

Media release

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HOT-ICU trial:

New findings on treatment with oxygen in intensive care

The New England Journal of Medicine (NEJM) recently published a large-scale multinational trial on “Handling Oxygenation Targets in the Intensive Care Unit (HOT-ICU)”. The trial, led by the Aalborg University Hospital, analyzed survival rates of critically ill patients with acute (“hypoxemic“) respiratory failure. Two patient groups were compared: one with a lower and one with a higher oxygenation target. Contrary to the initial assumption, the mortality rates were comparable in both groups after 90 days. The Inselspital, Bern University Hospital, made an important contribution to the trial.

Critically ill patients with respiratory diseases are often treated with oxygen in intensive care units. Oxygen, one of the oldest and most widely used medications, is frequently applied by means of mechanical ventilation to target defined partial oxygen pressures (“oxygenation targets“) in the blood. However, different strategies with either a higher or lower partial pressure of oxygen are used in intensive care units worldwide. The respective benefits and harms of these strategies have remained unclear in intensive care practice and the scientific literature so far.

Surprising results

The trial reveals no difference in 90-day mortality when critically ill patients in the group with a higher (n=1447, 90 mmHg arterial partial pressure of oxygen) target are compared to the group with a lower target (n=1441, 60 mmHg arterial partial pressure of oxygen). Thus, a lower oxygenation target did not reduce mortality at 90 days. Further, no significant differences were observed in the percentage of days without life-support or in the percentage of days after hospital discharge.

Large-scale multinational trial

The pragmatic trial, led by the Aalborg University Hospital, was performed by a scientific team at 35 intensive care units in Denmark, Finland, the Netherlands, Norway, the UK, Iceland and Switzerland (University hospitals of Basel and Bern). It included 2928 critically ill adult patients with an oxygen requirement of at least 10 liters per minute or 50% of inspired oxygen. Allocation to the two treatment groups (90mmHg or 60 mmHg arterial partial pressure of oxygen) was randomized. The 90-day

mortality rate was the primary outcome of the trial. The percentage of days that patients were alive without life-support treatment and the percentage that patients were alive after hospital discharge, as well as the percentages of patients with shock, myocardial infarction, stroke and intestinal ischemia were documented as well.

Prospects

Following intensive discussions on oxygenation targets in critically ill patients in the past years, arguments for and against both approaches were identified. The current trial results seem to support a “conservative” approach to administration of oxygen with lower oxygenation targets in critically ill adult patients.

Prof. Dr. med. Joerg C. Schefold, Chief Physician of the Department of Intensive Care at Inselspital, Bern University Hospital and member of the scientific team explains: “*The trial results address a question of daily relevance in critical care and contribute to a better understanding of the impact of respective treatment strategies. They show that the “conservative” strategy is not associated with a lower mortality rate. We expect our data to influence international recommendations regarding oxygenation targets in critically ill adult patients requiring oxygen supplementation.*”

Experts:

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Links:

- DOI: 10.1056/NEJMoa2032510, Publication in NEJM “Lower or Higher Oxygenation Targets for Acute Hypoxemic Respiratory Failure” ([Link: https://www.nejm.org/doi/full/10.1056/NEJMoa2032510?query=featured_home](https://www.nejm.org/doi/full/10.1056/NEJMoa2032510?query=featured_home))
- [Department of Intensive Care, Inselspital, Bern University Hospital](#)
- HOT-ICU: <http://www.cric.nu/hot-icu/> and statistical methodology: <https://pubmed.ncbi.nlm.nih.gov/32068884/>