CASE REPORT

Atrial fibrillation causing ST elevation myocardial infarction due to coronary embolism: case report and review of the literature

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Abstract

Background: Atrial fibrillation is a rare but important nonatherosclerotic cause of ST elevation myocardial infarction.

Case description: We report the case of a 69 years old woman who presented to our hospital with ST elevation myocardial infarction and permanent atrial fibrillation and eventually treated with thrombus aspiration from the left descending coronary artery.

Conclusion: We have to notice the importance of the appropriate antithrombotic treatment in atrial fibrillation to prevent systemic embolism. In selected cases with ST elevation myocardial infarction due to coronary embolism, aspiration thrombectomy with or without balloon dilatation or stenting can be safely performed. Hippokratia 2016, 20(2):160-162

Keywords: Atrial fibrillation, myocardial infarction, coronary embolism, thrombus aspiration

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Introduction

Acute myocardial infarction in most cases is characterized by atherosclerotic plaque rupture, ulceration, fissure, erosion or dissection with resulting thrombus presence in coronary arteries leading to imbalance between myocardial oxygen supply and demand and subsequent myocardial necrosis[1]. On the other hand, coronary artery embolism (CE) is a rare but important nonatherosclerotic cause of acute myocardial infarction, and atrial fibrillation (AF) is the most frequent cause of CE[2].

We describe the case of a 69 years old woman who presented to our hospital with ST elevation myocardial infarction (STEMI) and permanent AF and eventually treated with thrombus aspiration from the left descending coronary artery (LAD).

Case report

A 69-year-old woman with a history of diabetes mellitus, arterial hypertension, dyslipidemia and persistent AF previously treated with clopidogrel 75 mg, presented complaining of chest pain radiating to the left arm and shoulder, which started 30 minutes before her arrival. Electrocardiogram demonstrated AF and ST-segment elevation in the anterolateral leads (Figure 1). Fifteen minutes after first medical contact she underwent fibrinolysis with 45 mg tenecteplase and she was also treated with a combination of antiplatelet agents (aspirin plus clopidogrel), metoprolol, atorvastatin and anticoagulation with low molecular weight heparin- enoxaparin. One hour later she was free of symptoms, but ST elevation did not improve and 12 hours later patient underwent a coronary angiography. High sensitivity troponin T was elevated at 5.33 ng/l (normal <0.014 ng/l). Coronary angiography, which was performed via right radial artery revealed an image suggestive of a large thrombus in the mid segment of LAD (Figure 2). Manual aspiration via a six French aspiration catheter (Stentys S.A. Paris, France) successfully retrieved a mass from LAD (Figure 3). Coronary angiography post aspiration demonstrated no remaining significant obstructive lesions in the LAD

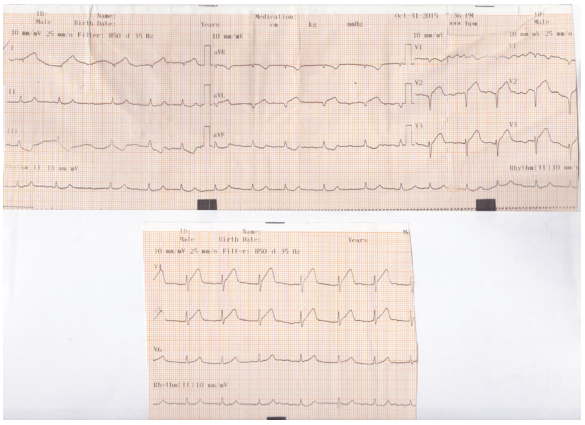

Figure 1: Electrocardiogram showing atrial fibrillation and ST-segment elevation in the anterolateral leads.

Figure 2: Coronary angiography image suggestive of a thrombotic occlusion in the mid-segment of the left descending coronary artery.

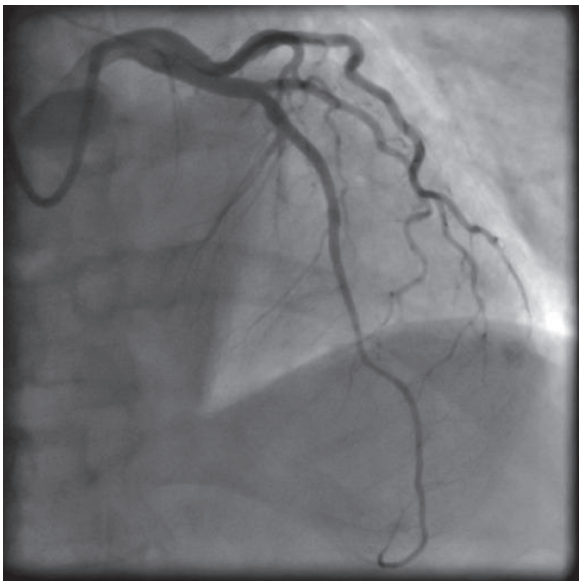

Figure 4: Thrombolysis In Myocardial Infarction (TIMI)-grade three flow in the left descending coronary artery was restored after thrombus aspiration.

and Thrombolysis in Myocardial Infarction (TIMI)-grade three flow was established (Figure 4). No angioplasty or stenting was undertaken. Right coronary artery and left circumflex artery had no significant obstructive lesions.

Angiographic appearance (localized filling defect on coronary angiography) combined with her past history of undertreated AF was highly suggestive of coronary artery embolus related to AF as the underline pathophysiology of STEMI. Mass/thrombus appearance as a cast of LAD measured eight millimeters (mm) in length was also consistent with an embolus. Transesophageal echocardiography was not performed and transthoracic echocardiography showed neither thrombus in the cardiac chambers, nor atrial septal defect or patent foramen ovale. She was discharged on the sixth day postinfarction. During her hospitalization, she remained free of symptoms and there were no recurrent ischemic events or other complications.

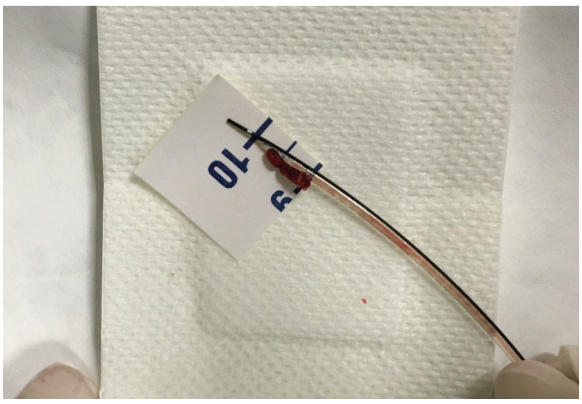

Figure 3: The mass (thrombus) successfully retrieved from the left descending coronary artery through an aspiration catheter (STENTYS AC aspiration catheter).

Discussion

Nonvalvular AF is the most common cause of systemic embolism, especially of CE[3]. AF can occur as a complication of STEMI, but in rare cases acute myocardial infarction can be occurred due to coronary artery embolus and those patients represents a high-risk subgroup requiring close follow-up[4,5].

In our case, successful reperfusion was achieved by aspiration thrombectomy without balloon dilatation or stenting, which is a very effective method of treating STEMI patients due to coronary artery embolism[6]. Use of manual thrombectomy devices can be combined with morbidity and mortality benefit, but in some cases myocardial reperfusion is not fully restored as a result of distal thrombus embolization (no-reflow phenomenon)[7]. On the other hand, optical coherence tomography (OCT) was not performed to exclude an erosion as the cause of thrombus formation and this could be a limitation of this report.

The TAPAS study, comparing a thrombus aspiration group and a percutaneous coronary intervention (PCI) group in patients presented with STEMI, showed favorable findings in cardiac death at one year in thrombus aspiration group[8]. The European Society of Cardiology Guidelines for the management of acute myocardial infarction in patients presenting with STEMI (2012) recommend that routine thrombus aspiration should be considered (class IIa, level B)[9]. On the other hand, TASTE and TOTAL trials compared routine manual thrombus aspiration followed by PCI, and PCI alone and did not show any benefit of thrombus aspiration on mortality, on rehospitalization for myocardial infarction and on stent thrombosis[10,11]. Furthermore TOTAL trial reported an increase in stroke incident in the subgroup of thrombus aspiration[11].

In 2015 the American College of Cardiology (ACC), American Heart Association (AHA) and Society for Cardiovascular Angiography and Interventions (SCAI) published focused guidelines on PCI for patients with STEMI and recommend that the usefulness of selective and bailout aspiration thrombectomy in patients undergoing primary PCI is not well established (class IIb, Level of Evidence: C-LD) and suggest that there is no benefit in routine aspiration thrombectomy before primary PCI (Class III, Level of Evidence: A)[12]. Therefore only in selected cases aspiration thrombectomy without balloon dilatation or stenting can be safely performed[13].

Finally, we have to notice the importance of the appropriate antithrombotic treatment in AF based on CHA2DS2-VASc Score to prevent systemic embolism. As in our case, undertreatment of AF is still very common and antiplatelet therapy is prescribed instead of oral anticoagulation especially in elderly patients[14].

In conclusion, STEMI due to coronary embolism in patients with AF is not a very common situation and aspiration thrombectomy can offer a safe and an effective solution for treatment in patients with otherwise normal coronary arteries on coronary angiography.

Conflict of interest

The authors report no conflict of interest.

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