The SOCCER-study: Effects of Oxygen Therapy on Myocardial Salvage in ST Elevation Myocardial Infarction – A Randomized Trial

Ardavan Khoshnood, Marcus Carlsson, Mahin Akbarzadeh, Pallonji Bhiladvala, Anders Roijer, David Nordlund, Peter Höglund, David Zughaft, Lizbet Todorova, Arash Mokhtari, Håkan Arheden, David Erlinge & Ulf Ekelund

Background: Oxygen (O_2) therapy is central in the treatment of myocardial infarction. O_2 may, however, have negative cardiovascular effects. In this study we evaluated the effects of O_2 therapy on myocardial salvage index (MSI), myocardium at risk (MaR) and infarct size (IS) as measured by cardiac magnetic resonance (CMR).

Methods: This study was an investigator-initiated, single blind, parallel group, randomized controlled trial at Skåne university hospital. Normoxic patients with first time ST Elevation Myocardial Infarction (STEMI), symptom onset < 6h and accepted for acute percutaneous coronary intervention (PCI), were in the ambulance randomized to the ”O_2 group” or the ”air group”. At day 2-6 after PCI, the patients underwent CMR.

Results:

CMR	O_2 group (n=46)	Air group (n=49)	95% CI
Mean Myocardial salvage index, % (SD)	53.9 (25.1)	49.3 (24.0)	-5.4 to14.6
Mean Infarct size, % (SD)	15.6 (10.4)	16.0 (11.0)	-4.7 to 4.1
Mean Infarct size, ml (SD)	20.6 (15.6)	20.1 (15.9)	-5.9 to 6.9
Mean Myocardium at risk, % (SD)	31.9 (10.0)	30.0 (11.8)	-2.6 to 6.3

Discussion: Previous studies indicate that hyperoxia may increase myocardial ischemia in acute coronary disease. The SOCCER-study is the first to assess the effects of O_2 therapy on MSI and MaR, as measured with CMR, in acute reperfused myocardial infarction. MSI was chosen as the primary endpoint since the prognosis in reperfused STEMI patients is directly related to the amount of myocardial salvage. CMR is the gold standard method to evaluate MSI, MaR and IS. Our study was also powered to detect a significant clinical difference in MSI between the study groups.

Conclusion: Our results showing no difference in MSI between the O_2 and air groups suggests that supplemental O_2 did not affect the efficacy of reperfusion in STEMI patients accepted for acute PCI. These results support the safety of withholding supplemental oxygen in normoxic STEMI patients.

Ardavan Khoshnood. Department of Emergency and Internal medicine, Clinical Sciences Lund, Lund University, Skåne University Hospital, Lund, Sweden. ardavan.Khoshnood@med.lu.se