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## **Sky is the limit — multivessel PCI with mechanical left ventricular support and simultaneous 10 stent deployment**

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# **Sky is the limit — multivessel PCI with mechanical left ventricular support and simultaneous 10 stent deployment**

**Short title:** Sky is the limit — Impella protected PCI

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Percutaneous coronary intervention (PCI) in contrast to coronary artery bypass grafting (CABG) in complex coronary artery lesions seems to be safer when performed in the few-stage procedure setting. However, in patients with diffuse coronary artery disease (CAD), unsuitable for surgical revascularization but qualified for palliative PCI, the precise planning a complex multistep procedure is scarcely possible, as the periprocedural dissection, occlusion resulting may occur resulting in an urgent need for further complex procedure.

In order to limit the risk for cardiogenic shock, complex PCI procedures, especially those associated with high risk of severe left ventricular systolic dysfunction are performed with the percutaneous mechanical circulatory support.

A 75-year-old man with history of heart failure with mildly reduced ejection fraction (HFmrEF 40%, NYHA III), with previously diagnosed multivessel coronary artery disease (MVCAD, SYNTAX Score 85, Figure 1A, 1B) was transferred to our clinical department. The comorbidities included hypertension and the type 2 diabetes. The Heart Team consultation performed at our center has disqualified from CABG due to diffuse CAD with distal segments affected.

Due to high-risk PCI (HR-PCI) because of complexity lesions, a percutaneous mechanical circulatory support-protected procedure was planned with the Impella CP. Though only mildly reduced ejection fraction, we believed that other left ventricular supports (i.e. pharmacological, including levosimendan or mechanical such as the Intra-Aortic Balloon Pump) could be insufficient during numerous stents deployment with possibility of iatrogenic, periprocedural ischemia.

After Impella was placed, using the femoral access, an intravascular ultrasound (IVUS)-guided PCI of left coronary artery (LCA) was performed. Three out of two-stent techniques have been used: DK crush (double kissing crush) for LM/LAD/Cx and Culotte LAD/Dg, TAP (T and protrusion): Cx/IB, including CTO of IB, respectively (Figure 1C, 1D, 1E, 1F). As a result, 10 stents of total length 280 mm were implanted. The periprocedural clinical course was uncomplicated, the patient did not experience recovery of angina symptoms and in the control transthoracic echocardiogram (TTE) — left ventricular ejection fraction (LVEF) recovered up to 53% within the 6-month follow up period.

Numerous studies focus on the elevated risk of both, thrombosis and restenosis following the long-stenting procedure [1], as the number and the length of stent increase risk of various post-intervention target lesion failure [2, 3]. In addition, long-stenting procedure is not only technical challenge, but also increases the risk for periprocedural ischemia due to i.e. small-branches occlusion or peripheral embolization. In numerous cases of diffuse CAD, the initially planned number and length of stents must be changed, since severe lesions occur including the bifurcation lesions. Ignoring some of that lesions may result in a procedure failure. Even though the Impella provides us with an incontestable benefit during HR-PCI [4, 5], the data regarding impact of such procedure on the long-stenting safety is scarce.

In our opinion, the Impella-supported long-stenting procedures seem to be safe for a very selected subset of patients, following an appropriate risk/benefit stratification. Nevertheless, the EBM-based data from clinical trials which could address the currently unmet clinical need for an appropriate patients' triage, and the risk stratification are still missing. Hence, there is a field for future trials in this matter, as for the long-stenting procedures only the sky (or mind) seems to be a limit.

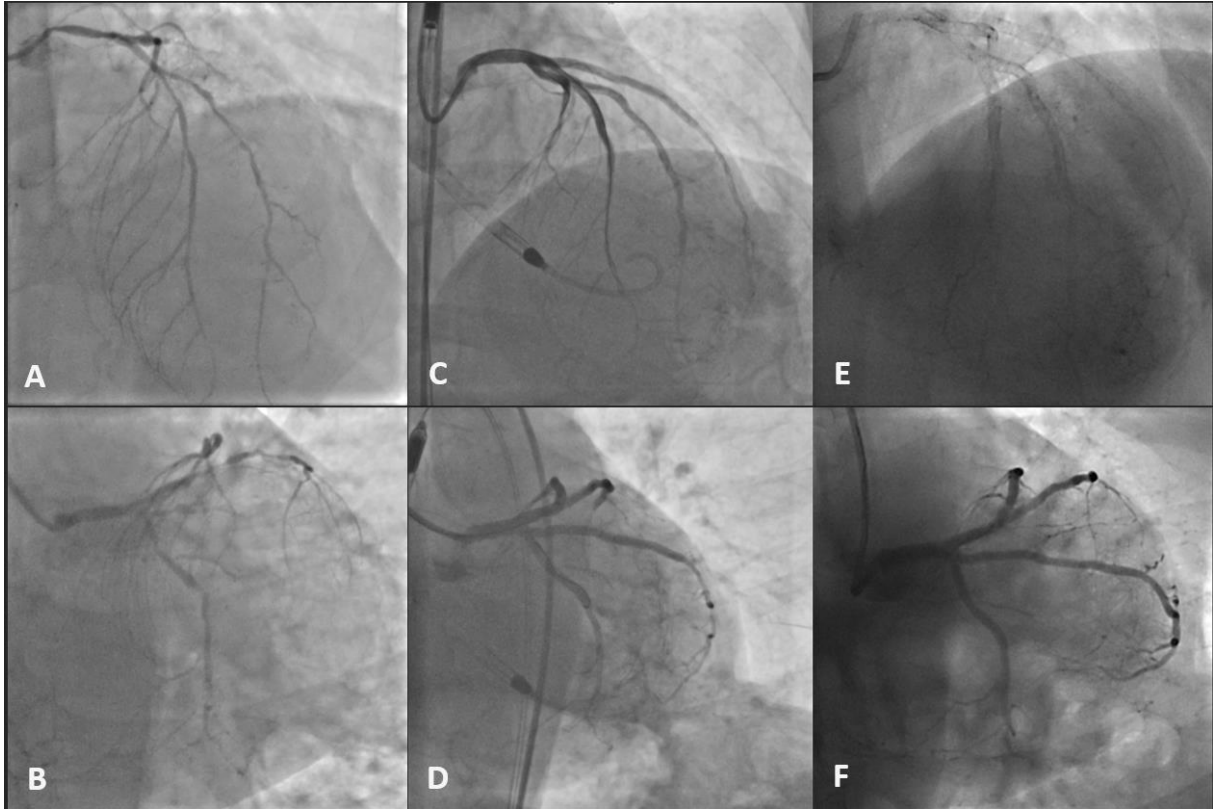
## **Article information**

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**Figure 1:** A — baseline angiogram showing diffuse coronary artery disease (CRA); B — baseline angiogram showing diffuse coronary artery disease (CAU); C — final result (CRA); D — final result (CAU); E — stent tree; F — coronary angiogram after 6 months