Review: glucocorticoids improve symptoms of croup within 6 hours


**QUESTION:** In children with croup, what is the effectiveness of glucocorticoids on croup severity, necessity for additional interventions, length of hospital stay, and rate of hospitalisations?

**Data sources**
Studies were identified by searching Medline (1966 to August 1997), EMBASE/Excerpta Medica (1974 to August 1997), the Cochrane Library Controlled Trials Register; and by contacting the authors of trials published in the past 5 years.

**Study selection**
Studies were selected if they were randomised controlled trials of glucocorticoids compared with placebo or another active treatment in patients with croup and if they included clinically relevant outcome measures (clinical score, length of hospital stay, or need for additional interventions).

**Data extraction**
Data were extracted on patient characteristics (inpatient or outpatient); details about the intervention and control (type of drug, route of administration, and dose); and outcomes. The main outcome measure was improvement from baseline croup score. Additional outcomes were use of additional interventions, length of stay in hospital or emergency department, and rate of hospitalisation.

**Main results**
24 studies were included; 19 were placebo-controlled. The children’s ages ranged from 4 months to 12 years (mean age range 13–45 mo). 17 trials evaluated dexamethasone, 9 evaluated budesonide, and 3 evaluated methylprednisolone. Improvement from baseline croup score was measured at 6 hours in 13 studies, 12 hours in 7 studies, and 24 hours in 5 studies. The pooled effect sizes (ESs) showed an improvement from baseline croup score with glucocorticoids at 6 hours (pooled ES 1.0, 95% CI 0.6 to 1.5) and 12 hours (pooled ES 1.0, CI 0.4 to 1.6), but not at 24 hours (pooled ES 1.0, CI −0.1 to 2.0). When children were assessed as clinically improved or not, glucocorticoids showed a benefit at all 3 time points (table). The use of adrenaline as an additional intervention decreased in children who received glucocorticoids (absolute decreases of 9% in budesonide recipients and 12% in dexamethasone recipients). Additional use of antibiotics or supplemental glucocorticoids did not increase. Children who received glucocorticoids spent less time in the emergency department (weighted mean decrease 11 h, CI 4 to 18) and inpatients spent less time in hospital (weighted mean decrease 16 h, CI 1 to 31). The use of glucocorticoids did not affect the rate of hospitalisation.

**Conclusion**
In children with croup, glucocorticoids relieve symptoms of croup within 6 hours of treatment.

**COMMENTARY**
Evidence continues to mount for the role of glucocorticoids in the treatment of croup. While their legitimate use in alleviating airway oedema in children hospitalised with severe croup has been recognised since the late 1980s, in recent years they have been increasingly utilised as an intervention for children with milder croup and less severe respiratory distress.

The meta-analysis by Ausejo et al rigorously examines the growing number of studies on the effect of glucocorticoids on croup. This review improves upon an earlier review by including only randomised controlled trials and more recently published outpatient trials. This is important because it is in the role of treatment of the non-hospitalised child that much of the remaining uncertainty lies. The authors note, however, a strong possibility that smaller studies showing no effect of glucocorticoids may not have been published and not included in their analyses, which would lead to an overestimate of the effect of glucocorticoids.

Ausejo et al found solid evidence of some short term benefits of glucocorticoids in relieving respiratory distress. Yet their inability to show a significant difference in hospitalisation rates (affected by heterogeneity among studies) argues for more studies limited to outpatients. The limited use of the Westley clinical croup score, a valid tool to monitor change in clinical status, serves as a reminder of the importance of valid outcome measurements in furthering our understanding of treatment efficacy.

Croup is a common problem in early childhood that is usually mild and self limited. In clinical practice it frequently provides an opportunity for caregivers to teach parents about the importance of symptomatic care, monitoring, and support during a viral illness. Only a minority of children with croup will develop respiratory distress that brings them to the emergency room. The effectiveness of glucocorticoids in alleviating respiratory distress in those children is recognised. However, bolstered by this knowledge, will clinicians increasingly begin to use glucocorticoids in the treatment of the more common milder croup? And if so, will there be as yet unforeseen effects from the unnecessary use of glucocorticoids?

Elizabeth Hawkins-Walsh, RN, DNSc, CPNP
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**Glucocorticoids vs placebo for clinical improvement in children with croup**

<table>
<thead>
<tr>
<th>Time point</th>
<th>No of studies</th>
<th>Weighted event rates</th>
<th>RBI (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 hours</td>
<td>13</td>
<td>56%</td>
<td>41%</td>
<td>37% (8 to 56)</td>
</tr>
<tr>
<td>12 hours</td>
<td>7</td>
<td>89%</td>
<td>68%</td>
<td>31% (16 to 43)</td>
</tr>
<tr>
<td>24 hours</td>
<td>5</td>
<td>95%</td>
<td>83%</td>
<td>14% (4 to 24)</td>
</tr>
</tbody>
</table>

*Abbreviations defined in glossary: RBI, NNT, and CI calculated from data in article.