



Traumatic coronary artery dissection leading to ventricular tachycardia[☆]

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ARTICLE INFO

Article history:

Received 7 January 2019

Received in revised form 10 February 2019

Accepted 12 February 2019

ABSTRACT

Traumatic coronary artery dissection is an unusual injury following trauma. It is potentially life threatening and requires prompt recognition on presentation. We present a case report of a 42-year-old male who presented with ventricular tachycardia following a high-speed motorcycle collision that was found to have a coronary artery dissection. The patient had multiple complications, highlighting the importance of early recognition of this disease process.

Published by Elsevier Inc.

1. Introduction

Coronary artery dissection is a rare diagnosis in the emergency department, with causes including spontaneous, iatrogenic, and traumatic [1]. While traumatic dissection is less common, patients typically present with chest pain after blunt thoracic trauma. In this case, we discuss a polytrauma whose presentation included ventricular tachycardia from his coronary artery dissection.

2. Case

A 42-year-old male presented to the emergency department following a high-speed unhelmeted motorcycle collision with a stopped vehicle. Paramedics reported that he was unconscious on scene with an initial blood pressure (BP) of 40/palpation with a wide complex tachycardia on 3-lead-electrocardiogram (ECG). Paramedics infused 2 units whole blood, 2 l normal saline, and 1 g tranexamic acid, resulting in improved BP, narrowing of tachycardia on 3-lead-ECG, and return of consciousness prior to arrival. Vital signs on arrival were BP 120/62, pulse 116, a mild tachypnea, and a Glasgow Coma Scale of 14 with eyes opening to verbal stimuli. Primary and secondary survey in the trauma bay revealed a hemodynamically stable patient with midface instability and bilateral femur deformities. The patient was taken to CT at which point a wide complex rhythm was noted on the monitor and ventricular tachycardia (VT) was confirmed on 12-lead-ECG. Following sedation

with etomidate, a successful synchronized cardioversion was performed, immediately followed by admission to the Trauma Intensive Care Unit (ICU).

In the ICU, a second cardioversion was performed for recurrent VT with a subsequent ECG demonstrating an anterior STEMI (Fig. 1) and elevated troponin. Cardiac catheterization was performed, at which time the patient required vasopressors and dissection noted in the proximal left anterior descending (LAD) coronary artery, subsequently stented. A distal LAD occlusion was identified. While attempting lesion revascularization, the patient went into pulseless ventricular tachycardia but was successfully resuscitated with CPR, placement of an Impella device, and initiation of Extracorporeal Membrane Oxygenation (ECMO).

Following 5 days of ECMO, the patient was decannulated. Repair of bilateral mid-shaft femur fractures was performed, while the LaForte III facial injury repair was deferred due to the risk of intraoperative decompensation. The patient had a prolonged hospital stay, complicated by pulmonary emboli, bilateral pneumothoraces, heparin induced thrombocytopenia, tracheostomy placement, and recurrent urinary tract infections. Echocardiogram prior to discharge demonstrated a reduced ejection fraction of 10–20%. Two months after admission, the patient was discharged to a long-term acute care facility.

3. Discussion

Originally described in 1988, traumatic coronary artery dissection is a rare but life-threatening complication of blunt thoracic trauma, with severe cardiac injury occupying only 5–15% of cases [2,3]. While the exact mechanism is unknown, it is thought to be a result of a tear in the coronary arterial intima from traumatic forces with subsequent platelet aggregation and thrombus [4–6]. The LAD is most often injured, accounting for 76% of cases, while the RCA occupies 12% of cases, and the circumflex artery represents 6% of cases [2,7,8]. In a review of 77 acute myocardial infarctions (MI) after blunt thoracic trauma, the

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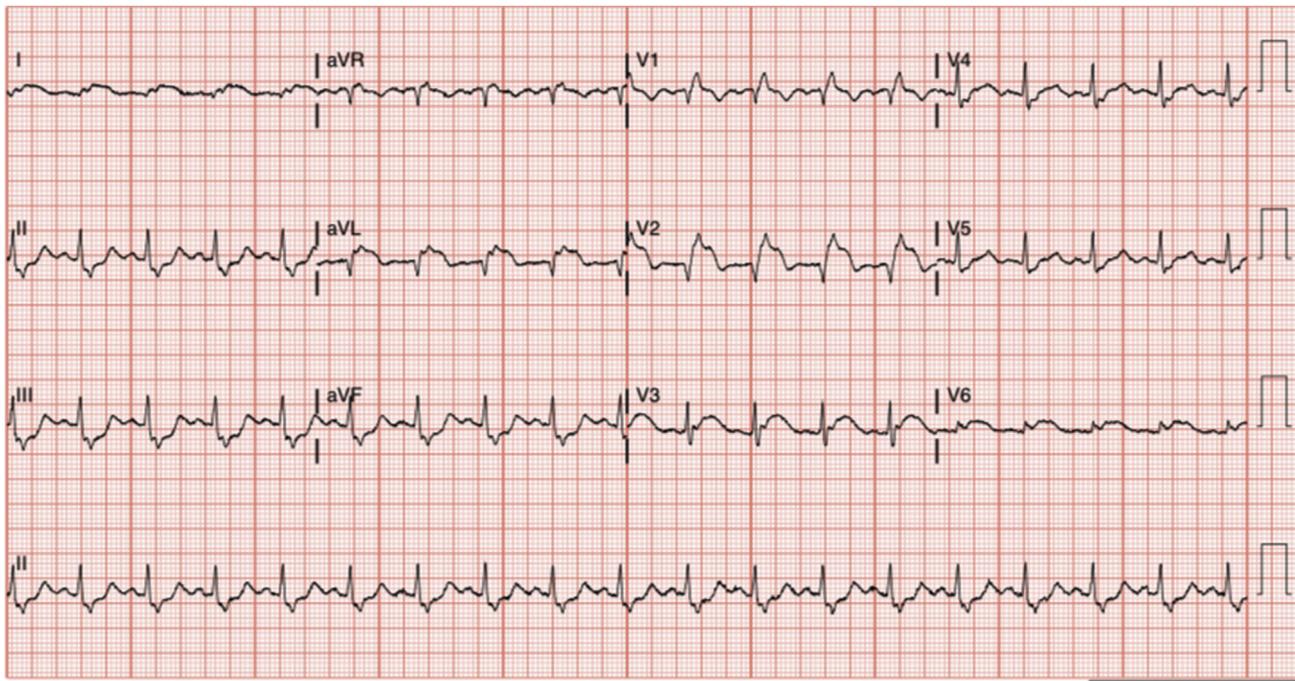


Fig. 1. Patient's EKG showing anterior STEMI.

predominant etiology was males under age 45 in motor vehicle accidents as the chest impacts the steering wheel, though other etiologies include sports, fights, and animal kicks [9].

While 80% of MIs are attributed to atherosclerotic occlusion, non-atherosclerotic etiologies play a larger role in the population with minimal comorbidities that predispose trauma patients to dissection or occlusion [14]. These etiologies include tobacco use, hypercoagulable states, spasm from sympathomimetics, vasculitis, previous mediastinal radiation or vinblastine, congenital coronary artery abnormalities, and embolism [14]. In patients with spontaneous coronary artery dissection (SCAD), the largest risk factor is fibromuscular dysplasia, accounting for >60% of cases [15]. It is uncertain if this contributes in traumatic coronary artery dissection. Distinguishing between a traumatic coronary artery dissection and atherosclerotic plaque rupture can be difficult in these situations. In younger patients with no prior cardiac history, the emergency physician should more closely consider traumatic coronary artery dissection, though catheterization will be both diagnostic and therapeutic.

Prompt ECG, cardiac biomarkers, and echocardiography are first line in establishing the coronary artery dissection diagnosis, with CK-MB holding little utility in a patient with recent trauma [4,5,16]. It should be suspected in anyone with chest pain or arrhythmia developing after a trauma. Coronary CT angiography with ECG gating can be considered, although coronary angiography remains the gold standard [2,4]. Percutaneous transluminal coronary angioplasty and coronary bypass grafting remain the favored treatment options, although no guidelines for the treatment for traumatic coronary artery dissection exist [2,10-13,17-19]. This is different from SCAD, which is typically treated more conservatively with <20% of patients treated with PCI [15]. The treatment can be further complicated as traumatic patients have other injuries that may preclude them from antiplatelet therapy. As such, cardiology should be involved early on in the treatment of this condition to determine the optimal approach. Because of the typical age and relatively minimal atherosclerosis, prognosis for one vessel dissection remains promising [2].

4. Conclusion

In the setting of high velocity blunt trauma with resultant chest pain or arrhythmia, the clinician should maintain a high suspicion of coronary artery dissection.

Acknowledgements

Not presented/published prior. No funding or acknowledgements to claim.

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