

## Spontaneous coronary artery dissection: two different surgical techniques

### *Spontan koroner arter diseksiyonu: İki farklı cerrahi teknik*

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In this article, two different surgical techniques employed in two cases of spontaneous coronary artery dissection are discussed. In the first case, left internal thoracic artery anastomosis (LITA) to left anterior descending artery (LAD) after endarterectomy was performed and in the second case, the dissected LAD layers were repaired and LITA anastomosis was performed. We recommend the use of endarterectomy in the presence of predisposing factors and in vessels inappropriate for bypass or angioplasty.

**Key words:** Coronary aneurysm; endarterectomy; spontaneous coronary artery dissection.

Spontaneous coronary artery dissection (SCAD) is a rare cause of acute myocardial ischemia or sudden death,<sup>[1]</sup> and it results from an intramural hematoma in the media of the arterial wall that creates a false lumen.<sup>[2]</sup> The intramural hematoma in the false lumen causes compression and/or occlusion of the true lumen which leads to myocardial ischemia.<sup>[3]</sup> This article presents two cases of SCAD in which two different surgical techniques were used according to the type of dissection presented.

### CASE REPORT

**Case 1–** A 37-year-old female was admitted to another cardiology clinic with chest pain. Coronary angiography was performed due to ST segment and T wave changes at the anterior and lateral leads on an electrocardiogram (ECG) which were associated with ischemia. A long segment of spiral dissection of the left anterior descending artery (LAD) was defined (Figure 1). The patient was hemodynamically stable at the time of admission to our hospital. She did not have any history of prior pregnancies or abortions. The only risk factors for SCAD were oral contraceptive use

Bu yazıda iki spontan koroner arter diseksiyonu olgusunda uygulanan iki farklı cerrahi teknik tartışıldı. Birinci olguda sol anterior inen artere (LAD) endarterektomi sonrası sol internal torasik arter anastomozu (LİTA) yapılır iken, ikinci olguda diseke LAD katmanları tamir edildi ve LİTA anastomozu gerçekleştirildi. Predispozan faktörler varlığında veya bypass ya da anjiyoplastiye uygun olmayan damarlarda endarterektomi yapılmasını önermekteyiz.

**Anahtar sözcükler:** Koroner anevrizma; endarterektomi; spontan koroner arter diseksiyonu.

and a history of smoking. Normal serum and urine  $\beta$  human chorionic gonadotropin (HCG) tests excluded pregnancy. Urgent coronary artery bypass grafting (CABG) was planned for the dissected artery. Surgical CABG was performed with cardiopulmonary bypass (CPB), moderate hypothermia (29 °C), and antegrade and retrograde cardioplegia under general anesthesia conditions. The spiral dissection on the LAD was long, beginning from the first diagonal branch and continuing towards the distal site of the vessel. There were thrombi as well as ecchymosis between the medial and adventitial layers. The thrombotic areas were excised and a 10 cm endarterectomy was performed on the LAD. The left internal thoracic artery (LITA) was cut longitudinally, and a 10 cm patch angioplasty was performed on the LAD (Figure 2). On the sixth postoperative day, a coronary angiogram revealed a patent graft and a completely visible LAD (Figure 3).

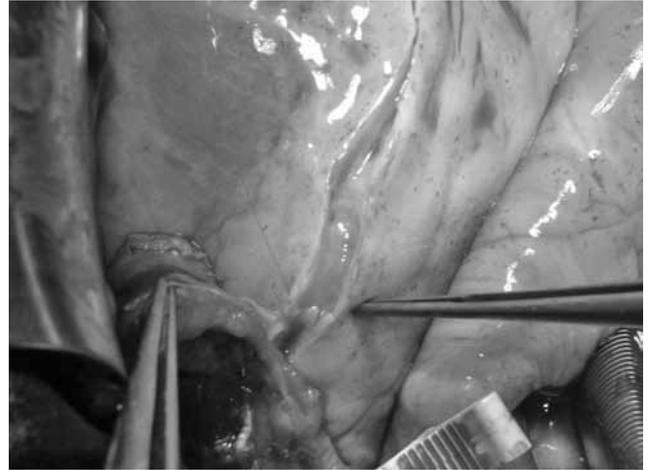
**Case 2–** A 39-year-old female was admitted to our hospital with severe chest pain. She did not have any risk factors. Pregnancy was ruled out by serum and urine  $\beta$  HCG assays. Although ischemic findings in the lateral leads on ECG were present, serum creatine

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**Figure 1.** Angiographic view of the long segment of spiral dissection of the LAD.



**Figure 2.** 10 cm endarterectomy and patch angioplasty on the LAD.

kinase-myoglobin and troponin blood levels were normal. The patient was treated medically with intravenous heparin and nitrates. Coronary angiography revealed a dissection involving the LAD and atherosclerosis in the circumflex artery (Figure 4). Though the dissection involved only a single, limited vessel, urgent CABG was planned because of the coexisting coronary lesion of 80% in the circumflex artery. Anesthesia and CPB procedures were similar to the first case. The dissection involving the LAD was limited, and there were no thrombi between the medial and adventitial layers. The dissected layers were sutured to each other in order to create a true lumen, and LITA anastomosis was performed on the true lumen. Reverse saphenous

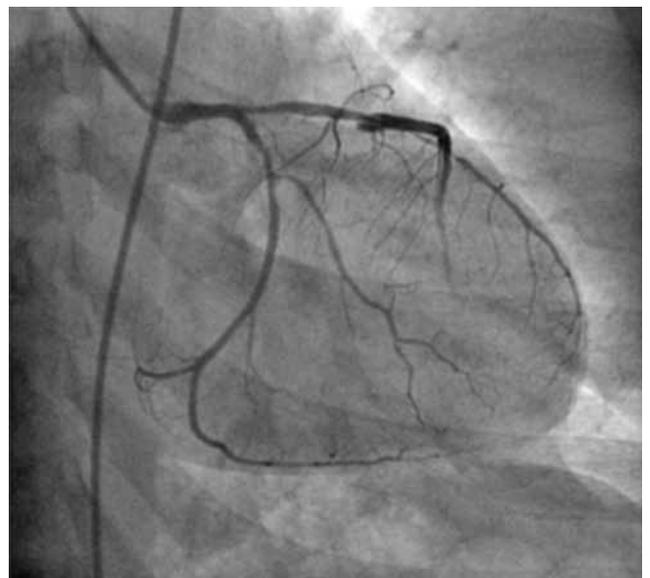
anastomosis was performed on the circumflex artery. On the ninth postoperative day, a coronary angiogram was performed. The graft was patent, and the LAD could be observed except for the distal one-third segment of the vessel. This led us to think there may have been another dissection of the distal segment of the vessel (Figure 5).

## DISCUSSION

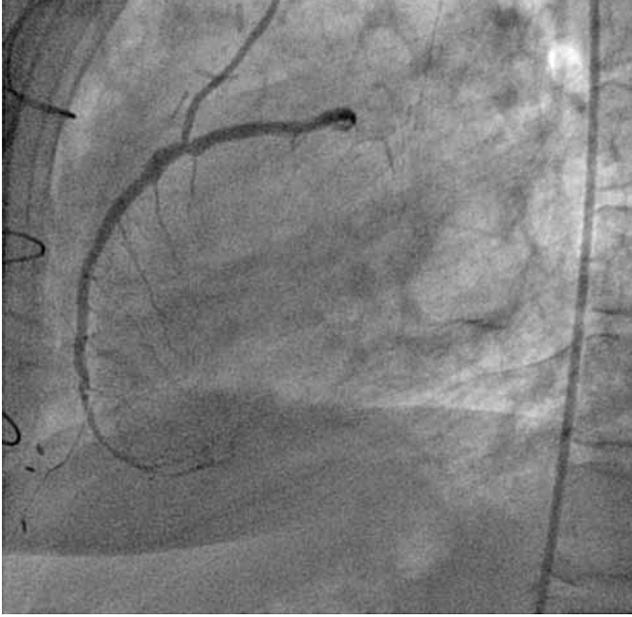
Spontaneous coronary artery dissection is a rare clinical entity and an unusual cause of myocardial ischemia. The majority (80%) of cases involve young women during the peripartum period or are associated with oral contraceptive use.<sup>[4]</sup>



**Figure 3.** Postoperative coronary angiogram revealed a patent graft and a completely visible LAD.



**Figure 4.** Angiographic view of the dissection involving the LAD and atherosclerosis in the circumflex artery.



**Figure 5.** Postoperative coronary angiogram revealed a patent LITA graft, and a visible LAD except for the distal one-third segment of the vessel.

When secondary causes, such as aortic dissection, blunt trauma, coronary angiography, angioplasty, or surgical manipulations, are excluded, the etiology and pathogenesis of SCAD remains uncertain.<sup>[1]</sup>

The pattern and the severity of the symptoms are associated with the extent of the dissection and its location. Acute myocardial ischemia or sudden death have been described as the most common presentations in previous articles.<sup>[5]</sup>

The treatment modalities for SCAD vary from medical therapy to revascularization procedures using percutaneous intervention or CABG.<sup>[5]</sup> Intracoronary stenting may be the better treatment modality for individuals with single vessel SCAD not involving the left main coronary artery (LMCA) or for patients who present with acute coronary syndromes or recurrent ischemia.<sup>[5]</sup> Surgical revascularization is preferred for SCAD with multivessel involvement, LMCA involvement, or refractory recurrent ischemia.<sup>[5,6]</sup> We think that even when the dissection is on a single vessel, surgical revascularization has to be kept in mind according to the extent, type, and severity of the dissection. Thus, we decided to perform CABG with an endarterectomy, although only the LAD was involved in the first case, because of the long, spiral-shaped dissection. In the presence of predisposing factors for SCAD, such as some collagen tissue diseases, we recommend surgery and a further endarterectomy

instead of percutaneous interventions in order to avoid recurrence of the dissection on the same vessel because revascularization does not alter the underlying propensity for further dissection in some subjects.<sup>[7]</sup>

Although indications and techniques of CABG for SCAD are reported to be the same as for patients with isolated atherosclerotic coronary artery disease in some articles,<sup>[8]</sup> we speculate that selected surgical techniques have to be performed according to the type and extent of the dissection. Johnson et al.,<sup>[3]</sup> who reported a case in which they performed an endarterectomy on a dissected LAD artery and coronary reconstruction with a saphenous vein graft, mentioned that the intima is not needed for coronary function and extensively damaged intima should be removed. In our first case, because performing an anastomosis to an occluded true lumen secondary to the long, spiral-shaped dissection is not beneficial, we performed a 10 cm endarterectomy and reconstructed the LAD with LITA. In our second case, because the dissection was limited, we created a true lumen by repairing the damaged vessel via suturing the dissected layers to each other and performing LITA anastomosis to the true lumen. On the ninth postoperative day, a coronary angiogram was performed. The graft was patent, and the LAD could be observed except for the distal third of the vessel. This led us to think there may have been another dissection of the distal segment even though the patient had had no symptoms to indicate this. We think that performing an open endarterectomy could have prevented us from missing the probable distal dissection in this case. However, we did not plan any further treatment because the patient was asymptomatic, and the graft was patent.

In conclusion, the decision to pursue medical treatment, percutaneous coronary interventions, or surgical revascularization in SCAD depends on the clinical picture and severity of the dissection. Although percutaneous coronary interventions are suggested for single vessel dissections in the literature, we speculate that surgical revascularization must always be considered depending on the extent and shape of the dissection, even when a single vessel is involved. We also think that surgical techniques for SCAD are not always the same as for patients with isolated atherosclerotic coronary artery disease. Our recommendation is to perform an endarterectomy on vessels unsuitable for bypass or angioplasty due to extensively damaged intima and/or existing clots. In the presence of predisposing factors, the clinician should not rule out performing an open endarterectomy, even in cases of limited dissections, because of unexpected dissections of distal segments of the same vessel.

Therefore, we conclude that the best manner in which to evaluate the origin and endpoint of the dissection is by observing it directly. Another probable advantage for an endarterectomy in the treatment of SCAD is it prevents a possible recurrence of the dissection on the same vessel.

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