

Spontaneous left main coronary artery dissection treated with primary stenting

Primer stent uygulanarak tedavi edilen spontan sol ana koroner arter diseksiyonu

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Summary– Spontaneous left main coronary artery (LMCA) dissection is an unusual cause of myocardial ischemia and sudden death. It is defined as an intramural hematoma of the media of the vessel wall. A 56-year-old male who underwent a two-vessel bypass ten years previous presented with chest pain for two hours. His blood pressure and heart rate were 60/35 mmHg and 120 beats per minute, respectively. The ECG showed inferior ST-segment elevation. Coronary angiography revealed total LMCA occlusion with dissection flap. A dissection flap was collapsing the true lumen of the LMCA. A bare metal stent was implanted after the flap was perforated and fenestrated by a stiff guide wire. Good TIMI 3 flow was achieved in the circumflex artery. Three months after the index procedure, coronary computed tomography angiography disclosed thrombosis of the false lumen beneath the patent left main stent. In conclusion, primer stenting can be successfully performed in the presence of spontaneous LMCA dissection.

Özet– Spontan sol ana koroner arter (LMCA) diseksiyonu miyokart iskemisinin nadir görülen ve genellikle ölümlü sonuçlanan bir nedendir. Damar duvarının medya tabakasındaki duvar içi tromboz olarak tanımlanmaktadır. On yıl önce iki damar baypas operasyonu yapılan 56 yaşındaki erkek hasta iki saatlik göğüs ağrısı yakınmasıyla başvurdu. Kan basıncı 60/35 mmHg ve kalp atım hızı 120/dk idi. EKG’de inferiyor derivasyonlarda ST-segment yükselmesi görüldü. Koroner anjiyografide LMCA’nın diseksiyon flepi ile tıkanmış olduğu görüldü. Diseksiyon flepi sert klavuz tel aracılığı ile delindikten sonra damara çıplak metal stent yerleştirildi. Stent yerleştirilmesinden sonra sirkumfleks arterde TIMI 3 akım izlendi. Üç ay sonra yapılan bilgisayarlı tomografi koroner anjiyografide sol ana koronerdeki stentin açık olduğu ve stentin altında kalan yalancı lümenin pıhtı tıkaçı ile kapandığı gözlemlendi. Sonuç olarak primer stent yerleştirilme işlemi spontan LMCA diseksiyonlu olgularda başarıyla uygulanabilir.

Spontaneous coronary artery dissection (SCAD) is an unusual cause of myocardial ischemia and sudden death. SCAD is defined as an intramural hematoma of the media of the vessel wall^[1] and mostly affects otherwise healthy, young to middle-aged women. Less than 1% of SCAD cases occur in the left main coronary artery (LMCA), and generally the treatment is surgery.^[2]

Abbreviations:

Cx	Circumflex
LAD	Left anterior descending
LM	Left main
LMCA	Left main coronary artery
MSCT	Multi-slice computed tomography
RCA	Right coronary artery
SCAD	Spontaneous coronary artery dissection

Herein, we present a case of acute inferior myocardial infarction with spontaneous LMCA dissection treated with primary stenting in a 56-year-old male.

CASE REPORT

A 56-year-old male who underwent a two-vessel bypass ten years previous presented with chest pain for two hours. The ECG showed inferior myocardial infarction without any sign of right ventricular infarction. His blood pressure was 60/35 mmHg and his heart rate was 120 bpm (sinus tachycardia). Intravenous fluids and inotropes, clopidogrel (600 mg),

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and aspirin (300 mg) were administered. The patient was immediately taken to the angiography laboratory. Coronary angiography revealed total left main (LM) occlusion with dissection flap, causing TIMI 2 flow in the circumflex (Cx) artery, mild atherosclerotic disease in the native right coronary artery (RCA), a completely occluded venous graft to the RCA, and a patent left internal mammary artery in communication with the left anterior descending (LAD) artery (Fig. 1a, Video 1*). The LAD had been totally occluded before the surgery. A dissection flap collapsed the true lumen of the left main artery. It was not possible to pass a soft guide wire into the true lumen. The flap was perforated and then fenestrated by a stiff guide wire. A 3.5x30 mm bare metal stent was directly implanted from the left main to the proximal Cx artery at 18 atm (Fig. 1b). Post-dilation was performed with a stent balloon at 20 atm. Good TIMI 3 flow was achieved in the Cx artery (Fig. 1c, Video 2*). An intra-aortic balloon pump was placed within the descending aorta under fluoroscopy and removed five days later. The patient continued to receive intravenous inotropes for two days after the procedure. The echocardiography on the second day showed moderate mitral insufficiency with mildly impaired left ventricular systolic dysfunction. The patient was discharged in good condition and placed on clopidogrel, aspirin, a beta-blocker, and an ace inhibitor. Three months after the index procedure, coronary CT angiography disclosed thrombosis of the false lumen beneath the patent left main stent (Fig. 2).

DISCUSSION

The incidence of spontaneous coronary artery dissection is 0.2% to 1.1% in angiography series.^[3] SCAD has been classified into three groups: a) SCAD with significant preexisting atherosclerosis; b) SCAD occurring during the peripartum period or in association with oral contraceptive use; and c) idiopathic SCAD.^[2] Atherosclerotic SCAD develops in older patients, predominately males, and has a better prognosis.^[2,3] SCAD in women usually affects the LAD or LM and develops during the peripartum period or in association with oral contraceptive use.^[2,3] In contrast, SCAD in men frequently develops in association with atherosclerosis, and the RCA is commonly involved.^[2,3] Some conditions associated with SCAD are collagen disease, cocaine use, vigorous physical activity, blunt chest trauma, smoking, hypertension, and severe psy-

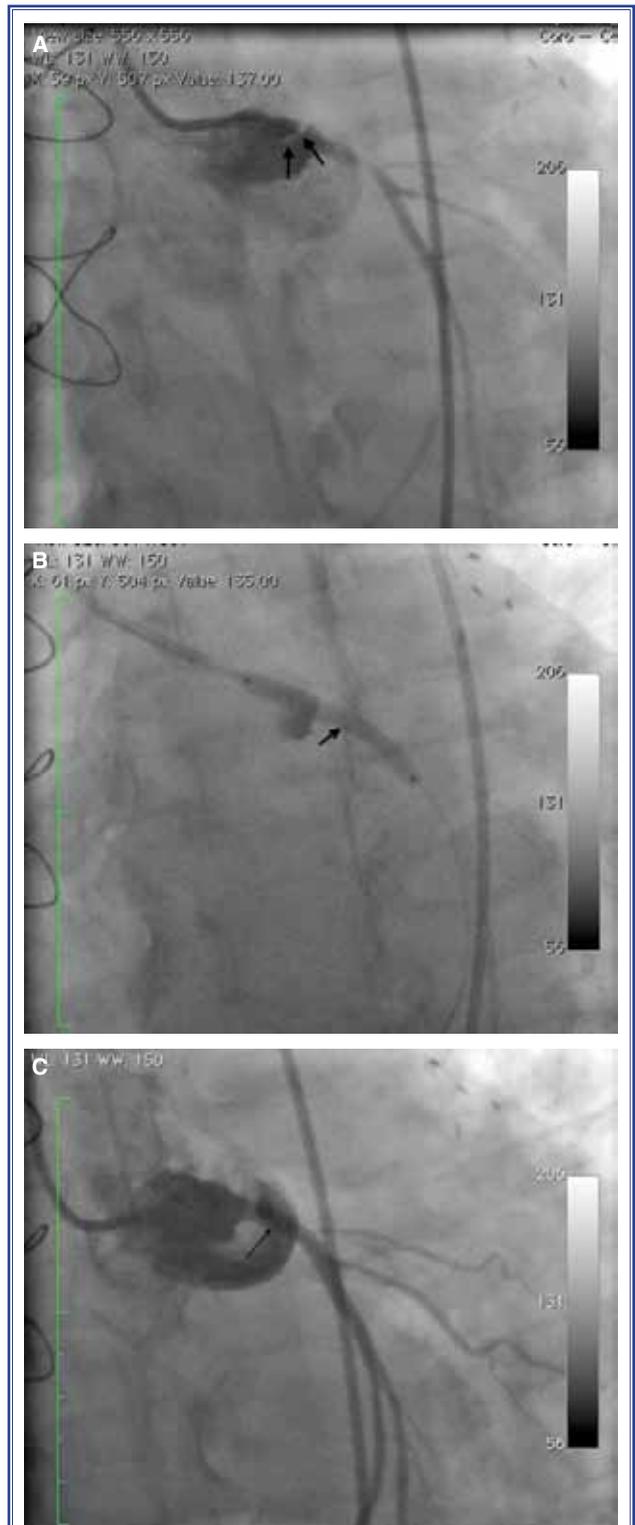


Figure 1. (A) Coronary angiography image (caudal view) showing the totally occluded left main coronary artery with dissection flap (Video 1). (B) The stent implanted from the left main to the circumflex artery. (C) Good TIMI 3 flow in the circumflex artery after implantation of the stent in the left main (caudal view) (Video 2).

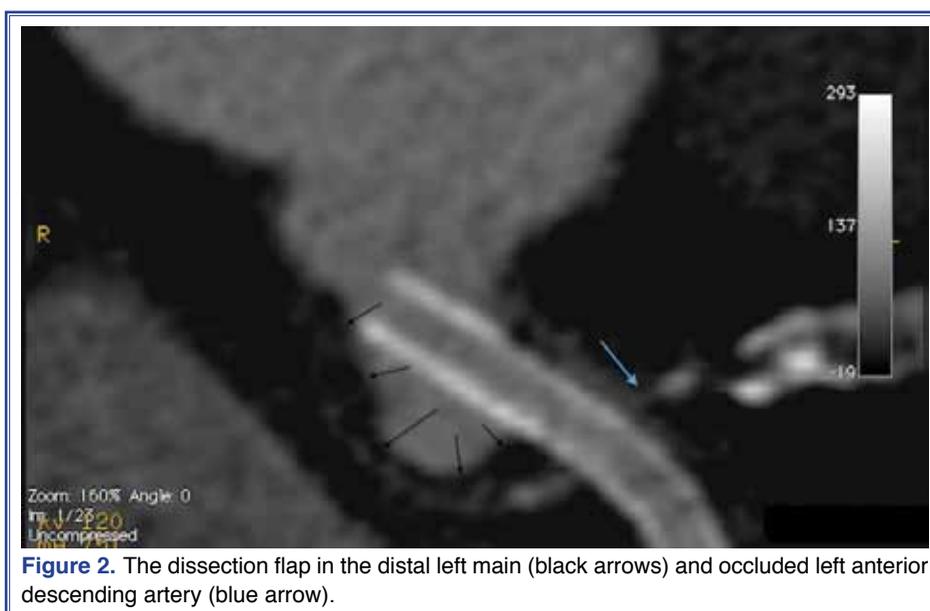


Figure 2. The dissection flap in the distal left main (black arrows) and occluded left anterior descending artery (blue arrow).

chological stress.^[4] In our case, SCAD was probably related to atherosclerosis.

SCAD results in the formation of a false lumen through an intramural hematoma. Expansion of this lumen with blood flow or clot formation compromises the true lumen, and myocardial ischemia eventually develops. Patients may present with chronic stable angina, acute coronary syndrome, myocardial infarction, cardiogenic shock, sudden cardiac death, or cardiac tamponade.^[5] Although the ECG did not show any signs, right ventricular infarction or mitral insufficiency might have contributed to the development of cardiogenic shock.

Usually, the diagnosis is determined by the appearance of the dissection and by delayed clearance of contrast media during coronary angiography. Intravascular ultrasound, optical coherence tomography, angioscopy, and multi-slice computed tomography (MSCT) can be helpful during diagnosis and percutaneous coronary intervention.^[6-9] Moreover, MSCT can be used for follow-up, as in this case. In the present case, the dissection flap could be seen easily on both the initial angiogram and the follow-up MSCT three months after the index procedure. MSCT also revealed that the stent was positioned across the dissection flap in the distal LM, reaching the Cx (Fig. 2).

Possible management options include conventional medical therapy, surgery or stenting. The treatment should be determined based on clinical presentation, extent of dissection, and amount of myocardium at

stake. In the case of SCAD in small-caliber distal vessels or side branches with TIMI 3 flow, conventional management is appropriate. If SCAD affects large-caliber or major epicardial coronary vessels, and flow is impaired with accompanying ischemia and electrocardiographic changes, revascularization is required. Although medical therapy as performed in cases of acute coronary syndrome is recommended and achieves good long-term survival in stable patients, it is unclear whether β -blockers, antiplatelet agents, heparin, or thrombolytic agents should be used in SCAD cases.^[10,11] However, ongoing ischemia, despite medical therapy, or extensive SCAD, especially in the LM or proximal LAD, should prompt urgent revascularization.^[11] In the absence of severe left ventricular impairment, symptomatic patients with single-vessel dissection who present with acute coronary syndrome or recurrent ischemia may benefit from primary stenting.^[11] Nevertheless, technical problems which occur during stenting include advancing the guide wire in the true lumen rather than in the false lumen, distal propagation of the intramural hematoma, and dissection during stent delivery.^[12] We overcame difficulties in advancing the guide wire in the true lumen by perforating the dissection. Most reported cases of SCAD in the LMCA were treated with surgery, and only a few cases were managed with percutaneous revascularization.^[13,14] After recovering from the initial event, prognosis is favorable.^[15] In our case, the patient was in cardiogenic shock, and prompt revascularization was needed and achieved with primary stenting.

In conclusion, SCAD in the LMCA results in a life-threatening condition. Primary stenting is an effective option with which to seal such dissections. Due to the very low number of surgeries which have been performed, it is very difficult to compare the results of treating SCAD in the LMCA with surgery versus percutaneous revascularization.

***Supplementary video files associated with this case can be found in the online version of the journal.**

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Key words: Acute disease; coronary angiography; myocardial infarction; stents.

Anahtar sözcükler: Akut hastalık; koroner anjiyografi; miyokart enfarktüsü; stent.