Primary Ventricular Fibrillation as The First Presentation of Aortic Dissection: A Case Report

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Case Report

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Abstract

This study is about an infrequent first presentation of Aortic Dissection (AD), and it is primary Ventricular Fibrillation (VF). We present a 64-year-old woman with a history of hypertension who came with sudden retrosternal chest pain, dizziness, nausea, and vomiting. The patient suffered a cardiac arrest a few seconds after admission. Cardiopulmonary resuscitation (CPR) was done for her. An electrocardiogram (ECG) showed ST elevation that demonstrated acute anterior MI (Myocardial Infarction). Trans-thoracic echocardiography (echo) CT angiography demonstrated decreased left ventricular ejection fraction with normal LV size (LVEF=25%) and type A Stanford and type I DeBakey aortic dissection flap from root up to distal of abdominal Aorta. This is while the patient's first presentation was VF, and she had anterior MI, which is unusual for aortic dissection. Therefore, we must consider AD in patients with VF. We have to consider AD in anterior MI patients because of the contraindication of medication.

Introduction

Aortic Dissection (AD) is a rare, life-threatening condition that occurs when the damaged internal layer of Aorta results in blood flowing through the layers of Aorta. We cannot use antiplatelet and anticoagulant drugs because of the surgery situation in type A AD, but we have to use antiplatelet and anticoagulant drugs in Acute Myocardial Infarction (AMI). (1) In this case, Ventricular Fibrillation (VF) and ST-segment elevation guided us to AMI and the use of antiplatelet and anticoagulant drugs and interventional procedures like catheterization. However, like what was said, they should not be used in type A Stanford AD. Therefore there is a difficult situation in type A, AD patients, even in differential diagnosis and follow up.

Case Presentation

A 64-year-old woman with a history of hypertension was admitted to the emergency department of Imam Hossein Hospital in Shahroud at 9:00 AM with sudden retrosternal chest pain (burning and spreading to the arms), dizziness, nausea, and vomiting. Blood pressure (103/63 mm Hg), pulse rate (78 b/min), respiration rate (14 BPM), oxygen saturation (96%), blood sugar (180), and temperature (36°) were checked. Cardiac auscultation sounds were clear, S1 and S2 in cardiac auscultation were heard. Pulmonary auscultation was clear. She had no history of food or drug allergies and did not take any specific medications or other medical conditions. She did not use any medicine for her hypertension and had uncontrolled hypertension.

The first ECG was taken at 9:15, and it showed recurrent PVC. She suffered a cardiac arrest a few seconds after the first ECG. Cardiopulmonary resuscitation (CPR) was done for her, and she received two shocks. The next ECG after successful CPR showed ST elevation in pericardial leads (V2-V6), and we found out that the arrest occurred in the field of acute anterior MI. A 7.5 endotracheal tube was inserted, and she was connected to a ventilator. After 10 minutes of CPR, the rhythm became almost normal.

Routine laboratory tests were done for the patient, and you can see the results in the following table. (Table 1)

Table 1
Hematology and biochemistry tests

	Normal Range
WBC (White blood cells) 13000	4.5 - 11.0 × 10 ⁹ /L
RBC (Red Blood Cell) 3.85	4.2 - 5.4 million cells/mcL
BS (Blood Sugar) 163	< 140 mg/dL
MCV (Mean Cell Volume) 91.1	80 - 100 fL
MCH (Mean Corpuscular Hemoglobin) 30.1	27.5 - 33.2 picograms
Troponin NEG	Negative

Pantoprazole 40 mg IV and Ondansetron 4 mg IV were prescribed. A cardiologist visited the patient, and the paraclinical examination was done.

Trans-thoracic echocardiography was done at the emergency room that demonstrated decreased left ventricular ejection fraction with normal LV size (LVEF=25%) and aortic dissection flap from root up to distal of abdominal Aorta (Figure 1-2) (video 1). CT angiography of Aorta and coronary arteries demonstrated patent epicardial coronary arteries and was in favor of aortic dissection type A Stanford and type I DeBakey (Figure 3). This is while the patient had anterior MI.

The patient's vital signs were controlled every five minutes and the last one was at 6:45 PM blood pressure (114.53 mm Hg), pulse (59 b/min), respiratory rate (12 BPM), oxygen saturation (100%), temperature (37°). The patient needed surgery as soon as possible, and since our hospital did not have the necessary facilities for cardiovascular surgery, she was transferred to a center with these facilities. Ethical approval was obtained from the patient and archived at Shahroud University of Medical Science Research Committee.

Discussion

AD symptoms may be similar to those of other heart disorders; AD is frequently confused with myocardial ischemia leading to a delayed or misdiagnosis, resulting in inappropriate treatment, including antithrombotic agents. (2)

When a dissection flap extends proximally, it may impinge on the orifice of one of the coronary arteries resulting in acute myocardial infarction (AMI) or ischemia. The dissection channel frequently propagates along the greater curvature of the Aorta and may compromise the Ostia of the arch vessels. Given its location on the greater curvature, the right coronary artery is particularly vulnerable to occlusion. This fact helps explain why most myocardial infarctions complicating aortic dissection are inferior in location. However, for patients with AMI, the missed diagnosis of AD could be catastrophic because the antiplatelet therapy and the cardiac catheterization, which are the therapeutic approaches for AMI, are exactly two absolute contraindications to AD treatment, as both of them can aggravate bleeding, broaden the range of the dissection, and even increase the risk of death. (3, 4)

The pain in approximately 17% of cases can change location and follow the dissection path. And other signs like Loss of consciousness, Shortness of breath, Sudden difficulty speaking, loss of vision, weakness or paralysis of one side of your body, similar to those of a stroke, Weak pulse in one arm or thigh compared with the other, leg pain, difficulty walking, leg paralysis, nausea and vomiting. (5)

Standard tests used to diagnose aortic incision include a chest iodine CT scan and an echocardiogram (sensitivity of 77–80% and a specificity of 93–96%). Both Transthoracic Echocardiography (TTE) and Transesophageal Echocardiography (TEE) can be performed quickly for the hemodynamically unstable patient. The TEE can identify the entry site of dissection, the presence of false lumen thrombus, an undulating intimal flap that differentiates the false lumen from the true lumen, the involvement of arch and coronary vessels, pericardial effusion, and severity of aortic valve regurgitation. Other tests that may be used include an aortogram or angiogram of the aortic magnetic resonance or a higher frequency ultrasound. Measurement of blood D-dimer level may be helpful in diagnostic evaluation. Each of these tests has pros and cons and does not have the same sensitivity and characteristics in diagnosing aortic dissection. (6)

10% of type B dissection patients have electrocardiographic signs of ischemia. So differential diagnosis should be performed on all patients to differentiate pain from AMI and AD. A normal ECG was seen in one-third of patients. ECG showed non-specific ST-and T-wave changes in 42%, ischemic changes in 15%, and evidence of acute myocardial infarction in 5% of patients with an ascending aortic dissection. (7)

The chest x-ray is insufficient to rule out or diagnose aortic dissection; however, it has been reported abnormal in 60%-90% of patients. (8)

Both AD and AMI may have onset with acute chest pain, and it is sometimes difficult to diagnose them by symptoms, ECG changes, and/or cardiac biomarkers.

Our case was presented with ECG changes in ST-elevation and VF, which was similar to anterior MI. the physician did echocardiography to confirm his diagnosis and noticed aortic dissection, according to the witness. In contrast, for aortic dissection, we expect inferior MI to occur.

Conclusion

This study states that we have to consider Aortic dissection in patients with the presentation of arrhythmia, especially Ventricular Fibrillation (VF), even if Myocardial infarction has been demonstrated in them.

Declarations

Ethics approval and consent to participate

Research committee of Shahroud University of Medical Sciences has approved this study.

Consent for publication

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

Availability of data and materials

The datasets used during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare no competing interests.

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Figures

Figure 1

transthoracic echocardiography demonstrated Dissection flap in Aortic Arch in long axis (A, B, C) and short-axis view(D).

Figure 2

Dissection flap in abdominal Aorta in long axis(A,C) and short-axis view(B,D).

Figure 3

CT Angiography of Aorta that demonstrated dissection flap in all section of Aorta

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Video1.mov](#)