Restricted versus liberal oxygen exposure for preventing morbidity and mortality in preterm or low birth weight infants

03 May 2013

RHL summary

The administration of restricted supplemental oxygen compared with unrestricted oxygen in preterm and low-birth-weight infants significantly reduces the incidence and severity of retinopathy of prematurity, without affecting mortality rates. Further research is required to determine the optimal range of blood oxygen levels.

Cochrane review

Citation: Askie LM, Henderson-Smart DJ. Restricted versus liberal oxygen exposure for preventing morbidity and mortality in preterm or low birth weight infants. Cochrane Database of Systematic Reviews 2007, Issue 4. Art. No.: CD001077. DOI: 10.1002/14651858.CD001077.

Abstract

Whilst the use of supplemental oxygen has a long history in neonatal care, resulting in both significant health care benefits and harms, uncertainty remains as to the most appropriate range to target blood oxygen levels in preterm and low birth weight infants. Potential benefits of higher oxygen targeting include more stable sleep patterns and improved long term growth and development. However, there may be significant deleterious pulmonary effects and health service use implications resulting from such a policy.

In preterm or low birth weight infants, does targeting ambient oxygen concentration to achieve a lower versus higher blood oxygen range, or administering restricted versus liberal supplemental oxygen, influence mortality, retinopathy of prematurity, lung function, growth or development?

The standard search strategy of the Neonatal Review Group was used. An additional literature search was conducted of the MEDLINE and CINAHL databases in order to locate any trials in addition to those provided by the Cochrane Controlled Trials Register (CENTRAL/CCTR).

All trials in preterm or low birth weight infants utilising random or quasi-random patient allocation, in which ambient oxygen concentrations were targeted to achieve a lower versus higher blood oxygen range, or restricted versus liberal oxygen was administered, were eligible for inclusion.

The methodological quality of the eligible trials was assessed independently by each author for the degree
selection, performance, attrition and detection bias. Data were extracted and reviewed independently by the each author. Data analysis was conducted according to the standards of the Cochrane Neonatal Review Group.

The restriction of oxygen significantly reduced the incidence and severity of retinopathy of prematurity without unduly increasing death rates in the meta-analysis of the five trials included in this review. The one trial that specifically addressed the question of lower versus higher PaO2 found no effect on death, but did not report (in sufficient detail to warrant inclusion) the effect of this intervention on eye or other outcomes. The effects of either of these oxygen administration policies on other clinically meaningful outcomes including chronic lung disease and long term growth, neurodevelopment, lung or visual function were not reported in any of the available trials.

The results of this systematic review confirm the commonly held view of today's clinicians that a policy of unrestricted, unmonitored oxygen therapy has potential harms, without clear benefits. However, the question of what is the optimal target range for maintaining blood oxygen levels in preterm/LBW infants was not answered by the data available for inclusion in this review.

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