

## **Coronary Artery Dissection and Myocardial Infarction Due to Blunt Chest Trauma**

**Ali Shamsedini<sup>1</sup>, Ghazaleh Salehabadi<sup>2</sup>**

<sup>1</sup>MD, Cardiologist, Department of Cardiology, Rasoul-e-Akram Hospital, Faculty of Medicine, Iran University of Medical Sciences, Tehran, Iran

<sup>2</sup>MD, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

---

### **ABSTRACT**

**Introduction:** Coronary artery dissection and myocardial infarction happen rarely after BCT (3). In the following, a rare case of acute myocardial infarction (AMI) caused by the dissection of left anterior descending (LAD) artery following BCT due to suffering a blow in boxing is presented.

**Case presentation:** A 22-year-old professional boxing athlete presented with chest pain and dyspnea from a week ago to our center. A week before the visit, the patient referred to the general hospital complaining from chest pain and nausea after suffering a blow during boxing. According to the ECG and normal cardiac troponin, the patient was discharged with diagnosis of Prinzmetal Angina (without coronary angiography). When referring our center, lead electrocardiogram (ECG) was done and showed ST segment elevation on V1-V4 leads and T inversion on aVL and I leads. According to echocardiography, (LVEF) was calculated to be 45%. Angiography was performed due to the lack of definitive diagnosis and suspicion of coronary artery disease. Results of angiography showed coronary artery dissection on LAD. Finally, the patient was diagnosed with AMI due to LAD dissection and was subjected to angioplasty intervention

**Discussion:** In our case, BCT resulted in LAD dissection after a less common cause of trauma. Not having a serious risk factor, the presence of atypical symptoms of the disease, as well as evidence of ST segment elevation without increasing the cardiac enzyme led to dilemma and delayed diagnosis, and the diagnosis of Prinzmetal angina was mistaken for the patient. So due to failure of improvement and further investigation, the diagnosis of AMI due to LAD dissection after BCT reached certainty

**KEYWORDS:** Coronary artery Dissection, Myocardial Infarction, Blunt Chest Trauma, Left Anterior Descending Artery

---

### **ARTICLE DETAILS**

**Published On:**  
**08 August 2022**

**Available on:**  
<https://ijmscr.org/>

---

### **INTRODUCTION**

Accidents such as motorcycle crashes, fall injuries and crush injuries may result in blunt chest trauma (BCT), while sports injuries are not common in BCT. BCT depends on the severity of the force and some underlying factors, may lead to variety of injuries from mild arrhythmias to fatal cardiac rupture [1, 2]. Coronary artery dissection and myocardial infarction happen rarely after BCT [3]. In the following, a rare case of acute myocardial infarction (AMI) caused by the dissection of left anterior descending (LAD) artery following BCT due to suffering a blow in boxing is presented.

### **CASE PRESENTATION**

A 22-year-old professional boxing athlete presented with chest pain and dyspnea from a week ago to our center, without past medical history. The patient also complained of epigastric pain, which started from a week ago too, and did not mention another complaint. Any cardio-pulmonary symptoms including coughing, sputum, palpitations, orthopnea, chest pain, PND, edema and any gastrointestinal symptoms, including nausea and vomiting, were not present in the patient.

A week before the visit, the patient referred to the general hospital complaining from chest pain and nausea after

## Coronary Artery Dissection and Myocardial Infarction Due to Blunt Chest Trauma

suffering a blow during boxing. According to the ECG and normal cardiac troponin, the patient was discharged with diagnosis of Prinzmetal Angina (without coronary angiography).

The patient had never experienced such symptoms, as well as exertional dyspnea or chest pain. He had no history of serious illness, any gastrointestinal, cardiac or pulmonary disease, and did not have history of smoking or drinking alcohol. There were no similar symptoms in people close to the patient and no history of serious cardiopulmonary or gastrointestinal diseases in the family.

When referring our center, blood pressure was 120/80 mm Hg, pulse rate was 85, respiratory rate was 14 and O<sub>2</sub> saturation was 97%. In the examination, the appearance of the patient was normal and there was no respiratory distress. The auscultation and examination of the lungs and the heart was normal, and no extra sound was heard. Other system examinations, including the peripheral pulses and the situation of the limbs and jugular vein, were also normal. First, the standard 12 lead electrocardiogram (ECG) was done and generally due to normal history and examination of

patient, some differential diagnosis was considered on gastrointestinal problems such as gastroesophageal reflux, or according to a history of BCT, lung problems such as pneumothorax or pulmonary embolism.

ECG showed ST segment elevation on V1-V4 leads and T inversion on aVL and I leads (Figure 1). The amount of cardiac enzymes and other routine emergency tests were normal. Chest radiography did not show suspicious symptoms. In emergency echocardiography, the size of chambers and function of the valves were normal and there was no stenosis or insufficiency, and left ventricular ejection fraction (LVEF) was calculated to be 45%. Angiography was performed due to the lack of definitive diagnosis and suspicion of coronary artery disease. Results of angiography showed coronary artery dissection on LAD (Figure 2). Finally, the patient was diagnosed with AMI due to LAD dissection and was subjected to angioplasty intervention (figure 3). The patient was discharged after a day with a good general condition. There was no problem in follow-up one week, one month and three months after the intervention.

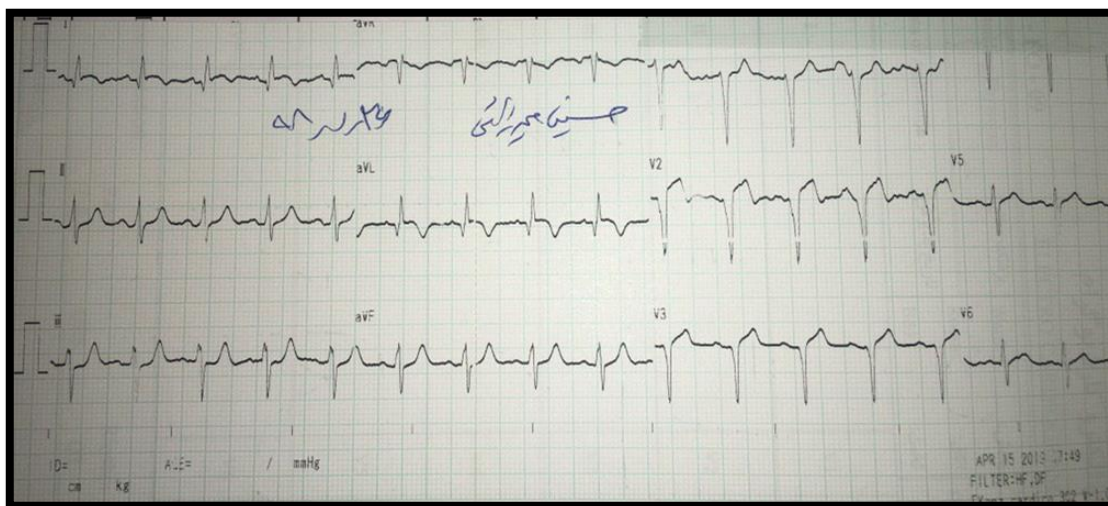


Figure 1. ECG at the time of admission

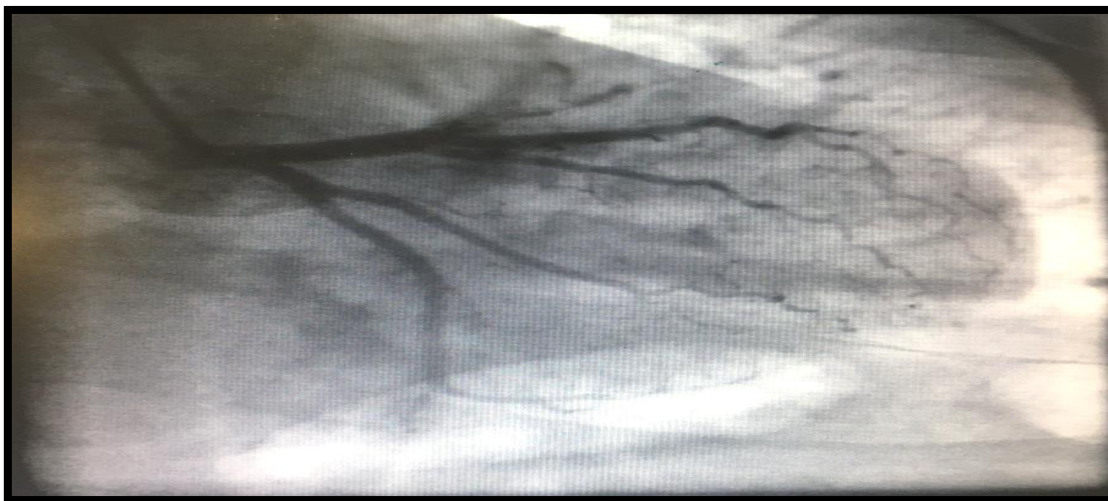


Figure 2. Coronary artery dissection on LAD



**Figure 3. After angioplasty intervention**

### DISCUSSION

Nearly 25% of the traumatic deaths occur due to BCT, although serious cardiac damage after BCT is not very common and only 5 to 15% of severe BCT cases are observed [4]. The intensity of the force and the underlying factors contribute to BCT damage, so BCT may cause lung damage, such as pneumothorax or heart damage, such as myocardial rupture, pericardial rupture, septal damage, valvular injury or myocardial contusion. [5,6]. Post-BCT death autopsies have shown that heart damage is the cause of one-fifth of patients' deaths, while death after coronary artery disease is uncommon and accounts for less than 2% of death causes. Coronary artery dissection is a rare complication of BCT. However, if coronary artery dissection occurs, dissection on LAD, followed by right coronary artery and circumflex artery, are more common than other coronary arteries. Although the cause of LAD dissection is still unknown, it seems that the anatomical position of the LAD is significant. On the other hand, vascular spasm and intimal tear or rupture of an existing plaque with thrombus formation have been suggested as possible causes [7,8].

Symptoms of coronary artery dissection are usually similar to acute coronary syndrome (ACS), and chest pain is a common clinical manifestation, so this complication may be indistinguishable from other causes of ACS. A detailed history taking to find out risk factors, including high blood pressure, is helpful. Also, accurate clinical examinations and its matching to the results of the tests as well as the ECG help to diagnose [9]. In cases where BCT is the cause of dissection, differentiation of coronary artery dissection or myocardial contusion from myocardial infarction is not easy, and chest radiography or observation of myocardial enhancement in computed tomography (CT) scan makes it easier to diagnose. On the other hand, although echocardiography and

observation of the ventricular septum movement and valve function are helpful, it may not be able to be reliable in differentiating myocardial contusion from ischemia induced by coronary artery dissection. Therefore, the best diagnostic methods in this regard are intravascular ultrasound or angiography [10].

In our case, BCT resulted in LAD dissection after a less common cause of trauma. Not having a serious risk factor, the presence of atypical symptoms of the disease, as well as evidence of ST segment elevation without increasing the cardiac enzyme led to dilemma and delayed diagnosis, and the diagnosis of Prinzmetal angina was mistaken for the patient. So due to failure of improvement and further investigation, the diagnosis of AMI due to LAD dissection after BCT reached certainty.

To sum up, we can say that; LAD dissection after BCT due to rareness may lead to misleading the doctor and not properly detected, because the typical symptoms of coronary artery dissection and AMI may be masked due to trauma induced pain. Although the LAD dissection is not common, it is life-threatening. This complication, especially if diagnosed late, can lead to delay in revascularization, leading to AMI and ultimately death. Therefore, a strong clinical suspicion and consideration of this complication after BCT is necessary.

### ACKNOWLEDGEMENT

We thank the patient who gave us consent to write this article

### REFERENCES

- I. De Gregorio, C., & Magaouda, L. (2018). Blunt thoracic trauma and cardiac injury in the athlete: contemporary management. *J Sports Med Phys Fitness*, 58(5), 721-726. doi:10.23736/S0022-4707.17.07776-3

## Coronary Artery Dissection and Myocardial Infarction Due to Blunt Chest Trauma

- II. Eghbalzadeh, K., Sabashnikov, A., Zeriouh, M., Choi, Y. H., Bunck, A. C., Mader, N., & Wahlers, T. (2018). Blunt chest trauma: a clinical chameleon. *Heart*, 104(9), 719-724. doi:10.1136/heartjnl-2017-312111
- III. Kohli, S., Saperia, G. M., Waksmonski, C. A., Pezzella, S., & Singh, J. B. (1988). Coronary artery dissection secondary to blunt chest trauma. *Cathet Cardiovasc Diagn*, 15(3), 179-183. doi:10.1002/ccd.1810150310
- IV. Kettunen, P. (1984). Cardiac damage after blunt chest trauma, diagnosed using CK-MB enzyme and electrocardiogram. *Int J Cardiol*, 6(3), 355-374. doi:10.1016/0167-5273(84)90196-7
- V. Stewart, D. J. (2014). Blunt chest trauma. *J Trauma Nurs*, 21(6), 282-284; quiz 285-286. doi:10.1097/JTN.0000000000000079
- VI. Dennis, B. M., Bellister, S. A., & Guillaumondegui, O. D. (2017). Thoracic Trauma. *Surg Clin North Am*, 97(5), 1047-1064. doi:10.1016/j.suc.2017.06.009
- VII. Korach, A., Hunter, C. T., Lazar, H. L., Shemin, R. J., & Shapira, O. M. (2006). OPCAB for acute LAD dissection due to blunt chest trauma. *Ann Thorac Surg*, 82(1), 312-314. doi:10.1016/j.athoracsur.2005.09.070
- VIII. Goyal, G., Singh, G., & Kapoor, R. (2009). Rare case of blunt chest trauma induced left main and LAD dissection in association with anomalous RCA origin. *Heart*, 95(14), 1178. doi:10.1136/hrt.2009.168914
- IX. Gilhofer, T. S., & Saw, J. (2019). Spontaneous coronary artery dissection: update 2019. *Curr Opin Cardiol*, 34(6), 594-602. doi:10.1097/HCO.0000000000000671
- X. Alfonso, F., Bastante, T., Garcia-Guimaraes, M., Pozo, E., Cuesta, J., Rivero, F., Saw, J. (2016). Spontaneous coronary artery dissection: new insights into diagnosis and treatment. *Coron Artery Dis*, 27(8), 696-706. doi:10.1097/MCA.0000000000000412