Which Interventions for Neonatal Respiratory Failure are Effective?

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Aim. To review the evidence from clinical trials of various interventions to treat and prevent respiratory failure in the neonate and to determine which interventions are effective and which require further study.

Methods. Randomized controlled trials and/or meta-analyses of trials of interventions for neonatal respiratory failure were sought from databases including the Cochrane Collaboration. The results were synthesized as typical relative risks and typical risk differences, with 95% confidence intervals (CI).

Results. The following interventions were effective: conventional mechanical ventilation (absolute reduction in mortality 12%, 95% CI 4-21%), continuous positive airway pressure (absolute reduction in mortality 15%, 95% CI 1-28%), surfactant therapy (absolute reduction in mortality 4 to 9%, 95% CI 1-13%), and extracorporeal membrane oxygenation (absolute reduction in mortality 29%; 95% CI 15-42%). High frequency oscillatory ventilation with a volume recruitment strategy and inhaled nitric oxide appeared promising, but have not yet reduced mortality. Prenatal corticosteroids (absolute reduction in mortality 4%; 95% CI 2-6%) and amnioinfusion (effect on mortality not yet possible to estimate) prevented respiratory failure, but routine endotracheal intubation and suctioning of the airways at birth in vigorous meconium-stained term babies did not prove effective.

Conclusions. Assisted ventilation, surfactant therapy, and extra-corporeal membrane oxygenation are effective, but it is uncertain how each should be applied in an individual infant. More research is needed to evaluate combinations of effective interventions, and effectiveness of high frequency oscillation and inhaled nitric oxide. Routine intubation and suctioning of the airways at birth in meconium-stained vigorous neonates is not recommended.

Key words: intensive care, neonatal; neonate; nitric oxide; pulmonary surfactants; respiratory failure; ventilation, mechanical

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