

## KEY ADVANCES PRACTICE ADVANCE

# Avoiding Routine Use of Supplemental Oxygen for Patients with Suspected Acute Myocardial Infarction

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**Why is this topic important?** The routine administration of supplemental oxygen to patients suspected of acute myocardial infarction (AMI) has been a mainstay of treatment for decades. Recent research has demonstrated that this practice does not provide benefit for suspected AMI patients that are not hypoxic, but also does not likely result in harm.

**How will this change my clinical practice?** The routine ED management of the patient suspected of AMI does not require supplemental oxygen unless their oxygen saturation is less than 90% or the patient is in respiratory distress.

**Synopsis Focus Points:** Emergency physicians are strongly recommended to not routinely administer supplemental oxygen to patients suspected of AMI unless hypoxic or in respiratory distress.

### Background:

A 2016 Cochrane Review reported no difference in hospital all-cause mortality based on four trials that compared supplemental oxygen to ambient air in patients with AMI; however, due to study limitations, these conclusions were based on a very low certainty of evidence. (1) In 2017, a registry-based randomized trial (DETO2X) was published, which enrolled 6,629 normoxic (room air oxygen saturation  $\geq 90\%$ ) patients suspected of AMI. The results were reported as an intention-to-treat analysis and demonstrated that routine supplemental oxygen at 6 L/min for 6 to 12 hours did not lower all-cause mortality (the primary outcome), cardiovascular mortality, or hospitalization for heart failure within a year when compared to those receiving ambient air (all-cause mortality rate 5% vs 5.1%, respectively). (2, 3) Subsequent meta-analyses that included the large DETO2X trial also reported a lack of mortality benefit of supplemental oxygen for normoxic patients. (4, 5)

One interpretation of this evidence is that supplemental oxygen in suspected AMI is ineffective but safe, which may be untrue. It has been hypothesized that hyperoxia may cause harm by increasing coronary artery vasoconstriction and vascular resistance along with the potential myocardial injury related to free radicals. (1,4,5) However, a small trial that randomized 95 normoxic STEMI patients undergoing acute percutaneous catheterization (PCI) to supplemental oxygen or air did not show any effect on the size of ischemia before PCI or on infarct size with follow-up cardiac MR. The authors concluded that these findings support the safety of withholding supplemental oxygen in normoxic patients with STEMI. (6) Of note is that a randomized clinical trial published in 1976 comparing 24 hours of 6 L/min oxygen with ambient air in suspected uncomplicated myocardial infarction patients showed no benefit. (7)

This is Level 1a evidence. (8)

### References:

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8. <https://www.cebm.net/2009/06/oxford-centre-evidence-based-medicine-levels-evidence-march-2009/>

**Resources for additional learning:**

<https://pubmed.ncbi.nlm.nih.gov/?term=oxygen%20myocardial%20infarction>  
<https://rebelem.com/?s=oxygen+myocardial+infarction>  
<https://www.youtube.com/watch?v=Kps3VzbykFQ>

September 2, 2020