# A patient with non-ST-segment elevation myocardial infarction complicated by distal perforation of the left anterior descending artery

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An 80-year-old male patient with non-ST-segment elevation myocardial infarction, disqualified from coronary artery bypass surgery due to high surgical risk, was admitted for further invasive treatment. His medical history included inferior wall myocardial infarction in 2005, New York Heart Association (NYHA) class II heart failure with reduced ejection fraction of 35%, hypertension, type 2 diabetes mellitus, hyperlipidemia, and nicotine dependence.

Coronary angiography revealed subtotal stenosis of the distal left main artery (LM), involving bifurcation of the left anterior descending artery (LAD) and the circumflex artery (LCx) (Figure 1A). The right coronary artery presented diffuse atherosclerosis without significant stenosis. Therefore, the patient was qualified for high-risk percutaneous coronary intervention (PCI) of the LM/LAD/LCx. He was preloaded with ticagrelor and aspirin before PCI.

During the procedure, unfractionated heparin was administrated, and the activated clotting time was maintained above 250 s. We applied an EBU 3.5 7 F guide catheter via right femoral access. Due to severe calcification, we effectively performed rotablation of the LM with the proximal segments of the LAD and LCX using a 1.5 mm burr (Supplementary material, *Videos S1, S2*). We obtained expansion of a full non-compliant (NC) 2.5 mm balloon and sequentially implanted a stent into the LCx (Supraflex Cruz 2.5 × 20 mm) and the LM/LAD (Ultimaster 3.5 × 24 mm) using the DK-crush technique. The first and second "kissing balloon" inflation was accomplished with 2.5 mm (LCx) and 3.5 mm (LAD) NC balloons, respectively. We performed a proximal optimization technique (POT) of the LM with a 5.0 mm balloon (Figure 1B). Intravascular ultrasound (IVUS) confirmed the optimal stent apposition (Figure 1C).

However, after removing the guidewire from the coronary artery (Sion Blue, Asahi Intecc, Japan), we noticed a distal LAD perforation (Supplementary material, *Video S3*). The guidewire was reintroduced into the vessel, and a 2.0 mm balloon was expanded, occluding the distal segment (Figure 1D). Despite several attempts at prolonged inflation, bleeding into the pericardium persisted. Autologous fat embolization was also unsuccessful. Due to hemodynamic instability in the course of increasing cardiac tamponade, effective decompression of the pericardial sac was performed, stabilizing the patient's condition. Because of the complexity of PCI, we decided not to administer protamine. Subsequently, we decided to close the distal LAD with a vascular coil. We delivered three vascular coils (Optima Coil System, BALT USA LLC), resulting in the complete cessation of bleeding (Figure 1E). The patient was transferred to the Intensive Care Unit in stable condition without any visible pericardial fluid on echocardiographic examination. After 4 hours, the patient's clinical condition deteriorated due to the re-accumulation of pericardial fluid and increasing cardiac tamponade, leading to cardiac arrest in the form of pulseless electrical activity (PEA). After ineffective pericardial puncture attempts, emergency thoracotomy was performed, resulting in pericardial sac decompression and return of hemodynami-

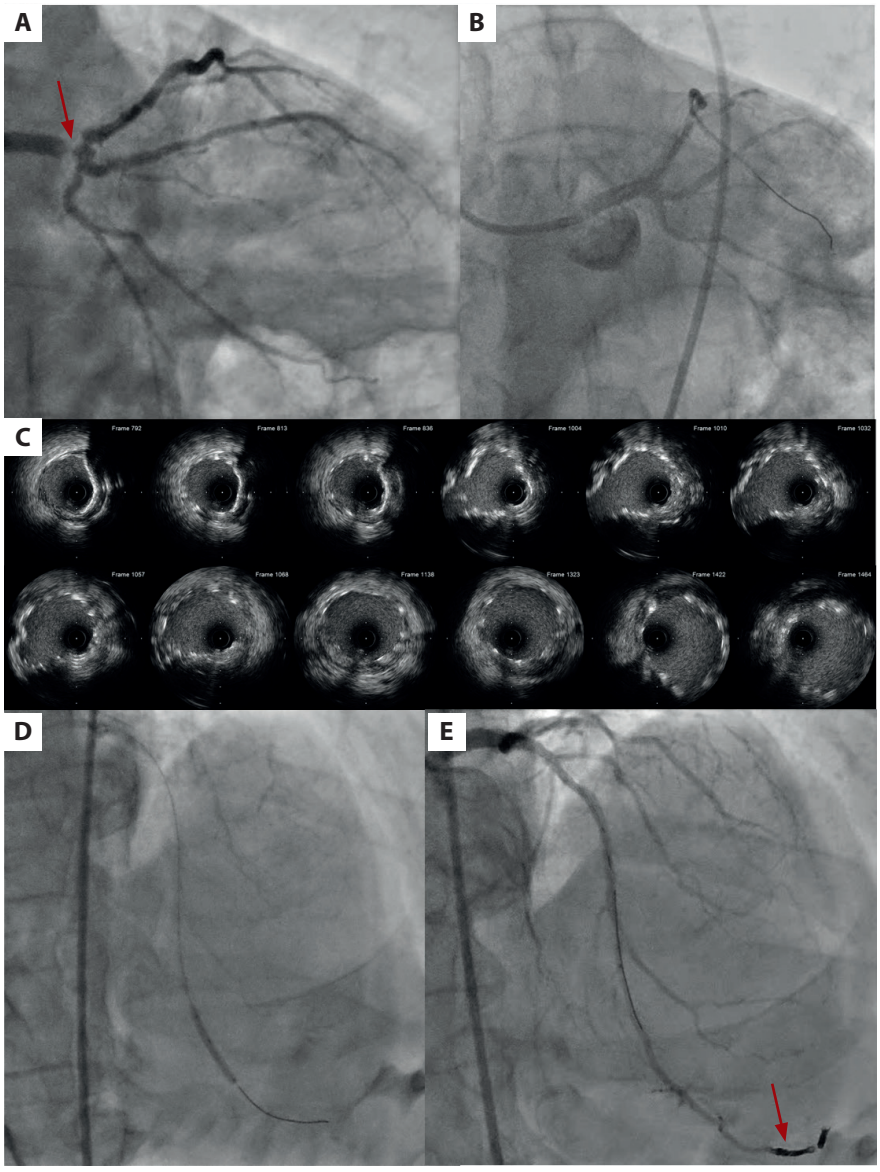


**Figure 1. A.** Baseline angiography of the left coronary artery with critical stenosis of the left main (LM), proximal anterior descending (LAD), and circumflex artery (LCX) (red arrow). **B.** The final angiographic result. **C.** Final IVUS cross-sections of the LM and the LAD, with a well-expanded stent. **D.** The balloon expanded in the distal segment of the LAD occluding the artery. **E.** The vascular coils placed in the distal segment of the LAD, closing the flow in the artery (red arrow)

cally efficient circulation. Unfortunately, the patient died the following day because of severe metabolic acidosis and multiple organ failure.

Distal coronary perforation is often caused by guidewire-related vessel injury and is more common for hydrophilic wires [1], as in our case. A looped wire tip is considered safer than a straight tip, reducing inadvertent migration into a distal segment or small branches [2]. It seems that with extensive damage to the small vessels, bleeding may continue despite occluding the main supplying artery.

## *Supplementary material*

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

## *Article information*

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