



## A conservative oxygenation strategy is feasible and appears to be safe compared with liberal oxygenation in mechanically ventilated patients

### Synopsis

Summary of: Panwar R, Hardie M, Bellomo R, Barrot L, Eastwood GM, Young PJ, et al. Conservative versus liberal oxygenation targets for mechanically ventilated patients – a pilot multicenter randomized controlled trial. *Am J Respir Crit Care Med*. 2015; in press.

**Question:** Is a conservative oxygenation strategy a feasible and safe alternative to liberal oxygenation in mechanically ventilated patients? **Design:** Pilot, multicentre, randomised, controlled trial with concealed allocation. Patients were blinded, but clinicians and assessors were not. **Setting:** Four intensive care units, located in Australia, New Zealand and France. **Participants:** Inclusion criteria were: being aged  $\geq 18$  years, receiving mechanical ventilation for  $< 24$  hours, being expected to continue  $\geq 24$  hours further. Exclusion criteria included: known pregnancy, imminent risk of death, or if the treating clinician lacked equipoise for the patient to be enrolled in the trial. Randomisation of 104 participants allocated 53 to conservative oxygenation and 51 to liberal oxygenation. **Interventions:** Throughout the period of mechanical ventilation, the bedside nurse titrated the fraction of inspired oxygen (within 0.21 to 0.80) to achieve the specific oxygen saturation targets, measured via pulse oximeter. For the conservative oxygenation group, the oxygen saturation target was 90 to 92%. For the liberal oxygenation group, the oxygen saturation target was  $\geq 96\%$ . Positive end-expiratory pressure was adjusted as per usual practice in both groups. **Outcome measures:** The primary outcomes included the mean area-under-curve for several

measures of oxygenation, including arterial oxygen saturation and partial pressure of oxygen in arterial blood on days 0 to 7. Secondary outcomes included ventilator-free days, arrhythmia-free days until day 28, and ICU and 90-day mortality. **Results:** One hundred and three participants were analysed. Compared with the conservative oxygenation group, those in the liberal oxygenation group had greater arterial oxygen saturation (mean difference 3.6%, 95% CI 2.9 to 4.3) and partial pressure of oxygen in arterial blood (mean difference 22.0 mmHg, 95% CI 17.8 to 26.2). Similar results were demonstrated for all measures of oxygenation. There were no significant between-group differences in any secondary outcomes. The adjusted hazard ratio for 90-day mortality in the conservative oxygenation group compared with the liberal oxygenation group was 0.77 (95% CI 0.40 to 1.50). This result was similar in a subgroup of patients with baseline partial pressure of oxygen to fraction of inspired oxygen ratios of  $< 300$ . **Conclusion:** A conservative oxygenation strategy was a feasible and safe alternative to the usual liberal oxygenation strategy. [95% CIs calculated by the CAP Editor]

**Provenance:** Invited. Not peer-reviewed.

Elizabeth H Skinner  
Physiotherapy, Western Health, Australia

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### Commentary

Within critical care, during the first week of mechanical ventilation, the liberal use of oxygen therapy often leads to PaO<sub>2</sub> and SpO<sub>2</sub> values  $> 80$  mmHg and 96%, respectively.<sup>1</sup> However, liberal use of oxygen therapy following cardiac arrest is associated with increased patient harm (mortality and worse neurological outcome).<sup>2</sup> The study by Panwar et al is an important preliminary pilot, randomised, controlled trial that demonstrates that a conservative regimen of oxygen therapy aiming for a range of SpO<sub>2</sub> values from 90 to 92% is both feasible and safe in predominantly medical mechanically ventilated patients. Of note, there was a two-fold increase in arterial blood gas sampling in the conservative oxygen therapy group, potentially expressing clinician concerns about the oxygenation levels. A secondary analysis of the same cohort also reported significantly reduced rates of chest radiograph-diagnosed atelectasis, and earlier weaning to spontaneous ventilation modes and first spontaneous breathing trials in the conservative oxygenation therapy group.<sup>3</sup> Clinician bias may explain the earlier transition in ventilation mode and spontaneous breathing

trials in this group.<sup>3</sup> The optimal oxygen therapy strategy across the spectrum of critical illness requires further exploration, rather than a 'pendulous swing' to conservative oxygen therapy targets for all critically ill patients, with preliminary evidence of beneficial impacts of moderate levels of hyperoxia on patient outcome.<sup>4</sup>

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George Ntoumenopoulos  
School of Physiotherapy, Australian Catholic University, Sydney,  
Australia

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