Spontaneous closure of iatrogenic epicardial coronary pseudoaneurysm with a fistula to the right ventricle following post-stenting perforation

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A 64-year-old man was admitted to the hospital with a diagnosis of acute myocardial infarction with non-ST-segment myocardial elevation (NSTEMI). Immediate coronary angiography showed critical 90% stenosis of the left anterior descending artery (LAD) in the medial segment on bifurcation with the first diagonal branch, with intramuscular LAD tortuosity below bifurcation (Figure 1A; Supplementary material, *Figure S1A–C*, *Video S1*) and no other abnormalities. A decision to perform LAD revascularization was made. After predilatation, a drug-eluting stent (DES) was implanted at the bifurcation (Supplementary material, *Figure S1D–E*), followed by a second DES overlapping the distal edge of the previous stent (Supplementary material, *Figure S1F*). After contrast injection, perforation with a fistula between the coronary artery and the cardiac ventricle was visualized (Figure 1B; Supplementary material, *Figure S1G–H*). The perforation was managed conservatively by prolonged balloon inflation and closed in the following minutes, no signs of pericardial effusion were observed on echocardiography after the procedure and in the subsequent days (Figure 1C; Supplementary material, *Figure S1I*). The patient was discharged home in a stable clinical state with a 12-month dual antiplatelet therapy recommendation (DAPT) with clopidogrel.

After one year, due to nonspecific chest pain, coronary angiography was performed. It revealed an iatrogenic epicardial post-stenting coronary pseudoaneurysm with a fistula to the cardiac ventricle at the site of the previous perforation (Figure 1D; Supplementary material, *Figure S1J–K*, *Video S2*). Cardiac computed tomography showed an epicardial pseudoaneurysm with a diameter of 10 mm on the intramuscular coronary artery course, with a 10-mm canal communicating with the right ventricle (RV) on the anterior wall of LAD (Figure 1E; Supplementary material, *Figure S1L–N*). The patient was presented at the Heart Team meeting. Due to the risk of pseudoaneurysm rupture with possible cardiac tamponade (e.g., accidental chest pressure trauma or other injury), a decision was made to perform pseudoaneurysm closure using coil embolization. At that time, a year had passed since the acute coronary syndrome and the patient stopped DAPT.

Three months later, the asymptomatic patient, was readmitted to the hospital to undergo a pseudoaneurysm closure procedure. A coronary angiogram showed spontaneous closure of the pseudoaneurysm (Figure 1F; Supplementary material, *Figure S1O*). Optical coherence tomography confirmed no visible communicating canal (Supplementary material, *Figure S1P*).

We present a rare case of an iatrogenic epicardial post-stenting coronary pseudoaneurysm with a fistula to the RV. The utilization of DES has been associated with the development of postprocedural coronary aneurysms, with an occurrence rate ranging from 0.8% to 1.1% [1, 2]. Most of "aneurysms" are actually pseudoaneurysms [1]. DES are designed to release antiproliferative drugs that prevent stent thrombosis. Nevertheless, an unintended consequence seems to be the inhibition of the healing process in the vascular wall (such as delayed re-endothelialization) [1, 3]. Additionally, DES chemical polymers have

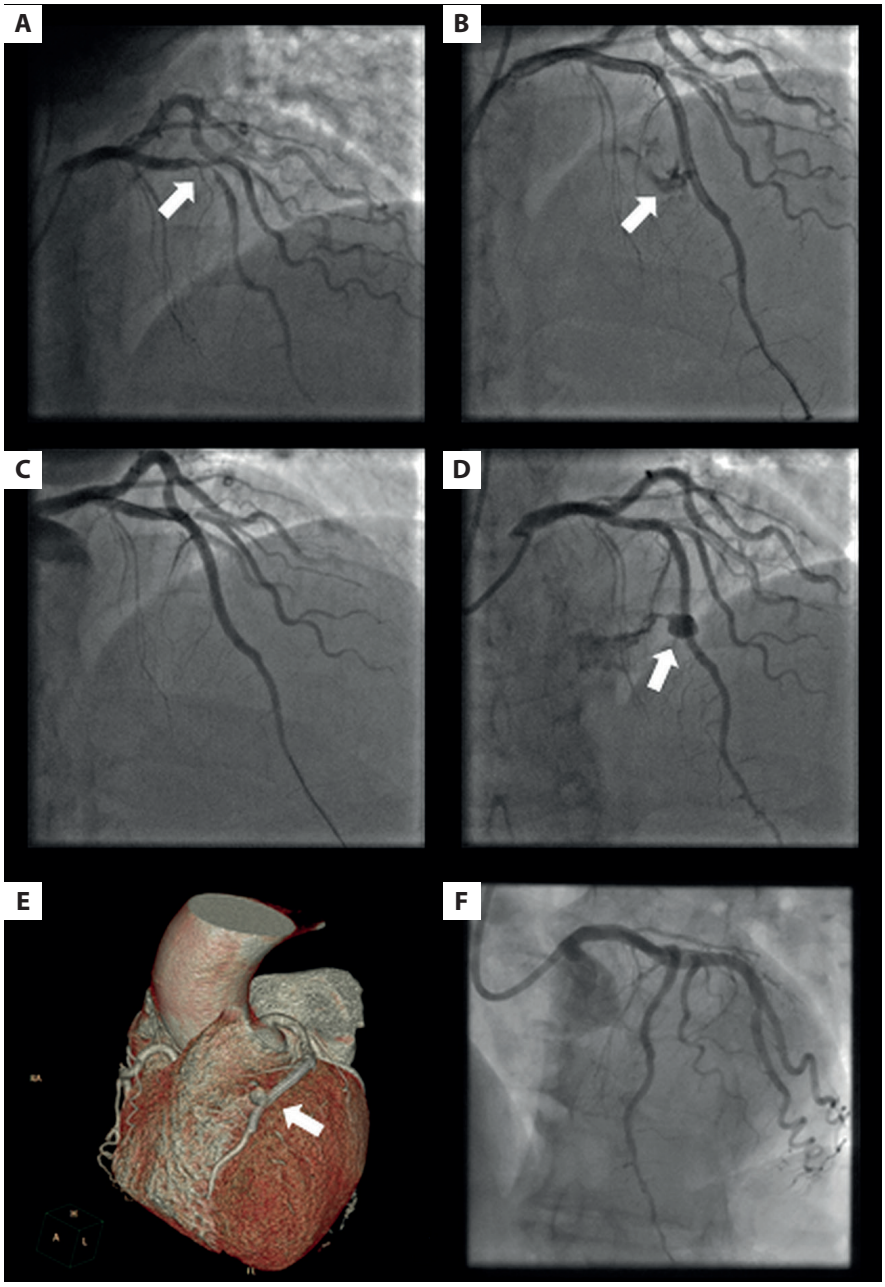

Figure 1. A. Coronary angiography: critical stenosis of the LAD in the medial segment on bifurcation with the first diagonal branch (arrow). **B.** Perforation with a fistula between the coronary artery and the cardiac ventricle (arrow). **C.** Perforation managed conservatively, final effect after the procedure. **D.** Epicardial coronary pseudoaneurysm with a fistula to the cardiac ventricle (arrow). **E.** Computed tomography: epicardial pseudoaneurysm with a canal communicating with the right ventricle (arrow). **F.** Spontaneous closure of the pseudoaneurysm

the potential to trigger an inflammatory state or cause hypersensitivity reactions [1]. We cannot rule out that coronary artery perforation with a fistula to the RV, along with the formation of an epicardial pseudoaneurysm, was a consequence of DES implantation in the intramuscular LAD segment.

Management of iatrogenic coronary perforations or aneurysms is typically determined by various factors such as size and localization; treatment options generally involve prolonged balloon inflations, stent grafts, coiling techniques, or surgical interventions [1, 4, 5].

It is imperative to adopt a personalized approach when managing such patients. We believe that stopping DAPT contributed to the spontaneous closure of the pseudoaneurysm and, in some cases, there may be an indication for shortening DAPT therapy.

Supplementary material

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

Article information

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