Atrial flutter mimicking ST-elevation myocardial infarction: A case report

Haifa Bradaï, Rabeb Mbarek, Sondes Laajimi, Dorra Loghmari, Mounir NAIJA.

Emergency Medical Service (SAMU 03), Sahloul University Hospital, Sousse, Tunisia

Abstract

The diagnosis of acute ST-segment elevation myocardial infarction (STEMI) is crucial in the emergency department for the rapid initiation of reperfusion therapy. However, many situations of non-coronary obstruction can mimic the ECG findings of a STEMI. These features are confused with myocardial infarction (MI) on the 12-lead ECG and lead to inappropriate activation of catheterization labs or thrombolytic therapy. In this report, we describe a case of STEMI mimicry produced by prominent atrial flutter waves.

Keywords: Atrial flutter; Myocardial infarction; Diagnosis; Management; Prehospital

CASE REPORT

A 45-year-old man with no previous medical history presented to the emergency department of a primary care hospital with palpitations and chest heaviness. Initial ECG showed narrow-complex tachycardia at 170 bpm with infero-lateral ST-segment elevation (Figure 1).

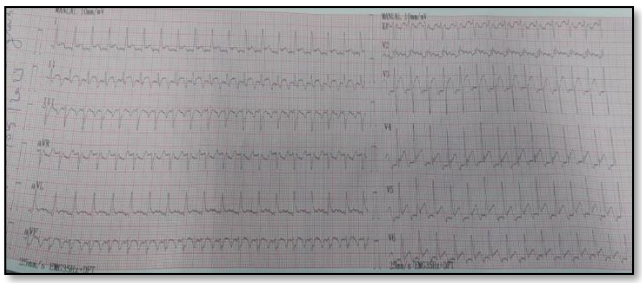


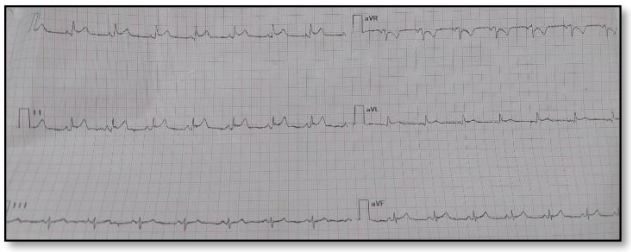
Figure 1: *Initial electrocardiogram*

He received dual antiplatelet therapy (DAPT), unfractionated heparin, analgesics, oral Bisoprolol, and intravenous Amiodarone. The pre-hospital dispatch center was alerted to a STEMI.

The emergency physician found a conscious patient with systolic blood pressure at 120 and diastolic at 80 mm Hg, tachycardia at 180 bpm, and polypnea with crepitant at the base of the lungs. He was treated with 40 mg furosemide, titrated with nitrate, and transferred to the cardiac catheterization laboratory. The coronary angiography was performed and found normal coronary arteries.

On discharge, the patient presented with hypotension and exacerbation of pulmonary edema with persistent arrhythmia. The diagnosis was mal tolerated flutter, requiring electrical cardioversion to sinus rhythm. The ECG showed sinus rhythm with an aspect of early repolarization. (Figure 2 A, Figure 2 B)

A



B

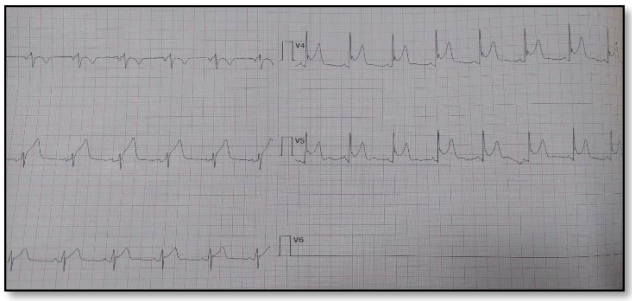


Figure 2: *Post-cardioversion electrocardiogram showing early repolarization in inferior (2A) and anterior (2B) leads*

After electrical cardioversion with confirmation of sinus rhythm, the patient's symptoms resolved, and serial cardiac markers were normal.

DISCUSSION

The 12-lead surface electrocardiogram (ECG) is the cornerstone of prompt acute coronary syndrome (ACS) diagnosis and management, namely ST-elevation Myocardial Infarction (STEMI). The rapid and accurate diagnosis of this critical illness can lead to rapid reperfusion, and it enables the reduction of cardiac ischemic damage and results in improved subsequent outcomes.

However, other conditions aside from STEMI can cause ST-segment elevation on the ECG. Some studies reported that the prevalence of false-positive cardiac catheterization laboratory activations was between 9.2-14%(1)

The ECG remains an imperfect diagnostic tool. Some patients present with classic symptoms and findings; however, around 60-80% of patients with ST-segment elevation on ECG are ultimately not associated with STEMI (1, 2).

Atrial flutter waves, particularly 2:1 atrial flutter, can distort the ST segment in such a way as to mimic a lesion on the electrocardiogram. Flutter waves can mimic ST-segment elevation or depression (3).

However, there have been no previous reports of atrial flutter, masking ST-segment elevation. Atrial flutter has not been included or considered a mimic or confounder of acute myocardial infarction (4,5,6).

Allegedly, the prominent flutter waves distorted the ST segment in this patient and misled physicians into initially considering an inferior STEMI. However, the absence of reciprocal ST-segment changes (ST depression) in the precordial leads could have been a clue. The second ECG ruled out Q waves but created confusion by showing greater ST-segment elevation in precordial leads (V2-V4).

The third ECG confirmed that these changes already existed, although it is still debatable whether there is an additional component of early repolarization changes in the precordial leads contributing to the appearance of a myocardial infarction mimic.

This case demonstrates that atrial flutter waves can mimic ST segment changes, which has been described previously (7)

CONCLUSION

Patients with atrial flutter may present with STEMI due to flutter waves coinciding with ST

segments and Q waves. A repeat ECG with slower atrioventricular conduction during flutter can reveal the diagnosis.

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