Case Report

A Rare Case of Left Ventricle Free Wall Rupture at two sites Secondary to Myocardial Infarction: An Autopsy Case

Mayank Kishore chand[1], Pankaj Sahu[2], Niranjan Kumar Gunjan[3], Nikhil Mehta[4]

[1]Postgraduate Student, [2]Postgraduate Student, [3]Associate Professor, [4]Assistant Professor, Department of Forensic Medicine and Toxicology, VCSGGIMS&R Srikot, Srinagar, Uttarakhand.

How to cite this article: Mayank Kishore chand, Pankaj Sahu, Niranjan Kumar Gunjan et. al. A Rare Case of Left Ventricle Free Wall Rupture at two sites Secondary to Myocardial Infarction: An Autopsy Case. Medico Legal Update / Volume 24 No 1, January-March 2024.

Abstract

Background: About 40–50% of occurrences of sudden death are due to cardiovascular reasons, with acute myocardial infarction (AMI) being the most common cause.

Case Details: The subject was 57 years male having alleged history of sudden fell down at his house and was unresponsive since then. He was brought to the Emergency Department of H.N.B Base hospital Srinagar, Garhwal, Uttarakhand.

Autopsy Findings: On opening pericardium, 190 grams of clotted blood was present in the pericardial cavity. Grossly enlarged heart. Weight of heart: 560 grams. Epicardial fat covers approx. 2/3rd of the heart's surface. It is present over the right ventricle especially along the right border, anterior surface and at the apex and along the distribution of coronary arteries.

Discussion: A myocardial rupture is the rupturing of one or more heart valves, the papillary muscles or chordae tendineae, the interatrial or interventricular septum, or the ventricles or atria of the heart.

Keywords: Sudden natural death, Left ventricular wall rupture, Cardiac tamponade.

Introduction

About 40–50% of occurrences of sudden death are due to cardiovascular reasons, with acute myocardial infarction (AMI) being the most common cause[1]. Harvey originally documented free wall rupture of the heart following an acute myocardial infarct in 1647.[2] Duaine also concluded that a cardiac rupture never happened spontaneously after publishing the first significant series of individuals with the condition in 1871[3,5]. It has been reported that following an acute myocardial infarction, the incidence of cardiac rupture varies between 1% and 3%. In patients with acute myocardial infarction, myocardial rupture is the second most frequent cause of hospital death. Ventricular rupture, a rare but deadly consequence of acute myocardial infarction (AMI), accounts for up to 15% of all AMI-related early fatalities in patients[4]. With the development of pharmacological therapy and immediate primary coronary intervention,

Corresponding Author: Nikhil Mehta, Assistant Professor, Department of Forensic Medicine and Toxicology, VCSGGIMS & R Srikot, Srinagar, Uttarakhand.

E-mail: drnikhilmehtamd@gmail.com

Mobile: 9463233470

Submission date: December 9, 2023 **Revision date:** Dec 22, 2023 **Published date:** Feb 14,2024

the frequency of cardiac rupture following acute myocardial infarction has declined throughout the previous 20 years. A myocardial infarct or blunt chest trauma are linked to the majority of cardiac rupture cases in which the pericardium is unharmed. An uncommon discovery like the reason of death can only be found by meticulous dissection and observation during the autopsy.

Case Details

The subject was 57 years male having alleged history of sudden fell down at his house and was unresponsive since then. He was brought to the Emergency Department of H.N.B Base hospital Srinagar, Garhwal, Uttarakhand, where he was declared brought dead. Police made an inquest as it was a case of sudden death and referred for medico-legal autopsy to the mortuary wing of Department of Forensic Medicine and Toxicology, VCSG Govt. Medical Science & Research Institute Srikot, Srinagar (PauriGarhwal) Uttarakhand.

Autopsy Findings

i. **External Examination:** The dead body of the subject was moderately built and well nourished, measured 179 cm and weighed 91.4 kg. On examination rigor mortis was present all over the body, hypostasis was present over the back except over pressure areas and fixed, pupils were bilaterally dilated and fixed. No external ante-mortem injury was present over the body after careful examination.

ii. **Internal Examination**

- On opening pericardium, 190 grams of clotted blood was present in the pericardial cavity.
- Grossly enlarged heart. Weight of heart: 560 grams. Epicardial fat covers approx. 2/3rd of the heart's surface. It is present over the right ventricle especially along the right border, anterior surface and at the apex and along the distribution of coronary arteries.
- Left ventricle was hypertrophied. Thickness of the left ventricle wall was 2.9 cm and right ventricle was 1.1 cm.
- Two lesions were present on gross examination. (a) Rupture of anterio-lateral free wall of left ventricle, measuring 03cm x 0.5cm x cavity deep, associated with extravasation of blood in surrounding area was present, over the middle 1/3rd portion of left surface of the heart, situated 04cm above the apex. (b) Rupture of anterio-lateral free wall of left ventricle, measuring 1.2cm x 0.5cm x cavity deep, associated with surrounding dark mottled area was present over the middle 1/3rd portion of left surface of heart, situated 1.2cm lateral from previous rupture.
- Coronaries were gritty on cut section. Left anterior descending coronary artery was almost completely occluded, in its proximal epicardial course & 50-60% occlusion of Left circumflex artery and right coronary artery was patent.

iii. The cause of death in this case was opined as complications of myocardial infarction.

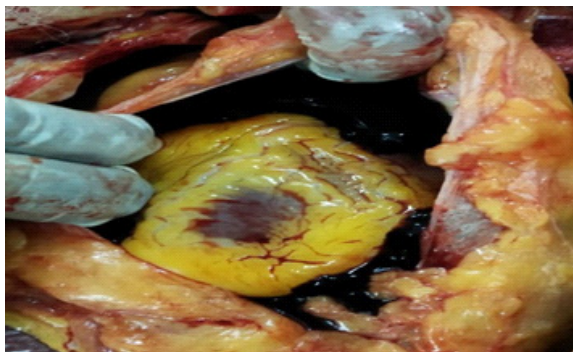

Figure 1: Clotted blood in the pericardial sac

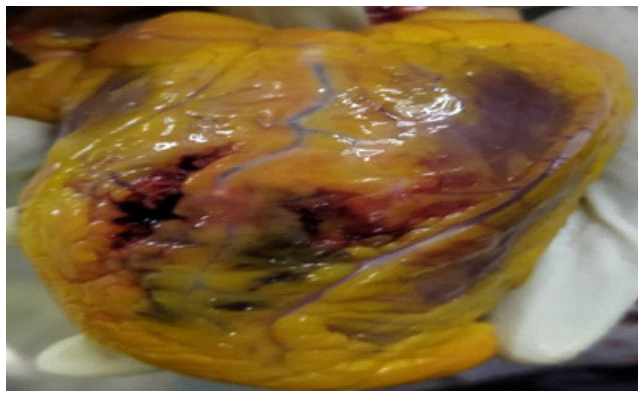

Figure 2: Ruptured left ventricle wall

Figure 3: occluded LAD

Discussion

A myocardial rupture is the rupturing of one or more heart valves, the papillary muscles or chordae tendineae, the interatrial or interventricular septum, or the ventricles or atria of the heart. The myocardium becomes necrotic and subsequently inflamed, which leads to the cardiac rupture syndromes. Myocardial ruptures are categorized as follows: Type I: a slit-like tear that happens 24 hours after an acute myocardial infarction. b) Type II: This kind of myocardial erosion usually happens 24 hours after the myocardial infarction and is indicative of a slow tear of the dead myocardium. c) Type III ruptures are distinguished by the early development of an aneurysm and the aneurysm's subsequent rupture.The area of the heart that has ruptured determines the anatomic classification of myocardial rupture.

Depending on which part of the heart has ruptured, myocardial rupture is classified anatomically. The most frequent type is rupture of the ventricular free wall, which can result in hemopericardium and cardiac tamponade. 2) Ventricular septal rupture (less common), which results in acute ventricle-to-right shunting and an acute VSD. 3) Rupture of the parietal muscle (less frequent), which causes an abrupt onset of severe mitral regurgitation. When coagulative necrosis, neutrophil infiltration, and myocardial connective tissue lysis have weakened the infarcted myocardium, free-wall rupture is most common 3 to 7 days after myocardial infarction (mean, 4 to 5 days; range, 1 to 10 days). The most typical location for post-infarction free-wall rupture, as in our case, is the anterolateral wall at the mid-ventricular level[4].

Conclusion

In cases of unexpected, suspicious, or unnatural deaths, a medico-legal autopsy is performed. Ventricular free wall rupture at two sites as a complication of AMI is a rare cause of sudden death, even though AMI is the most common cause. Finding such a rare finding could direct and assist in the implementation of preventative measures to preserve the lives of those with any history of AMI, even if the condition is clinically ignored. To determine the cause of death, a thorough autopsy examination and careful dissection are therefore necessary.

Financial support and sponsorship: Nil

Conflicts of interest: There are no conflicts of interest

Informed consent: Not applicable as it is medicolegal autopsy based case where subject confidentiality was maintained.

Ethical clearance: taken from institutional ethical committee

References

1. Antman EM et al. Myocardial infarction: Management in Braunwald's Heart Disease, 9th Ed, RO Bonow et al.
2. Harvey W. The Works of William Harvey, MD. Sydenham Society; 1847.
3. Matteucci M, Fina D, Jiritano F, Meani P, Blankesteijn WM, Raffa GM, Kowaleski M, Heuts S, Beghi C, Maessen J, Lorusso R. Treatment strategies for post-infarction left ventricular free-wall rupture. European Heart Journal: Acute Cardiovascular Care. 2019 Jun;8(4):379-87.
4. Kumar PV, Begum T. Cardiac Tamponade due to Myocardial Rupture-a Case Report. Indian Journal of Forensic Medicine & Toxicology. 2016 Jan 1;10(1).
5. Daş T, Buğra A. Pathological View of Cardiac Rupture and Myocardial Infarction. COMPREHENSIVE MEDICINE. 2022;14(1):85-90.
6. Pollak H, Nobis H, Mlczoch J. Frequency of left ventricular free wall rupture complicating acute myocardial infarction since the advent of thrombolysis. The American journal of cardiology. 1994 Jul 15;74(2):184-6.