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[Intervention Review]

Late (≥ 7 days) inhalation corticosteroids to reduce bronchopulmonary dysplasia in preterm infants

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ABSTRACT

Background

Bronchopulmonary dysplasia (BPD), defined as oxygen dependence at 36 weeks postmenstrual age (PMA), remains an important complication of prematurity. Pulmonary inflammation plays a central role in the pathogenesis of BPD. Attenuating pulmonary inflammation with postnatal systemic corticosteroids reduces the incidence of BPD in preterm infants but may be associated with an increased risk of adverse neurodevelopmental outcomes. Local administration of corticosteroids via inhalation might be an effective and safe alternative.

Objectives

To determine if administration of inhalation corticosteroids after the first week of life to preterm infants at high risk of developing BPD is effective and safe in reducing the incidence of death and BPD as separate or combined outcomes.

Search methods

We identified randomised, controlled trials by searching the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*), PubMed (from 1966), EMBASE (from 1974), CINAHL (from 1982), references from retrieved trials and handsearches of journals, all assessed to February 2012.

Selection criteria

Randomised controlled trials comparing inhalation corticosteroids, started ≥ 7 days postnatal age (PNA) but before 36 weeks PMA, to placebo in ventilated and non-ventilated infants at risk of BPD were included. Trials investigating systemic corticosteroids versus inhalation corticosteroids were excluded.

Data collection and analysis

Data on patient characteristics, trial methodology, and inhalation regimens were collected. The primary outcomes were death or BPD, or both, at 28 days PNA or 36 weeks PMA. Secondary outcomes were short-term respiratory outcomes, such as failure to extubate, total days of mechanical ventilation and oxygen use, and the need for systemic corticosteroids. The original trialists were contacted to verify the validity of extracted data and to provide missing data. All data were analysed using RevMan 5.0.24. When possible, meta-analysis was performed using typical risk ratio (TRR) for dichotomous outcomes and weighted mean difference (WMD) for continuous outcomes along with their 95% confidence intervals (CI). Ventilated and non-ventilated participants were analysed separately.

Main results

Eight trials randomising 232 preterm infants were included in this review. Inhalation corticosteroids did not reduce the separate or combined outcomes of death or BPD. Furthermore, inhalation steroids did not impact short-term respiratory outcomes such as failure to extubate and total duration of mechanical ventilation or oxygen dependency. There was a trend to a reduced use of systemic corticosteroids in favour of inhalation corticosteroids (TRR 0.51; 95% CI 0.26 to 1.00). There was a paucity of data on short-term and long-term adverse effects. These results should be interpreted with caution because the total number of randomised patients is relatively small and most trials differed considerably in patient characteristics, inhalation therapy and outcome definitions.

Authors' conclusions

Based on the results of the currently available evidence, inhalation corticosteroids initiated at ≥ 7 days of life for preterm infants at high risk of developing BPD cannot be recommended at this point in time. More and larger randomised, placebo-controlled trials are needed to establish the efficacy and safety of inhalation corticosteroids.

PLAIN LANGUAGE SUMMARY

Inhalation corticosteroids for bronchopulmonary dysplasia

Preterm infants have an increased risk of developing chronic lung disease or bronchopulmonary dysplasia (BPD). Inflammation in the lung seems to play a central role in the development of BPD. Administration of the anti-inflammatory drugs called corticosteroids into the bloodstream (systemically) reduces the risk of BPD but may also have serious side effects. Administering corticosteroids via inhalation directly into the lungs may reduce these adverse effects. This review looked at trials that compared inhalation corticosteroids to inhalation placebo in preterm infants at risk of developing BPD after the first week of life. These trials did not show a beneficial effect of inhalation corticosteroids on death or BPD. In addition, the safety of inhalation corticosteroids was assessed in only a small number of trials. Based on these results, inhalation corticosteroids cannot be recommended for preterm infants at risk of BPD. More studies are needed.