The use of dexamethasone in the prevention of postextubation stridor in pediatric patients in PICU/NICU settings: an analytical review

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Authors' objectives
To determine the effectiveness of prophylactic dexamethasone in preventing postextubation stridor in paediatric patients.

Searching
MEDLINE and CINAHL were searched for studies published in the English language within the past two decades. The search terms used were ‘extubation’ and ‘pediatric intensive care’, ‘postextubation’, ‘stridor’ and ‘dexamethasone’. The reference lists of the identified studies were also reviewed.

Study selection

Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were included.

Specific interventions included in the review
Studies comparing the intravenous (IV) administration of dexamethasone (0.25 or 0.5 mg/kg dose) with placebo (IV saline solution) were included in the review. Studies in which other types of corticosteroids were used were excluded, as were those focusing on infectious croup.

Participants included in the review
The participants were infants and children.

Outcomes assessed in the review
The outcome variables measured by the studies were the incidence of stridor, respiratory distress or airway obstruction. The incidence of stridor was determined by the presence of the clinical signs in all studies. Three studies used systematic scores to classify the severity of upper airway obstruction. However, no study reported the validity, reliability and sensitivity of the stridor score, croup score or Downes’ score. Other outcome measures of respiratory distress were pulmonary function tests, pulsus paradoxus, atelectasis and blood gas.

How were decisions on the relevance of primary studies made?
The author does not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
Validity was not formally assessed, although the study inclusion criteria, clarity of protocol and blinding were commented upon.

Data extraction
The author does not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.

Data were extracted on the study setting, sampling, dexamethasone regimen, outcome measures and outcomes.

Methods of synthesis
How were the studies combined?
The studies were summarised narratively.

How were differences between studies investigated?
Heterogeneity was not formally assessed, although the author states that the dexamethasone dosage, total amount of drug, and duration of administration were inconsistent among the studies.

Results of the review
Five studies with a total of 351 participants were included in the review.

The results were not sufficiently consistent to determine whether dexamethasone prophylaxis among postextubation paediatric patients is beneficial. Three studies revealed no significant difference in stridor incidence between the dexamethasone and the placebo groups. Two studies found significant differences between the dexamethasone and placebo groups. In one of these studies, the incidence of stridor was 43% in the placebo group but 7% in the dexamethasone group. None of the dexamethasone-treated infants had severe respiratory distress immediately after extubation, but four placebo infants required reintubation for significant stridor; the placebo group had a significantly greater increase in total pulmonary resistance and decrease in tidal volume and minute ventilation after extubation. The other study found fewer dexamethasone-treated patients required epinephrine aerosol and reintubation.

One study reported that 7 of 27 infants in the dexamethasone group had glucosuria, whereas no glucosuria was found in 23 patients in the placebo group. However, this complication resolved within 24 hours without any treatment. Another study found one patient in the dexamethasone group had occult gastrointestinal bleeding, while one patient in the placebo and one in the dexamethasone group had hypertension.

Authors’ conclusions
The reviewed studies had inconsistent results. Several factors may contribute to postextubation stridor in paediatric patients. Postextubation stridor and extubation failure do not always result from airway oedema.

CRD commentary
The author stated the review question and inclusion criteria clearly. The search was limited to English language literature and only two electronic databases were searched. In addition, no attempts were made to identify unpublished studies. Therefore, the review may have omitted other relevant studies. The validity of the included studies does not appear to have been formally assessed. The fact that there was only one reviewer may decrease the reliability of the study selection and data extraction processes; the potential for errors and bias are reduced where these processes are conducted independently by more than one reviewer. Adequate details of the studies were tabulated. The author stated that the dexamethasone dosage, total amount of drug, and duration of administration were inconsistent among the studies; therefore, a narrative synthesis seems to have been appropriate.

The author’s conclusions appear justified.

Implications of the review for practice and research
Practice: The author states that in addition to prophylactic dexamethasone, other approaches should be used to prevent postextubation stridor, such as preparing the patient, following established guidelines and providing appropriate postextubation care.

Research: The author states that future research should examine the plans or protocols for postextubation and subsequent outcomes. Different postextubation management strategies and outcomes need to be compared in terms of efficacy, safety, parent satisfaction and cost-effectiveness. Studies relating to the mechanism and factors that contribute to postextubation stridor in children are important, as are the management strategies for particular etiologies, such as effective extubation for neurologically impaired children. In addition, the type of corticosteroids, dosage amount and number of doses that may help prevent postextubation airway obstruction still need to be explored. Instruments that are valid, reliable and sensitive to stridor and/or airway obstruction need to be developed.
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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.