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A case with in-stent restenosis due to crushed strut by heavy surrounding calcium behind the stent

A 68-year-old male was admitted to our hospital with chest pain on effort. He has a history of old myocardial infarction and diabetes mellitus.

Previously he received PCI at the time of initial myocardial infarction and implanted bare metal stent 2.75/18 and everolimus-eluting stent (EES) 2.75/20 to mid LCX. After that, he received PCI again because of recurrent angina and was implanted additional EES 3.0/38, 2.5/32 to the proximal to mid LAD following rotational atherectomy. Furthermore, he had other EES 3.5/23, 3.5/38, 2.5/18 to the mid to distal RCA following rotational atherectomy as well.

Eighteen month later after PCI to LAD, we performed coronary angiography because he had developed recurrent angina pectoris.

He had stent edge stenosis at proximal LAD, moreover proximal edge of the stent was crushed by heavy calcium behind previously implanted stent. Our strategy for this case was to ablate heavy calcium with rotational atherectomy without sequent stent implantation.

We started procedure with 8F Judkins left 3.5 guiding catheter for preparing larger size of a burr. IVUS revealed that, the implanted stent was crushed circumferentially by heavy calcium at proximal edge, and neointima was further involved in restenosis. OFDI revealed calcium behind stent was extremely thick circumferentially. Both imaging devices were located in the center of the lumen at restenotic site, and angiography did not show any bending from ostial LMT to proximal LAD in-stent restenosis site. That means wire bias should be nice during rotational atherectomy with large burr.

We started rotational atherectomy with 2.0mm burr extremely carefully, then we stepped up the burr size to 2.25mm in order to ablate crushed stent strut and calcium that located behind the stent at proximal edge. IVUS after ablation showed sufficient lumen at restenosis site, and OFDI revealed that crushed stent strut was disappeared. Moreover, calcium behind crushed stent were well ablated without any dissection. After drug-coated balloon, we finished this procedure without additional stent implantation.

It has been reported that long term patency of well-expanded DES in patients with calcified lesion is satisfactory compared with BMS.

In this case, proximal edge of DES was well-expanded at final angiography of previous PCI. However, extreme heavy calcium behind the stent at proximal edge had crushed stent strut during the elapse of eighteen months after previous PCI. Then, that had led to in-stent restenosis.

Crushed stent by surrounding heavy calcium could not be expanded with high pressure balloon dilatation. Moreover, satisfactory long-term patency would not be expected after balloon dilatation because stent recoil would cause repeated restenosis.

In this situation, debulking with rotablator might be more effective. Imaging device would makes debulking with rotablator safe and more effective, because these modality would elucidate mechanism of ISR as well as effect of ablation.