Dissection Flap Protruding Through Stent Struts

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A 64-year-old male with unstable angina underwent direct stenting in the proximal and mid-left anterior descending coronary artery (LAD) lesions. Although coronary angiography showed a good result, intravascular ultrasound imaging revealed a dissection flap protruding through the struts of the stent in the proximal LAD. Another stent was deployed in the first stent (stent-in-stent) to seal it. The patient’s in-hospital course was uneventful. Subacute stent thrombosis was not observed. (Jpn Circ J 2001; 65: 50–51)

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Severe coronary artery dissection had been one of the most feared complications of percutaneous transluminal angioplasty because it often resulted in acute or threatened closure! However, since the coronary stent was introduced, it can be treated with stents that have the potential to seal a dissection flap against the vascular wall. This case report describes an unusual dissection flap protruding through the struts of a stent.

Case Report

A 64-year-old male who had unstable angina was referred for coronary angiography, which revealed a 70% stenosis in the proximal left anterior descending coronary artery (LAD) (Fig 1A) and a 60% stenosis in the mid-LAD. There was no significant stenosis in the right coronary artery or the left circumflex artery. An 8Fr VFL 3.5 guiding catheter (Boston Scientific, Maple Grove, MN, USA) was engaged at the left main ostium. A 0.014" Balance guidewire (Guidant, Temecula, CA, USA) was advanced into the distal LAD. Intravascular ultrasound (IVUS) imaging was performed in the proximal and mid-LAD using a 30-MHz 3.2 Fr UltraCross catheter (Boston Scientific). The IVUS image revealed significant stenoses in both the proximal (Fig 2A) and mid-LAD. A 13-mm Tristar stent (Guidant) premounted on a 3.5 mm balloon catheter was deployed in the mid-LAD using an inflation pressure of 15 atm. Then, a 15-mm AVE S670 stent (Medtronic AVE, Santa Rosa, CA, USA), premounted on a 4.0-mm balloon catheter, was deployed in the proximal LAD using an inflation pressure of 12 atm. Coronary angiography showed good results in both lesions (Fig 1B). IVUS image demonstrated good lumen in both the proximal and mid-LAD lesions except for a dissection flap in the stent in the proximal LAD where the diagonal branch came into the LAD (Fig 2B). A 9-mm NIR stent (Boston Scientific) premounted on a 4.0 mm balloon catheter was then deployed in the first stent to seal the dissection flap using an inflation pressure of 14 atm. Because ostial compromise of the diagonal branch was observed, kissing balloon inflation was performed using a 3.25-mm Solaris balloon catheter (Guidant) inflated to 12 atm for the proximal LAD and a 2.25 mm Adante balloon catheter (Boston Scientific) inflated to 8 atm for the diagonal branch. The final angiography showed a good result (Fig 1C) and the IVUS image showed good lumen with double stent struts and no dissection flap (Fig 2C).

Prior to stent implantation, the patient was given aspirin (325 mg) and clopidogrel (450 mg), and following stent implantation, aspirin (325 mg/day) and clopidogrel (75 mg/day) was started for 1 month. The patient’s in-hospital course was uneventful. Subacute stent thrombosis was not observed.

Discussion

Severe coronary artery dissection after percutaneous transluminal coronary angioplasty often causes abrupt closure. Coronary stents are ideally suited to treat dissection because of the scaffolding effect of the stent, which can protect against further propagation of the dissection and/or occlusion of the vascular lumen by the flap. Previous studies have had high success rates with stents in the treatment of acute or threatened closure to seal dissections to the vascular wall. Hamon et al demonstrated by angiography a dissection flap protruding through the struts of a Wiktor stent. Heijer et al evaluated a case of subacute stent occlusion with angiography, which revealed obstructive intimal flaps through the articulation of a Palmaz-Schatz stent. IVUS imaging is a more sensitive method for detecting information about the coronary artery and in the present case report it showed a dissection flap in a S670 stent, although a good result was demonstrated by angiography. The S670 stent is the next generation of the GFX II stent (Medtronic AVE) and is made of 1.5-mm units that have 7 crowns in circumference (Fig 3). Each unit is connected at 2 points to the next unit, which makes the stent flexible. The dissection flap was observed where a diagonal branch came into the LAD. The stent may have been overexpanded at that segment, resulting in less coverage, which allowed tissue protrusion through the stent.

Additional stenting was performed to treat the dissection flap and the second stent successfully sealed it. This stent-in-stent technique has been used to treat plaque prolapse in the stent and in-stent restenosis! but it does result in increased metal surface area, which might cause subacute stent thrombosis or restenosis? However, in the present
Dissection Flap in Coronary Stent

Fig 1. Left coronary angiography in the right anterior oblique projection showing a 70% stenosis in the proximal left anterior descending coronary artery (arrow) (A). Coronary angiography after the first stent deployment shows a good result (B). The final angiography after additional stenting in the first stent (stent-in-stent) demonstrates a good result.

Fig 2. Intravascular ultrasound (IVUS) image revealing a significant stenosis in the proximal left anterior descending coronary artery (LAD) (A). IVUS image demonstrates a dissection flap (arrowheads) in the stent (arrows) where the diagonal branch comes into the LAD (B). IVUS image shows good lumen with double stent struts (arrowheads) and no dissection flap (C). *Guidewire artifact.

Fig 3. Schema of the S670 stent.

case the large dissection flap might have caused flow disturbance in the coronary artery, resulting in abrupt closure or subacute stent thrombosis, unless the additional stenting had been performed. Subacute stent thrombosis was not observed in this case and antiplatelet therapy may play a significant role in preventing this complication. The effect of this technique on restenosis is beyond the scope of this case report.

IVUS imaging revealed a dissection flap in the stent that could not be demonstrated by angiography. Liberal use of IVUS is important to optimize stent deployment.

References