Oxygen therapy in acute situations

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This article summarises the research evidence for the use of normobaric oxygen, that is, oxygen administered at normal atmospheric pressure. There is no evidence from randomised trials that oxygen is effective for patients with an acute myocardial infarction, compared to the administration of room air. An open trial has yielded evidence that administering oxygen to a saturation of 88-92% may lead to lower mortality among patients with COPD exacerbations than high-flow oxygen administration, but this study had serious methodological limitations. No randomised trials have been published in which oxygen was compared with room air for patients with a COPD exacerbation, so the question remains whether oxygen therapy for this indication offers any added value. The same conclusion can be drawn for its use in asthma exacerbations, for which no trials using clinical endpoints have been published. A meta-analysis of studies on asphyxia at birth even showed a higher mortality risk for 100% oxygen compared to room air. A lower saturation target (85-89% vs. 91-95%) was found to reduce pre-discharge mortality at the hospital, but this was a coprimary endpoint. Results of two small randomised double-blind trials showed that oxygen was more effective than room air for the treatment of cluster headaches, but the results were uncertain, as one trial had failed to calculate the required sample size, while the other was affected by high drop-out rates. Although oxygen has been registered as a medicine for over eight years, the number of randomised trials examining its efficacy and side-effects is limited. In practice, medicinal oxygen is used in various life-threatening situations, without clear evidence for its efficacy. Nor is it clear what research evidence has been used in the registration procedure. The therapy is largely based on expert opinion, founded on pathophysiological arguments and experience.

Apart from the question whether oxygen therapy is sufficiently effective in acute situations, its safety has been insufficiently examined, and in fact, a number of studies suggest that it can increase mortality risk. In addition, oxygen represents a fire hazard. The conclusion must be that oxygen is not a medication that should be administered automatically, under the assumption that ‘it can’t hurt to try’. Further research is required to avoid adverse effects and overtreatment, and withholding oxygen therapy cannot be regarded as medical negligence from the point of view of evidence-based medicine. The precise costs of oxygen therapy in acute situations are not known, but might be high due to the safety measures required for its transport and storage.

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*The literature refers to the Dutch tekst

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