Sudden Death Due To Rupture Pseudoaneurysm : A Rare Case

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Abstract

Rupture of ventricular pseudoaneurysm (PSA) as a complication of Acute myocardial infarction is a rare cause of sudden death. PSA may lead to fatality by rupture /thromboembolism, the force of myocardial contraction leads to rupture. We discuss here a case of such sudden death which resulted out of such a rare condition. A person died within 2-3 hours of chest pain during referral without investigation and treatment. On autopsy rupture of pseudoaneurysm was detected on the posterolateral wall of left ventricle. We intend to discuss the findings of this rare case and through light upon the importance of regular treatment to avoid such complications.
Introduction

As per WHO death is said to be sudden or unexpected if a person not known to have been suffering from any dangerous disease, injury or poisoning is found dead or dies within 24 hours after the onset of terminal illness. [1] Among the leading natural causes of sudden death, cardiovascular system accounts for about 45-50% cases out of which Acute Myocardial Infarction (AMI) is leading entity [2].

A pseudoaneurysm of the left ventricle is a potentially lethal complication from a myocardial infarction. A pseudoaneurysm, also known as a false aneurysm, is a hematoma that forms as the result of a leaking hole in an artery. This hematoma forms outside the arterial wall, so it is contained by the surrounding tissues. Also it must continue to communicate with the artery to be considered a pseudoaneurysm.[3] A pseudoaneurysm may also occur in a chamber of the heart following myocardial damage due to ischemia or trauma. A pseudoaneurysm is a contained rupture of a blood vessel or of the myocardial wall. Typically, pseudoaneurysms will have to-and-fro blood flow into a cavity contained by pericardium, thrombus, or adhesions. This contrasts with a true aneurysm that forms as a result of a weakness rather than a rupture of the wall that typically bulges outward during systole, is thin, and has an outer layer that contains all layers of the myocardium or vessel wall. A pseudoaneurysm will typically have a narrow neck, with a ratio of the breach in the wall to the maximal diameter of the pseudoaneurysm of <50%. In contrast, a true aneurysm has a broad base[4].

Patients with cardiac pseudoaneurysm often present with symptoms of chest pain or heart failure. If the rupture is not entirely contained or a previously contained pseudoaneurysm ruptures, a patient may present with tamponade, shock, or sudden death. Here we discuss such a rare case and its findings.

Case Report

An average built male aged about 54 years was brought to emergency Department of S.C.B. Medical College being referred from peripheral hospital and was declared brought dead. An inquest was conducted by the police as it was a case of sudden death. Autopsy was conducted in the mortuary of Department of Forensic Medicine and Toxicology. The deceased was working as a daily laborer and while doing some strenuous work he suddenly complained of chest pain & sweating. Thereafter he pinned to the ground, so the other co-workers carried him to the nearest CHC where the doctor referred him to the SCB MCH suspecting a cardiac problem. He died on the way. On further inquiry the relative mentioned that prior to the mishap the deceased was suffering from fever since 4 to 5 days, so also it is ascertained that he was irregularly attending the hospital for treatment since many a days.

External examination: The subject was average body built, moderately nourished, medium complexioned, face appeared congested, eyes were closed, cornea hazy, conjunctiva congested, pupil bilaterally dilated and fixed, mouth was closed and tongue inside, nail beds were pale, rigor mortis was present all throughout the body, post mortem lividity was present in the back, all natural orifices were intact and free. No external injury could be detected on the body.
Internal examination: The scalp and skull were intact. Brain substance was intact & congested. Pericardial sac was full of clotted blood about 700 grams. After opening the cavity, blood was drained and heart was examined thoroughly. The epicardial surface revealed fibrous deposits over its entire surface. A mass like lesion was found protruding from the posterolateral wall of the left ventricle. [Fig.: 1] There was a raw area at its apex with rupture which was the source of bleeding. It was bluish grey in colour and measured 4cm x 3cm. At the raw area, edges of the nick appear to be collapsed. On dissection it was connected to left ventricle through a narrow neck. [Fig.: 2] There was left ventricular hypertrophy, AV, semilunar valves appeared normal. The lungs were intact and congested. The stomach was intact and contained yellowish coloured semidigested food material about 50 grams, Mucosa was congested and there were minimal submucosal haemorrhages.

The cause of death was certified as “due to cardiogenic shock as a result of cardiac tamponade consequent to rupture of ventricular pseudo aneurysm secondary to CIHD and atherosclerosis.

Discussion

LV pseudoaneurysm is a rare complication that is reported in less than 0.1% of all myocardial infarction patients. It is catastrophic causing death in 48% of patients without surgical intervention [5]. The most common site of cardiac pseudoaneurysm is the left ventricular myocardium after a myocardial infarction. Other cardiac sites include the mitral-aortic intervalvular fibrosa[6] the right ventricular outflow tract, native and grafted coronary arteries and the atria. Less commonly, blunt or penetrating trauma may cause pseudoaneurysm. Finally, although rare, reported complications of radiofrequency ablation procedures have included both atrial and ventricular pseudoaneurysms.[6]

As per Frances et al most common etiology of LV pseudoaneurysm is myocardial infarction followed by cardiac surgery. The risk factors for the LV pseudoaneurysms are older age, female sex, hypertension and inferior and lateral wall myocardial infarction. The common location for LV pseudoaneurysm is postero-inferior followed by postero-lateral and anterior, in contrast to true LV aneurysm which is more commonly located in the anterior and apical walls. However, prompt diagnosis is essential as LV pseudoaneurysm is associated with a cardiac rupture risk of 30%-45%. [7]

Initial evaluation is done by transthoracic echocardiography; it helps in diagnosing LV pseudoaneurysm and also in determining the infarction. A ratio of < 0.5 between the width of the neck and the maximal internal diameter of the aneurysmal sac[8] or the presence of bidirectional turbulent flow through the neck by color and pulsed Doppler study[9]. Distinguishing true from false aneurysms has clinical relevance because a patient with pseudoaneurysm will have a greater risk of rupture and should thus be considered for immediate repair. Transesophageal echocardiography, cardiac CT, and cardiac MRI will have a higher diagnostic yield.

Normal pericardial fluid is upto 50 ml of serous fluid but in this case we got Haemopericardium, which is a pathological condition found at autopsy and is not quite synonymous with 'cardiac tamponade', which a clinical state is caused by the progressive accumulation of blood within the closed pericardial sac. It leads to reduced ventricular filling and subsequent hemodynamic compromise. Here, blood accumulates in the pericardial sac faster than it can escape, either because the bleeding rate exceeds the drainage. When there is no laceration of the pericardium, there is no escape route for the blood from the pericardial sac. When sufficient blood accumulates, the pressure in the pericardial sac increases and begins to prevent the passive filling of the atria during diastole. The cardiac output falls, as does the systemic blood pressure and the venous pressure rises. If unrelieved, death follows, though the time that this takes is variable and difficult to calculate retrospectively on pathological findings. About 400-500 ml of blood is sufficient to cause death. Clinically, it is a medical emergency requiring admission, hemodynamic monitoring and urgent pericardiocentesis.

A substantial number of patients with pseudoaneurysm are asymptomatic. Although surgical repair is the treatment of choice, conservative management in selected patients with increased surgical risk seems reasonable because no deaths were caused by further rupture. Pseudoaneurysm may cause complications such as rupture, thromboembolism, compression of nearby structures, and infection. Ventricular pseudoaneurysm may also serve as a focus for arrhythmia and result in decreased cardiac output. Historically, ventricular pseudoaneurysm was considered to confer a high risk of rupture, with estimates as high as 30% to 45%. [6] Thrombi within the lumen of cardiac pseudoaneurysms may embolize. [10] The main goal of therapy is to reduce the risk of expansion or rupture.
Conclusion

Left ventricular pseudoaneurysm, a complication of myocardial infarction though rare, also follows a trauma to the organ. The function of cardiovascular system gets deranged very commonly in elderly after the age of 40 years, which needs proper investigation and routine follow up.

The mandatory cardiac check up in the risk groups considering the age, sex, obesity and dietary habit, can prevent such catastrophic out come. The cardiac manifestation presented as tip of iceberg of the cardiac diseases attract many cardiologists to create awareness in the society for the larger interest of the community. Death in most of the patients is multifactorial and divergent in nature. Hence to prevent it require an effective measures and conscious thought so also to a protocol based treatment.

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References