ICU
MANAGEMENT & PRACTICE

Targeted Normoxaemia and Supplemental Oxygen–Free Days

Critically ill patients often receive supplemental oxygen to prevent hypoxaemia, but excessive oxygen can lead to harmful effects like oxidative damage and inflammation. While higher oxygen levels may provide a safety margin, they also increase the risk of hyperoxaemia, particularly in resource-limited settings.

Recent trials in ICU patients without trauma found no mortality benefit from conservative oxygen targets, though observational studies suggest targeting normoxaemia (SpO_2 90%-96% or PaO_2 60-100 mm Hg) may improve outcomes in trauma patients. However, high-quality trials in trauma populations are lacking. A pilot study showed that targeting normoxaemia reduced oxygen use but didn't assess clinical outcomes.

The SAVE-O2 trial was conducted to evaluate whether targeting normoxaemia in critically ill trauma patients could safely reduce hyperoxaemia and increase days alive without supplemental oxygen. The clinical trial compared targeted normoxaemia versus usual care in adult trauma patients admitted to the ICU at 8 level I trauma centres in the U.S. Centres transitioned from usual care to targeted normoxaemia every three months. Patients were enrolled from July 15, 2020, to November 14, 2022, and analyses were conducted using an intention-to-treat approach from April 2023 to November 2024.

In the usual care group, oxygen levels were managed at the clinicians' discretion. In the targeted normoxaemia group, an educational and informatics intervention promoted reducing supplemental oxygen when SpO_2 was above 96%. The primary outcome was supplemental oxygen–free days (SOFDs) through day 28. Safety outcomes included hypoxaemia (SpO_2 <88%), in-hospital mortality, and adverse events during the ICU stay.

The trial enrolled 12,487 trauma ICU patients (mean age 51.7 years, 70.5% male). Targeted normoxaemia increased ICU time spent in normoxaemia (56.2% to 71.6%) and reduced hyperoxaemia (42.4% to 26.7%) without increasing hypoxaemia (1.1% in both groups). There was no significant difference in overall supplemental oxygen–free days (SOFDs), but non-ventilated patients had more SOFDs with targeted normoxaemia. Patients in the targeted normoxaemia group weaned to room air faster (1.6 vs 2.7 days). In-hospital mortality was similar between groups, and no adverse events were reported.

Targeting normoxaemia in critically ill trauma patients did not significantly increase SOFDs overall but safely reduced supplemental oxygen use without increasing hypoxaemia, mortality, or adverse events. Benefits included faster liberation from oxygen and more ventilator-free days (VFDs) in the targeted normoxaemia group. These findings suggest targeting normoxaemia is a safe strategy to conserve oxygen, especially valuable in resource-limited or military settings. The study also highlights potential benefits for non-ventilated patients, a population less studied in previous trials.

Overall, findings from this trial show that targeting normoxaemia did not increase SOFDs but safely reduced oxygen use without increasing hypoxaemia or adverse events. Among non-ventilated trauma patients, targeting normoxaemia appeared to increase SOFDs.

Source: JAMA

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