

Contained Cardiac Rupture: An Autopsy Case

Heena M. Desai and Gayathri P. Amonkar

Department of Pathology, T.N. Medical College and B.Y.L. Nair Charitable Hospital, Mumbai Central, Mumbai, India

ABSTRACT

Rupture of the myocardium due to myocardial infarction is often fatal but when such patients survive, they present with a pseudoaneurysm where the defect is sealed by the pericardium preventing the complete rupture. This is described as a '*contained myocardial rupture*'. We describe here a case of left ventricular contained myocardial rupture following an acute myocardial infarction. [Indian J Chest Dis Allied Sci 2013;55:163-165]

Key words: Myocardial infarction, Pericardial fibrosis, Pseudoaneurysm.

INTRODUCTION

Rupture of the myocardium occurs in 2.4% cases of acute myocardial infarction and is often associated with catastrophic haemodynamic sequelae.¹ Usually, it is fatal accounting for 10% to 20% of total deaths but when such patients survive, they present with a pseudoaneurysm where the defect is sealed by the pericardium, preventing a complete rupture. This has been described as a '*contained myocardial rupture*'. We describe here a case of left ventricular contained myocardial rupture following an acute myocardial infarction.

CASE REPORT

A 55-year-old female presented with complaints of onset of acute chest pain and died within one hour of admission to the hospital. At autopsy, the heart weighed 550g and was enlarged and globular with a blunted apex (Figure 1). The pericardium was adherent to the left ventricular wall and showed layering of blood within the fibrotically thickened pericardium and hematoma formation that was suggestive of contained myocardial rupture (Figure 2). Transverse sections of the left ventricle showed a thinned out anterolateral wall with transmural acute myocardial infarction. The left anterior descending and left circumflex arteries showed 100% atherosclerotic narrowing. Aorta showed

grade VI atherosclerosis. The upper lobe of left lung showed an area of haemorrhagic infarct.



Figure 1. Gross photograph of the heart showing enlarged, globular heart with blunted apex and adherent pericardium.

On microscopic examination of the heart, the pericardium was thickened with large areas of haemorrhage and granulation tissue composed of proliferating capillaries, fibroblasts and mixed inflammatory infiltrate. The myocardium showed a large area of coagulative necrosis with mixed inflammatory infiltrate comprising of lymphocytes, polymorphs and plasma cells confirming the diagnosis of an acute myocardial infarction (Day 3-7). The endocardium was fibrotically thickened.

The lung on microscopic examination showed a large area of haemorrhagic infarct with occasional

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Correspondence and reprint requests: Dr Heena M. Desai, Assistant Professor, Department of Pathology, T.N. Medical College and B.Y.L. Nair Charitable Hospital, Dr A.L. Nair Road, Mumbai Central, Mumbai, India; E-mail: drheena81@gmail.com and gpamonkar@hotmail.com



Figure 2. Transverse section of the left ventricle showing adherent pericardium with layering of blood within the fibrotically thickened pericardium and hematoma formation.

vessel showing fibrin thrombus. The final cause of death was reported as acute myocardial infarction and pulmonary infarction with thromboembolism.

DISCUSSION

Approximately 60% of cases of myocardial rupture occur after an anterior wall transmural myocardial infarct.¹ The risk factors for a cardiac rupture include elderly patients, female sex, sixth decade of life, pre-existing systemic hypertension, absence of previous episode of angina pectoris or infarction, symptoms of pericarditis, ST-T wave changes, peak values of creatine kinase-MB fraction more than 150 IU/L, absence of a mural thrombus, absence of collateral vessels in the area of infarction, and therapy in the form of thrombolysis given more than seven hours after the onset of chest pain.³ The pathophysiological mechanisms of rupture include leucocyte infiltration, apoptosis of myocytes and increased activity of matrix metalloproteinases that depend on the time of occurrence of the rupture.⁴

A left ventricular contained rupture is a sub-acute pathological condition between free rupture into the pericardial space and a pseudoaneurysm. A left ventricular diverticulum is a very rare condition in adults but is commonly seen in children and can mimic a pseudoaneurysm.⁵ A pseudoaneurysm is an uncommon complication of acute myocardial infarction where the rupture is contained by the overlying pericardium or the epicardial wall.² It commonly occurs after acute myocardial infarction but it has also been reported to occur after chest trauma, cardiac surgery and endocarditis.²

Patients with acute cardiac rupture can present with a sudden onset chest pain with death within a few minutes whereas cardiac tamponade can occur when the presentation is sub-acute. A

pseudoaneurysm can develop with a chronic left ventricular free wall rupture.⁴

The location of the pseudoaneurysm is usually related to its cause, e.g. in the inferior or posterior wall after myocardial infarction, in the posterior subannular region of the mitral valve after mitral valve replacement, in the subannular region after aortic valve replacement and in the right ventricular outflow tract after complex congenital heart disease.⁶

It has been suggested that pericardial adhesions in the ruptured area or minimal slow extra-cardiac leaks can result in inflammation and adhesions of the pericardium leading to subsequent cardiac rupture.⁶ When myocardial infarction occurs, complete rupture is prevented by the pericardial fibrous symphysis and an aneurysmatic sac is formed.²

There are four morphological patterns of cardiac rupture classified as, Type I to Type IV. In the first two types, there is little-to-extensive bloody infiltration of the myocardium. Types III and IV ruptures are usually grouped together as pseudoaneurysms in which there is a dissection of the myocardial layers sparing the epicardium or the visceral pericardium, the orifice of the rupture being protected by fibrosis or a thrombus.^{7,8}

Most cases of cardiac rupture and pseudoaneurysm occur within three to six days of acute myocardial infarction and most present with symptoms of heart failure. Pseudoaneurysm may lead to a fatal rupture after an acute myocardial infarction. The post operative mortality is in the range of 13% to 29% after surgical repair of left ventricular pseudoaneurysm.⁹ However, one should always weigh the advantages of surgery over conservative management. Echocardiography can be used as a mode of investigation for the diagnosis of pseudoaneurysm, since timely diagnosis and early surgical repair are required as soon as possible to avoid the risk of fatal rupture.

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