Successful Management of Spontaneous Coronary Artery Dissection: A Case of Event-Free 5 Years Follow-Up

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Abstract

Spontaneous coronary artery dissection (SCAD) is non-iatrogenic longitudinal separation of the coronary arterial walls, generating true and false lumens. Although it was known as a disease of the young females without cardiovascular risk factors, recent evidences have revealed that SCAD can also be seen in older patients having traditional risk factors for atherosclerosis. In this report, we present a 50-year-old female patient with the SCAD of left anterior descending artery (LAD) leading to anterior myocardial infarction, ten days previously and persisting angina. She was successfully treated using intravascular ultrasound (IVUS) by stenting dissected segment. She has done well since then, and stent patency was demonstrated with coronary computed angiography (CTA) at the fifth-year follow up.

Keywords: Coronary Dissection, Ivus, Percutaneous

1. Introduction

Spontaneous coronary artery dissection (SCAD) is non-iatrogenic longitudinal separation of the coronary arterial walls, generating true and false lumens. Although it was known as a disease of the young females without cardiovascular risk factors, recent evidences have revealed that SCAD can also be seen in older patients having traditional risk factors for atherosclerosis (1-3).

It usually presents with acute coronary syndrome (ACS) or, less commonly, with stable angina pectoris (SAP), ventricular arrhythmias, and sudden cardiac death (4, 5). Its frequency ranges from 0.1% to 4% in patients with ACS depending on imaging technique that is used for the diagnosis of SCAD such as optical coherence tomography (OCT) or intravascular ultrasound (IVUS) (6).

The classical angiographic appearance of SCAD is radiolucent intimal flap associated with contrast dye staining on the arterial wall that can be easily recognized with conventional coronary angiography. There have been several studies and the treatment options for SCAD are controversial, as well. A generally accepted opinion exists among physicians supporting using an initial conservative management strategy in patients without ongoing chest pain, ischemia, ST elevation, or hemodynamic instability.

In this report, we present a 50-years-old female patient with the SCAD of left anterior descending artery (LAD) leading to anterior myocardial infarction ten days previously and persisting angina. She was successfully treated using intravascular ultrasound (IVUS) by stenting dissected segment. She has done well since then, and stent patency was demonstrated with coronary computed angiography (CTA) at the fifth-year follow up.

2. Case Presentation

A 50-year-old female patient was referred to our hospital with angina 10 days after a ST-segment elevation myocardial infarction (STEMI). Coronary angiography (CAG) was performed due to ongoing ischemia. Left main coronary artery, circumflex, and right coronary arteries were angiographically normal. A dissection line starting from the mid-LAD and extending to distal part of the LAD (Figure 1A) was seen. Furthermore, a false lumen involving a large hematoma that partially obliterated the true lumen and disrupted TIMI flow was revealed. The extent of dissection and intramural hematoma were clearly visualized with intravascular ultrasound (IVUS) (Figure 1D, 1G). Furthermore, a reduction in luminal area and the absence of atheromatous plaque were confirmed using IVUS. An everolimus eluting stent (2.75 × 28 mm) was deployed to seal dissection plane (Figure 1B) according to the IVUS guideline to make sure that the stent is completely coated the dissecting segment.

After the stenting, IVUS was repeated (Figure 1E). No residual dissection was observed, distortion of the true lumen was diminished and stent apposition was appropriate.
3. Discussion

SCAD was originally described in the young women without traditional cardiovascular risk factors (1, 7). Although, SCAD can be occurred less frequently in males, some published studies demonstrated male predominance in patients with associated coronary artery disease (2).

SCAD is classified into three groups according to the angiographic findings (8). Type I angiographic SCAD represents the classical angiographic pattern of SCAD which is defined as pathognomonic contrast dye staining of arterial wall with multiple radiolucent lumen (intimal flap) detected by conventional coronary angiography with no need for any additional imaging techniques. Type II angiographic SCAD is characterized by the abrupt change in arterial caliber, with demarcation from normal diameter to diffuse smooth narrowing. This type of SCAD is often misdiagnosed as atherosclerotic narrowing without using IVUS or OCT. Type III SCAD (mimic atherosclerosis) is the most challenging type and there is no clue on conventional angiography to distinguish this type of SCAD from atherosclerotic stenosis. Saw et al. found type II as the most frequent type of SCAD accounting for 67% of cases. The LAD artery was the most commonly affected vessel in almost all previous studies (8, 9).

It is difficult to decide which patients with SCAD are suitable for revascularization. First, majority of those patients present with ACS (especially STEMI) which increases the importance of rapid and correct decision and encourages us in favour of revascularization. However, those are the findings of the recent studies that promote a watchful waiting strategy: 1) determination of high admission TIMI flow grade (> 2) in patients with SCAD (8), 2) low procedural success rate of PCI in patients with SCAD, 3) suspicion about the long term patency of grafts that attached to the dissected vessels, 4) spontaneous healing of the dissected segments after conservative treatment, 5) a decrease in hospital mortality rate regardless of initial treatment modality. An initially conservative strategy was recommended for all SCAD patients in the absence of persistent or recurrent ischemia (2). Recent studies have noted a lower procedural success rate of PCI in patients with SCAD compared with atherosclerotic lesions. The success rates in those studies range from 64% to 72.5% (8, 9). There are several technical and anatomical factors that may explain this lower procedural success rate. Some of these reasons are the difficulty in directing guidewire tip to true lumen, extension of dissection line accidentally while trying to proceed the guidewire in the false lumen, and propagation of intramural hematoma (IMH) during intervention leading to impairment of antegrade flow due to the compression of vessel wall. In addition, spontaneous healing of vessel wall may lead to the late stent malapposition and late stent thrombosis. Considering the procedural risk and long-term durability, PCI should be restricted to the patients with ongoing ischemia, chest pain, hemodynamic instability and ST elevation. Regarding PCI as the most appropriate choice for the patient, there are some tips that should be taken into account while performing PCI to improve the results. The length of the selected stent should be at least 5 - 10 mm longer than the lesion to allow an adequate coverage on either side of the dissection line. Stenting the distal edge first, followed by the proximal edge and then the middle section is another reasonable approach for longer lesions, which requires multiple overlapping stents. The goals of this strategy are to prevent extension of IMH, proximally and distally. Another important issue that must be emphasized is residual distal dissections that can be seen after stent deployment. Complete disappearance of the dissection image at the follow-up can be occurred in most of these patients without intervention. When it is feasible, the generally accepted strategy for the dissection in large and proximal vessels is to treat them with PCI in case of ongoing ischemia. Dissection of distal vessels of small caliber with preserved blood flow (TIMI 2 - 3) should be followed with initial conservative strategy.

Furthermore, coronary artery bypass grafting patency in patients with SCAD may not be promising, due to the native flow competition which develops as a result of spontaneous healing of dissected vessel over time. Consequently, surgical revascularization should be limited to the patients with ongoing or recurrent ischemia and multivessel or left main SCAD or PCI failure on main coronary arteries (9).

3.1. Conclusions

This case is instructive to show that patients with SCAD and ongoing ischemia should be treated by the available choice, accordingly. Furthermore, non-atherosclerotic SS-CAD can successfully be followed up non-invasively by CTA after stenting and the coating of the site of dissection by drug eluting stent to prevent atherosclerosis in this region.
Figure 1. A, Coronary angiogram showing a dissection line starting from the mid-left anterior descending coronary artery (LAD) and extending to the distal part of the LAD; B, An everolimus eluting stent that sealing dissection plane was deployed, successfully; C, Atherosclerosis started in the stent distally was seen at the fifth-year follow-up coronary computed tomography angiography (CTA); D, Intramural hematoma dissection length is demonstrated with intravascular ultrasound (IVUS); E, Closure of the dissection site was revealed with post-stenting IVUS; F, Stent apposition and vessel patency were still satisfactory at fifth-year coronary CTA; G, False lumen of the dissected LAD was seen with IVUS; I, Atherosclerotic plaque is demonstrated at the fifth-year control coronary CTA.

References