



How long should dual antiplatelet therapy be applied after covered stent implantation?

The case report of clinical implications of left anterior descending artery aneurysm treatment with covered stent implantation

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**How long should dual antiplatelet therapy be applied after covered stent implantation?
The case report of clinical implications of left anterior descending artery aneurysm
treatment with covered stent implantation**

Short title: Duration of dual antiplatelet therapy after covered stent implantation

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A 65-year-old male patient was admitted to the Department of Interventional Cardiology because of non-ST-segment elevation myocardial infarction (NSTEMI). Medical history revealed ST-segment elevation myocardial infarction (STEMI) anterior and percutaneous transluminal coronary angioplasty (PTCA) of the left anterior descending artery (LAD) with two drug-eluting stents (DES) implantation in 2017. Moreover it showed anterior STEMI anterior with acute very late thrombosis in previously implanted stents, treated with balloon angioplasty (POBA) in 2020. Urgent coronary angiography revealed a newly formed LAD medial saccular coronary artery aneurysm (CAA) (8.08 mm × 5.64 mm) between previously

implanted stents (Figures 1A, 1B). The intravascular ultrasound (IVUS) confirmed the pseudoaneurysm character. The successful implantation of GraftMaster covered stent (a common off-label application of this device) 3.5 mm × 19 mm × 16 atm with NC 3.5 mm × 20 mm × 20 atm balloon postdilatation was performed (Figure 1C). The closure of the CAA was confirmed with IVUS (Figure 1D). The patient was initially treated with dual antiplatelet therapy (DAPT) (aspirin and ticagrelor). The control echocardiography revealed a thrombus in the akinetic left ventricle apex. The bleeding risk was assessed as high because of coexisting active malignancy process. Moreover, the thrombotic risk was qualified as high because of the significant thrombotic potential of covered stents. Considering the above premises, the patient was qualified to continue ticagrelor therapy with initiated dabigatran therapy (aspirin was temporarily withdrawn). After one month, the thrombus dissolved and the patient was switched to aspirin and ticagrelor; the dabigatran was discontinued. The control coronary angiography after 6 months revealed the optimal effect of the previous procedures.

The patient was admitted to the ward approximately 11 months after the covered stent implantation because of anterior STEMI. Ticagrelor was interrupted five days before because the urgent surgical procedure was needed. Coronary angiography revealed late thrombosis in the previously implanted covered stent. Under the control of IVUS, the covered stent deployment optimization with POBA- LAD (3.25 mm × 15 mm × 20 atm and 4.0 mm × 12 mm × 20 atm) was performed. Finally, the optimal treatment effect was confirmed with the IVUS (Figure 1E, 1F). The patient was qualified for prolonged DAPT.

The CAA is defined as the focal dilation of coronary segments of at least 1.5 × the adjacent normal segment. It occurs in 0.3%–5% of cases [1]. The mechanism of CAA formation after stent implantation includes deep vessel wall injury, localized hypersensitivity vasculitis, focal infection, vessel remodeling, and DES malposition [2]. It may cause clinical consequences, including myocardial infarction [3]. The covered stent implantation is one of the treatment options of CAA, especially dedicated to smaller CAA. There are no standards of DAPT and NOAC treatment after covered stent implantation. The guidelines do not describe the combination of dabigatran and ticagrelor [4]. However, dabigatran was chosen because some clinical trials indicated it reduces the overall risk of bleeding [5]. We observed that a combination of ticagrelor and dabigatran was sufficient to prevent acute covered stent thrombosis. A combination of aspirin and ticagrelor was also sufficient during the next ten months. Single antiplatelet therapy (SAPT) was insufficient to prevent acute covered stent thrombosis.

Based on the presented observation, we would cautiously suggest that twelve months DAPT period can be insufficient to prevent covered stent thrombosis and that prolonged DAPT therapy should be considered as a destination therapy in patients after covered stent implantation, especially in the low bleeding risk group.

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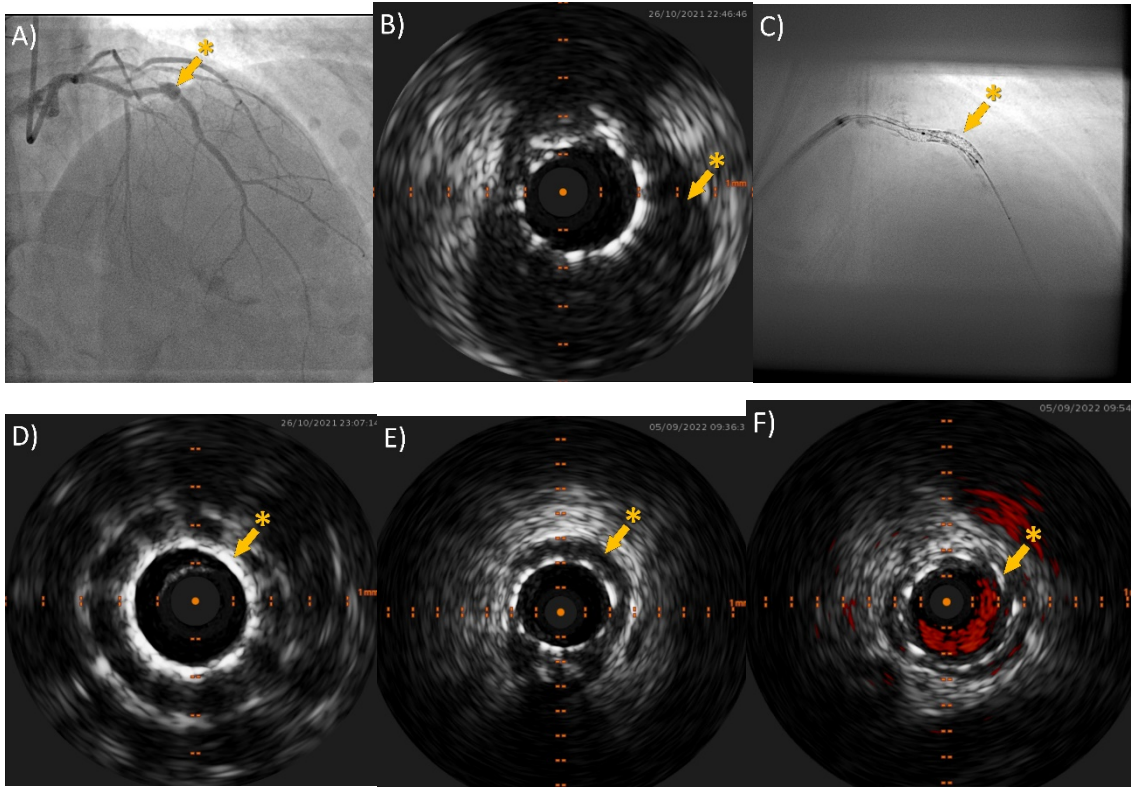


Figure 1. **A.** Angiography: the image of coronary artery aneurysm (CAA) (*) in medial left anterior descending artery (LAD). **B.** Intravascular ultrasound IVUS imaging of CAA (*). **C.** ClearStent view of medial LAD after covered stent placement (*). **D.** IVUS imaging of covered stent in CAA (*). **E.** IVUS imaging of covered stent — suboptimal stent expansion (*). **F.** IVUS imaging of covered stent after optimization (*)