Treatment

Review: early postnatal corticosteroids reduce chronic lung disease in preterm infants, but increase complications


QUESTIONS: Does early postnatal corticosteroid (PC) treatment given within the first 96 hours of birth decrease the risk of chronic lung disease (CLD) in at risk, preterm infants? Do PCs increase the risk of adverse effects?

Data sources
Studies were identified by searching the Oxford Database of Perinatal Trials, the Cochrane Controlled Trials Register, and Medline (1966 to September 2000); handsearching paediatric and perinatal journals; examining review articles; and contacting practising neonatologists.

Study selection
Randomised controlled trials were selected if they compared intravenous PC treatment given within 96 hours of birth with control (placebo or nothing) in preterm infants at risk of developing CLD.

Data extraction
Data were extracted on study methods, participant characteristics, and outcomes.

Main results
19 trials were included in the analysis. Most trials involved low birthweight infants with respiratory distress syndrome (RDS) who were receiving mechanical ventilation. The most common treatment assessed was dexamethasone, 0.50 mg/kg/day for 3 days, followed by 0.25 mg/kg/day for 3 days, 0.12 mg/kg/day for 3 days, and 0.05 mg/kg/day for 3 days. Meta-analysis showed that early PC treatment reduced CLD and combined death or CLD at 28 days and at 36 weeks postmenstrual age, and need for late steroids; but increased metabolic complications (hyperglycaemia, hypertension, hypertrophic cardiomyopathy, and growth failure) and gastrointestinal complications (gastrointestinal bleeding and intestinal perforation) (table). It did not affect mortality at 28 days (14 studies, n=1637) or before discharge (19 studies, n=2567). Meta-analysis of long term follow up studies showed an increased risk of developmental delay, cerebral palsy, and combined death or cerebral palsy (table).

Conclusion
Early corticosteroid treatment within 96 hours of birth prevents chronic lung disease in at risk, preterm infants, but increases the risk of metabolic and gastrointestinal complications in the short term, and developmental delay and cerebral palsy in the long term.

Early postnatal corticosteroids (PCs) (<96 h after birth) v control in at risk, preterm infants*

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Number of studies (n)</th>
<th>Early PCs</th>
<th>Control</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic lung disease (CLD) at 28 days</td>
<td>14 (1831)</td>
<td>39%</td>
<td>48%</td>
<td>21% (13 to 29)</td>
<td>10 (8 to 17)</td>
</tr>
<tr>
<td>CLD at 36 weeks postmenstrual age</td>
<td>13 (1653)</td>
<td>16%</td>
<td>26%</td>
<td>38% (25 to 49)</td>
<td>10 (8 to 17)</td>
</tr>
<tr>
<td>Death or CLD at 28 days</td>
<td>13 (1533)</td>
<td>54%</td>
<td>63%</td>
<td>14% (6 to 21)</td>
<td>12 (8 to 25)</td>
</tr>
<tr>
<td>Death or CLD at 36 weeks postmenstrual age</td>
<td>15 (2415)</td>
<td>43%</td>
<td>50%</td>
<td>14% (6 to 21)</td>
<td>15 (10 to 34)</td>
</tr>
<tr>
<td>Need for late steroids</td>
<td>9 (1865)</td>
<td>34%</td>
<td>48%</td>
<td>20% (22 to 37)</td>
<td>6 (7 to 10)</td>
</tr>
</tbody>
</table>

Hyperglycaemia 11 (2016) 40% 27% 48% (32 to 66) 8 (6 to 10)
Hypertension 10 (1946) 22% 12% 84% (54 to 121) 10 (8 to 15)
Hypertrophic cardiomyopathy 1 (50) 52% 12% 333% (40 to 1240) 3 (2 to 6)
Growth failure 1 (50) 80% 12% 567% (127 to 1860) 2 (2 to 3)
Gastrointestinal bleeding 9 (1440) 12% 6% 90% (35 to 166) 17 (12 to 34)
Intestinal perforation 9 (1871) 8% 4% 98% (32 to 195) 25 (17 to 50)
Developmental delay 1 (248) 34% 20% 68% (8 to 161) 8 (5 to 34)
Cerebral palsy 2 (510) 21% 9% 132% (48 to 265) 9 (6 to 17)
Death or cerebral palsy 2 (510) 53% 39% 35% (11 to 64) 8 (5 to 20)

*Abbreviations defined in glossary; RRR, RRI, NNT, NNH, and CI calculated from data in article using a fixed effects model.

COMMENTARY
The aim of multidisciplinary teams that care for preterm infants in neonatal intensive care units is to reduce the risk of CLD without compromising the short and long term condition of these infants. It is therefore important for clinicians caring for preterm infants to use evidence based treatment regimens that are effective and are evaluated on a regular basis.

Corticosteroids, which are used to reduce persistent inflammation within the lungs, have both short term and long term effects. In 2 separate systematic reviews, Halliday and Ehrenkranz evaluated the evidence available on the use of PCs to reduce CLD and mortality, as well as the implications of short and long term side effects associated with early and moderately early intravenous PCs. Inhaled corticosteroids were not considered in either of these reviews as they were the subject of a separate review.19 Randomised controlled trials were included in the analysis of early PCs (given within 96 h of birth), whereas only 7 trials were included in the analysis of moderately early PCs (given at 7–14 d after birth).
Review: early postnatal corticosteroids reduce chronic lung disease in preterm infants, but increase complications

Evid Based Nurs 2002 5: 9
doi: 10.1136/ebn.5.1.9

Updated information and services can be found at:
http://ebn.bmj.com/content/5/1/9

These include:

References
This article cites 2 articles, 2 of which you can access for free at:
http://ebn.bmj.com/content/5/1/9#BIBL

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Topic Collections
Articles on similar topics can be found in the following collections
- Child health (466)
- Hypertension (220)
- Child and adolescent psychiatry (165)
- Child and adolescent psychiatry (paediatrics) (165)
- Infant health (122)
- Mechanical ventilation (35)
- Neonatal health (66)
- Cerebral palsy (11)
- Cardiomyopathy (4)
- Diabetes (189)
- Drugs: cardiovascular system (269)
- Drugs: respiratory system (37)
- GI bleeding (8)
- Immunology (including allergy) (328)
- Internet (387)
- Mechanical ventilation (35)
- Metabolic disorders (155)

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/