EMA Emergency Medicine Australasia

Emergency Medicine Australasia (2015) ••, ••–•• doi: 10.1111/1742-6723.12391

LETTER TO THE EDITOR

Do ambulance paramedics administer too much oxygen to patients with acute exacerbations of chronic obstructive airways disease?

Dear Editor,

The COPD-X guidelines (2014)[1] recommend that for patients with chronic obstructive pulmonary disease (COPD) treated in emergency settings (including the prehospital setting), oxygen flow should be carefully titrated to achieve arterial oxygen saturations between 88% and 92%. The rationale is that there is evidence that high-flow oxygen administered prehospital may increase mortality (number needed to harm 14), based on work by Austin *et al*.,[2] and is associated with an increased risk of of death, assisted ventilation or respiratory failure.[3] We aimed to determine what proportion of patients with COPD arriving at the ED by ambulance is over-oxygenated.

This was an unplanned sub-study of retrospective cohort by medical record review of patients presenting to ED by ambulance with final hospital diagnosis of COPD. The parent study aimed to compare mortality for those receiving controlled *versus* uncontrolled oxygen therapy. Inclusion criteria were age ≥18 years and ED discharge diagnosis of COPD. Exclusion criteria were: did not arrive by ambulance; did not receive oxygen prehospital; did not receive oxygen after initial ED assessment; failure to confirm COPD as the principal hospital discharge diagnosis; discharged from ED; was receiving assisted ventilation on ED arrival; and missing records. Patients were identified from the ED data management system for the period 1 January 2012 to 31 March 2013. There were 864 potentially eligible patients. A convenience sample of 642 patients, based on record availability, was screened for inclusion representing approximately 74% of all potentially eligible patients.

Data collected included demographics, use of home oxygen, prehospital oxygen delivery method, last recorded SpO_2 prehospital, primary hospital discharge diagnosis and in-hospital mortality. The outcome of interest was the proportion of patients with SpO_2 ≥93% at last prehospital reading. Analysis is descriptive with 95% confidence intervals (CIs). Ethics approval as a quality assurance project was obtained. Patient consent was not required.

Two hundred and sixty-three patients met inclusion and exclusion criteria. Median age was 73 (interquartile range [IQR] 65–79) and 53.2% were male. There were 27.4% receiving home oxygen therapy. Nasal prongs were used in 35.7% of patients, oxygen masks in 63.5% and mode of delivery was unknown in 0.8%. The proportion of patients with SpO_2 ≥93% at the last ambulance reading was 222 (84.4%; 95% CI 79.5–88.3%). Of patients documented as having home oxygen therapy, 73.6% (95% CI 62.4–82.4%) had final ambulance SpO_2 ≥93%. Inpatient mortality overall was 4.2% (95% CI 2.4–7.3%), similar to that reported in a previous study.[4]

These data suggest that despite recent evidence of adverse effects, prehospital administration of oxygen results in over-oxygenation in the majority of cases. Of concern, this is also true of patients on home oxygen therapy, a high-risk group for reliance on hypoxic drive to drive respiration.

The reasons for this are not clear but are worthy of investigation. They may be educational, issues with protocols, lack of availability of air in ambulance to drive nebulisers or related to availability of alternative oxygen delivery equipment options such as venturi-type masks. Identification of the contributors will inform efforts to address this issue and potentially improve patient outcomes.

These data are an example of the importance of periodically measuring what is actually being done rather than assuming that guidelines are being followed. Without measurement, quality of care cannot be assured and quality improvement opportunities may go unidentified.

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