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SUDDEN DEATH DUE TO CARDIAC RUPTURE – A CASE REPORT

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ABSTRACT

Every autopsy expert has to deal with many kind of cases like road traffic accidents, poisoning, insect bites, hanging, drowning, burns etc., but sometimes some cases made us think twice, to give perfect opinion regarding the cause of death which otherwise might be missed and injustice might occur. A case of 55 years old, Muslim, female with history of coronary artery bypass graft 7 years back, met with road traffic accident followed by head injury and admitted in hospital for the same. After complete careful examination and investigations, doctors came to know that she had subarachnoid and subpial hemorrhage along with fracture of left forearm bones and treated accordingly. She survived for 10 days in hospital under treatment and died suddenly without any significant cause. On autopsy examination, haemopericardium as a result of cardiac rupture was found to be the cause of sudden death.

Keywords: Sudden death, Cardiac rupture, Cardiac tamponade, Haemopericardium.

INTRODUCTION

Death is said to be sudden or unexpected, when a person not known to have been suffering from any dangerous diseases, injury or poisoning, is found dead or dies within 24 hours after the onset of terminal illness. [1, 2] In old aged patients with past history of cardiac surgeries, heart is always at risk then healthy person for sudden death to occur. Further complications may arise in a case of sudden death due to fall from height or vehicular accident, which shows infarction in heart or rupture of heart during autopsy examination. It is not easy for any forensic pathologist to opine whether the accident is followed by rupture of heart or rupture of heart is followed by accident. [3]

CASE REPORT

A 55 years old, Muslim female met with road traffic accident on 9-7-2012 and suffered head injury. She had past history of coronary artery bypass graft 7 years back in 2005. At the time of admission, vitals were stable and Glasgow coma scale was 15. Multiple abrasions and lacerated wounds were present over face. X-ray showed fracture of left radius and ulna. Chest X-ray showed mild cardiomegaly without any fracture or pneumothorax. CT scan of brain suggested subarachnoid hemorrhage in left frontal and parietal region, and remained steady. She was treated conservatively for head injury and fracture of left forearm bones for 10 days, and then suddenly she complained of chest pain over left and died in minutes.

Post Mortem Examination

The deceased was examined on the requisition and inquest by the police, on the same date of death. Autopsy examination revealed old linear surgical scar in the midline of chest, surgical stitches on forehead and cheek along with multiple abrasions with fallen off scabs at places and contusions over body at places. Over left fronto-parieto-temporal region, scalp found ecchymosed. On opening

cranial cavity, subarachnoid and subpial hemorrhage were present at left fronto-parieto-temporal region with congested and edematous brain. (Photograph – 1) Pericardial cavity packed with fluid and clotted blood approximately 350 ml. (Photograph - 2) On removing clots, large tear with irregular margins and surrounding hyperemia was present over anterior surface of left ventricle measuring 4 cm x 0.5 cm x cavity deep. (Photograph - 3) The heart was enlarged and weighs 487 gm with left ventricular wall hypertrophy. No intra cardiac calcification or mass noted. All viscera found congested.

DISCUSSION

Sudden, unnatural deaths have always to be investigated but sometime need arise for natural deaths too, if death occurs in apparently healthy person and under suspicious condition. [4] In sudden natural deaths, lesion in cardio vascular system is responsible in 45-50 % cases. Causes may be coronary artery diseases, congenital heart diseases, valvular heart diseases, infection and cardiac tamponade following ruptured myocardial infarction or trauma etc. [1, 5, 6, 7]

In this case, there was a clear history of head injury with old history of cardiac pathology. Deceased was treated in hospital and showed improvement in her condition. Her CT scan of brain was static, suggestive of no further damage in the brain since accident. On postmortem examination, old linear surgical scar over midline of chest was present, suggestive of old cardiac surgery. Further, multiple contusions and abrasions with fracture of left forearm bones were found which correspond with history of accident as mentioned in inquest. Head injury, she suffered, was neither severe enough to cause instantaneous death nor sufficient enough to cause death, especially if treatment started immediately following injury. [8] On autopsy examination, pericardium was found packed with fluid and clotted blood with cardiac rupture, suggestive of rapid feeling of pericardium with blood – haemopericardium which resulted in cardiac tamponade followed by death. Deceased was known case of bypass surgery hence had suffered ischemic attacks in the past which had weaken her heart and this time further overwork by heart became unbearable and gave way.

Cardiac tamponade is life threatening situation, which requires some form of surgical intervention for improvement. Management of tamponade depends upon its etiology and rate of development of pericardial effusion. Most commonly encountered situations are post operative bleeding in open heart surgery, trauma, malignancy, uremia etc. [9] Acute tamponade is usually caused by trauma, which may be iatrogenic or by rupture of the heart or aorta. Rupture of heart may occur during acute myocardial infarction. Tamponade may be so sudden that the patient does not complain of symptoms. Occasionally there is pericardial pain, but its characteristics are obscured by the pain of other injuries. [10]

Pathophysiology of tamponade involves elevation of pericardial pressure, which results in diminished venous return, equalization of end diastolic pressure in all four chambers and eventually diminished cardiac output and venous return as stroke volume become fixed. [9] The majority of pericardial effusions that are seen following myocardial infarction do not cause hemodynamic compromise. When tamponade occurs, it is usually due to ventricular rupture or hemorrhagic pericarditis. [11]

Infarcts involve much more commonly and extensively, the left ventricle than do the right ventricle, partly due to greater work load imposed and greater thickness. In a few cases of acute myocardial infarction, patient succumbs to pump failure (cardiogenic shock.). However, in majority of cases, clinical course may be dominated by variety of complications of infarct, which includes arrhythmias, left ventricular failure and cardiogenic shock, rupture of myocardium, aneurism, myocardial fibrosis, thrombosis and embolism etc. [3, 12] Rapid accumulation of as

little as 150 ml of fluid can result in a marked increase in pericardial pressure and can severely decrease cardiac output, whereas 1000 ml of fluid may accumulate over a longer period without any significant effect on diastolic filling of the heart. This is due to adaptive stretching of the pericardium over time. The overall risk of death depends on the speed of diagnosis, the treatment provided, and the underlying cause of the tamponade.

Myocardial rupture occurs in the setting of acute myocardial infarction (AMI), blunt and penetrating cardiac trauma, primary cardiac infection, primary and secondary cardiac tumors, infiltrative diseases of the heart and aortic dissection. Mortality is extremely high unless early diagnosis is made and urgent surgical intervention is provided. Blunt cardiac trauma, commonly occurring in the setting of an automobile accident, may cause myocardial rupture as a result of cardiac compression between the sternum and the spine, direct impact on the heart (sternal trauma) or deceleration injury. It may result in rupture of the papillary muscle, free cardiac wall, or the ventricular septum. [13]

The cardiac chambers involved in decreasing order of frequency are right ventricle, left ventricle, right atrium, and left atrium. However, among patients who reach the hospital alive, the right atrium is most commonly involved. Delayed myocardial rupture has been reported as a result of cardiac contusion. Acute mitral or tricuspid regurgitation, ventricular septal defect or pericardial tamponade may result from myocardial rupture secondary to blunt cardiac trauma. [13]

In our case, the rupture was probably related to a sudden cardiac event rather than a cardiac contusion because no external chest injury; patient was hemodynamically stable at admission; left ventricular rather than right ventricular or right atrial injury and history of coronary artery disease.

CONCLUSION

A case of 55 years old female with history of coronary artery bypass graft in the past, presented with non fatal head injury, no chest injury, stable vitals and Glasgow coma scale 15. She treated conservatively in hospital and responded well, died after 10 days of admission with pre terminal chest pain. Autopsy examination revealed cardiac tamponade as a result of hemopericardium as a result of left ventricle myocardial rupture, was the real cause of death.

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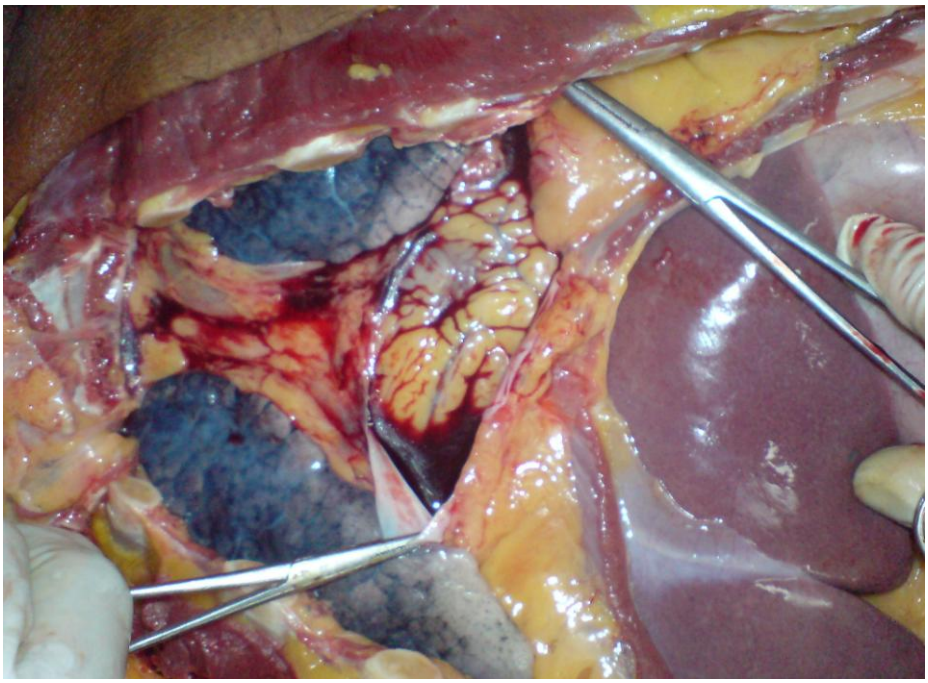
Photograph – 1: Subarachnoid and subpial hemorrhage present on left fronto-parieto-temporal region of brain

Photograph – 2: Haemopericardium.



Photograph – 3: Heart rupture on anterior surface.