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Title: Avoiding mechanical ventilation to prevent bronchopulmonary dysplasia: A meta-analysis

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Body: Background: Intubation and mechanical ventilation of neonates with respiratory distress syndrome is associated with the development of bronchopulmonary dysplasia (BPD). However, it is not known whether avoidance of mechanical ventilation can reduce the incidence of BPD in very premature infants. Objective: To investigate, in a meta-analysis, the influence of strategies to avoid mechanical ventilation on BPD incidence in premature infants of <30 weeks' gestational age (GA). Methods: The authors searched MEDLINE, EMBASE and CENTRAL (January 2000 to February 2013) for randomized controlled trials comparing continuous positive airway pressure or non-invasive ventilation with endotracheal ventilation or intubation-surfactant-extubation (INSURE). The primary outcome was death or BPD at 36 weeks' GA. A secondary outcome was intraventricular haemorrhage (IVH) grade 3 or 4. Data analyses were performed with RevMan Version 5.1.6 using a random effects model. Results: Seven studies comprising 3289 patients were included in the meta-analysis. In infants randomized to strategies avoiding intubation and mechanical ventilation, the rate of death or BPD was 39.6% (614/1552) versus 42.4% (737/1737) in controls, p=0.01. The odds ratio [95% confidence interval] for death or BPD was 0.83 [0.71-0.96], the number needed to treat was 35. Avoiding intubation and mechanical ventilation had no influence on IVH, p=0.35. Conclusions: This meta-analysis shows that BPD rates in premature infants <30 weeks' GA can be reduced by applying strategies to avoid intubation and mechanical ventilation. However, the overall effect size is moderate. Avoiding ventilation can only be one component of a comprehensive strategy to reduce BPD.