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STATE-OF-THE-ART REVIEW

**Percutaneous Circulatory Assist Devices for High-Risk Coronary Intervention** CME 229
Aung Myat, Niket Patel, Shana Tehrani, Adrian P. Banning, Simon R. Redwood, Deepak L. Bhatt

High-risk percutaneous coronary intervention reflects a multitude of patient, anatomic, and procedural characteristics that can increase risk. The relative inability to withstand the hemodynamic sequelae of ischemia, arrhythmia, reperfusion injury, or distal embolization of plaque serves as a common foundation for this patient cohort. This enhanced susceptibility to circulatory collapse has stimulated the development and use of the intra-aortic balloon pump, Impella, TandemHeart, and extracorporeal membrane oxygenation. The authors discuss the physiology underpinning their application. Thereafter, they appraise the evidence base investigating their use in high-risk coronary intervention to determine which patients might benefit most from their use.

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CLINICAL RESEARCH

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**Procedural Outcomes of Chronic Total Occlusion Percutaneous Coronary Intervention: A Report From the NCDR (National Cardiovascular Data Registry)** 245
Emmanouil S. Brilakis, Subhash Banerjee, Dimitri Karmpaliotis, William L. Lombardi, Thomas T. Tsai, Kendrick A. Shunk, Kevin F. Kennedy, John A. Spertus, David R. Holmes, Jr, J. Aaron Grantham

Between July 1, 2009, and March 31, 2013, chronic total occlusion (CTO) percutaneous coronary intervention (PCI) represented 3.8% of the total PCI volume for stable coronary artery disease. CTO PCI was associated with lower procedural success (59% vs. 96%, $p < 0.001$) and higher major adverse cardiac event (1.6% vs. 0.8%, $p < 0.001$) rates. Multivariable analyses revealed several characteristics (older age, current smoking, previous myocardial infarction, previous coronary artery bypass graft, previous peripheral arterial disease, previous cardiac arrest, right coronary artery CTO target vessel, and less operator experience) associated with a lower likelihood of CTO PCI procedural success.

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The multicenter CT-RECTOR (Computed Tomography Registry of Chronic Total Occlusion Revascularization) is a registry based on 240 consecutive chronic total occlusion (CTO) lesions with pre-procedural coronary computed tomography angiography (CCTA) data; it established a simple and accurate CCTA model for predicting successful guidewire crossing within 30 min through CTO. The proposed CCTA scoring system does not suffer from the limitations of conventional angiography and thus has the potential to exceed the discriminatory performance of the previously validated angiographic models. Clinicians may find the CT-RECTOR score particularly useful for predicting the time-efficient percutaneous revascularization and thus difficulty grading in CTO.

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Chronic Total Occlusion Percutaneous Coronary Intervention in 2014 Beyond the J-CTO Score (Japanese Multicenter CTO Registry): Chance Favors the Prepared Mind 268
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Long-Term Survival Benefit of Revascularization Compared With Medical Therapy in Patients With Coronary Chronic Total Occlusion and Well-Developed Collateral Circulation 271
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Little is known about the clinical outcomes of patients with chronic total occlusion (CTO) and abundant collateral. Jang et al. analyzed data from 738 patients with at least 1 CTO and Rentrop 3 grade collateral. Patients who underwent revascularization and medical therapy (revascularization group) were compared with those who underwent medical therapy alone (medication group) in terms of cardiac death and major adverse cardiac events (MACE). During follow-up duration, the incidence of cardiac death and MACE were significantly lower in the revascularization group compared with the medication group. In patients with CTO and abundant collateral, aggressive revascularization may reduce the risk of adverse cardiac events.

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