Prognostic impact of active mechanical circulatory support in cardiogenic shock complicating acute myocardial infarction: results from the CULPRIT-SHOCK trial

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Background: Active mechanical circulatory support (MCS) devices are increasingly used in patients with cardiogenic shock (CS) complicating acute myocardial infarction (AMI). However, data derived from randomized controlled trials on the efficacy and safety of these devices are still limited.

Purpose: To analyze the prognostic impact of active MCS devices in a large prospective contemporary cohort of patients with CS complicating AMI.

Methods: This is a predefined subanalysis of the Culprit Lesion Only PCI versus Multivessel PCI in Cardiogenic Shock (CULPRIT-SHOCK) randomized trial and prospective registry. Patients with CS, AMI and multivessel coronary artery disease were categorized in two groups; (1) use of at least one active MCS device, vs. (2) no active MCS or use of intra-aortic balloon pump (IABP) only. The primary endpoint was a composite of all-cause death or need of renal replacement therapy at 30 days.

Results: Two hundred of 1055 (19%) patients received at least one active MCS device (n=112 Impella®; n=95 extracorporeal membrane oxygenation [ECMO]; n=6 other devices). The primary endpoint occurred significantly more often in patients treated with active MCS devices compared to those without active MCS devices (142 of 197, 72% vs. 374 of 827, 45%; $p<0.001$). All-cause mortality at 30 days and 1 year as well as bleeding rates were significantly higher in the active MCS group (all $p<0.001$). After multivariable adjustment the use of active MCS was significantly associated with the primary endpoint (odds ratio [OR] 4.0, 95% confidence interval [CI] 2.7–5.9; $p<0.001$).

Conclusion: In the CULPRIT-SHOCK randomized trial and prospective registry approximately one fifth of patients was treated with active MCS devices. Compared to patients without active MCS, patients treated with active MCS devices showed worse outcome at 30 days and 1 year.