

Mechanical circulatory support above a mechanical aortic valve during protected high-risk coronary intervention: a case report

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KEYWORDS: mechanical circulatory support, percutaneous coronary intervention, intravascular ultrasonography, heart valve prosthesis.

CITATION: *Cardiol Croat.* 2026;21(1-2):32. | <https://doi.org/10.15836/ccar2026.32>

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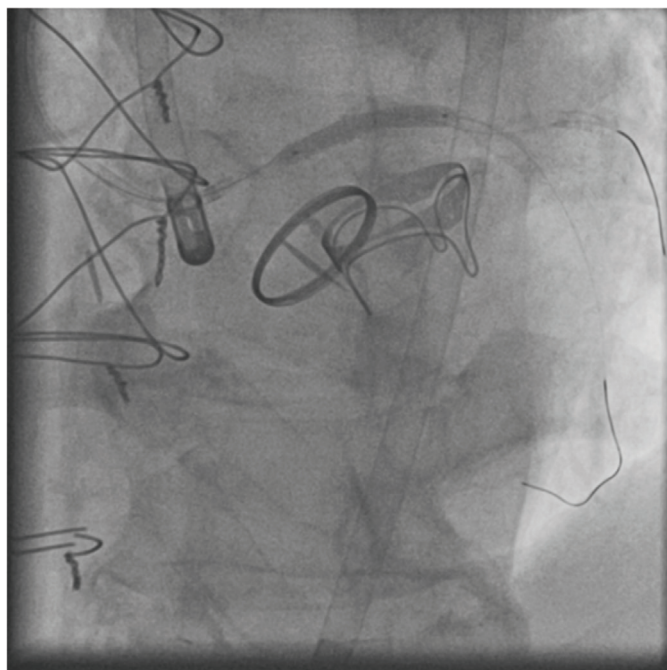


FIGURE 1. iVAC 2L catheter positioned entirely within the ascending aorta, above the mechanical aortic valve, in an "aorta-only" configuration used to support high-risk percutaneous coronary intervention.

Introduction: Mechanical circulatory support (MCS) is increasingly used during high-risk percutaneous coronary interventions (HR-PCI), especially in patients with limited myocardial reserve and complex coronary anatomy¹. Pulsatile devices such as the iVAC 2L are typically positioned across the aortic valve for left ventricular (LV) unloading². However, in patients with mechanical aortic valves, this configuration is contraindicated³.

Case report: We report the case of a 73-year-old male with a history of complex cardiac surgery, including initial bioprosthetic aortic and mitral valve replacement followed by reoperation due to infective endocarditis, resulting in mechanical aortic valve implantation and prior coronary artery bypass grafting. He presented with exertional angina (CCS III). Coronary angiography revealed a severely calcified 70% stenosis of the left main coronary artery (LMCA), chronic total occlusion of the right coronary artery, and a patent previously implanted stent in the circumflex artery. All previous bypass grafts were found to be occluded. The patient was considered inoperable due to prohibitive surgical risk and referred for HR-PCI. To avoid crossing the mechanical prosthesis, the MCS catheter was positioned entirely within the ascending aorta, just above the valve ("aorta-only" configuration; **Figure 1**), with the aim of augmenting aortic pressure and maintaining coronary perfusion during the procedure. Intravascular lithotripsy and drug-eluting stent implantation of the LMCA were performed under intravascular ultrasound guidance. The procedure was successful and uneventful, with preserved renal function and resolution of anginal symptoms.

Conclusion: This "aorta-only" approach represents a conceptual shift from traditional LV unloading toward pressure augmentation². It offers a novel and feasible strategy in anatomically and surgically complex cases where conventional support options are contraindicated⁴. To our knowledge, this is the first report of mechanical circulatory support positioned exclusively in the ascending aorta during HR-PCI in a patient with a mechanical aortic valve.

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RECEIVED:
October 21, 2025

ACCEPTED:
November 14, 2025

