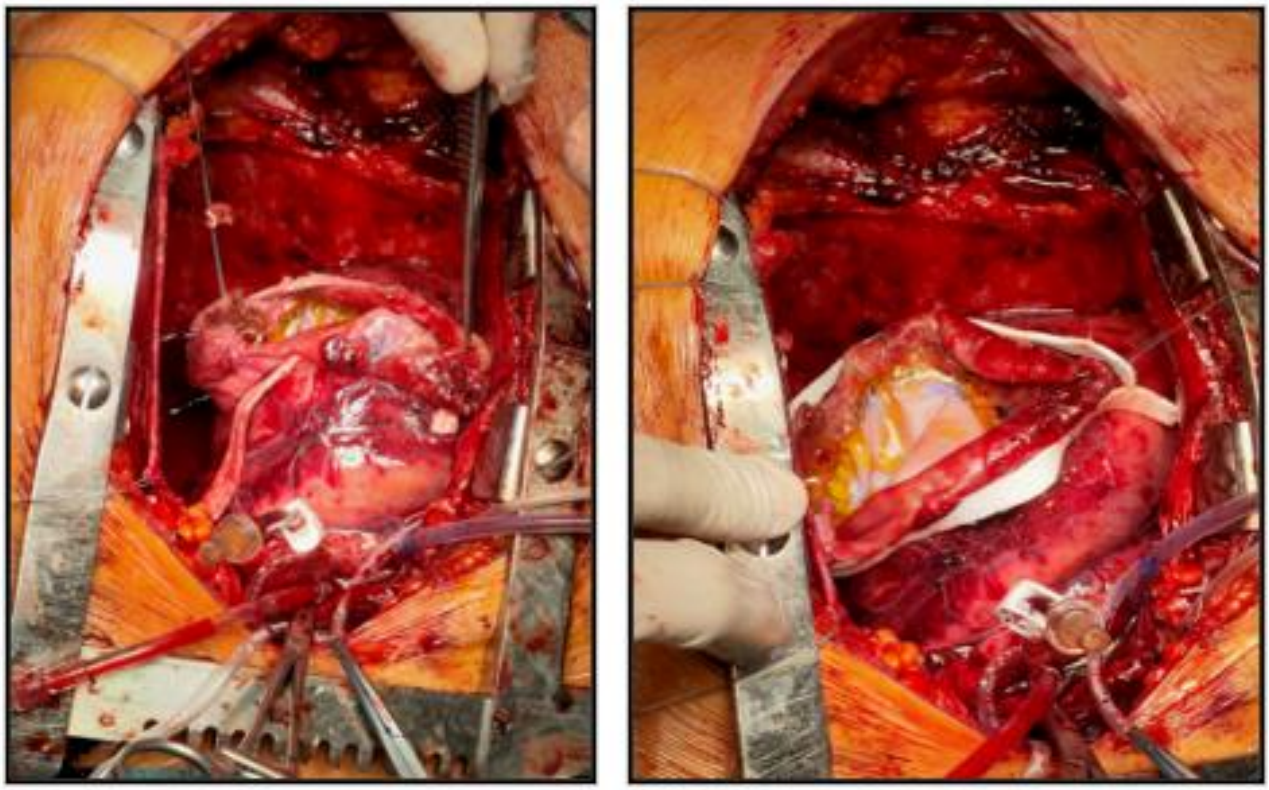

Figure 8: Plication of the aneurysm wall with a Teflon strips

The heart and aorta were ventilated. Reperfusion. Stopping and disconnecting extracorporeal circulation. Administration of protamine. Hemostasis. Drains to the mediastinum and left pleural cavity. Two epicardial electrodes were sutured. Anastomosis of the sternum with steel sutures. Layer closure of subcutaneous tissue and skin. The patient underwent standard postoperative rehabilitation. Discharged on postoperative day 7 in good condition for further cardiac rehabilitation.

Postoperative transesophageal TEE echocardiography on 7/08/2024. found - LVEF 36%, posterior wall akinesis, inferior wall hypoakinesis, anterior wall hypokinesis, lateral wall with uneven outline akinetic (dacron and bovine pericardial patch) without features of leakage on color Doppler (Figure 9).

Figure 9: Postoperative echocardiography TEE after pseudoaneurysm repair

In the post-operative follow-up in the angio CT scan of the chest on 2/12/2024. - Status post cardiacsurgery for a giant left ventricular aneurysm. Aneurysm sac filled with a conglomerate of felt measuring about 50 x 35 x 60mm, from the medial side partial inflow of blood into the residual lumen of the aneurysm, traces of shadowing blood on its external outlines. The wall of the left ventricle from the anterolateral side thin (Figure 10).

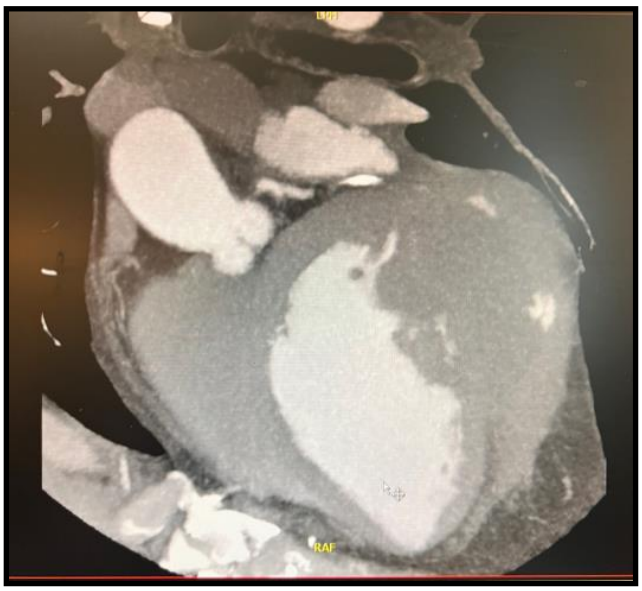

Figure 10: Postoperative control CT angio scan - closed chamber of pseudoaneurysm with trace of contrast agent

3. Discussion

The case described here concerns a patient with a complication of acute myocardial infarction in the form of a large left ventricular pseudoaneurysm. The peri-infarct patient was scheduled for two-stage invasive treatment for coronary angioplasty procedures. The aneurysm was not visualized until the 12th week after the myocardial infarction by echocardiography and ventriculography during the second stage of PCI. After final diagnosis by angio CT scan, a decision was made within the Heart Team to treat the aneurysm with cardiac surgery due to the imminent risk of rupture, tamponade and sudden death. Symptoms of an aneurysm can be nonspecific. For a long time such an aneurysm may be asymptomatic, there may be features of heart failure, hypotonia, bradycardia, chest pain, shortness of breath, arrhythmia, syncope, vomiting [1, 2, 3]. The incidence of this complication is very rare and estimated at less than 0.1% of all patients with myocardial infarction. According to the literature, as low as 0.05%, and this is most common in cases of first myocardial infarction [5].

Transthoracic echocardiography remains the primary diagnostic tool [6]. Complementary examinations for the surgical procedure allowing to provide detailed information about the left ventricular anatomy are magnetic resonance imaging (MRI), computed tomography (angioCT), and ventriculography [7, 8, 9]. Echocardiography can assess left ventricular ejection fraction (LVEF) excluding the area of the pseudoaneurysm. Cardiac MRI has higher accuracy due to its ability to use contrast enhancement and thus assess the perfusion of cardiac tissues. This makes it possible to distinguish a true aneurysm from a pseudoaneurysm, determine in detail the structures of the aneurysm under study, its contents, gates and surrounding tissues [3].

The goal of cardiac surgery is to reconstruct and restore left ventricular anatomy (volume and shape), as well as function (exclusion of akinetic segments of myocardium), thereby avoiding progressive dilatation and rupture of the aneurysm [10]. The surgical technique must be tailored to the patient, taking into account the size and shape of the aneurysm, location, size of the gate, relationship to the mitral valve and interventricular septum, with possible simultaneous revascularization of the myocardium. Rupture of a pseudoaneurysm can affect 30-45% of all cases and usually ends in death [1, 2].

Surgical treatment methods are based on various techniques for closing the aneurysm gates. Teflon/dacron patches, bovine pericardium patches, tissue plication, biological tissue glue as reinforcement of the above are used. The oldest method is the so-called Cooley plication, in which the resection of the aneurysm is followed by approximation of the edges of the healthy left ventricular muscle with single mattress sutures reinforced with dacron patches, with sealing of the edges with continuous sutures. Aneurysmectomy by Jatene s'method - plication with mattress sutures of the muscular septum involved in the aneurysm, crinkle suture to reduce the deformation of the left ventricular wall, restoration of the shape of the left ventricle with strips/flaps. The endoaneurysmoraphy method (the Dagett, Dor and Cooley technique) - sewing a patch on the left ventricular side at the aneurysm gate, excising the excess aneurysm wall, and plicating the remaining edges of the aneurysm with patches - allows reconstruction of the left ventricle with restoration of its geometry [1, 2, 10, 11, 12].

Cardiac surgery has been shown to be superior to conservative treatment in both acute and chronic cases. Aneurysm repair improves ejection fraction, reduces end-diastolic and end-systolic volumes, improves diastolic filling, left ventricular diastolic compliance, contractility and performance. It is difficult to determine whether the size of a left ventricular pseudoaneurysm is related to the risk of rupture, and which features are associated with a higher risk of rupture and serious complications [1, 2].

The in-hospital mortality rate is 5-7% [1]. The most common cause of in-hospital mortality is left ventricular failure concerning 64% of deaths. In addition, risk factors for in-hospital mortality include old age, incomplete revascularization, LVEF less than 20-30%, simultaneous mitral valve replacement, preoperative cardiac index (CI) less than 2L/min, mean pulmonary artery pressure greater than 33mmHg, and creatinine level greater than 1.8mg/dl. The 5-year survival rate is as high as 80% [2]. Studies show improved quality of life with symptom reduction compared to the preoperative clinical picture. Because it is a rare type of complication, there is a lack of clear evidence and standards of management. Important therapeutic decisions should be made within the Heart Team.

4. Conclusions

We believe that the surgical method used is safe and effective, which is confirmed both in imaging studies and the clinical condition of the patient. This is a method used individually for a specific case. Cardiac surgery surpasses the effect of conservative treatment. The final decisions are made by Heart Team.

5. Disclosures

The authors report no conflict of interest.

References:

1. Kouchoukos NT (eds.). (2003). Left Ventricular Aneurysm. In: Kirklin/Barratt-Boyce Cardiac Surgery. Third Edition. Churchill Livingstone, 437-455.
2. Glower DD, Lowe JE. (2008). Left Ventricular Aneurysm. In: Lawrence H. Cohn (eds.). Cardiac Surgery in the Adult. Third Edition. McGraw-Hill, 803-821.
3. Barbosa RR, Sassine AM. (2021). Surgical Treatment of Chronic Giant Left Ventricular Pseudoaneurysm. *Case Rep Cardiol*. 2021:4308690.
4. Solomakhina N, Lishuta A. (2023). Giant Left Ventricular Pseudoaneurysm in a 79-Year-Old Female Patient: Diagnostic and Management. *Acta Med Indones.* 55(1):70-77.
5. Mujanovic E, Bergsland J. (2014). Surgical treatment of left ventricular pseudoaneurysm. *Med Arch*. 68(3):215-217.
6. Kjeld T, Hassager C. (2009). Ruptur af fri venstre ventrikelvaeg, septum og papillaermuskler ved akut myokardieinfarkt [Rupture of free left ventricle wall, septum and papillary muscle in acute myocardial infarction]. Ugeskr Laeger.171(23):1925-1929.
7. Kaur N, Panda P. (2021). Left ventricular pseudoaneurysm: imaging. *BMJ Case Rep*. (6):e243913.
8. Faustino M, Ranchordás S. Left ventricular pseudoaneurysm - a challenging diagnosis. *Rev Port Cardiol.* 35(6):373.e1-6.
9. Sharma RK, Gore R. (2014). Diagnosis of left ventricular pseudoaneurysm by cardiac CT angiography. *J Cardiovasc Comput Tomogr*. 8(3):246-247.
10. Kim SJ, Kim KH. (2004). Surgical Repair of Postinfarction Left Ventricular Pseudoaneurysm. *Tex Heart Inst J*.51(2):e248405.
11. Blażejewski J, Sinkiewicz W. (2012). Giant post-infarction pseudoaneurysm of the left ventricle manifesting as severe heart failure. *Kardiol Pol.* 70(1):85-87.
12. Cooley DA. (1989). Ventricular endoaneurysmorrhaphy: a simplified repair for extensive postinfarction aneurysm. *J Card Surg*.4(3):200-205.

DOI:10.31579/2690-1919/546