Stent Recoil in Overlapping Stent 18 Years After Wiktor Stent Implantation

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Summary
In this paper, we look at the case of a 79 years old male who received a Wiktor stent (WS) implantation for myocardial infarction in proximal left anterior descending artery 18 years ago. Eleven years later, an Everolimus eluting stent (EES; Xience V™) was implanted for the proximal edge restenosis of WS from mid left main trunk to the middle part of WS. Seven years after EES implantation, the angiography and optical coherence tomography revealed in-stent restenosis with severe stent recoil just distal to the overlapping zone of WS. In the present case, stent recoil seems to have occurred due to different radial stiffness and flexibility between the two stents.

Key words: Stent fracture, Radial stiffness, Stent overlapping

Percutaneous coronary intervention (PCI) with stenting improves clinical performance in patients with ischemic heart disease. However, the long-term clinical outcome after stenting has not improved with the times, in spite of the amelioration of the stent design and concept. The stent deformation, including recoil and fracture, are known to be deeply associated with this phenomenon. We experienced a severe stent deformation case when stents with different types were overlapped.

Case Report
A 79 years old male with a history of anterior old myocardial infarction and prior PCI was admitted to our hospital due to effort angina. Eighteen years prior to this admission when he was 61 years old, he experienced anterior ST-elevation myocardial infarction. He received one Wiktor stent (WS) for the treatment of lesion in the proximal left anterior descending artery (LAD). A follow up angiography performed eleven years later revealed stenosis in the proximal edge of the WS. An Everolimus eluting stent (EES; Xience V™) was implanted from mid left main trunk to the middle part of WS (Figure 1). The controls of coronary risk factors were acceptable, except for diabetes mellitus (HbA1c = 7.8%). The routine 12-month follow up angiography after the EES implantation revealed 50% stenosis without ischemia in the overlapping zone. Seven years after EES implantation (18 years after WS implantation), he was suffering from effort angina. The angiography revealed in-stent restenosis with stent recoil in the middle of WS (Figure 2). The morphological status of his heart changed within an 18 year time period, the left ventricular end-diastolic dimension increased (53 mm to 65 mm) and the left ventricular ejection fraction decreased (53% to 30%). Revascularization was performed for the in-stent lesion. Optical coherence tomography (OCT) findings demonstrated that stent struts in the stenosis lesion had collapsed and were covered with diffusely thickened neointima in a layered tissue pattern (Figure 2). WS showed hinge motion in the distal site of the overlap lapping zone. Another drug eluting stent (Xience Alpine™) was implanted in the LAD. Hinge motion disappeared and lumen area was enlarged after the procedure (minimum stent area increased 3.80 mm² to 7.55 mm²).

Discussion
In the present case, angiography and OCT revealed stent recoil with neatherosclerosis in the distal part of the overlapping zone between 2 different stents of distinct designs. WS acted as the hinge motion at a fulcrum of the distal edge of EES in the middle of LAD, after EES implantation.

Stent recoil is defined as an abnormal and postoperative stent axial deformation. Stent fracture, including stent recoil after stent implantation, sometimes causes target lesion revascularization. Although the exact mechanism is unknown, the change in angulation of the lesion after stenting, total stent length, vessel tortuosity, the stent design, and overlapping stent are associated with the stent deformation.
The findings of angiography and intravascular ultrasound at the time of everolimus eluting stent (EES; Xience V™) implantation. A: Mixed plaque was observed in the proximal edge of Wiktor stent (WS). WS was expanded into proximal left anterior descending artery. B: EES was implanted from mid left main trunk to the middle part of WS. The mild under-expansion without stent recoil was shown in the distal from the overlapping zone (Area of stent lumen at the distal end of overlapping zone decreased; 5.58 mm² to 4.91 mm²).

The angiography and optical coherence tomography (OCT) findings 18 years after WS implantation. The angiography and OCT demonstrated stent recoil with neatherosclerosis in 5 mm distance from the overlapping zone (area of stent lumen = 3.80 mm²; minimum lumen area = 1.71 mm²) (A). EES was quite well expanded, and almost all stent struts were covered with thin neointima (B).
ated with this phenomenon. Fortunately, complete stent fracture was not observed in this case. However, it is possible an adverse event, such as stent thrombosis and sudden death following stent fracture, could have occurred if this stent deformation was left unremedied.

In recent years, a variety of stent-less percutaneous treatment strategies have become available, such as drug-coated balloon in in-stent restenosis and selected de novo lesion or directional coronary atherectomy in the bifurcated lesion including left main trunk. In the present study, these novel strategies might have led to a better long-term clinical outcome.

These findings suggest that overlapping stents of different types may cause stent recoil and aim to help decide the optimum strategy in the case of a lesion near the stent.

Disclosures

Conflicts of interest: None.

References


