Blunt Chest Trauma Presenting with Acute Coronary Event

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Abstract:

We are presenting a case that initially was diagnosed as non-ST segment elevation myocardial infarction following a blunt chest trauma from left lateral contusion. Coronary angiography and later cardiac CT were performed that showed narrowing and dissection of LCx/OM artery which was treated medically without any coronary intervention.

Keywords: traumatic injury, coronary artery disease, coronary dissection

Introduction:

Blunt chest trauma is associated with a high mortality. Injury to coronary vessels can include dissection, contusion and intramural hematoma. Coronary angiography can identify the location but may be able to identify the mechanism of injury. Multi detector computed tomography (MDCT) can locate and elucidate the nature of coronary artery injury on admission and during follow up. Utilizing multimodal imaging including Cardiac CT and Cardiac MRI can help understand the nature of coronary artery injury and guide management.

Case Report

A 58-year-old female with a history of morbid obesity, hypertension, hyperlipidemia, bipolar disorder, depression and hypothyroidism who presented to our emergency department (ED) with two days of chest pain. Her pain started after sustaining a left lateral chest wall contusion in a motor vehicle collision. Initial ECG upon arrival to ED was unremarkable (figure 1) with +ve troponin that peaked at 37 ng/dl. Upon presentation, she was tachycardiac and tachypneic with soft BP, so CTA of the chest was ordered that didn't reveal any evidence of pulmonary embolism or aortic dissection. Subsequently, a bedside echocardiogram was done which showed left ventricular

ejection fraction of 55% with basal and mid inferolateral hypokinesis. The patient was admitted to the cardiac floor as a non-ST segment elevation myocardial infarction. Given increasing severity of chest pain, the decision was made to proceed with an urgent coronary angiography that showed abrupt high grade narrowing of the distal circumflex (LCx) and first obtuse marginal branch (OM-1) with TIMI 3 flow.

To further evaluate the pathology of the LCx lesion, a cardiac CT angiography showed faint flow of contrast with intramural hematoma along the distal LCx and OM-1. Cardiac MRI showed hypokinesis, edema, resting perfusion defects, and transmural late gadolinium enhancement in the basal-to-mid anterolateral and basal-to-mid inferolateral segments, suggestive of acute/subacute myocardial infarction in the LCx/OM-1 territory (figure 2).

We suspected that this "traumatic" injury maybe related to the blunt chest trauma. However, given worsening symptoms and increasing chest pain severity we then preceded with cardiac CT and cardiac MRI. An intramural hematoma was identified in the area of narrowing along the distal LCx and OM-1 branch on cardiac CT. cardiac MRI confirmed wall motion abnormalities in this coronary distribution. We treated this patient in the same manner as one presenting with spontaneous coronary artery dissection and did not pursue percutaneous coronary intervention. The patient was discharged home after five days of hospitalization on dual antiplatelet therapy. She was followed up at 1 month and 3 months interval and she continued to do well with no new symptoms. A follow up cardiac CT showed a mild disease in the mid LCx artery most likely represents healed prior dissection.

Discussion

Blunt chest trauma has been associated with rib fractures, pneumothorax, pulmonary contusion and cardiac and aortic injury[1]. Mortality rates have been reported in the literatures up to 5.5 %[2]. Cardiac injuries have been reported in 10 - 15% of chest trauma cases.[3] A multitude of unpredictable mechanism include direct trauma to the organs of the thoracic cavity, deceleration injury and acute increases in aortic pressure.[4] Frequent cardiac injuries include contusion with arrhythmias, effusion and even tamponade in the setting of direct blunt trauma.

Five kinds of coronary lesions are described in the literature. Intimal tear leading to dissection, thrombosis secondary to artery compression, external compression or sub intimal edema causing a stenotic lesion, coronary rupture and coronary fistula [5,6]. Coronary occlusion can result from vasospasm, intimal injury with thrombosis or compression by an epicardial hematoma or intramural hematoma. The left anterior descending artery has been described as the most commonly involved[7], although the mechanism of injury and vector of forces can influence the injury of the other epicardial coronary vessels as in our case.

The diagnosis of potential coronary injury post trauma requires the clinician to have a high degree of suspicion as the typical chest pain scenario can be confounded by soft tissue injury related pain. One would have to employ several tools including ECG, cardiac enzymes, ECHO and coronary

CT imaging or angiography. It is indeed important to consider acute coronary syndrome in the differential diagnosis of chest pain following blunt chest trauma.

The differential diagnosis of chest pain with elevated troponins in the setting of a recent blunt chest trauma includes acute coronary syndrome due to coronary artery dissection or ruptured plaque, aortic dissection, coronary spasms, coronary embolism and myocardial contusion.

Despite being less common compared to LAD or RCA arteries, LCx is prone to dissection especially in the context of left lateral chest trauma. There should be always high degree of suspicion in those presenting with chest pain, troponin release +/- ischemic ECG changes.

Conclusion

Blunt chest trauma is associated with a high mortality. Injury to coronary vessels can include dissection, contusion and intramural hematoma. Coronary angiography is the gold standard diagnostic tool to diagnose this pathology, however, cardiac CT add valuable information to the nature and mechanism of coronary injury. Coronary artery dissection is generally managed medically with overall good prognosis.

References

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Figures

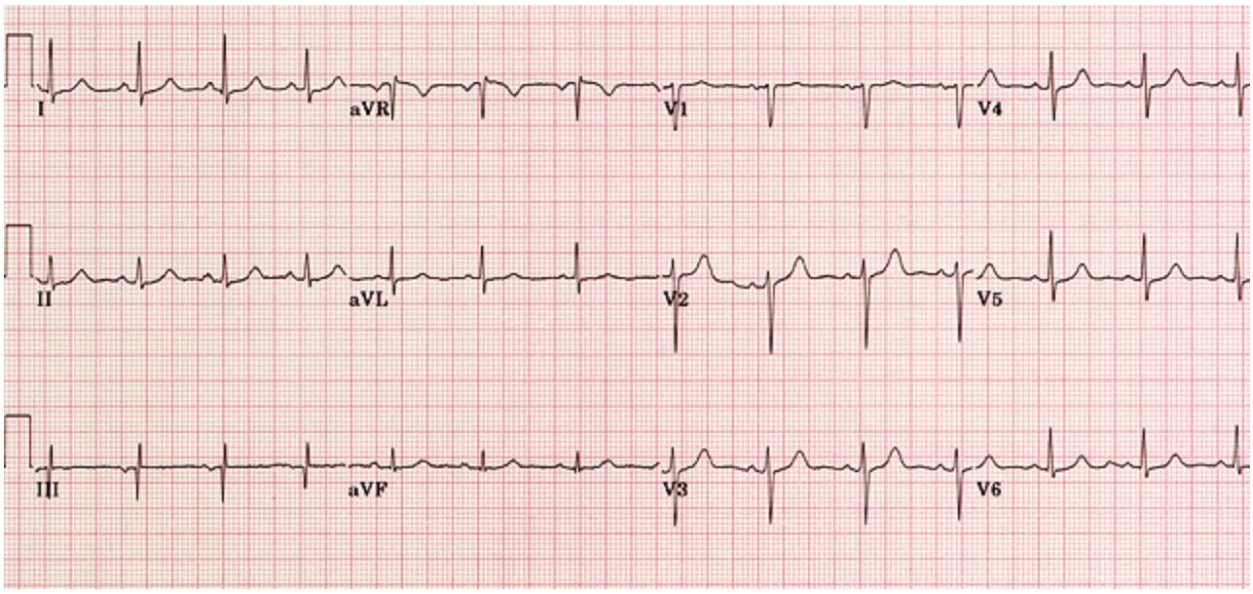

Figure 1: initial ECG at presentation to emergency department (ED).

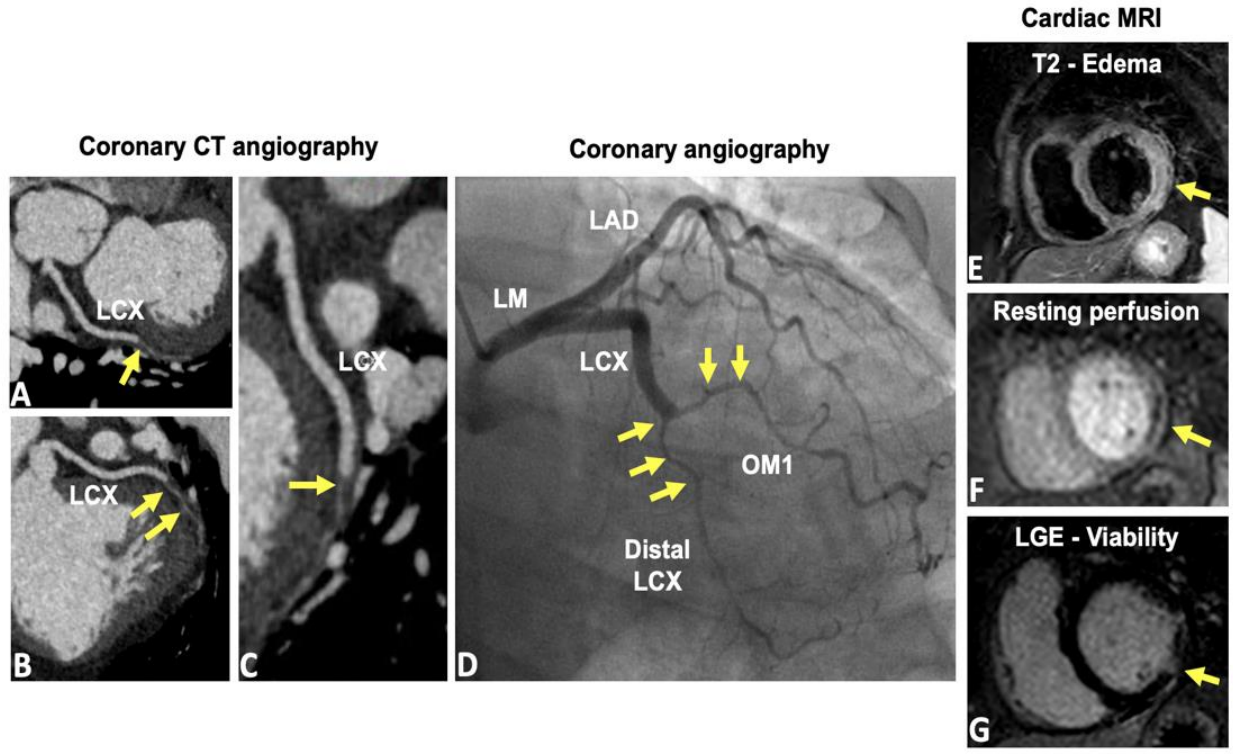

Figure 2: Multimodality imaging of intramural hematoma of distal LCX and OM1. LCX = left circumflex artery. OM1 = obtuse marginal (1) artery.