



## Case Report

# Blunt traumatic dissection of right coronary artery presenting with acute inferior wall myocardial infarction: Dilemma in management



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## ABSTRACT

Thirty-nine year male had a history of road traffic accident with polytrauma. At emergency room he started having chest pain with ventricular tachycardia. He was subsequently diagnosed with right coronary artery dissection secondary to blunt trauma which is an extremely rare cause of inferior wall myocardial infarction. After some dilemmas, he was ultimately treated with intravascular ultrasound guided coronary angioplasty with stenting and had an uneventful recovery.

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## 1. Introduction

Traumatic dissection of right coronary artery (RCA) is an extremely rare cause of inferior wall myocardial infarction (IWMI). In this report we are presenting a middle aged man, who had a road traffic accident (RTA) with polytrauma, subsequently diagnosed with IWMI due to traumatic dissection of RCA. We had to deal with few very important therapeutic dilemmas while treating the patient.

## 2. Case report

Thirty-nine year male smoker presented to emergency department with history of RTA 30 min back while riding his motorcycle. He had sustained multiple traumas. Initial evaluation revealed complex greater trochanteric fracture of right femur and ulner bone fracture of right forearm. Subsequently at emergency room he had severe compressive chest pain with polymorphic VT, which was reverted with DC cardioversion. ECG at that point was suggestive of acute inferior wall MI (Fig. 1). Urgent coronary angiogram revealed totally occluded RCA from its origin (Fig. 2). We were not sure regarding the exact etiology

of RCA total occlusion at that time. Patient had few spells of bradycardia during the angiography, so temporary pacemaker was inserted.

At this point the case was discussed with family members, critical care and orthopedic teams. Patient had multiple sites of active bleeding and was also planned for emergency orthopedic surgery. At the same time, he had on-going chest pain. A decision was made to establish the distal flow without stenting to avoid antiplatelet related issues. Final coronary angioplasty with stenting was scheduled on a later date once the surgery related and other bleedings are secured. After getting proper consent, we proceeded with our plan. Repeated thrombus aspiration was performed with eliminate catheter, which established the distal flow. Patient's chest pain reduced and resolution of ST segment in ECG was noticed (Fig. 3). Temporary pacemaker support was continued.

Patient underwent emergency orthopedic surgery which was uneventful. On first post-operative day he again started having chest pain. Urgent ECG revealed re-elevation of ST segment in inferior leads. Patient was shifted to cathlab and repeat angiography revealed total reocclusion of ostial RCA. After some difficulty, wiring was possible. We decided to do an IVUS imaging to understand the nature of pathology in this case. IVUS revealed spiral dissection at proximal to mid RCA (Fig. 4). We understood that even the initial RCA total occlusion and IWMI was also due to this coronary dissection precipitated by blunt trauma during RTA. After proper predilatation, angioplasty with stenting was

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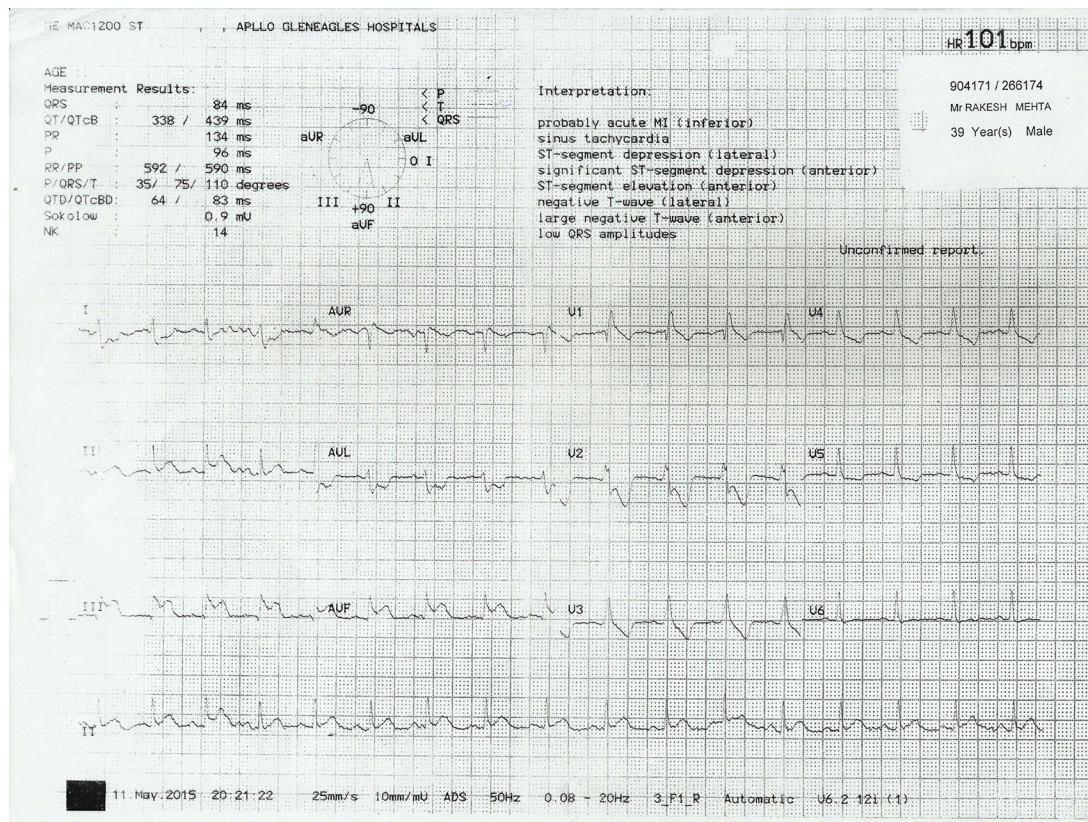


Fig. 1. ECG at emergency room showing ST elevation in inferior leads with reciprocal changes in anterior chest leads.

performed with excellent end result (Fig. 5). Rest of the hospital stay of the patient was uneventful and he had gradual recovery thereafter. In 6-month follow-up period no further cardiac decompensation occurred and he was doing well.

### 3. Discussion

Coronary artery dissection is a rare life-threatening complication resulting from blunt trauma injury. Most cases of coronary

artery injury, including dissection, involve the left anterior descending (LAD) artery given its anatomical location relative to the impact.<sup>1</sup> Right coronary artery dissection secondary to blunt trauma is a particularly unusual occurrence, and only few cases has been reported in literature till date.<sup>1,2</sup>

The differential diagnosis of chest pain in the setting of blunt trauma is extensive and may include injury to the chest wall, lungs, pleura, great vessels and the heart. Injury to the heart and coronary vessels should be suspected in patients who present with chest pain or dyspnea after sustaining significant blunt chest trauma.<sup>3</sup> Mechanisms of injury suspected of causing dissection include intimal tearing, intraluminal thrombosis or coronary spasm.<sup>4,5</sup> Alternatively, rapid deceleration in the setting of maximal heart filling, where the RCA is under relative tension, may injure the vessel at its attachment to the fixed portion of the ostial root.<sup>6</sup> There is no clear relationship between the severity of thoracic trauma and the development of coronary lesions.<sup>2</sup> In fact, coronary injury has been reported following low- and high-speed motor vehicle collisions as well as direct chest trauma caused by a kick from a horse and sports injuries.<sup>6</sup>

Coronary artery dissections can be completely asymptomatic or result in acute coronary syndromes and sudden death.<sup>3</sup> In our case, the patient along with chest pain had a cardiac electrical disturbance in the form of hemodynamically significant polymorphic VT which had to be terminated by DC cardioversion. This electrical event actually accelerated cardiological evaluation and prompt detection of myocardial infarction. In our patient although other potential causes of coronary dissection, such as severe systolic hypertension or intense physical exertion, cannot be completely ruled out, the temporal relationship of direct blunt

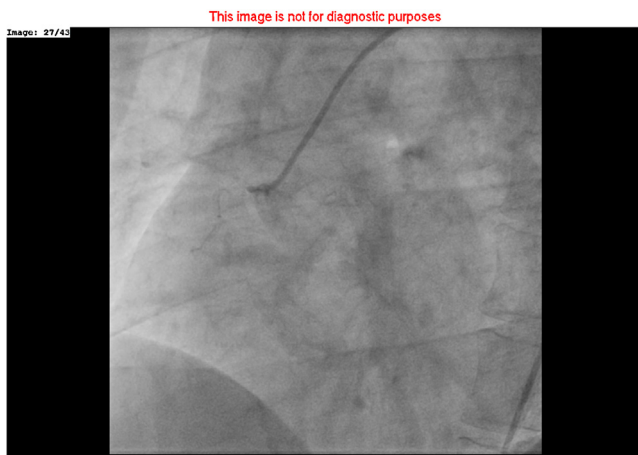


Fig. 2. Right coronary angiography through Judkin's right diagnostic catheter in right anterior oblique view showing totally occluded right coronary artery from proximal part.

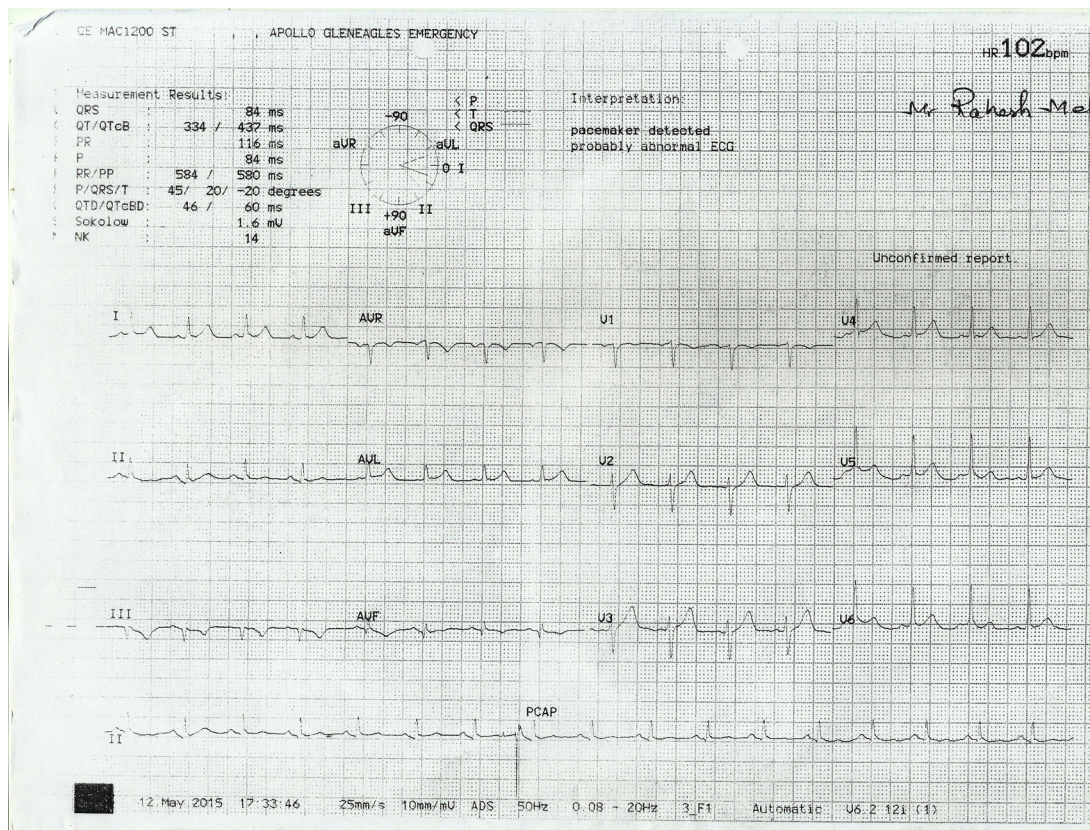


Fig. 3. Repeat ECG after thrombus aspiration showing complete resolution of ST segment.

trauma to the coronary dissection suggests itself as the most probable mechanism of injury in this otherwise healthy young individual.

When differentiating between myocardial contusion and more life-threatening injuries like myocardial infarction, myocardial rupture, ventricular septal defects, valvular injury and coronary dissection, recognition of patients at risk should include careful assessment of historical clues such as traumatic injury, extreme physical exertion, notable past medical history (e.g. coronary artery disease or severe systolic hypertension) and family history

(e.g. connective tissue disorders).<sup>1</sup> The initial diagnostic examination should include ECG, serial cardiac enzymes and continuous cardiac monitoring. If the index of suspicion remains high for cardiac injury, early cardiology consultation is indicated. Echocardiogram can differentiate between structural and non-structural damage to the heart. When coronary dissection leading to myocardial ischemia is suspected, cardiac catheterization is aimed at restoring perfusion and minimizing infarct size. In our patient we did not perform IVUS during the first catheterization. So the diagnosis of coronary dissection was not evident at that time. This led to the decision of restoring the coronary flow without stenting.

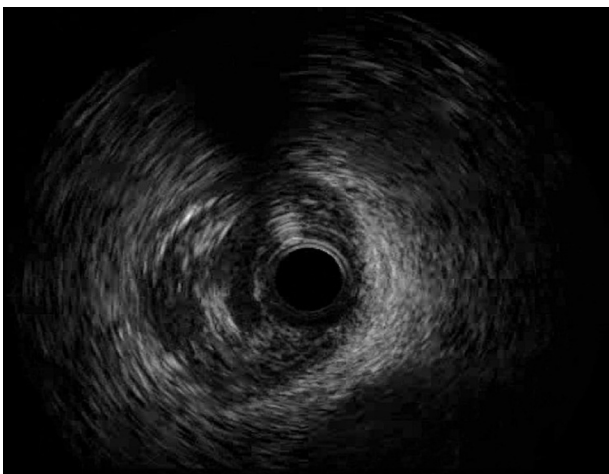


Fig. 4. Intravascular ultrasound image showing dissection flap in right coronary artery.

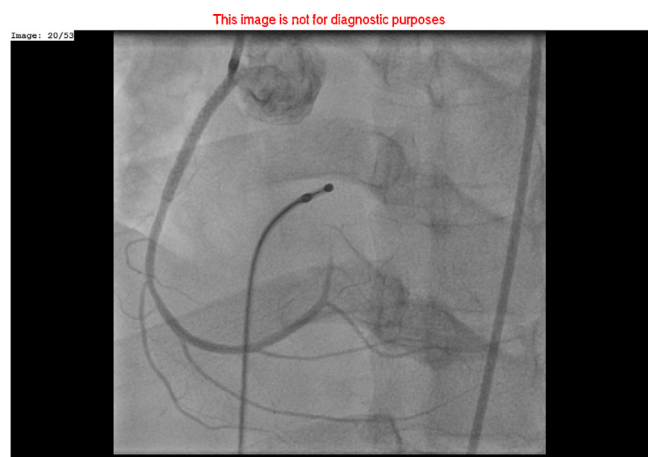


Fig. 5. Final angiographic result after placement of drug eluting stent in right coronary artery.

We could have probably saved the patient from having the re-infarction if angioplasty with stenting was performed in the first attempt.

#### 4. Conclusion

In polytrauma patients chest pain should always be given special attention as cardiac management needs preference over other. Traumatic dissection of RCA is an extremely rare cause of IWMI. Coronary dissection flaps should always be stented, even if excellent distal flow is established, as chance of reocclusion and repeat myocardial infarction is very high. Inter-disciplinary coordination is the key to success in all critically ill patients and should be strongly advocated.

#### Conflicts of interest

The authors have none to declare.

#### Acknowledgement

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