Does a longer graft stent prevent cavity-spilling perforation?

Yeliz Guler[1], Bilal Boztosun[2]

[1]University of Health Sciences, Basaksehir Cam and Sakura City Hospital, Istanbul, Türkiye
[2]Department of Cardiology, Istanbul Medipol University, Istanbul, Türkiye

Correspondence to:
Yeliz Guler, MD,
Department of Cardiology,
Basaksehir Cam and Sakura City Hospital,
Olimpiyat Bulvarı Yolu, 34480 Başakşehir,
Istanbul, Türkiye,
phone: +90 212 444 70 44,
e-mail: yelizguler829@gmail.com

DOI: 10.33963/KP.a2023.0164

Received:
December 23, 2022

Accepted:
April 7, 2023

Early publication date:
July 26, 2023

A 32-year-old male was admitted to our hospital due to chest pain. He experienced chest pain with ST-segment depression during the treadmill test. Coronary angiography was performed and revealed 70% long segment stenosis in the left anterior descending artery (LAD), and percutaneous intervention was planned (Figure 1A, Supplementary material, *Video S1*). After predilatation, a 2.75 × 28.0 mm stent was deployed, and the in-stent segments were postdilated with a 3.0 × 15 mm noncompliant balloon. At that point, angiography revealed extravasation of contrast material at the proximal stent segment (Figure 1B, Supplementary material, *Video S2*). The patient remained hemodynamically stable, but chest pain appeared. Prolonged balloon inflation and reversal of anticoagulation failed. A 3.5 × 19 mm graft stent (GS) was implanted via a GuideLiner catheter. Subsequent angiography showed the absence of extravasation at the proximal location of the stent but multiple focal jets of contrast extravasation at the distal stent segment (Figure 1C, Supplementary material, *Videos S3, S4*). Then we performed implantation of a 2.8 ×19.0 mm GS in the drainage site of the LAD stent (Figure 1D). The patient's hemodynamic condition was stable, and echocardiography showed no pericardial effusion. After the second GS implantation, the subsequent angiographic image revealed a dissection just before the proximal GS (Supplementary material, *Video S5*). A 3.0 × 23.0 mm stent was successfully deployed restoring normal antegrade flow (Figure 1E, 1F). The patient had an uneventful recovery.

In this case, we evaluated the stenosis as a mid-segment atherosclerotic LAD lesion with low risk of procedural complication due to less angulation and tortuosity. We applied nominal pressure created by the balloon, but subsequent angiography demonstrated apparent contrast extravasation first from the proximal stented segment and after the distal stented segment into the right ventricle. At the end of the procedure, we noticed a dissection on the angiogram just before the proximal GS, and we also deployed a coronary stent. In retrospect, the stenotic LAD segment might have had an intramyocardial course, which, in the presence of atherosclerosis, could explain why flow was tracked into the right ventricle. Following the GS implantation, an intimal tear completely penetrated the arterial wall leading to extravasation from multiple sites along the distal stented segment. Similarly, a proximal dissection, which is encountered as a final complication, may be associated with a corner dissection caused by the proximal GS or using a GuideLiner catheter, which may also represent the expansion upward of the ruptured segment causing intimal tear.

Cavity-spilling perforations are rare complications of PCI, and there are limited data in the literature about how they should be managed. Fortunately, they have a benign course since they are less often associated with pericardial tamponade or acute hemodynamic compromise. In this case, we encountered Ellis grade III coronary perforation, and our therapeutic approach was determined by the patient's hemodynamic stability, distal coronary artery flow, and size of the fistula [1–3]. Multiple overlapping stents may be required in cases of coronary artery perforations [4]. The main reasons can be stent malposition, disruption of the integrity of the GS coating at high pressure, and extension of the intimal tear proximally and distally. To avoid the last scenario, the GS length should not only cover the ruptured segment but also the proximal and distal parts to prevent further dissection or intimal tear.

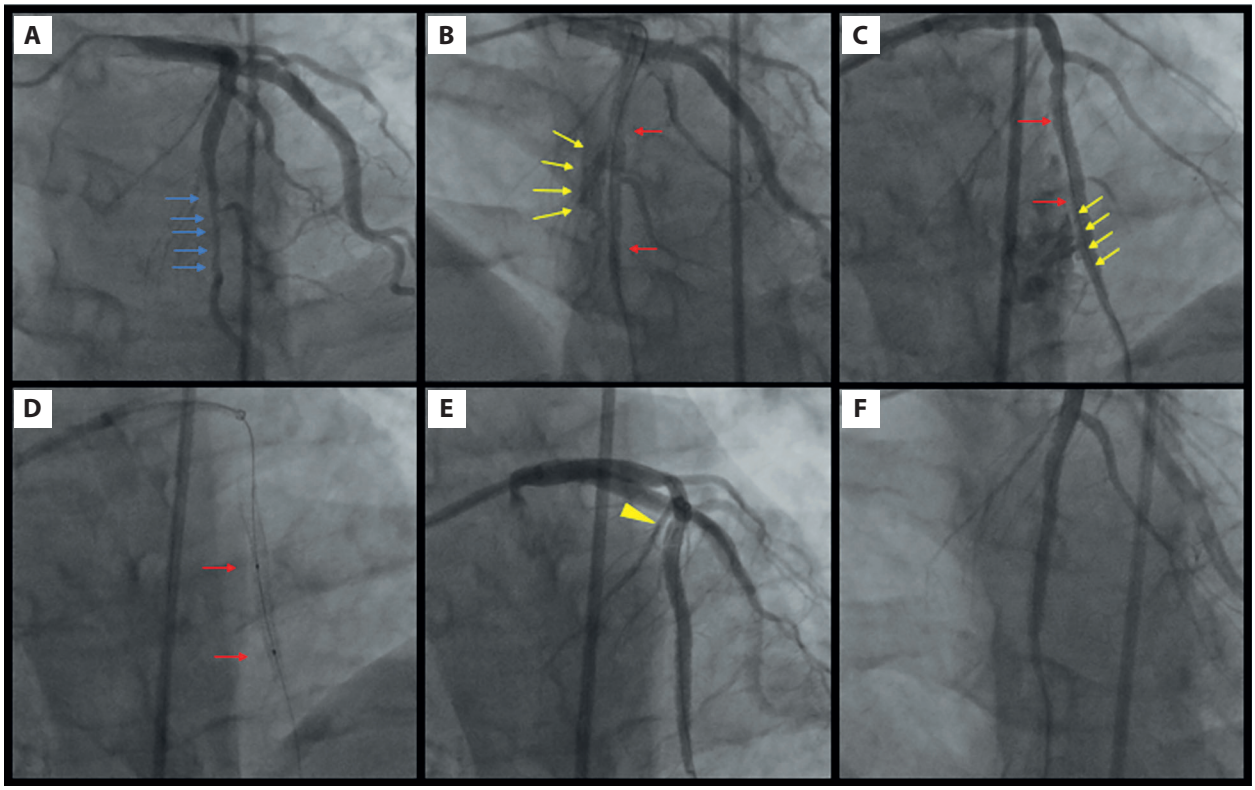

Figure 1. **A.** Coronary angiography showing left anterior descending artery (LAD) long segment stenosis (blue arrows). **B.** Angiographic image showing extravasation of contrast material into the right ventricle (yellow arrows). Red arrows show the proximal and distal zones of the coronary stent. **C.** Angiographic image after deployment of a covered stent showing the absence of extravasation at the proximal location of the LAD stent but progressively multiple focal jets of contrast extravasation at the distal stent segment (yellow arrows). Red arrows show the proximal and distal zones of the graft stent. **D.** Red arrows show the proximal and distal zones of the second graft stent. **E.** Angiographic image revealing a dissection just before the proximal graft stent (yellow arrowhead). **F.** Final angiogram

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska.

Article information

Conflict of interest: None declared.

Funding: None.

REFERENCES

1. Ellis SG, Ajluni S, Arnold AZ, et al. Increased coronary perforation in the new device era. Incidence, classification, management, and outcome. Circulation. 1994; 90(6): 2725–2730, doi: 10.1161/01.cir.90.6.2725, indexed in Pubmed: 7994814.
2. Murthy A, Singh A, Driesman M. Acquired coronary cameral fistula due to post stent balloon dilatation: dual coronary artery perforations into the left ventricle—what is the right treatment? World J Cardiovasc Dis. 2014; 04(11): 548–555, doi: 10.4236/wjcd.2014.411066.
3. McCormick LM, Ko BS, Zaman S, et al. Persistent type III cavity-spilling coronary perforation due to covered stent malapposition. Cardiovasc Interv Ther. 2016; 31(4): 269–274, doi: 10.1007/s12928-015-0346-0, indexed in Pubmed: 26197781.
4. Lansky AJ, Yang Ym, Khan Y, et al. Treatment of coronary artery perforations complicating percutaneous coronary intervention with a polytetrafluoroethylene-covered stent graft. Am J Cardiol. 2006; 98(3): 370–374, doi: 10.1016/j.amjcard.2006.02.041, indexed in Pubmed: 16860026.