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## Images in Cardiology

# Does a Drug-Coated Balloon Accelerate Neoatherosclerosis?

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Drug-coated balloons (DCBs) are frequently used to treat in-stent restenotic lesion of coronary artery disease in countries where they are available. However, how DCBs affect the neointimal characteristics is poorly understood.

A 79-year-old man with multiple coronary risk factors (diabetes, dyslipidemia, hypertension, and smoking) had received 2 bare metal stents 20 years before, a sirolimus-eluting stent 12 years before, and a paclitaxel-eluting stent 10 years before at the proximal left anterior descending artery for repeated restenosis (Fig. 1A1). Because the patient developed late stent thrombosis, a DCB (Sequent Please Paclitaxel-eluting Balloon 3.0/30, B. Braun Medical Inc., Melsungen, Germany) was used to treat this lesion after thrombus aspiration and predilation with a scoring balloon (NSE 2.75/13, NIPRO, Osaka, Japan). One year later, follow-up optical frequency domain imaging was obtained. Figure 1 shows the angiography and optical frequency domain imaging findings before DCB treatment, after DCB treatment, and 1 year after DCB treatment at the matching slice. Of note, what had been relatively homogenous neointima proximal to the culprit site showed newly formed lipid-laden neointima and even neointimal calcification in just 1 year (Fig. 1B1-3 and C1-3). The thrombus site showed multiple levels of healing (Fig. 1D1-3 and E1-3). The neointimal characteristics showed dynamic changes after DCB treatment.

In-stent atherosclerotic change (neoatherosclerosis) after drug-eluting stent implantation is not rare.[1] One of the mechanisms seems to be alteration of endothelial barrier protein expression by antiproliferative drugs,[2] which may also happen for paclitaxel used in DCB.[3] Further studies in a case series would be helpful to understand the frequency and pathophysiology of neoatherosclerosis after DCB.

**Novel Teaching Point**

- Drug-coated balloons might have a potential to accelerate neoatherosclerosis.

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## Disclosures

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## References

1. Otsuka F, Byrne RA, Yahagi K, et al. Neoatherosclerosis: overview of histopathologic findings and implications for intravascular imaging assessment. Eur Heart J 2015;36:2147-59.

2. Mori H, Cheng Q, Lutter C, et al. Endothelial barrier protein expression in biodegradable polymer sirolimus-eluting versus durable polymer everolimus-eluting metallic stents. JACC Cardiovasc Interv 2017;10:2375-87.

3. Hu T, Yang C, Fu M, et al. Cytotoxic effects of docetaxel as a candidate drug of drug-eluting stent on human umbilical vein endothelial cells and the signaling pathway of cell migration inhibition, adhesion delay and shape change. Regen Biomater 2017;4:167-78.

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See page 306 for disclosure information.

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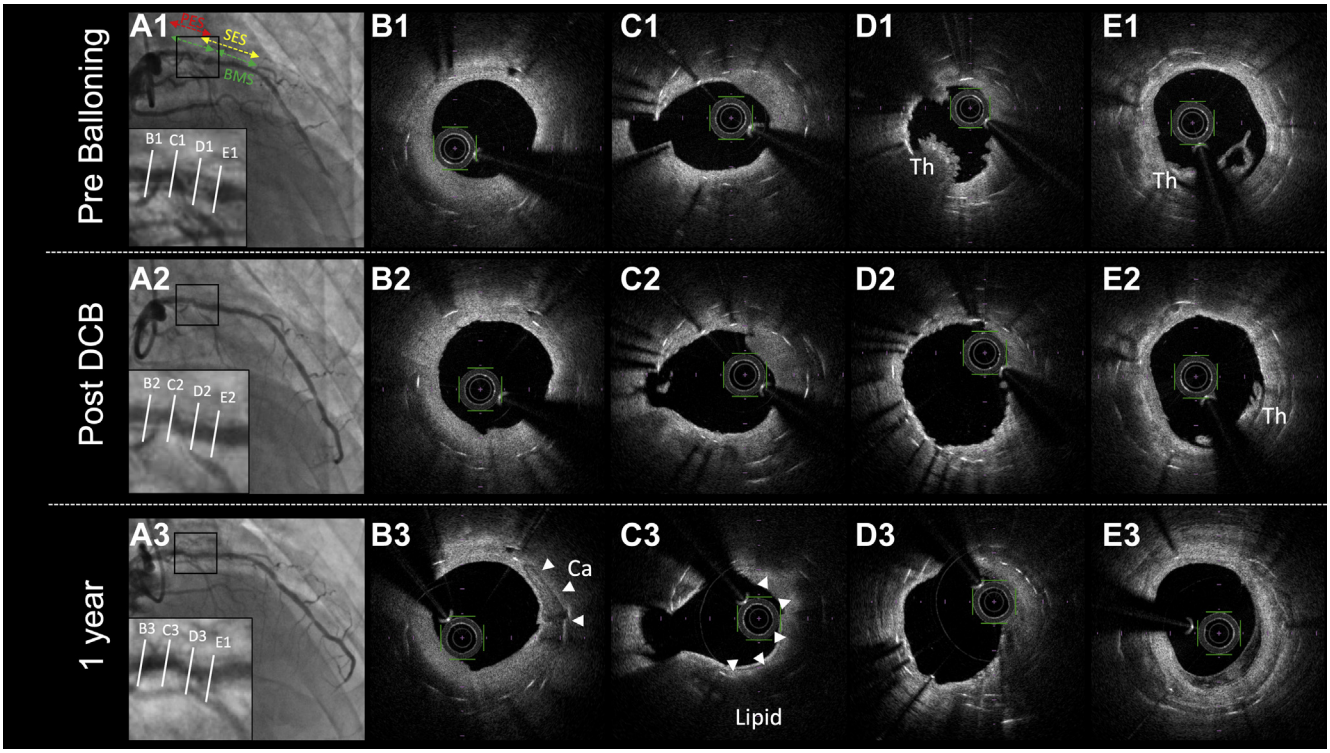


**Figure 1.** Corresponding optical frequency domain imaging and angiography findings at different timings are shown: before drug-coated balloon (DCB) treatment (**A1-E1**), after DCB treatment (**A2-E2**), and 1 year after DCB treatment (**A3-E3**). **Arrowheads** in B3 and C3 indicate newly formed calcification and lipid-laden neointima. C, calcification; Th, thrombus.