

MANNER OF DEATH - MYOCARDIAL INFARCTION OR FALL FROM HEIGHT- A CASE REPORT

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Abstract

Fall from Height frequently occurs within domestic environments and are mainly associated with elderly individuals and often present as multiple injuries on various parts of the body. In most cases it is not possible to determine the cause of the fall or of the death solely by means of external examination. Here we are presenting a case in which an adult male fell down the stairs, sustained injuries and died within few hours. But at autopsy, the heart showed atheromatous changes in the aorta and 90% occlusion of left coronary artery by complicated atheromatous plaque. These types of cases pose a challenge for Forensic Pathologists to determine the cause of death as to which of the two occurred first and effects of the mutually inclusive causes on the progression of injury or disease.

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Introduction

Accidental fall from height usually involves elderly individuals. The most common cause of death in individuals who died because of fall from height is cranio-cerebral injury. Fall from height may be associated with any pre existing natural disorders (eg. Cardiac or cerebral syncope), accidents or a third party involvement.¹ Most common cardiac disorders which may lead to fall are acute coronary insufficiency, acute myocardial infarction, or simply an angina. These are the conditions which may lead to sudden death even without any associated history of fall or any assault. Various cardiac causes which may lead to sudden death are coronary atherosclerosis, acute rheumatic carditis, acute toxic myocarditis, dissecting aortic aneurysm, hypertensive cardiovascular diseases²

Coronary atherosclerosis is the most common cause of death. Approximately half the individuals with coronary artery disease die suddenly. The left coronary artery and its branches showed a slightly higher incidence of thrombosis than the right coronary artery. Significant obstruction of the coronary artery lumen usually requires 75% narrowing of the lumen.³

If both, injuries and coronary occlusion due to atherosclerosis co exist, it's a challenge to the Forensic Pathologist to determine which has occurred first and which lead to death. Here we are presenting one such case in which both the things co existed.

Case Report

A 52 years, male was brought to emergency department of KIMS Bangalore at around 6.40 pm with history of unwitnessed fall down from stairs at around 5.30 pm. On inquiry, relatives who saw him after the fall, said that deceased was complaining of chest pain and lost consciousness immediately after fall. On clinical

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examination, rib fractures and polytrauma was suspected. As there was no history of previous Ischaemic Heart Disease, the treating physicians did not suspect any cardiovascular causes for chest pain and chest pain was attributed to thoracic injury and accordingly treatment was initiated. He did not gain consciousness and succumbed at 7.00 pm on the same evening in the emergency department of KIMS.

Autopsy Findings

Autopsy was conducted on the next day morning at 11.00 am, 16 hours after the death of the individual.

External examination: Dead body of a male aged about 52 years, measuring 165cms in length, and was moderately built and nourished. Cold rigor was present all over the body, post-mortem staining present over back of the body. He had few abrasions over both upper limbs and lower limbs. There were no external injuries over the chest.

Internal examination: Muscles of front of chest were diffusely contused. Transverse fracture of body of sternum was present. 2nd to 6th ribs on left side and 2nd to 4th ribs on right side were fractured. 300ml of blood and blood clots were present in pleural cavity. Heart weighed 350 gms with occlusion of left anterior descending coronary artery.(Figure 1) Left kidney was diffusely contused. Skull and Brain were intact.

Heart and other organs were subjected for histopathological examination. No pathology was detected in other organs, however heart showed complicated atheromatous plaques in aorta and complicated atheromatous plaques in left anterior descending coronary artery with 90% obstruction. (Figure 2) There was no evidence of myocardial contusion or myocardial injury.

Based on the history, post mortem findings and histopathological report, cause of death was opined as acute myocardial infarction as a result of occlusion of left coronary artery by atheromatous plaque.

It was opined that injuries were sustained due to consequent fall from height and that injuries are fresh in nature.

Discussion

Diseases of the heart account for approximately 90% of all sudden deaths due to natural diseases with atherosclerotic coronary artery disease being the underlying cause of approximately 75 to 90% of sudden cardiac deaths. Deaths due to atherosclerotic coronary artery disease are of greatest incidence in the age group of 35 to 64 years. Only 25 to 40 % of individuals dying suddenly of atherosclerotic coronary artery disease will have evidence of acute myocardial infarct.⁴ In the present case, the deceased has succumbed to injuries within one and half hour after the onset of signs and symptoms. Histopathological evidence of myocardial infarction will be seen after 6 hours.² So based on the history and evidence of occlusion of coronary artery, it was deduced that he died due to acute myocardial infarction. In another study of fatal fall from stairs, average age of the males was 63.9 years. In 67.4% cases the accident occurred at home, in 79.1% cases the head was mostly injured followed by chest injuries in 30.2% cases.⁵

a) Disease aggravated by trauma

Injury to any part of the body may predispose to myocardial infarction, if the injury is sufficiently severe to cause hypovolemia and coronary arteries are previously narrowed by atherosclerosis. In such case myocardial infarction occurs during period of hypovolaemic

shock. To recognise a casual relationship between the aggravation of cardiac disorder and the trauma, trauma must be of some significance and symptoms must develop shortly after the event that precipitated the episode of cardiac disease. It is well documented in literature, mentioning occurrence of cardiac disease following trauma, both in acute condition⁶ and where hospitalisation is required for prolonged duration⁷.

b) Disease and concurrent trauma

Sudden cardiac disease may result in loss of consciousness. It was suggested that, falls should always be regarded as symptoms of a disease or the side effect of a drug with impairment of the central nervous system.⁸ 76.7% cases of fall from stairs were suffering from cardiac diseases like chronic ischaemic heart disease, myocardial hypertrophy, cardiac failure following myocardial infarction and cardiac dilatation. Pre existing severe internal diseases or drug intoxication was attributed for most of the fatal cases of fall from stairs.⁵ Similar were findings of Hartshorne et al, showed that 77% of cases had significant pre existing internal disease mainly of cardio-vascular system.⁹

Injury concurrent to heart failure raises the question whether the fall and the ensuing injury aggravated the cardiac condition or whether the sudden failing of the heart was responsible for the loss of consciousness, the fall and the injury. As a general rule, if the injury was sufficiently severe to be considered incompatible with life and it can be shown to occur before death, the death can be attributed to injury. Conversely, if the injury was not severe, and the heart condition at autopsy provides an adequate explanation for death, the death can be attributed to the cardiac condition.

In this presented case, fall from stairs of

the deceased was unwitnessed. Chest pain was attributed by treating Physicians to chest injuries. It was highly unlikely that the deceased succumbed to injuries over chest and also it was not conclusive that cardiac pathology could have been aggravated by injuries sustained. However, atheromatous coronary occlusion was present which was not only more than 90 % but also atheromatous plaques in aorta and coronaries were complicated in nature. It highly suggests that victim suffered from ischemic heart symptoms before fall from stairs, and consequently sustained thoracic injuries which were not fatal in ordinary course of nature. Concurrent injuries sustained inadvertently because of event occurring after initiation of disease process may result in adverse outcome of natural progression of disease, as probably would have been occurred in present case.

Conclusion

Occlusion of left coronary artery and fractured ribs were noticed during post mortem and histopathological examination. Based on the above review of literature, we may conclude that in our case also, the fall from the stairs must have been caused by the pre-existing cardiac disease, which was clearly shown in the histopathology report. Other injuries are sustained after fall and may have adversely influenced the outcome of treatment process. So every case of fall should be examined thoroughly during the autopsy to determine the definite cause of the fall and death.

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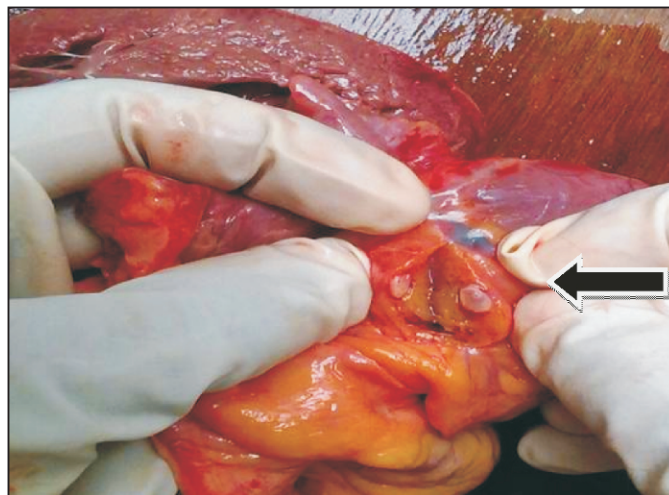


Figure 1: Occlusion of left anterior descending coronary artery

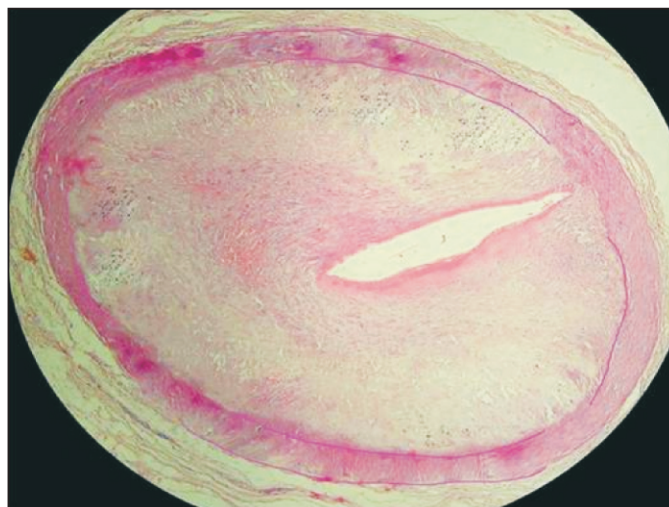


Figure 2: Atheromatous plaque occluding 90% of coronary lumen (H&E 10x10)