

Blunt Traumatic Left Anterior Descending Artery Dissection

Dinesh Upreti¹, Chandra Mani Poudel¹, Hemant Shrestha¹, Surya Devkota¹, Samir Shakya¹, Romila Chimoriya¹, Shovit Thapa¹, Sanjeev Thapa¹, Bhawani Manandhar¹, Vijay Yadav¹, Rajaram Khanal¹, Smriti Shakya¹, Ratna Mani Gajurel¹

¹ Department of Cardiology, Manmohan Cardiothoracic Vascular and Transplant Centre, Institute of Medicine, Maharajgunj, Nepal

Corresponding Author:

Dinesh Upreti

Department of Cardiology,

Manmohan Cardiothoracic Vascular and Transplant Centre, Institute of Medicine,

Maharajgunj, Nepal.

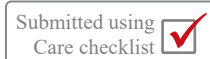
Email: dinesh.dangali@gmail.com

Orchid ID: 0009-0007-1448-2986)

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Abstract

Background: Coronary artery dissection is a rare and life-threatening event resulting after blunt trauma especially in setting of high-speed motor vehicle collision. It can result in acute coronary syndrome due to subsequent thrombus formation, propagation of dissection, and total occlusion of coronary artery.

Case: A thirty-year-old male sustained high speed motorbike collision resulting in closed right sub-trochanteric fracture and right mid clavicle fracture. While being evaluated for surgery, he developed heart failure and further cardiac evaluation was done. Coronary computed tomography angiography was done which revealed dissection of proximal left anterior descending artery and percutaneous coronary intervention (PCI) was attempted in view of refractory ventricular tachycardia. After unsuccessful PCI, off-pump coronary artery bypass grafting was done with successful revascularization and electrical stabilization.

Conclusion: This highlights the importance of considering coronary artery dissection in patients with blunt chest trauma.

Keywords: Blunt chest trauma, Coronary artery dissection, Percutaneous coronary intervention, Coronary artery bypass grafting, Ventricular tachycardia

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Introduction

Coronary artery dissection is a rare and life threatening condition that results in intraluminal thrombosis, vasospasm and coronary occlusion leading to subsequent acute myocardial infarction (MI), ventricular arrhythmias and death.^{1,4} It can be spontaneous or due to secondary causes like trauma, atherosclerosis or iatrogenic.^{1,3} Dissection of coronary artery is an extremely rare but lethal complication of blunt chest trauma that results from various causes like high speed motor vehicle accidents, physical assault and fall from height.³ Despite its low incidence of approximately 0.1%; early recognition by the attending physician is crucial for optimum patient outcome.³

The presentation is similar to acute coronary syndrome (ACS) with symptoms of myocardial ischemia, concurrent electrocardiogram (ECG) changes and increase in cardiac enzymes.⁶ Potential cardiac cause is missed usually in cases of blunt chest trauma attributing

chest pain to chest wall and pulmonary injuries. ECG and subsequent cardiac evaluation should be done in all cases of thoracic trauma to identify relevant cardiac complications including coronary artery dissection.²

Diagnosis of coronary artery dissection in the background of blunt chest injury is challenging. Although invasive coronary angiography is the diagnostic tool of choice, non-invasive techniques like Coronary computed tomography angiography (CCTA) has gained popularity in modern era owing its ability to differentiate between plaque rupture, dissection or external compression.^{3,4} It optimizes diagnostic accuracy by providing better quantitative and qualitative assessment of coronary arteries and aortic root.⁴ Most common vessel involved is left anterior descending artery(LAD) followed by right coronary artery(RCA).³ We present a case of proximal LAD dissection in a 30 year old male patient after motor bike collision and emphasize on increasing the degree of suspicion for this condition in setting of blunt chest trauma.



Case

Presentation: A thirty-year-old male with no significant past medical history was referred to our center from nearby trauma center. He was an occasional alcohol consumer but didn't smoke. He sustained road traffic accidents in the form of motorbike collision ten days back and sustained injury over right thigh and clavicle resulting in closed right sub-trochanteric fracture and right mid clavicle fracture. There was no significant head injury, and his neurological status was intact. He complained of chest pain immediately after trauma and was inappropriately attributed only to blunt chest injuries.

After initial stabilization of patient, he was kept under skeletal traction and conservative management was done for clavicle fracture. Six days after injury, he developed sudden shortness of breath and was referred to our center for further workup after initial management. Upon admission to the emergency room (ER), his blood pressure was 80/60 mm/Hg with heart rate of 120 bpm and maintains saturation at 95% in 10 L/min of oxygen via facemask.

Investigation: His ECG revealed QS pattern in I, aVL, V1-V4, and reciprocal ST depression in inferior leads. Bedside echocardiography showed hypokinesia in LAD territory with ejection fraction of 30% and without any features suggestive of pulmonary embolism and aortic dissection. Inotropes were started for cardiogenic shock, and diuretics were administered judiciously. Triple scan was done, and it ruled out aortic dissection and pulmonary embolism but revealed hypodense plaque in proximal LAD causing near total occlusion.

Management: Loading of anti-platelet agents and statins was done, and patient was heparinized after orthopedics and neurosurgery consultation. Medications for left ventricular dysfunction were optimized gradually. Angiography was done which revealed similar findings as CCTA. In between, patient had two episodes of sustained ventricular tachycardia (VT) for which cardioversion was done with synchronized direct cardioversion (DC) shock and loading and maintenance doses of lignocaine and amiodarone was started for frequent non-sustained ventricular tachycardia. Angioplasty was attempted but was unsuccessful as the wire couldn't be negotiated after multiple attempts. In view of electrical instability, off-pump coronary artery bypass graft (CABG) was done with successful recanalization of LAD and patient was extubated the next day.

Outcome: There were no major events after surgery, and anti-arrhythmic agents were weaning gradually. The patient was discharged after adequate optimization of medications and is under regular follow-up in OPD with significant clinical improvement and improvement in ejection fraction to 50%.

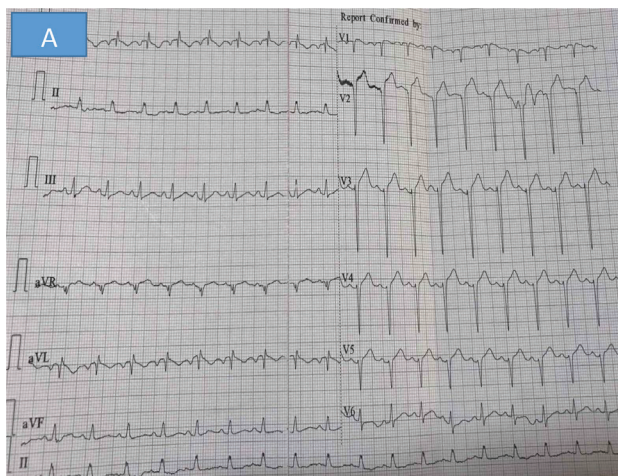


Figure 1. A: Twelve lead ECG (sweep speed 25 mm/sec) showing QS pattern in anterior and high lateral leads suggestive of ischemia in LAD territory

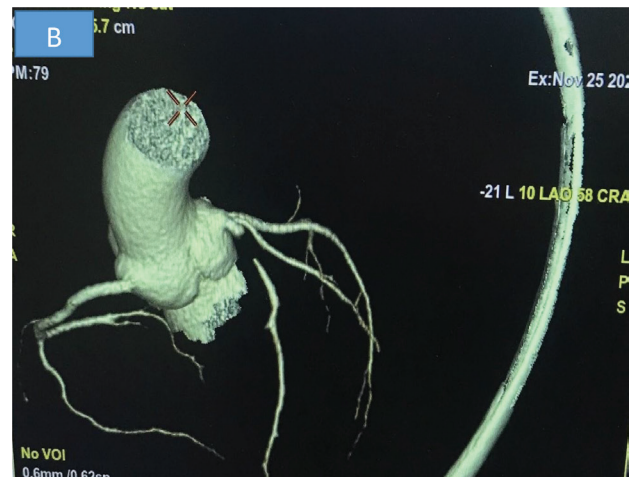


Figure 1. B: 3D image of Coronary computed tomography angiography showing contrast filling defect in proximal Left anterior descending artery

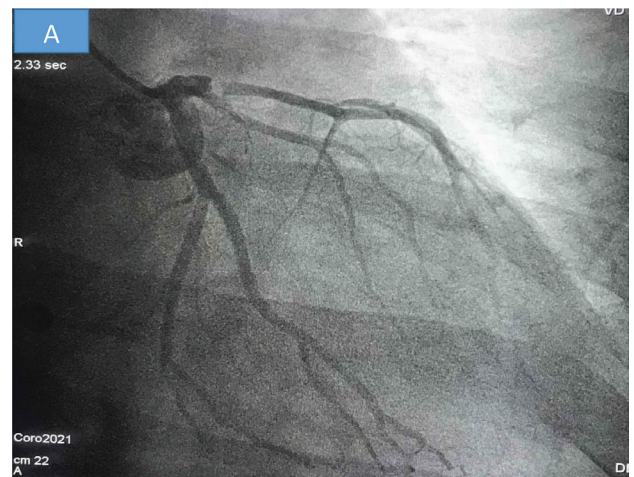


Figure 2. A: Coronary angiography showing dissection in proximal left anterior descending artery and normal left circumflex artery



Figure 2. B: Normal right coronary artery

Discussion

About 5-15% of patients sustaining severe blunt chest trauma develop clinically significant cardiac injury. Coronary artery dissection is one of the extremely rare cardiac complications among them.² There is a significant increase in morbidity and mortality in such patients due to

delayed recognition of traumatic coronary dissection and subsequent pulmonary edema and malignant arrhythmias. However, traumatic dissection has been frequently described in recent literature only, as it has been underdiagnosed earlier.¹

Traumatic dissection can affect any of coronary vessels but is most commonly seen in LAD artery probably due to its most vulnerable anatomic position being in close proximity to chest wall.³ However RCA is most susceptible at its origin due to acceleration/deceleration injuries. Rapid deceleration causes increased shear forces on endothelium leading to intimal tear which is further propagated by intra-arterial hypertension in response to catecholamine surge.⁶

Diagnosis of traumatic dissection is typically challenging as cardiac symptoms at the initial stage are falsely attributed to mechanical or pulmonary cause.⁴ Clinical suspicion and early ECG is crucial for early diagnosis. Hyper acute T waves in the affected territory followed by ST elevation and eventual formation of Q waves are the usual ECG changes.⁵ Definitive diagnosis is established through non-invasive or invasive coronary angiography.

In our case also, cardiac evaluation including echocardiography was done only later when he developed heart failure six days after trauma. CCTA was done which revealed coronary artery dissection and was confirmed by invasive coronary angiography. In view of electrical instability in the form of refractory VT, revascularization was done with off-pump CABG after unsuccessful PCI.

Conclusion

Coronary artery dissection is one of the rare and potentially fatal cardiac complications of high-speed motor vehicle collision. It remains underdiagnosed in various instances as the presenting symptoms of dissection are falsely attributed mostly to orthopedic and pulmonary issues.

Routine ECG and cardiac enzymes level at presentation in an emergency room, in patients with blunt chest trauma, will help in prompt diagnosis and intervention of dissection for a favorable outcome.

Declaration of patient consent

The authors certify that they have obtained consent from the parent for publication of clinical information and investigation report.

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Conflicts of interest

There are no conflicts of interest.

References

1. Elgendy MS, Mahfood Haddad T, Akinapelli A, White MD. A Rare Case of Traumatic Coronary Artery Dissection After a Motor Vehicle Collision. *Cureus* 2019 Mar 29 <https://doi.org/10.7759/cureus.4345>
2. Allemeersch GJ, Muylaert C, Nieboer K. Traumatic Coronary Artery Dissection with Secondary Acute Myocardial Infarction after Blunt Thoracic Trauma. *Journal of the Belgian Society of Radiology* 2018 Jan 4;102(1):4 <https://doi.org/10.5334/jbr-btr.1379>
3. Blevins AJ, Repas SJ, Alexander BM, Siebenburgen C. Blunt traumatic coronary artery dissection: A case study. *Trauma Case Reports* 2022 Feb;37:100594 <https://doi.org/10.1016/j.tcr.2021.100594>
4. Paparoupa M, Conradi L, Warncke ML, Well L, Burdelski C, Cramer C, et al. Blunt traumatic right coronary artery dissection presenting with second-degree atrioventricular block and late-onset severe cardiogenic shock. *BMC Cardiovasc Disord* 2022 Dec;22(1):341 <https://doi.org/10.1186/s12872-022-02784-6>
5. Miegheem NMV, van Weenen S, Nollen G, Ligthart J, Regar E, van Geuns RJ. Traumatic Coronary Artery Dissection Potential Cause of Sudden Death in Soccer. *Circulation*, 127(3) <https://doi.org/10.1161/CIRCULATIONAHA.112.119982>
6. Jiang T, Qian C, Wei G, Cheng L, Zheng W, Chen G. Case report: Fatal traumatic coronary artery dissection-an overlooked complication of chest fracture. *Front Cardiovasc Med* 2023 Sep 5;10:1226129 <https://doi.org/10.3389/fcvm.2023.1226129>