

## Outcomes associated with respiratory failure for patients with cardiogenic shock and acute myocardial infarction: a substudy of the culprit-shock trial

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**Funding Acknowledgement:** Type of funding source: Public grant(s) – EU funding. Main funding source(s): Swiss National Foundation

**Background:** Respiratory insufficiency with the need for mechanical ventilation (MV) is one of the most common indications for admission to intensive care units. However, little is known about the clinical outcomes of patients with acute myocardial infarction (AMI) complicated by cardiogenic shock (CS) who require mechanical ventilation (MV). The aim of this study was to identify the characteristics, risk factors, and outcomes associated with the provision of MV in this specific high-risk population.

**Methods:** Patients with CS complicating AMI and multivessel coronary artery disease from the CULPRIT-SHOCK trial were included. We explored clinical outcome within 30 days in patients not requiring MV, those with MV on admission, and those in whom MV was initiated within the first day after admission.

**Results:** Among 683 randomized patients included in the analysis, 17.4% received no MV, 59.7% were ventilated at admission and 22.8% received MV within or after the first day after admission. Patients requiring MV were younger, more frequently non-smokers, had higher body mass indices, presented more often with clinical signs of impaired organ perfusion includ-

ing worse renal function, higher burden of coronary artery disease, were more likely to have experienced resuscitation within 24h before admission, had worse left ventricular function, and presented more often with non-ST-segment elevation myocardial infarction. The primary endpoint of all-cause death or need for renal replacement therapy occurred in 21.8% of patients without MV, in 53.3% of patients with MV at admission (adjusted odds ratio [aOR] 6.03, 95% confidence interval (CI) 3.17–11.47,  $p=0.002$ , compared to patients without) and 65.4% of patients with MV initiated within the first day after admission (aOR 8.09 95% CI 4.32–15.16,  $p<0.001$ , compared to patients without). Factors independently associated with the provision of MV on admission included higher body weight, resuscitation within 24h before admission, elevated heart rate and evidence of triple vessel disease.

**Conclusions:** Requiring MV in patients with CS complicating AMI is common and independently associated with mortality after adjusting for co-variables. Patients with delayed MV initiation appear to be at higher risk of adverse outcomes. Further research is necessary to identify the optimal timing of MV in this high-risk population.