Case Report

A fluttering coronary event

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Abstract

Acute coronary syndrome (ACS) is a term used to describe a spectrum of diseases associated with sudden reduced blood flow to the heart. Coronary artery thromboembolism is recognized as an important nonatherosclerotic cause of acute myocardial infarctions in 2.9% of ACS cases, with a long-term outcome indicating that coronary embolism patients represent a high-risk subpopulation. There are various risk factors for developing a coronary thromboembolism, with atrial fibrillation being the most frequently reported cause. Herein, we are presenting a case of a 65-year-old female patient who presented to the emergency department with sudden-onset pressure-like chest pain diagnosed as ACS due to nonatherosclerotic thromboembolism secondary to atrial flutter.

Keywords: Acute coronary syndrome, atrial flutter, coronary artery thromboembolism

Introduction

Acute coronary syndrome (ACS) is a term used to describe a spectrum of diseases associated with sudden reduced blood flow to the heart. Coronary artery thromboembolism is recognized as an important nonatherosclerotic cause of ACS. There are risk factors for developing a coronary thromboembolism, and in the study published by Shibata *et al.*, atrial fibrillation was the most frequent cause. Herein, we are presenting a case of a 65-year-old female patient who presented to the emergency department (ED) with sudden-onset pressure-like chest pain diagnosed as ACS due to nonatherosclerotic thromboembolism secondary to atrial flutter.

Case Report

A 65-year-old African-American female with medical history of hypertension, type 2 diabetes mellitus, rheumatoid arthritis, and a 45-pack-year smoking history presented to the ED complaining of sudden onset, pressure-like non-radiating chest pain that occurred at rest, it was associated with diaphoresis; and there were no relieving or provocative factors. The pain persisted till she arrived to ED. On physical examination, she was alert, oriented, and in acute distress. Her vital signs were temperature 36.3°C; pulse 37 bpm; blood pressure 81/54 mmHg (mean arterial pressure 63); respiratory rate 16 bpm; and O_2% of 95% on 4 L/min oxygen through nasal cannula. Her initial electrocardiogram showed new-onset atrial flutter with ST-segment depression in lead I and V2–V4 [Figure 1]. This was suspicious for a posterior infarct.

She was taken to the cardiac catheterization laboratory urgently. Selective coronary angiography revealed patent left main, left anterior descending, and right coronary artery, but total occlusion of the left circumflex artery at its origin due to thrombus. An aspiration thrombectomy of the left circumflex coronary artery was performed using a 6-French JL4 guiding catheter, a 0.014 mm × 190 cm Cougar guide-wire, and a Fetch catheter. Images following the intervention revealed no ulcerated lesions or residual disease, with thrombolysis in myocardial infarction (TIMI) 3 flow was present immediately on withdrawing the catheter [Figure 2].

The patient became chest-pain free, and her blood pressure normalized; however, she remained in atrial flutter during her hospital stay. Anticoagulation was initiated following a negative hypercoagulable workup. A transesophageal

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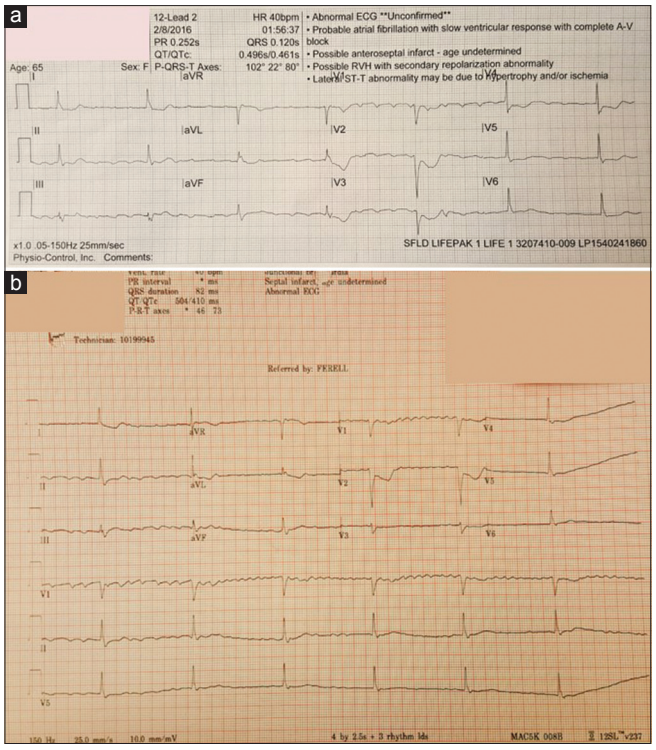

Figure 1: (a) Initial electrocardiogram done by emergency medical service revealed atrial flutter with ST-segment depressions and T-wave inversion in lead I and V2–V4. (b) Repeated electrocardiogram in the emergency department was consistent with initial findings

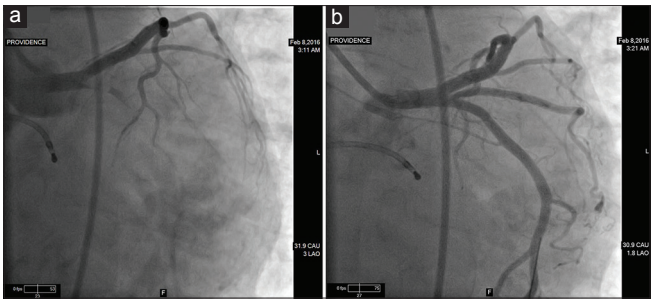

Figure 2: (a) Emergent selective coronary angiography revealed patent left main and left anterior descending coronary arteries, but total occlusion of the left circumflex artery at its origin. (b) An aspiration thrombectomy of the left circumflex coronary artery was performed and images following the intervention revealed no ulcerated lesions or residual disease; with thrombolysis in myocardial infarction (TIMI) 3 flow immediately on withdrawing the catheter

echocardiogram (TEE) was performed (to rule out atrial thrombus and other etiologies of coronary embolism) followed by electric cardioversion which failed to convert her to normal sinus rhythm. She was discharged home with anticoagulation therapy and planned for elective outpatient atrial flutter ablation procedure.

Discussion

Acute myocardial infarctions originating from a thromboembolism are reported in 2.9% of ACS.[1] There are various reported risk factors for developing a coronary thromboembolism, and multiple studies reported atrial fibrillation as the most common cause.[1-6] Given that atrial flutter is also a trigger for thromboembolism, we expect that it may have led to an acute myocardial infarction in our patient. Other reported causes of coronary embolism include hypercoagulable states, recent cardiac surgery, dilated cardiomyopathy, atrial septal defect, and endocarditis.[4,5]

A retrospective study by Shibata *et al.* proposed the National Cerebral and Cardiovascular Center (NCVC) criteria for the clinical diagnosis of coronary embolism which consists of three major and three minor criteria. The authors distinguish between definite (≥2 major criteria, one major criterion plus ≥2 minor criteria, or three minor criteria) and probable (one major criterion plus one minor criterion or two minor criteria) cases of coronary embolism in patients with acute myocardial infarction by scores based on these criteria. The three major criteria included the following: (1) angiographic evidence of coronary artery embolism and thrombosis without atherosclerotic components, (2) concomitant multisite coronary embolism, and (3) concomitant systemic embolization excluding left ventricular thrombus attributable to acute myocardial infarction. The three minor criteria included the following: (1) coronary angiography shows <25% stenosis, except for the culprit lesion; (2) evidence of an embolic source detected by any imaging modality; and (3) coexistence of a potential for thromboembolic disease (atrial fibrillation, cardiomyopathy, rheumatic valvular disease, infective myocarditis, prosthetic valve implantation, recent cardiac surgery, hypercoagulable state, patent foramen ovale, or atrial septal defect).[1,7-9]

In the setting of atrial fibrillation and atrial flutter, it is also important to recognize that an absence of an atrial appendage thrombus on TEE does not preclude thromboembolism. We believe that our patient's clinical presentation, including the angiographic imaging and coronary embolism criteria (one major and two minor NCVC criteria), make the diagnosis of coronary embolism secondary to underlying atrial flutter definite.

As with any other ST-elevation myocardial infarction, urgent intervention is necessary. However, with a coronary embolism, interventional techniques involving aspiration thrombectomy may be more crucial than stent implantation. Although current guidelines suggest no mortality benefit and an increased risk of stroke with routine aspiration thrombectomy, nonatherosclerotic coronary embolism may be an exception. There is currently no consensus in regard to the optimal intervention.[10]

Conclusion

An acute myocardial infarction caused by coronary artery thromboembolism is an atypical entity. Coronary embolism is possible when the angiographic imaging matches and the patient has appropriate risk factors. As with an atherosclerotic myocardial infarction, a high index of suspicion with rapid recognition

and intervention is required for better outcomes. However, diagnosing a coronary embolism is crucial for appropriate measures to be taken in terms of intervention and treatment of the primary cause of the embolism.

Acknowledgment

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initial will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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