

Recurrent Thrombosis in a Case of Coronary Ectasia with Large Thrombus Burden Successfully Treated by Adjunctive Warfarin Therapy

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Coronary ectasia (CE) is an uncommon disease. Most patients with CE have coexisting coronary artery stenosis, which can easily lead to acute myocardial infarction (AMI). The current standard treatment for AMI is well-established. However, for CE patients, the standard treatment might fail because of the large thrombus burden. We report a case of CE suffering from AMI twice during a two week period. Percutaneous coronary intervention with aspiration thrombectomy was performed but failed to restore adequate blood flow. Heparin and antiplatelet treatment including glycoprotein IIb/IIIa inhibitor was given for pharmacological management, but follow-up angiography still revealed a poor result. This patient was finally treated with dual antiplatelet therapy in combination with warfarin treatment. Follow-up coronary angiography a few months later showed restored TIMI 3 flow. This patient reminds us that in CE patients with large thrombus burden, if standard treatment fails, long-term warfarin in combination with antiplatelet might be a good alternative choice to decrease thrombus burden and enhance blood flow.

Key Words: Acute myocardial infarction • Anticoagulation • Aspiration thrombectomy • Coronary ectasia • Warfarin

INTRODUCTION

Coronary ectasia (CE) is an uncommon disease and its incidence has been reported in different studies as between 0.3 and 5%,¹ despite some exceptions.² It has been defined as the diameter of the ectatic segment being more than 1.5 times larger compared with an adjacent healthy reference segment with diffuse

dilatation involving more than 50% of the coronary artery.¹ Most cases of CE are considered as a variant of coronary artery disease (CAD).³ The pathogenesis of CE has not yet been completely illustrated; however, it likely involves the destruction of the arterial media, increased wall stress, thinning of the arterial wall, and progressive dilatation of the coronary artery segment. CE could produce sluggish blood flow and predisposes patients to acute myocardial infarction (AMI) even without obstructed coronary arteries.⁴ In addition, large thrombus burden in CE patients complicated with AMI is also a particular challenge to interventional cardiologists. Herein, we report a case of CE with recurrent AMI, where large thrombus burden was difficult to treat by repetitive aspiration thrombectomy and initial medical therapy (aspirin, clopidogrel, glycoprotein IIb/IIIa inhibitor, and heparin). The patient was finally treated by adjunctive warfarin

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therapy, and follow-up coronary angiography showed TIMI 3 blood flow without residual thrombus.

CASE REPORT

A 46-year-old man suffered from sudden onset of severe chest pain and cold sweating in the early morning, and was brought to our emergency department (ED) for first aid. A review of the patient's medical history showed complicating hypertension and chronic hepatitis B, but he denied the existence of any other significant systemic disease. When he arrived at the ED, the patient's vital signs were pulse 65 beats/min and blood pressure 144/96 mmHg. His initial electrocardiogram (ECG) showed ST elevation over lead II, III, and aVF, with reciprocal change over lead I, aVL, and V2-V4 (Figure 1). Subsequent laboratory data revealed elevated cardiac enzymes. Thereafter, emergency coronary angiography was arranged, under the preliminary impression of ST elevation myocardial infarction (STEMI). The right coronary angiogram showed a large ectatic vessel and total occlusion over the middle right coronary artery (RCA) with large thrombus burden (Figure 2A), and left coronary angiogram also showed ectatic vessels but without significant lesion. According to electrocardiographic and angiographic findings, we started to perform percutaneous coronary intervention (PCI) over RCA. Due to the large thrombus burden, we repetitively used a 6-French PercuSurge aspiration catheter (Medtronic, Minneapolis, MN, USA) to extract the thrombus as much as possible. However, after several attempted

thrombus aspirations, only Thrombolysis In Myocardial Infarction grade (TIMI) 1 flow was restored (Figure 2B). Glycoprotein IIb/IIIa inhibitor (Eptifibatide) was given during the procedure for large thrombus burden, but intracoronary thrombolysis was not used because of bleeding concerns. In addition, this patient was only a case of one-vessel-disease involving RCA with stable hemodynamic and improving symptoms, so emergency coronary artery bypass surgery was also not considered. Left ventriculography after PCI revealed near akinesis of the inferior wall. Then, the patient was transferred back to our cardiac care unit (CCU) for further intensive care. After intravenous heparin and IIb/IIIa inhibitor infusion, the patient's chest pain symptom was relieved gradually. In addition, oral medication such as dual antiplatelet (aspirin and clopidogrel), angiotensin-converting enzyme inhibitor, beta blocker, and statin were also given for optimal medical treatment. The patient was discharged after 5 days of treatment.

However, the patient suffered a sudden attack of severe chest tightness again 4 days after discharge, and was brought to our ED again for further evaluation. Follow-up ECG revealed pathologic Q wave and inverted T wave over lead II, III, and aVF. Cardiac enzymes also elevated gradually. Hence, under the impression of non-ST elevation AMI, the patient was again admitted to our CCU. During this CCU stay, intravenous heparin was given again for anticoagulation, and coronary angiography was performed for further lesion evaluation. This time, RCA showed total occlusion with large thrombus burden over a more proximal segment than noted on previous angiography (Figure 2C). Repetitive manual

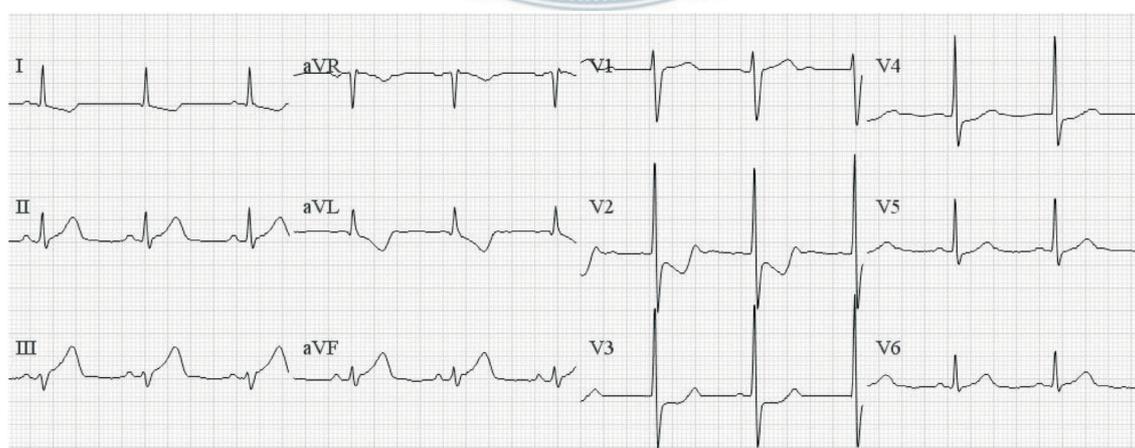


Figure 1. Initial electrocardiogram showed ST elevation over lead II, III, and aVF, and with reciprocal change over lead I, aVL, and V2-V4.

thrombectomy was performed again; however, the thrombus volume was too large to be resolved, and only TIMI 0-1 flow could be restored. We finally abandoned the procedure and decided to treat the lesion in combination with long-term warfarin therapy. The patient was then discharged after several days of treatment. After discharge, we maintained optimal medical treatment in combination with adjunctive warfarin therapy and coronary angiography, which was repeated several months later. This time, TIMI 3 flow was restored and complete resolution of the thrombus was noted (Figure 2D). In addition, follow-up left ventriculography revealed improved inferior wall hypokinesia. Therefore, the patient was finally treated uneventfully with long-term warfarin therapy.

DISCUSSION

CE was reported to be a variant of CAD and is associated with similar risks as patients with CAD.^{1,4} Even in patients with isolated CE without coronary stenosis, there is still a higher incidence of adverse events in this population compared to people with normal coronary arteries. The presence of ectatic segments produces sluggish blood flow, with exercise-induced angina and myocardial infarction (MI), regardless of the severity of coexisting stenotic coronary disease.⁴ The possible causes of higher level adverse events might be related to the repeated dissemination of microemboli to distal segments, or thrombotic occlusion of the dilated vessel. In addition, slow blood flow in the ectatic coronary arteries might be another cause which predisposes a patient to AMI. Disturbances in blood flow filling and washout in the ectatic vessels were due to inappropriate coronary dilatation and were clearly associated with the severity of CE.⁵ The turbulent and stagnant blood flow could induce endothelial damage, increase wall stress, and even cause extensive thrombosis.

Currently, no universal treatment of CE has been recommended because of the low incidence and the lack of clinical controlled trials. The appropriate treatment for CE is still controversial and has become a therapeutic dilemma.⁵ Thrombectomy was reported to be effective at restoring coronary flow, preventing the establishment of no-reflow, and salvaging the infarcted

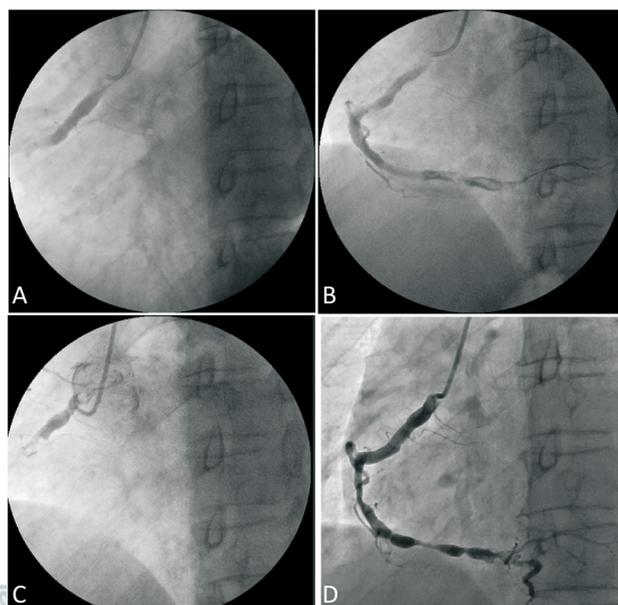


Figure 2. (A) First coronary angiogram before intervention showed large ectatic vessel and total occlusion over the middle right coronary artery (RCA) with large thrombus burden. (B) First coronary angiogram after intervention showed only Thrombolysis In Myocardial Infarction grade (TIMI) 1 flow was restored in RCA. (C) Second coronary angiogram showed total occlusion with large thrombus burden over more proximal segment than previous angiography. (D) Third coronary angiogram showed TIMI 3 flow was restored and complete resolution of the thrombus was noted after warfarin use.

myocardium. In a “Thrombus Aspiration during Percutaneous Coronary Intervention in Acute Myocardial Infarction (TAPAS)” study, thrombus aspiration before stenting of the infarcted artery reduced cardiac death and reinfarction rate more than conventional PCI. In addition, a recent meta-analysis also reported that the use of thrombus aspiration devices in primary PCI significantly improves the clinical outcome and that its effect may add to that of IIb/IIIa inhibitors.⁶ However, when AMI occurs in cases of CE, current reperfusion therapies such as thrombectomy, thrombolysis, and balloon angioplasty with stenting are limited to prevent development of no reflow phenomenon due to the large vessel size with massive thrombus burden and frequently leads to unsuccessful reperfusion. Yip et al. earlier reported the clinical features and outcome of CE in patients with AMI undergoing a primary PCI.⁷ In their study, all of the infarct-related arteries filled with heavy thrombus. The no-reflow phenomenon and distal embolization after primary PCI were found in 62.5 and 70.8% of the infarct-related arteries, respectively.⁷ In

addition, large thrombus burden was also found to be associated with death, repeat AMI, re-intervention, and higher risk of distal embolization and stent thrombosis. Hence, how to decrease the large thrombus burden is a very important treatment strategy issue to prevent no-reflow, and the major adverse events. If PCI fails to resolve the problem, medical treatment might be the most useful strategy to restore adequate blood flow and decreased thrombus burden. Several pharmacological strategies have been proposed to prevent and decrease the high thrombus burden such as thrombolysis, antiplatelet, and anticoagulation therapy. Although intravenous (IV) and intracoronary (IC) thrombolytic therapy have been reported to be successful in patients with CE-related acute coronary thrombosis, they did not result in complete resolution of the coronary thrombosis in the reported observations and required subsequent long-term anticoagulation therapy.⁸ Administration of a GP IIb/IIIa inhibitor has also proven to be beneficial to patients with acute coronary syndromes. There is also a limited case report mentioning the benefit of GP IIb/IIIa inhibitor in combination with heparin in the case of CE.⁹ However, despite repetitive aspiration thrombectomy and combined pharmacotherapy with IV anticoagulation and multiple antiplatelet therapy (including glycoprotein IIb/IIIa inhibitor, aspirin, and clopidogrel), our patient still suffered from another episode of AMI. Coronary angiography revealed large thrombus burden which was difficult to resolve and even progressed to the more proximal RCA.

Previous research based on the thrombus formation and flow disturbances within the CE have suggested chronic anticoagulation as the main therapy, but this treatment strategy has not been tested prospectively and could not be considered as the standard treatment for the patient group. In previous case reports, warfarin was frequently used to achieve complete resolution of residual thrombosis.⁸ In our case, we did not use warfarin during the first time admission because of concerns about bleeding, and the relative improvement of coronary flow and clinical symptoms. The chest discomfort experienced by our patient was relieved gradually under the initial treatment. In addition, coronary artery thrombosis was not considered as the class I indication for warfarin therapy in current guidelines for STEMI. In the U.S. and European guidelines, warfarin

therapy was suggested to be used in the post-STEMI patients with atrial fibrillation for stroke prevention, acute ischemic stroke, mechanical heart valve replacement to avoid thrombus formation, existing left ventricular mural thrombus, high risk of left ventricular thrombus, as well as venous thromboembolism. However, our patient still suffered another episode of AMI 4 days later, after discharge. Due to the failure of further mechanical and pharmacological treatment to the large thrombus burden in ectatic RCA, and considering the recurrent patient AMI episode after only a few days, we decided to add adjunctive warfarin therapy to improve the thromboembolic complication and possible recurrent AMI. After warfarin treatment, the clinical course of our patient was uneventful and follow-up coronary angiography revealed the infarct-related artery became completely recanalized with TIMI 3 flow.

CONCLUSIONS

Aspiration thrombectomy, in combination with a thrombolytic agent, heparin and multiple antiplatelet agents including glycoprotein IIb/IIIa inhibitor, is a useful treatment for acute coronary thrombosis.¹⁰ However, in some special cases such as CE, it might not be as effective as in the general population.⁸ We believe that management of CE with AMI should be individualized depending on clinical and angiographic conditions such as location and amount of thrombus burden. If current standard treatment for CE with AMI fails to achieve the adequate result, early warfarin therapy in combination with antiplatelet is possibly an effective alternative to improve the coronary blood flow and decrease the thrombus burden in the patient group. However, additional controlled studies are necessary for further evaluation.

CONFLICT OF INTERESTS

Non declared.

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