

# Acute Myocardial Infarction Following Blunt Chest Trauma and Coronary Artery Dissection

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## ABSTRACT

Blunt chest traumatic coronary artery dissection is an uncommon cause of atherosclerotic and non-atherosclerotic Acute Myocardial Infarction (AMI). Injuries of the coronary artery after blunt chest trauma are caused by different mechanisms such as vascular spasm, dissection and intimal tear or rupture of an existing thrombus formation. Chest pain might be masked by other injuries in patients with multiple traumas in car accident.

Present case report is on a 37-year-old male without any specific past medical history who reported to the emergency department of a hospital with chest discomfort and was discharged with the impression of chest wall pain. After three days he experienced severe chest pain and he was admitted with the impression of acute coronary syndrome and underwent coronary angiography which showed Left Anterior Descending (LAD) artery dissection.

The possibility of injury of the coronary artery should be kept in mind after blunt trauma to the chest. This condition is sometimes underdiagnosed. Its diagnosis may be difficult because chest pain can be interpreted as being secondary to chest wall contusion or it may be overshadowed by other injuries. Coronary dissection diagnosis after chest trauma requires clinical suspicion and systematic evaluation. Electrocardiography (ECG) should be done for every patient with thoracic trauma as the clinical findings may be misleading.

**Keywords:** Acute coronary syndrome, Angiography, ST elevation

## CASE REPORT

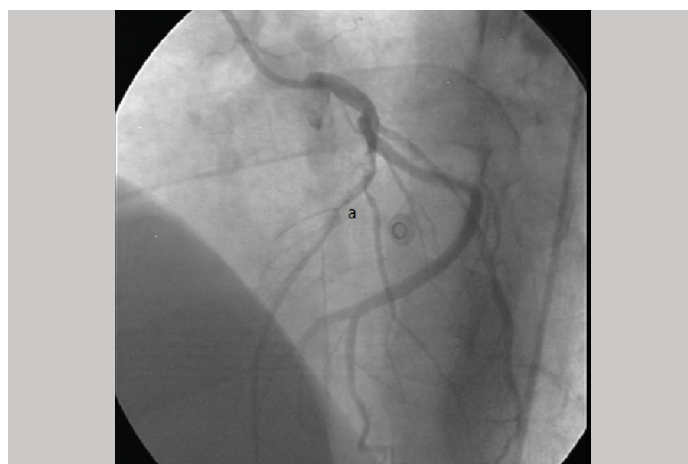
A 37-year-old male without any specific past medical history had a car accident (car collision with another car) with the speed of 50Km/h and was injured at the chest with the steering wheel of the vehicle. He had pain and superficial wounds in the chest after the accident and went to the emergency department of a hospital. After evaluation and physical examination, he was discharged with the diagnosis of chest wall injury. The same night he had a sense of discomfort in the chest and was transferred to the hospital by EMS but unfortunately was discharged without complete examination. The third day after the accident, after having an alcoholic drink and sexual intercourse with his wife, he suffered from severe chest pain and sweating at rest and was transferred to a hospital and admitted with the diagnosis of acute coronary syndrome.

Blood pressure on admission was 130/70 mmHg and heart rate of 90/min. ECG revealed ST elevation in V1-V6 and D1 and avL. He had dynamic ST-T changes and because angiography was not available in the hospital, streptokinase was administered to the patient. He was thus diagnosed with extensive anterior ST elevation MI and was referred to our center for angiography.

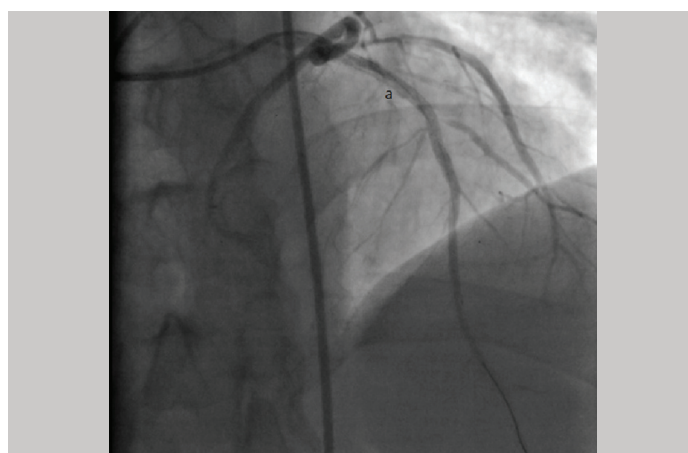
At our center after echocardiography (EF= 25%) he underwent coronary angiography [Table/Fig-1] which revealed significant long dissected lesion at proximal part with good run off in LAD and Right coronary artery (RCA) showed significant lesion at proximal part with good run off.

Stress echocardiography was done for the patient and according to the data of stress echocardiography which showed sufficient viability in the territory of LAD the patient was scheduled for Percutaneous Coronary Intervention (PCI).

PCI on LAD [Table/Fig-2] and Diagonal was done after wiring LAD and D2 with 3x38 Xience Stent and then kissing ballooning was done with 3x10 NC and 2x12 Balloon and the patient was discharged after 2 days with medical therapy.



**[Table/Fig-1]:** Coronary angiography, LAO Cranial view, a: significant long dissected lesion at proximal part of LAD.



**[Table/Fig-2]:** Coronary angiography, AP Cranial view, a: stenting of long dissected lesion at proximal part of LAD.

## DISCUSSION

Most patients having blunt chest trauma complain of dyspnoea or chest pain. Also, in the vast majority of these patients it is only the minor injuries that cause the pain, some would have serious underlying conditions that would need specific therapies.

Majority of blunt cardiac injuries are as a result of rapid deceleration and trauma caused by high speed motor vehicle accidents [1-4]. One of the most common scenarios is chest damage by the steering wheel axis when the car comes to a sudden stop for an unrestrained driver in a high speed motor vehicle collision. Less common causes include a direct blow to the anterior chest, falls from a height and sport related accidents [4,5].

In some cases direct abdominal trauma have been found to generate enough upward force into the chest cavity to cause blunt cardiac injury [5,6].

There have been several recent reports describing coronary artery dissection following blunt chest trauma which shows the previous underestimation of this sequel [1-10]. In a case described, anterior chest wall blunt trauma has led to damage to both LAD and left circumflex artery (LCx) and the patient was treated by surgery [1]. In another case, a patient had occlusion at the mid part of both LAD and LCx arteries after a motorcycle accident and polytrauma, was treated by PCI [2]. Left main coronary artery dissection following blunt chest trauma is also a rare condition which has been reported as a case and has led to patient's mortality [10].

The pain may be masked by different injuries so a high clinical suspicion is required. Although fibrinolytic therapy has been given to certain patients after mild trauma, it is better not to use such a strategy in patients for potential bleeding risk [8].

The most affected artery is the LAD because of its anatomical relationship. The higher incidence of dissection in LAD artery may be due to its proximity to the chest wall. Relative weakness to acceleration/ deceleration forces at the junction of proximal and middle part of the LAD can also explain the higher incidence of injuries to the vessel. The second most affected artery is the RCA [3,11].

## CONCLUSION

It is important to have in mind the possibility of injury of the coronary artery after blunt trauma of the chest. Sometimes the condition is underdiagnosed. As chest pain can be interpreted as being secondary to chest wall contusion or it may be overshadowed by

other injuries, the diagnosis may be difficult. After chest trauma, high clinical suspicion and systematic evaluation of the patient is needed for the diagnosis of coronary artery dissection. As the clinical findings may be misleading, Electrocardiography (ECG) should be done in every patient with thoracic trauma.

Echocardiography is necessary in patients with hemodynamic compromise to rule out mechanical complications such as new valve regurgitation, ventricular wall rupture or cardiac tamponade. An abnormal cardiac enzymes and or ECG show the need for further investigation. Both coronary angiography and echocardiography should be used when needed. It is needed to make the time span between coronary artery occlusion and revascularization short as to avoid acute myocardial infarction.

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