CPAP and oxygen have similar impact on mortality of COVID-19 patients that wouldn't benefit from intensive care

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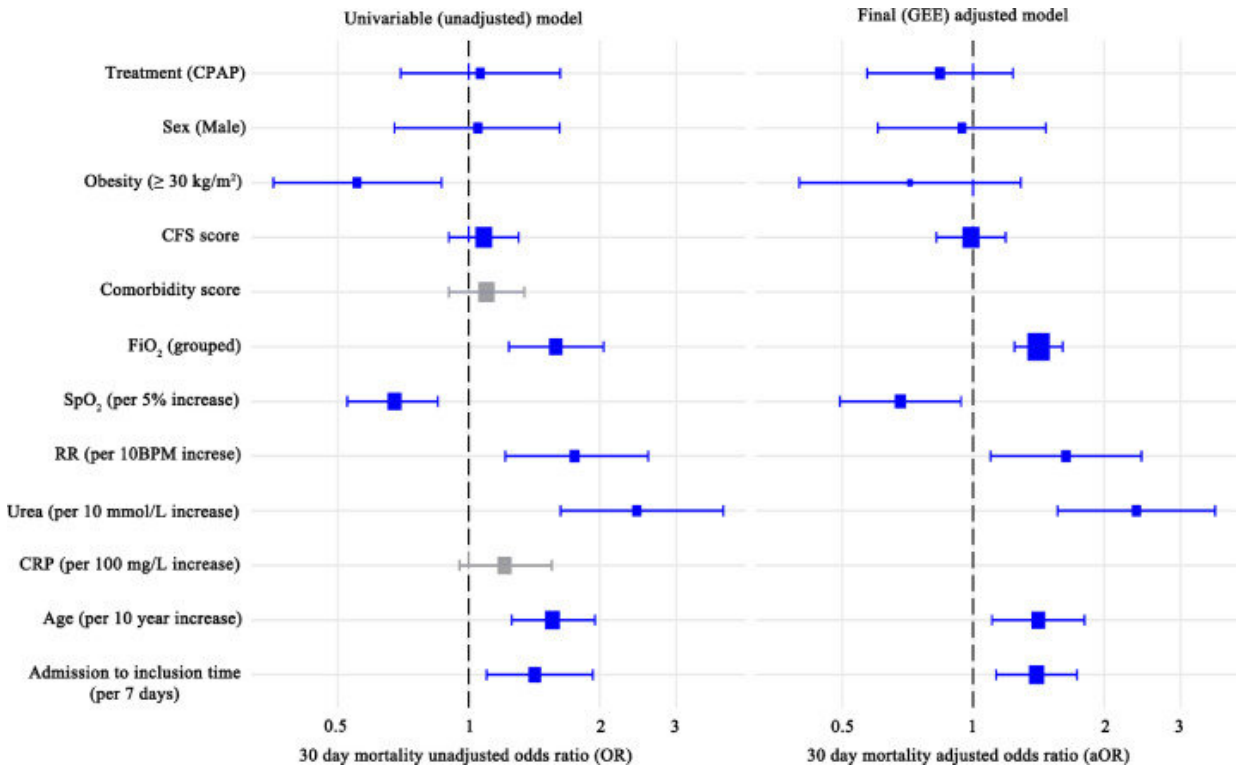

Figure 130 day mortality unadjusted odds ratios (OR, left) of variables and final Generalized Estimating Equations (GEE) model with estimated 30-day mortality adjusted odds ratios (aOR, right). Variables colored gray were not included in the final GEE model. An OR>1 represents increased occurrence of 30 day mortality. Abbreviations used: FiO2, fraction of inspired oxygen; RR, respiratory rate; SpO2, pulse oximetry; CRP, C-reactive protein; BMI, body mass index; CFS, clinical frailty scale. Blue variables were subsequently used in the final adjusted OR model. Credit: DOI: 10.1016/j.eclinm.2021.101122

Unwell COVID-19 patients may be treated just as effectively with oxygen through a mask rather than the sometimes difficult to tolerate therapy known as Continuous Positive Airway Pressure (CPAP), according to a new study.

The patients in the study, whose frailty and other medical conditions meant they were unlikely to benefit from invasive mechanical ventilation and intensive care treatment, received treatment with either an oxygen mask or CPAP.

The study of CPAP was led by researchers at The University of Manchester and Manchester University NHS Foundation Trust (MFT), and is published today in *EClinical Medicine*.

Though the study team argue more research is needed to confirm the findings and see if there are specific groups of patients who may benefit from CPAP, the research, they say, casts doubt on current national and international guidance that supports broad application of the treatment.

All the 479 patients from seven NHS Trusts across the North West of England had both respiratory failure from COVID-19 and pre-existing medical conditions which meant invasive mechanical ventilation in intensive care would not help them.

Overall CPAP did not improve mortality: 75.6 percent of the patients died after 30-days in the oxygen group (186/246 patients) whereas the figure was 77.7 percent in the CPAP group (181/233 patients).

In the study, almost 50 percent of the patients on CPAP—in which oxygen under pressure is delivered through a tight-fitting mask under pressure—chose to discontinue the therapy after around two days.

The clinicians involved say that might be because patients felt they did not feel benefit from the treatment, they found it hard to tolerate, or other reasons.

The study team hope the results can help clinicians guide patients to make informed, joint decisions, about whether to give CPAP treatment. Until now, there had been no information comparing CPAP to oxygen therapy.

The data adds to a recent national study which looked at otherwise healthy patients, excluded from the Manchester study, requiring oxygen who were likely to benefit from invasive mechanical ventilation and ITU treatment.

The study of the different patient group, not looked at by the Manchester team, is available as a pre-print and summarized in the *BMJ*, found CPAP reduces the need for invasive mechanical ventilation in the fitter COVID-19 patients.

That—together with the results of the Manchester study—suggest CPAP—which requires high dependency care but can be delivered on a ward, might be more effectively used for otherwise healthy patients, freeing up beds in intensive care units.

Dr. Laurence Pearmain, a clinical researcher at The University of Manchester and a respiratory doctor at Wythenshawe Hospital, part of MFT, and funded by the Medical Research Council (MRC), led the study.

He said: "CPAP therapy is commonly used for patients with respiratory failure from severe COVID-19 pneumonitis, including in patients not likely to benefit from invasive mechanical ventilation.

"But we show there is no evidence to demonstrate its superiority over conventional oxygen therapy in those patients.

"High patient-initiated discontinuation of CPAP suggests it can be a significant treatment burden for them; it's fair to assume that CPAP is a stressful experience for some patients. Conventional oxygen therapy, delivered by a mask is far easier to tolerate.

"Our study findings, including the absence of a clear benefit from CPAP in this frail patient population, can help inform often challenging conversations between patients and doctors when making treatment decisions surrounding breathing support.

"Ward-level delivery of CPAP also presents practical challenges to nursing staff, however, for some patients CPAP is a valuable and effective treatment when used in the correct context."

Co-author, Dr. Tim Felton, is Clinical Senior Lecturer at The University of Manchester, researcher at the NIHR Manchester Biomedical Research Centre (BRC) and Consultant in Intensive Care and Respiratory Medicine at Wythenshawe Hospital.

He said: "We feel that reflection is warranted on the current treatment guidance and widespread application of CPAP for these patients who cannot be treated with mechanical ventilation.

"Given the resources required to provide CPAP, it raises questions as to whether it should be provided to patients who are not suitable for mechanical ventilation, which has been commonplace during the COVID-19 pandemic.

"Some caution should be applied to these findings, as there may be patient sub-groups who benefit from CPAP in the setting of COVID-19.

There have been no studies looking at predictors of CPAP efficacy in this patient cohort to date, and our study was not designed to address that question."

Dr. Patrick Bradley is an author and co-lead of the North West Collaboration Organisation for Respiratory Research (NWCORR) research network as well as a respiratory doctor at Blackpool Victoria NHS Foundation Trust, who provided statistical support for the study.

He said: "This project is a great example of what can be done when research-interested doctors from around the region work together, gathering much more data than any single hospital could do on their own. It has added meaningfully to our understanding of an important, unanswered question."

The paper, "Conventional oxygen therapy versus CPAP as a ceiling of care in ward-based patients with COVID-19: a multi-centre cohort evaluation," is published in *EClinical Medicine*.

More information: P Bradley et al, Conventional oxygen therapy versus CPAP as a ceiling of care in ward-based patients with COVID-19: a multi-centre cohort evaluation., *EClinicalMedicine* (2021). DOI: 10.1016/j.eclinm.2021.101122

Gavin D Perkins et al, An adaptive randomized controlled trial of non-invasive respiratory strategies in acute respiratory failure patients with COVID-19, (2021). DOI: 10.1101/2021.08.02.21261379

Provided by University of Manchester

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