

## May 2016 Phoenix Critical Care Journal Club: Oxygen Therapy

**Panwar R, Hardie M, Bellomo R, Barrot L, Eastwood GM, Young PJ, Capellier G, Harrigan PW, Bailey M; CLOSE Study Investigators; ANZICS Clinical Trials Group. Conservative versus liberal oxygenation targets for mechanically ventilated patients. A pilot multicenter randomized controlled trial. Am J Respir Crit Care Med. 2016 Jan 1;193(1):43-51. [\[CrossRef\]](#) [\[PubMed\]](#)**

We continue to debate the appropriate level of oxygenation for a variety of patients. This study attempted to address the question of appropriate oxygenation targets for intensive care unit (ICU) patients. At four multidisciplinary ICUs, 103 adult patients were randomly allocated to either a conservative oxygenation strategy with target oxygen saturation as measured by pulse oximetry (SpO<sub>2</sub>) of 88-92% (n = 52) or a liberal oxygenation strategy with target SpO<sub>2</sub> of greater than or equal to 96% (n = 51). There were no significant between-group differences in any measures of new organ dysfunction, or ICU or 90-day mortality. Although the study is underpowered, it does support the concept that a conservative oxygen strategy might be appropriate.

**Eastwood GM, Tanaka A, Espinoza ED, Peck L, Young H, Mårtensson J, Zhang L, Glassford NJ, Hsiao YF, Suzuki S, Bellomo R. Conservative oxygen therapy in mechanically ventilated patients following cardiac arrest: A retrospective nested cohort study. Resuscitation. 2016 Apr;101:108-14. [\[CrossRef\]](#) [\[PubMed\]](#)**

In mechanically ventilated (MV) cardiac arrest (CA) survivors admitted to the intensive care unit (ICU) avoidance of hypoxia is considered crucial. However, avoidance of hyperoxia may also be important since some prior studies have suggested that high levels of oxygenation decrease survival. The same investigators as the study discussed above, evaluated the introduction of conservative oxygen therapy (target SpO<sub>2</sub> 88-92% using the lowest FiO<sub>2</sub>) during MV for resuscitated CA patients admitted to the ICU. 100 patients (50 in each group). ICU length of stay was significantly shorter for conservative group patients (p=0.04). There was no difference in the proportion of survivors discharged from hospital with good neurological outcome (14/23 vs 12/22 patients, p=0.67). As in the previous study, this study was also underpowered but does support the feasibility and physiological safety of conservative oxygen therapy in patients admitted to ICU for MV support after cardiac arrest.

**Cabello JB, Burls A, Emparanza JI, Bayliss S, Quinn T. Oxygen therapy for acute myocardial infarction. Cochrane Database Syst Rev. 2013 Aug 21;(8):CD007160 [\[Crossref\]](#) [\[PubMed\]](#)**

Oxygen is widely prescribed for patients with acute myocardial infarction (AMI) although it has been suggested it may do more harm than good. Previous systematic reviews have concluded that there was insufficient evidence to know whether oxygen reduced, increased or had no effect on heart ischemia or infarct size, as did our original Cochrane review on this topic in 2010. The authors used the Cochrane Library to search for randomized controlled trials of oxygen in patients with suspected or proven AMI. The updated search identified one new trial. In total, four trials involving 430 participants were included and 17 deaths occurred. The pooled RR of death was 2.05 (95% CI 0.75 to 5.58) in an intention-to-treat analysis and 2.11 (95% CI 0.78 to 5.68) in participants with confirmed AMI. While suggestive of harm, the small number of deaths recorded means that this could be a chance occurrence.

### ***Discussion***

Many of us were surprised that there is ongoing argument over use of oxygen. Although it is cheap and easy to administer, the three articles cited suggest that a conservative approach is equally effective. None of the trials were sufficiently powered to draw a conclusion. The possibility exists that oxygen might do harm but this will require further and larger (and more expensive) trials.

It is worth pointing out that these studies do not necessarily apply to other patients. An acute exacerbation of chronic obstructive pulmonary disease with hypercarbia may be different. A recent study demonstrated that titrated oxygen treatment significantly reduced mortality, hypercapnia, and respiratory acidosis compared with high flow oxygen in acute exacerbations of chronic obstructive pulmonary disease (1). Since pulse oximeters are nearly universally available in the US to guide therapy, it seems reasonable to use titrated oxygen whenever possible.

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### ***Reference***

1. Austin MA, Wills KE, Blizzard L, Walters EH, Wood-Baker R. Effect of high flow oxygen on mortality in chronic obstructive pulmonary disease patients in prehospital setting: randomised controlled trial. *BMJ*. 2010 Oct 18;341:c5462. [\[CrossRef\]](#) [\[PubMed\]](#)