It's never too late for PCI: A case of bail-out intentional percutaneous LIMA closure due to CABG-induced coronary subclavian steal syndrome

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Cardiac surgery remains the optimal therapeutic strategy in severe valvular disease accompanied by multivessel coronary artery disease (MVD). However, in cases with extremely advanced atherosclerosis, this treatment is contraindicated, as it may result in acute life-threatening complications. Hemodynamic support systems such as Impella or Extracorporeal Membrane Oxygenation (ECMO) are commonly used nowadays in the emergency treatment of cardiogenic shock, but the limiting criterion is the requirement of optimal vascular access [1].

A 73-year-old female with severe aortic stenosis (high-gradient normal-flow with preserved left ventricular ejection fraction) and MVD including the left main (LM) (SYNTAX-Score = 49 points; critical stenosis of the LM with ostium left anterior descending (LAD) and circumflex, then diagonal, and medial-RCA including bifurcation: LM/LAD/circumflex [Medina 1,1,1] and LAD/diagonal [Medina 1,0,1]) was expeditiously transferred from a collaborating Cardiology Department to the Department of Cardiac Surgery for Surgical Aortic Valve Replacement and coronary artery bypass grafting, following earlier local Heart Team's consultation. Due to general atherosclerosis including Lerich syndrome and periprocedurally diagnosed porcelain aorta, which made it impossible to connect the extracorporeal circulation, a decision was made to perform only the left-internal-mammary artery → left-anterior descending coronary artery (LIMA → LAD) bypass graft, with subsequent complete percutaneous coronary intervention (PCI) and transcatheter aortic valve implantation.

There were no data on atherosclerosis involving other vascular beds. At the end of the surgical procedure, the patient's hemodynamic instability was achieved, but ECMO could not be applied due to occlusion of both femoral arteries (Figure 1A). As the patient's clinical condition was rapidly deteriorating, and she was developing cardiogenic shock, coronary angiography was performed. Initially, left-radial access was used, and the occlusion of the subclavian artery (Figure 1B) with a massive steal syndrome in the LAD → LIMA → left upper limb vascular system was identified (Figure 1C). Due to both femoral and the right-radial-artery occlusion (following previous coronary angiography), right-brachial access was used. First, a PK-PAPYRUS-covered stent was implanted into the LAD at the LIMA suture site to stop the stealing from the LAD-supplied area through the LIMA to the upper limb (Figure 1D). The LIMA-LAD connection was successfully closed at once. Afterwards, complete revascularization of the remaining vessels was conducted (Figure 1E).

Following the procedure, a gradual improvement in the patient's clinical condition was observed; she remained hemodynamically stable and was discharged home in good clinical condition. After 12 weeks, scheduled transapical transcatheter aortic valve implantation was performed without acute complications (Figure 1F).

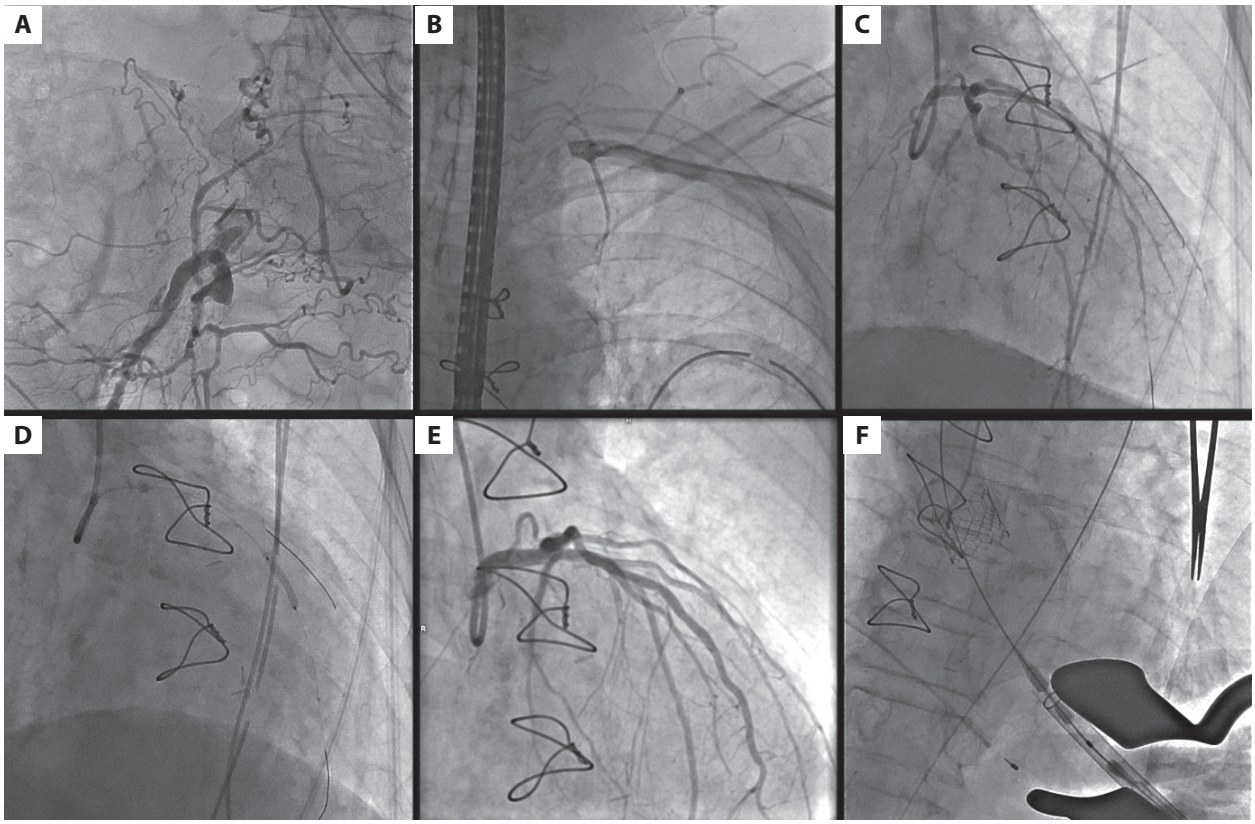

Figure 1. A. Iliac artery occlusion, **B.** Occlusion of the left subclavian artery, with the LIMA-LAD steal syndrome, **C.** Retrograde flow in the LIMA from the LAD to the left upper limb. **D.** Implantation of a covered stent in the LAD at the LIMA suture site. **E.** Coronary arteries after PCI (LM/LAD/Cx) follow-up after 2 weeks (CRA projection). **F.** Transapical TAVI

Abbreviations: CRA, cranial; Cx, circumflex; Dg, diagonal; LAD, left anterior descending; LIMA, left-internal mammary artery; LM, left main; PCI, percutaneous coronary intervention; RCA, right coronary artery; TAVI, trans-catheter aortic valve implantation

Knowledge regarding the advancement of atherosclerotic lesions in vascular beds is crucial for appropriate qualification for interventional treatment and to avoid potentially foreseeable complications. In our case, the creation of the LIMA/LAD bypass (the primary goal of the operation) could have led to fatal complications, which were avoided by using the last available vascular access for emergency PCI to close the LIMA with a covered stent, demonstrating yet another of its application. Although intraoperative, blood flow from the graft was unquestionable, any sudden destabilization of the patient after coronary artery bypass grafting LIMA → LAD requires consideration of steal syndrome as a potential cause within the urgently performed revision with the possibility of the rescue *ad hoc* intervention [2–4].

Article information

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