

Traumatic Coronary Dissection and Associated Hepatic Injury in a Polytrauma Patient - Case Report and Review of Literature

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Abstract

Case report: A 54-year old man with no prior medical history fell from a height of about 3 meters. He reported pain to the chest and fractures of both forearms fracture of the first rib with a pneumothorax and a large injury of the IV segment (III grade AAST).

The EKG showed an ST elevation on the anterolateral leads and an ST depression on the inferior leads; echocardiographic evaluation showed an akinetic mid-apical septum and apex and a severe impairment of the left ventricle

The coronarography revealed a dissection of the proximal Left Anterior Descending (LAD) coronary artery and of the Left Main Coronary Artery (LMCA). Two Drug-Eluting Stents (DES) were positioned. The following day echocardiographic examination showed a Left Ventricular Ejection Fraction (LVEF) of 40%.

Discussion: Coronary dissection following blunt chest trauma is a rare but potentially fatal event. The most affected vessel is the LAD coronary artery, probably for the more vulnerable anatomic position. It's difficult to recognize and there are no guidelines that can help identify patients at risk, but its early diagnosis is essential to minimize the morbidity and mortality of this event. For the treatment every case needs to be discussed considering the associated injuries and their bleeding risk.

Conclusion: The implementation of trauma team protocols, availability of all the members of the trauma team and the possibility to perform all the diagnostic and therapeutic procedures H24 allows a more efficient triage and a reduction of the time that passes between patient arrival and the performance of life-saving procedures.

Introduction

Coronary dissection following blunt chest trauma is a rare but potentially fatal event. We report a case in which the patient presented with both coronary dissection and a liver injury with a bleeding risk. The multidisciplinary management among the Trauma Team members (Intensivist, Surgeon, Emergency physician) and the Cardiologists proved essential for the favorable outcome of the patient.

Case report

A 54-year old man with no prior medical history fell from a tree during gardening, from a height of about 3 meters. On arrival the Helicopter Medical Team found the patient awake and alert, with no memory deficits. He reported pain to the chest and arms, with apparent fractures of both forearms. His vital parameters were stable and he had intact motility and sensation to the four limbs.

He was transported to our Trauma Center, where he arrived awake and alert, hemodynamically stable. The EKG showed an ST elevation on the anterolateral leads and an ST depression on the inferior leads; echocardiographic evaluation showed an akinetic mid-apical septum and apex, no pericardial effusion and a normal aortic arch.

Before coronarography, the Trauma Team members and the cardiologist conveyed to perform a total body (head-chest-abdomen) CT scan, for which the patient was intubated. The total body CT scan showed a fracture of the first rib with a small pneumothorax and a large, branched liver injury of the IV segment (6 cm, III grade AAST) with no active bleeding nor hemoperitoneum.

The patient was then immediately transferred to the CAT lab, where the coronarography revealed a dissection of the proximal Left Anterior Descending (LAD) coronary artery and of the Left Main Coronary Artery (LMCA). Two Drug-Eluting Stents (DES) were positioned and an Unfractionated Heparin (UFH) bolus of 16.000 UI was administered.

At the end of the procedure a liver arteriography was performed in the CAT lab, which did not show active hepatic bleeding.

Since a control echocardiography showed a severe impairment of the left ventricle, the patient was kept intubated and transferred to the Intensive Care Unit, where he remained stable with minimal aminic support (dopamine 6 mcg/kg/min). While completing the diagnostic procedures 3 hours later (cervical CT and limb x-ray) he had one episode of self-limiting Ventricular Tachycardia (VT).

The following day echocardiographic examination showed a Left Ventricular Ejection Fraction (LVEF) of 40%, an apical and antero-septal akinesis and small pericardial effusion. Peak troponin T level was 470 ng/ml. The liver lesion remained stable at Ultrasound (US) follow-up. After surgical fixation of the forearm fractures the patient was extubated; he remained stable with minimal dopamine support and didn't develop other organ dysfunctions.

On the third day he was transferred to a coronary ICU, where there was gradually weaned off aminic support. Telemetry showed no major arrhythmic events and he required transfusion with 3 units of Packed Red Cells in total. On the eighth day after admission he was transferred to the Cardiology ward and eventually discharged home on the thirty-sixth day.

Discussion

Coronary injury after blunt chest trauma is rare, and coronary dissection is even less common; the most frequent causes are motor vehicle accidents and sport accidents. Males are more affected, and the mean age is younger than that of patients with Acute Coronary Syndrome (ACS), which goes into differential diagnosis.

The most affected vessel is the LAD coronary artery, probably for the more vulnerable anatomic position. After chest trauma, an Acute Myocardial Infarction (AMI) may be caused by intimal lesion or proper dissection, as well as by the rupture of a pre-existing plaque, a coronary spasm, vessel rupture or external compression by epicardial hematoma.

The patient may refer chest pain, but it is easy to attribute this symptom to the thoracic contusion or to coexisting rib or sternal fractures that are likely present. There is no correlation between the severity of the trauma and the probability of cardiac injury and there are no pathognomonic signs on EKG, which may show any sign of ACS, including AMI. Troponin levels and signs on cardiac US are also variable. The reference standard for the diagnosis is coronarography.

Traumatic coronary dissection may be difficult to recognize and there are no guidelines that can help identify patients at risk, but its early diagnosis is essential to minimize the morbidity and mortality of this event.

Treatment includes coronary by-pass, angioplasty, stent positioning and medical therapy. The literature does not indicate one specific treatment over the others, but every case needs to be discussed considering the associated injuries and their bleeding risk, as well as the therapeutic options available inside the hospital. Early multidisciplinary is a key element.

Conclusions

Even if AMI following blunt chest trauma is a rare event, an EKG and serial cardiac markers measurement should be performed in all chest trauma patients. In case of EKG abnormalities and/or hemodynamic instability further cardiological assessment is mandatory. This case report also highlights the importance of a multidisciplinary approach to Polytrauma patients, who may present multiple life-threatening injuries.

The implementation of trauma team protocols, availability of all the members of the trauma team and the possibility to perform all the diagnostic and therapeutic procedures H24 allows a more efficient triage and a reduction of the time that passes between patient arrival and the performance of life-saving procedures.

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