Change in how paramedics use oxygen could reduce deaths

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A change to the way paramedics use oxygen when treating patients with chronic lung disease could cut the death rate in these cases by up to 78%, according to a new study published in the British Medical Journal today.

Researchers based in Australia found the risk of death in patients with chronic obstructive pulmonary disease (COPD) was significantly reduced by using titrated (controlled) oxygen therapy instead of the current common approach of high concentration oxygen.

High concentration oxygen is used routinely by many paramedics in emergency situations for patients with acute breathlessness caused by episodes of COPD, a condition that affects over 200 million people across the world.

However, giving high concentration oxygen to patients with severe lung disease can lead to a build up of carbon dioxide in the blood, which can induce respiratory failure.

Hospital audits have also shown an association between using high concentration oxygen and adverse outcomes such as an increase in mortality, length of hospital stay, need for ventilation and admission to high dependency units.

For these reasons, the British Thoracic Society together with 21 other UK Colleges and Societies produced a guideline in 2008 which recommended that oxygen therapy for patients with COPD should be

titrated to achieve a blood oxygen saturation of 88-92% compared with a target saturation range of 94-98% for most other medical emergencies. This guidance was implemented by the UK ambulance service in 2009.

Researchers from Tasmania carried out a study involving 405 patients aged 35 and over who were treated by 62 paramedics from the Tasmanian Ambulance Service and transported to a local hospital.

The participants were split into two groups – one group (226) was treated with the standard high concentration oxygen approach and the other (179) with titrated oxygen therapy – and data collected over a 13-month period between 2006 and 2007.

A confirmed COPD subgroup was identified retrospectively as those patients with a definite diagnosis of COPD during the study and this included 214 patients, 117 of whom were treated using high concentration oxygen and 97 with titrated oxygen with a target range of 88-92%.

Results showed significant differences in outcomes, depending on which approach was used.

Overall mortality was 9% (21 deaths) in the high concentration oxygen group and 4% (7 deaths) in the titrated oxygen group. This difference was more pronounced in the confirmed COPD subgroup for which there was a 9% (11 deaths) mortality rate in the high concentration group compared with a 2% mortality rate (2 deaths) in the titrated group.

Overall, titrated oxygen therapy reduced the risk of death from respiratory failure by 58% for all patients and 78% for confirmed COPD patients compared to high concentration oxygen therapy.

Patients who received high concentration oxygen were also significantly

more likely to develop respiratory acidosis (a condition in which decreased respiration causes increased blood carbon dioxide and decreased pH) or hypercapnia, when there is too much carbon dioxide in the blood.

The researchers conclude: "Our findings provide the first high quality evidence from a randomised controlled trial for the development of universal guidelines and support the British Thoracic Society's recent guidelines on acute oxygen treatment, which recommend that oxygen should be administered only at concentrations sufficient to maintain adequate oxygen saturations."

In an accompanying editorial, senior doctors Ronan O'Driscoll and Richard Beasley warn that routine use of high concentration oxygen may also be harmful in several other medical emergencies, including heart attack and stroke."

They conclude: "After more than 200 years of haphazard use, it should be recognised that oxygen should be prescribed for defined indications in which its benefits outweigh its risks and that the patient's response must be monitored."

Provided by British Medical Journal