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Trauma Induced Myocardial Infarction

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Abstract

Chest Trauma in athletes is a common health problem. However, myocardial infarction secondary to coronary dissection in the setting of blunt chest trauma is extremely rare. We report a case of acute inferior wall myocardial infarction following blunt chest trauma. A 32-year-old male with no relevant medical problems was transferred to our medical center for retrosternal chest pain after being elbowed in the chest during a soccer game. Few seconds later, he started experiencing sharp retrosternal chest pain that was severe to that point where he called the emergency medical service. Upon arrival to the Trauma department patient was still complaining of chest pain. ECG demonstrated ST segment elevation in the inferior leads with reciprocal changes in the lateral leads all consistent with active ischemia. After rolling out Aortic dissection, patient was loaded with ASA, ticagerlor, heparin and was emergently taken to the cardiac catheterization lab. Coronary angiography demonstrated 100% thrombotic occlusion in the distal right coronary artery with TIMI 0 flow distally. After thrombus aspiration, a focal dissection was noted on the angiogram that was successfully stented. Two days after admission patient was discharged home. Echocardiography prior to discharge showed inferior wall akinesis, normal right ventricular systolic function and normal overall ejection fraction.

Introduction

Although blunt chest trauma is a common health problem, myocardial infarction (MI) secondary to coronary artery dissection in the setting of blunt chest trauma is extremely rare. We report a case of right coronary artery (RCA) dissection resulting in inferior wall MI following blunt chest trauma. The patient was successfully treated with primary percutaneous coronary angioplasty (PPCI).

Case Presentation

A 32-year-old male with no relevant medical problems was transferred to the medical center for retrosternal chest pain after being elbowed in the chest. Patient was playing soccer when he took a blow from an opponent's elbow while dribbling the ball. Few seconds later, he started experiencing sharp retrosternal chest pain that radiated to the left arm and was associated with shortness of breath. Pain persisted upon his arrival to the emergency department and was not relieved by sublingual nitroglycerine. On examination, the patient was afebrile, Blood pressure averaged 129/61 mm Hg in all four extremities, with a heart

rate of 76 beats per minute. Chest examination did not reveal any abnormalities or contusion marks.

Cardiac auscultation revealed normal heart sounds without murmurs, gallops, or rubs. No jugular venous distention or lower extremity edema were observed. A 12-lead-electrocardiogram (ECG) was notable for ST segment elevation in the inferior leads with reciprocal changes in the lateral leads all consistent with active ischemia. A bedside echocardiogram showed hypokinesis of the inferior wall with preserved global left ventricle systolic function, and no pericardial effusion. Troponin and CK levels peaked at 3.620 and 3092 respectively. After ruling out aortic dissection with a CT angiography, patient was loaded with oral aspirin, ticagrelor and intravenous bolus of heparin and was emergently taken to the catheterization lab. Invasive coronary angiography demonstrated 100% thrombotic occlusion in the distal right coronary artery with TIMI-0 flow distally, no significant lesions in the rest of the coronary arteries (Figure 1). After thrombus aspiration, repeat angiography showed a focal dissection in the distal right coronary artery (Figure 2). A 4.0×23 mm Xience drug-eluting stent was advanced to the lesion and successfully deployed. At this point, there was TIMI-3 flow throughout the entirety of the vessel. Optimal coherence tomography post-stent deployment showed no evidence of dissection from the ostium of the right coronary through to the distal vessel. After the procedure, patient was admitted to the cardiovascular intensive care unit. Echocardiography prior to discharge showed inferior wall akinesis, normal right ventricular systolic function and normal overall ejection fraction. He was discharged home and was instructed to follow up as in the cardiac rehab facility.

Discussion

This case report describes a rare, yet catastrophic, complication of sport-associated blunt chest trauma. A young patient with no significant past medical history suffered a dissection of the RCA resulting in ST-elevation myocardial infarction after being hit in the chest with opponent's elbow. While uncommon, blunt trauma accounts for a significant portion of cardiac events among athletes. In a registry that looked at athletes who died suddenly or survived cardiac arrest, blunt trauma with subsequent structural cardiac damage was the second most common cause of sudden death¹. The mechanism of coronary occlusion following blunt chest injury could be due to: (i) shear force applied to the coronary arteries causing intimal tear leading to intraluminal thrombosis; (ii) vascular rupture; (iii) embolism to the coronary arteries; (iv) fissuring of an atherosclerotic plaque with dislodgment of plaque material; (v) vascular spasm at the site of the injury². The most frequently injured vessel is the left anterior descending artery, followed by right coronary artery, and occasionally the left circumflex artery³. In our case, patient had no prior coronary artery disease, however the ECG and echocardiogram findings were consistent with active inferior wall myocardial infarction. In conclusion, trauma induced myocardial infarction is not a common entity. However, clinical presentation warranting a high index of suspicion should prompt thorough cardiac work up including ECG, echocardiography, evaluation of cardiac enzymes. Proceeding with invasive coronary angiography is necessary if the findings of these test is suggestive of myocardial injury.

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Figure 1.

Figure 2.