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CASE ARTICLE

Myocardial Infarction or Cardiac Tamponade? Forensic Dilemma

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ABSTRACT

Sometimes, two consequent findings make it difficult for the autopsy surgeon to decide upon the cause of death. When two causes of death co-exist, several factors have to be taken into consideration to measure the gravity of each, which might have resulted into death. We present here, a case report of an autopsy conducted on a 57 year old man, who suffered from reeling of head and a fall from standing position at the emergency department and eventually succumbed, before treatment could be initiated. Autopsy revealed cardiac tamponade and myocardial infarction in the deceased. Cardiac tamponade may occur as a result of rupture of myocardial wall and is mainly observed in rupture of ventricles, but the incidence is as low as 2 in 10,000. There are several other causes of cardiac tamponade though. Myocardial infarction on the other hand is the leading cause of mortality and morbidity amongst non-communicable diseases and affects men above 40 years more than their counterpart.

***Keywords**: Autopsy, cardiac tamponade, myocardial infarction*

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INTRODUCTION

Cardiac tamponade is caused by an increase in pericardial pressure due to collection of blood, pus, other fluid, or gas in the pericardial space. This hampers contraction and relaxation of myocardium and ventricular filling and expansion of heart. Cardiac tamponade may occur due to various causes. One such cause is following rupture of myocardial wall. This is a rare complication post myocardial infarction and may lead to sudden unexpected death. According to National Centre of Biotechnology Information, cardiac tamponade occurs in 2 out of 10,000 cases only. Myocardial infarction is responsible for highest morbidity and mortality worldwide.[1] In India, 31.7% of deaths occur due to myocardial infarction and the incidence of cardiovascular diseases being 7% in 1970 has significantly raised up to 32% in 2011.[2] The burden of Coronary Artery Disease in Indian subcontinent is huge and is mainly due to population explosion and high risk factors like smoking, alcohol, low fruit and vegetable intake, physical activity, obesity, high blood pressure and abnormal lipids and diabetes amongst the mass[3]

CASE REPORT

A 57 year old man, contractor by profession, came to the emergency department of AGMC with complains of headache and discomfort. As his blood pressure was high he was advised ECG which revealed ST elevation and T wave inversion for which he was advised immediate admission, but he refused and went back home. Two hours later, he was brought back to the hospital with a history of headache and a fall from standing position chest pain and disorientation and thus succumbed before any treatment could be initiated.

AUTOPSY FINDINGS

Dark brown complexion and was of average built. Pallor, rigor mortis was present with post mortem staining on the back of the trunk, thighs and legs, which was fixed. On dissection, 500 gm of clotted blood were found inside the pericardial cavity surrounding the heart (**Figure 1**). Heart weighed 490 gm. Rupture of left ventricle was present, 5cm above the apex of the heart measuring 1.5cm x 0.8cm x cardiac cavity deep (**Figure 2**). On dissection of the heart, an infarct area measuring 2.5cm x 1.8cm in the left ventricular wall was present (**Figure 3**). On cut section, hemorrhage in the walls of the left ventricle around the ruptured area was seen (**Figure 4**). Atherosclerosis was found in the anterior descending branch of left coronary artery and in the right coronary artery.

Figure 1 Blood in pericardial sac causing cardiac tamponade

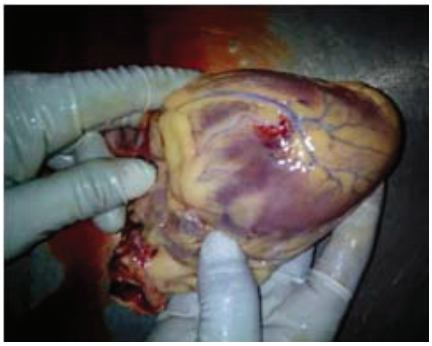

Figure 2 Rupture site at left ventricle

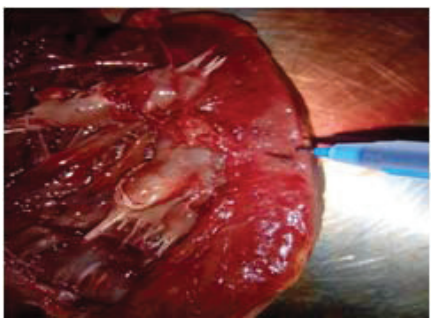

Figure 3 Cut section of heart shows the pale infarct area

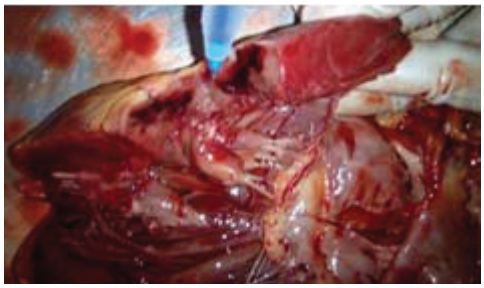

Figure 4 Cut section of the ruptured site shows haemorrhage

DISCUSSION

Cardiac tamponade may occur due to dissecting aortic aneurysm (thoracic), lung carcinomas, acute myocardial infarction, heart surgery, pericarditis caused by bacterial or viral infections, trauma to the heart. Other uncommon causes include tumors of the heart like myxoma, acute renal failure, hypothyroidism, leukaemias, introduction of central lines, chest irradiation, invasive heart procedure like angiography or cardiac catheterization, metastasis in the pericardial sac from breast, lungs and other cancers and SLE. The main signs and symptoms include anxiety, restlessness, sharp chest pain which may be radiated to the neck, shoulder, back, or abdomen, and worsens with deep breathing or coughing, difficulty in breathing, discomfort, sometimes relieved by sitting upright or leaning forward, fainting attack, light-headedness, palpitation, increased respiratory rate, dizziness, drowsiness, weak or absent pulse. Rupture of the myocardium is a rare but an early complication of acute myocardial infarction. The time of rupture is usually during 1 to 14 days post myocardial infarction. The site of rupture may be at the wall, papillary muscles or at the intraventricular septum.[4] It has been statistically proved that the most common cause of cardiac tamponade is accumulation of blood in the pericardial sac, occurring from rupture of the myocardium in a case of an infarct.[5] In this case the deceased had an episode of reeling head and on measurement, blood pressure was high on his first presentation. ECG recordings showed suspected myocardial infarction, as there were ST elevation and T wave inversion but he refused admission. Two hours later in his second presentation, he had chest pain, fainting attack, low blood pressure and absent pulse which signifies rupture of the myocardium, followed by haemo pericardium leading to cardiac tamponade. Due to accumulation of blood in the pericardial sac, there was increased pressure on the heart, leading to chest pain.

Cardiac tamponade caused pooling of blood and decreased venous return, which resulted in the fainting attack, low blood pressure and absent pulse. So, the question arises as to what was the ultimate and immediate cause of death. Myocardial infarction is the leading cause of death and cardiac tamponade is a medical emergency and a cause of sudden death. In this case though the man survived after myocardial infarction, but the sudden rupture of the ventricles causing pooling of blood in the pericardial sac and thereby cardiac tamponade eventually contributed to his death. A study conducted on the frequency of left ventricular wall rupture shows that cardiac tamponade has increased following advent of thrombolytic therapy and has been on the spree since then and now a cause of hospital deaths in myocardial infarction patients.[6] Sedentary life style with decreased physical activity is a high risk factor for myocardial infarction is shown in another study.[7] In another study, it is shown that with increasing age there is higher incidence of myocardial infarction if there is decline in physical activity.[8] Men are at a higher risk of having myocardial infarction and women after menopause have similar incidence as their male counterparts. In one study, it is revealed that certain features exacerbate left ventricular rupture secondary to myocardial infarction. These are age above 55 years, 1st transmural infarction, Killip class I or II, persistent ST segment elevation, persistent or recurrent chest pain, sudden or progressive hypotension, and sudden electromechanical dissociation.[9] Timely intervention is the only mantra behind survival after cardiac tamponade. The quickest and most sensitive imaging test to confirm cardiac rupture is a trans-thoracic echocardiography and should be done at the earliest .[10]

CONCLUSION

Awareness about life style modification should be propagated amongst the common mass in order to decrease non-communicable diseases like myocardial infarction. Early medical help should be sought after, in cases of chest pain, irrespective of the age of the patient. Early initiation of treatment can save lives and reduce mortality and complications like cardiac tamponade following myocardial infarction.

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