

## Management of myocardial infarction related to *in situ* thrombosis



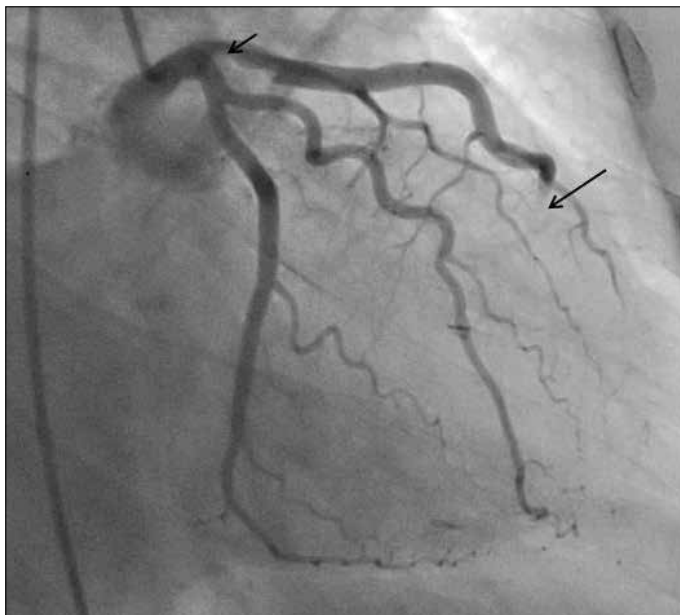
### *In-situ tromboza bağlı miyokardiyal enfarktüs tedavisi*

#### Introduction

Glycoprotein IIb/IIIa (GP IIb/IIIa) blockers and aspiration thrombectomy are now widely used and have been shown to be associated with an improvement in myocardial salvage in high-risk ST-elevation myocardial infarction (STEMI) patients with angiographic evidence of thrombus (1-4).

#### Case Report

A 49-year old female patient was admitted with anginal complaints accompanied by ST-elevation of 3-4mm in leads V2-V4 of electrocardiogram and diagnosis of acute anterior STEMI was established. Diagnostic coronary angiography revealed an ostial thrombotic stenosis in the left anterior descending artery (LAD) (Fig. 1, Video 1. See corresponding video/movie images at [www.anakarder.com](http://www.anakarder.com)). This subtotal occlusive thrombus in the proximal LAD was thought to be the result of endogenous fibrinolysis after total occlusion and the mid occlusion was thought to be due to the embolization from the proximal thrombus. A GP IIb/IIIa blocker tirofiban bolus was given at a dose of 10 microgram/kg IV and both proximal thrombotic lesion and distal occlusion were passed with 0.014 inch floppy wire. Aspiration thrombectomy with Medtronic Export aspiration catheter was performed (Fig. 2). After aspiration thrombectomy, TIMI III flow and a myocardial blush grade (MBG) score of 2 were achieved (Fig. 3, Video 2, 3. See corresponding video/movie images at [www.anakarder.com](http://www.anakarder.com)). To be sure, that there was no dissection, but only in-situ thrombus formation intravascular ultrasonography (IVUS) with CromoFlo was performed with Volcano Eagle Eye Gold IVUS catheter (Fig. 4). Therefore, no balloon angioplasty and stent-

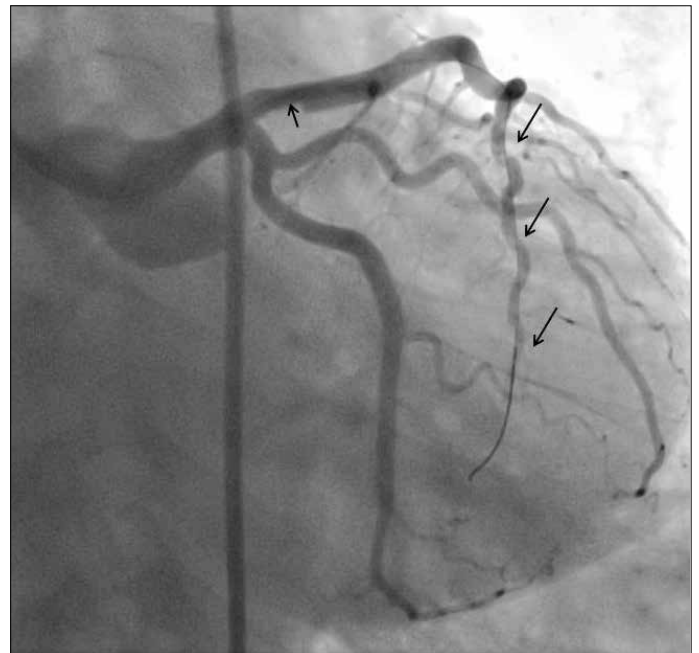


**Figure 1. Right anterior oblique view of left coronary system indicating thrombus in ostial LAD (short arrow) and thrombotic occlusion in mid LAD (long arrow)**

LAD - left anterior descending artery



**Figure 2. Aspiration thrombectomy with Medtronic Export aspiration catheter aspirated fresh thrombi from the lesions**

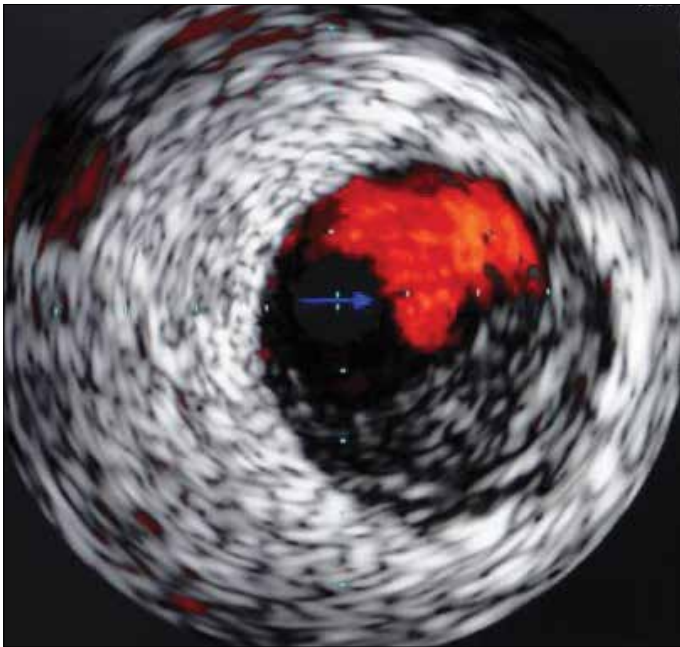


**Figure 3. Right anterior oblique view of left coronary system after tirofiban bolus and aspiration thrombectomy**

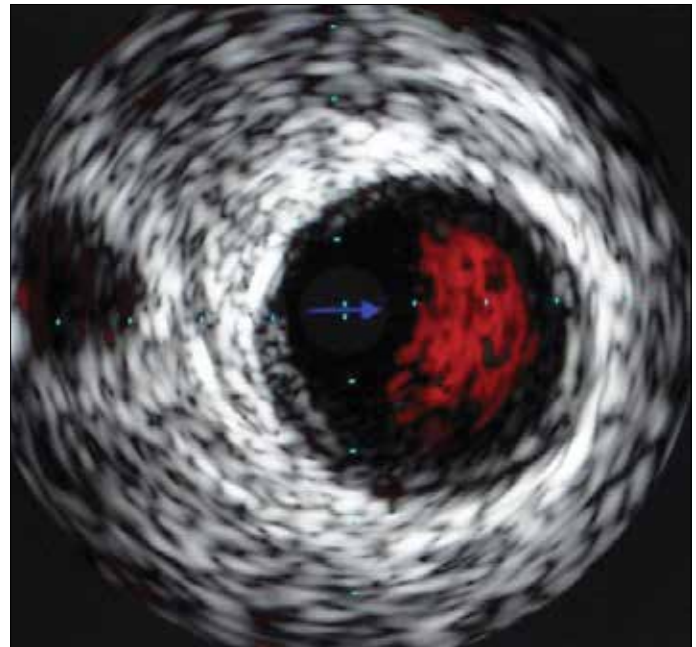
ing procedures were performed. She received heparin and tirofiban infusion for 24 hour. She was consulted with hematology department for the predisposition to hypercoagulability. Laboratory tests showed an increased homocysteine level to 17.2  $\mu\text{mol/L}$  (cut-off values 4.4-13.5  $\mu\text{mol/L}$ ) and folic acid was prescribed at a dose of 5mg per day. Her echocardiographic examination revealed apical akinesia with an ejection fraction of 44%. After one month of folic acid therapy, her homocysteine level was decreased to 9.1  $\mu\text{mol/L}$ . Follow-up coronary angiography at six-month demonstrated that the LAD was clearly open with TIMI III flow (Fig. 5, Video 4, 5, 6. See corresponding video/movie images at [www.anakarder.com](http://www.anakarder.com)) and control IVUS views (Fig. 6) showed that thrombus in the proximal LAD was resolved.

#### Discussion

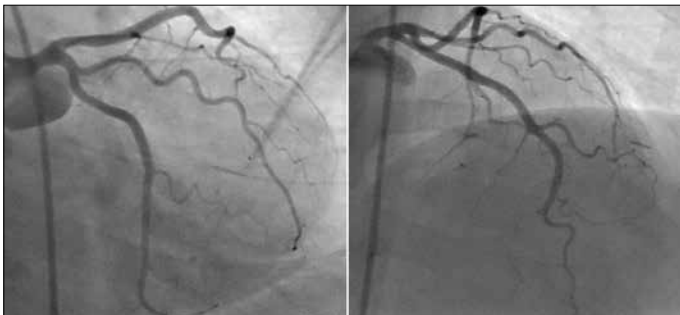
Almost all myocardial infarctions result from coronary atherosclerosis, generally with superimposed coronary thrombosis (1). In patients with high thrombus burden, use of GPIIb/IIIa antagonists accompanied by aspiration



**Figure 4.** Intravascular ultrasonography with CromoFlo indicating in-situ thrombus formation. The vessel wall was free of significant atherosclerotic disease and there was no dissection



**Figure 6.** Follow-up intravascular ultrasonography with CromoFlo was free of significant thrombus burden



**Figure 5.** Follow-up coronary angiography at six-month demonstrated that the LAD was clearly open with TIMI III flow

thrombectomy is of great importance. In revascularization guidelines of European Society of Cardiology published in 2010 and of American Heart Association published in 2011, use of GPIIb/IIIa antagonists was proposed with a class IIa indication in patients with high thrombus burden (2, 3). On the other side, distal thrombus embolization is frequently occurring in patients with high thrombus burden and aspiration thrombectomy was also proposed with a class IIa indication in ESC and AHA revascularization guidelines. Aspiration thrombectomy increased myocardial blush grade and survival rates in Thrombus Aspiration During Percutaneous Coronary Intervention in Acute Myocardial Infarction Study (TAPAS) (4, 5). As we know, plaque morphology, coronary anatomy and the presence or absence of intimal dissection are very important features in the pathophysiology of STEMI. Atherogenic and nonatherogenic forms of myocardial infarction can exactly be distinguished with IVUS (6).

In-situ thrombosis is an important cause of nonatherogenic myocardial infarction. It is generally related to hematological disorders associated with hyperviscosity (7). Elevated plasma homocysteine levels are associated with an increased risk of thrombosis (8). The current data links hyperhomocysteinemia and folate status with cellular and protein injury via oxidant stress. Nevertheless, in various clinical trials vitamin supplementation failed to exert significant effects on cardiovascular risk in spite of the lowering of homocysteine levels (9).

According to the latest literature based on the TAPAS trial, in primary PCI for STEMI, aspiration thrombectomy has provided better ST segment resolution, myocardial blush, and 1-year mortality rates compared to PCI alone (4, 5, 10). When our patient was concerned, she had large thrombus in the LAD, however, after thrombus aspiration we did not require to perform angioplasty in the light of the IVUS study, since it has shown that there was not any atherosclerotic lesion or dissection in LAD. In this point, the importance of the IVUS study should be emphasized for avoiding an unnecessary PCI procedure which itself is related to intimal injury and subsequently thrombotic and stenotic complications.

## Conclusion

As a result we have shown that eligible patients with in situ coronary thrombus could be treated with aspiration thrombectomy without angioplasty along with a IVUS study excluding coronary atherosclerotic lesions and intimal dissection.

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**Video 1.** Right anterior oblique view of left coronary system indicating thrombus in ostial LAD

**Video 2.** Right anterior oblique view of left coronary system after tirofiban bolus and aspiration thrombectomy

**Video 3.** Left coronary system after tirofiban bolus and aspiration thrombectomy

**Video 4.** Follow-up coronary angiography at six-month demonstrated that the LAD was clearly open with TIMI III flow.

**Video 5.** Right anterior oblique view of left coronary system at six-month demonstrated that the LAD was clearly open with TIMI III flow

LAD - left anterior descending artery

**Video 6.** Follow-up coronary angiography at six-month demonstrated that the LAD was clearly open with TIMI III flow

LAD - left anterior descending artery

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## Cannabis smoking and sildenafil citrate induced acute coronary syndrome in a patient with myocardial bridge

*Miyokart köprüsü olan bir hastada esrar içilmesi ve sildenafil sitrat ile indüklenen akut koroner sendrom*

### Introduction

Cannabis is a common substance of drug abuse among young adults because of its euphoric and addictive effects (1, 2). The pathophysiological effects of cannabis smoking and its relation to adverse

cardiovascular events have been previously reported (1, 2). Sildenafil citrate is widely used as a primary pharmacological treatment of erectile dysfunction in men with and without underlying cardiovascular disease (3). However, the relative contribution of cannabis smoking when combined with sildenafil citrate in pathogenesis of acute coronary syndrome (ACS) is not well known.

We present here a case of cannabis smoking and sildenafil citrate induced ACS in a patient with myocardial bridge.

### Case Report

A 42-year-old man presented to the emergency department with severe ongoing chest pain radiating to both arms followed by nausea and excessive sweating. The pain had started shortly after he had smoked two cannabis cigarettes with taking 50 mg sildenafil citrate and had engaged in sexual activity. Patient's history was normal except for smoking. Upon his visit to the emergency, the patient's blood pressure was 110/60 mmHg, with a rapid pulse of 130 beats/min. Initial electrocardiogram (ECG) showed sinus tachycardia and ST segment elevation in leads V1-V3 (Fig. 1A). Because the findings were thought to favor the ACS, the patient immediately underwent a coronary angiography. The left coronary angiogram revealed a myocardial bridging causing 100% systolic compression of mid-segment of left anterior descending artery with return to a normal caliber during diastole (Fig. 2) and right coronary angiogram showed hypoplastic coronary artery. Initial laboratory study revealed mildly elevated creatine kinase MB fraction with 7.1 ng/mL (normal range <5 ng/mL). The patient was started on aspirin, diltiazem, nitrate and lipid lowering agent and discharged home 4 days with disappearance of chest pain and ST elevation on ECG (Fig. 1B) after his cardiac catheterization. He remained asymptomatic and will be followed up regularly to determine whether abstinence from cannabis will prevent him from experiencing any future episodes of ACS.

### Discussion

Cannabis derived from the plant *Cannabis sativa* is a common drug of abuse among young adults because of its euphoric and addictive



**Figure 1. Initial electrocardiogram (ECG) showed sinus tachycardia and ST segment elevation in leads V1-V3 (A). There is no evidence of ST segment elevation on follow-up ECG (B)**



**Figure 2. The left coronary angiogram revealed a myocardial bridging causing 100% systolic compression of mid-segment of left anterior descending artery with return to a normal caliber during diastole**