Histology and Optical Coherence Tomography Images of Restenotic Lesions due to Late Catch-Up Phenomenon after Sirolimus-Eluting Stent Implantation

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Back ground

• Medical literatures have recently focused on late catch-up phenomenon after drug-eluting stent (DES) implantation.

• As optical coherence tomography (OCT) allows the visualization of fine lesions in intima and angioscopy dose the detailed observation from the surface of intima, the mechanisms of late catch-up phenomenon after DES implantation are mainly discussed with the OCT and angioscopy images.
However the histological study of the lesions that will directly clear the mechanisms has not been reported yet. Here we report on the patient with late catch-up phenomenon after sirolimus-eluting stent (SES) implantation, whose lesions were observed by intravascular ultrasound (IVUS) and OCT, and assessed histologically after removal by directional coronary atherectomy (DCA).
Clinical history

• A 47-year-old man presented to our hospital with unstable angina pectoris in May 2004. Coronary angiography (CAG) showed 90% stenosis in the proximal portion of the left anterior descending (LAD) artery, which was treated with a $4.0 \times 18$ mm bare metal stent.

• In December 2004, follow-up CAG showed in-stent restenosis at the site, which was treated with a $3.5 \times 23$ mm SES.

• In September 2005, follow-up CAG showed no restenosis at the site.
PCI to LAD (2004/5/26)

RAO 30° CAU 20°

LAO 45° CRA 30°

BMS implantation (PENTA 4*18mm)
PCI to LAD (2004/12/6)

RAO 30° CAU 20°

LAO 45° CRA

SES in BMS (Cypher 3.5*23mm)
Clinical history

- In August 2010, he presented to our hospital with intermittent claudication. We performed percutaneous peripheral intervention for the right and left common iliac arteries. At this time, CAG revealed 90% tandem restenosis lesions in the proximal portion of the LAD, which was late catch-up phenomenon at 68 months after SES implantation.
68M after SES Implantation (ISR) “Late Catch-up Phenomenon” (2010/7/22)
Pre DCA (OCT)

PENTA 4*18
Cypher 3.5*23
Histological Examination of Distal Lesion
Histologica Examination of Proximal Lesion
Conclusion

• In the present case, we directly shows that late catch-up phenomenon after DES implantation is caused by the two mechanisms by OCT images and histological findings.

• One mechanism is the atherosclerotic transformation of the neointima and the other is thrombus formation on uncovered stent struts.