TAKE-HOME MESSAGE
The use of systemic or inhaled glucocorticoids in children aged 2 years or younger with acute bronchiolitis does not decrease admission rate or length of hospitalization.

Do Glucocorticoids Provide Benefit to Children With Bronchiolitis?

EBEM Commentators
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Results

Pooled estimates of effect for glucocorticoids versus control.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Quality of Evidence (GRADE*)</th>
<th>Relative Effect (95% CI)</th>
<th>Control (Assumed Risk†)</th>
<th>Steroid (Corresponding Risk†)</th>
<th>Number of Participants (Studies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions, outpatients</td>
<td>High</td>
<td>RR 0.92 (0.78–1.08)</td>
<td>162/1,000</td>
<td>149/1,000</td>
<td>1,762 (8)</td>
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<tr>
<td>Follow-up: day 1</td>
<td></td>
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<tr>
<td>Admissions, outpatients</td>
<td>Moderate</td>
<td>RR 0.86 (0.7–1.06)</td>
<td>250/1,000</td>
<td>215/1,000</td>
<td>1,530 (5)</td>
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<tr>
<td>Follow-up: day 7</td>
<td></td>
<td></td>
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<tr>
<td>Length of stay, inpatients, days</td>
<td>High</td>
<td>Unable to meta-analyze</td>
<td>0.8–6.6</td>
<td>0.41–6.64</td>
<td>633 (8)</td>
</tr>
</tbody>
</table>

CI, Confidence interval; RR, relative risk.
*Assumed risk for admissions was based on the median control group risks across the studies included in the meta-analysis (medium risk).
†Corresponding risk (and its 95% CI) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

Of the 2,533 studies screened, 17 studies were included in the final analysis, totaling 2,596 patients. Different trial arms of each study were considered as separate comparisons.

Primary outcomes were the number of hospital admissions within 1 day and 7 days of the initial visit in the outpatient setting and length of stay for inpatients. Eight of the studies (N=1,824 patients) included outpatients, mostly from pediatric emergency departments (EDs), whereas 9 studies (N=772 patients) included inpatients only. The secondary outcomes were the following: (1) clinical severity scores such as the...
The evidence demonstrates no clinically or statistically significant difference in admission rates or inpatient lengths of stay with systemic or inhaled glucocorticoid use compared with control (Table). Results of the clinical severity scores for the inpatients in one study suggest some short-term benefit of glucocorticoids at the 3- to 6- and 6- to 12-hour times, but there were no differences found in other secondary outcomes.3 The sensitivity analysis using a fixed-effects model for primary outcomes of trials with overall low risk of bias found no change in the direction or magnitude of results.

Commentary

Bronchiolitis in the United States accounts for an average of more than 280,000 ED visits per year4 and 31.2 pediatric admissions per 1,000.5 Patients with bronchiolitis have a mean inpatient length of stay of 3.3 days5,7 and cost more than $500 million per year.7 As such, treatment that alters the clinical course of bronchiolitis in the ED would be beneficial to both patients and payers. However, determining the effectiveness of interventions for bronchiolitis has been challenging for several reasons.

First, the definition of bronchiolitis is imprecise and heterogeneous. In some studies, it is the presence of crackles with viral respiratory illness, whereas in others, it is wheezing with viral respiratory illness.8 In this Cochrane Review, the latter definition was used.

Second, the patient characteristics that may determine responsiveness to glucocorticoids are diverse. For example, some authors have suggested that glucocorticoids are effective in subgroups of patients with atopy, older age, or specific viral infections (ie, respiratory syncytial virus or rhinovirus).7,10 The prespecified subgroup analyses of both respiratory syncytial virus and age in this review found that each of these factors had limited predictive value in glucocorticoid responsiveness. However, the heterogeneity among trials did not allow adequate analysis of patients with atopy, and this review did not investigate the subgroup of patients with rhinovirus.

Third, the benefits of glucocorticoids may be specific to the intervention characteristics. For example, the benefits of glucocorticoids may depend on the dose, the type of steroid, and the method of medication administration (eg, inhalation, oral, intramuscular injection). The subgroup analysis of drug type and dose that was performed in this review found no difference, and a subgroup analysis of method of medication administration was not performed.

Fourth, the absence of standardized patient-important outcome measures has been a serious limitation in establishing the consistency and validity of bronchiolitis trials. This review used admission rates and hospital lengths of stay as the primary outcome measures. A major limitation of this review was the lack of consistent reporting of admission and discharge criteria in studies that were included. Also, the majority of trials had unclear risk of bias because of inadequate or incomplete reporting.

Nevertheless, the findings from this review do not support the routine use of glucocorticoids in young children with acute bronchiolitis, which is consistent with the recommendations from the 2006 American Academy of Pediatrics clinical practice guideline on the diagnosis and management of bronchiolitis.11 There was one large trial from this review that suggested a synergistic effect when glucocorticoids were used with nebulized epinephrine; however, further studies are needed to support this conclusion.3

Respiratory Distress Assessment Index and the Respiratory Assessment Change Score; (2) improvement in vital signs (oxygen saturation, respiratory rate, and pulse rate); (3) health services outcomes (hospital readmissions, return health care visits, and length of stay for outpatient studies); (4) pulmonary function tests; (5) symptoms and quality of life; and (6) short-term adverse events associated with the use of glucocorticoids (no studies addressed long-term harms).
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