Dexamethasone reduced the incidence of children with mild croup who returned for medical care

Bjornson CL, Klassen TP, Williamson J, *et al*; for the Pediatric Emergency Research Canada Network. A randomized trial of a single dose of oral dexamethasone for mild croup. *N Engl J Med* 2004;**351**:1306–13.

Q Does dexamethasone reduce the incidence of children with mild croup who return for medical care more than placebo?

METHODS

Design: randomised placebo controlled trial.

Allocation: unclear allocation concealment.

Blinding: blinded (patients and data analysts).

Follow up period: 7 days after treatment.

Setting: 4 paediatric emergency departments (EDs) in Canada.

Patients: 720 children (mean age 35 mo, 61% boys) with mild croup (onset of a seal like, barking cough in the previous 72 h and ≤ 2 out of 17 points on a validated croup scoring system). Exclusion criteria included other respiratory disorders, severe systemic disease, immune dysfunction, corticosteroids within the previous 2 weeks, epinephrine for respiratory distress, and previous ED visit for this croup episode.

Intervention: single oral dose of dexamethasone suspension (12.5 ml DM phosphate injection plus 50 ml of cherry flavoured syrup, 0.6 mg/kg of body weight (maximum 20 mg) (n=359) or placebo (10 ml of distilled water plus 50 ml of cherry flavoured syrup) (n=361).

Outcomes: return to a healthcare provider for croup within 7 days after treatment (parent interview; and review of chart and database, if possible); ongoing croup symptoms (parent interviews using the validated telephone outpatient score [TOS]), hours of sleep lost by the child on days 1, 2, and 3; and costs.

Patient follow up: 98% (intention to treat analysis).

MAIN RESULTS

Fewer children who received dexamethasone returned for medical care than did those who received placebo (table). On day 1, a smaller

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Dexamethasone (DM) v placebo for mild croup in children*

Outcome at 7 days	DM	Placebo	RRR (95% CI)	NNT (CI)
Return to medical care	7.3%	15%	52% (25 to 69)	13 (8 to 31)

*Abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article.

proportion of children in the dexamethasone group had severe croup (ie, higher TOS) (adjusted odds ratio 3.4, 95% CI 1.6 to 7.4), but by day 3, the groups did not differ, and symptoms had resolved in >75% of children. Children who received dexamethasone lost less sleep than those who received placebo (2.9 v 4.2 h, $p<0.001$). The cost of dexamethasone was lower than placebo for the payer (provincial government; CN\$18 v \$25, $p<0.001$), non-payer (family; CN\$54 v \$68, $p<0.001$), and society (CN\$72 v \$93 per case of croup; average savings/case CN\$21, $p=0.01$).

CONCLUSIONS

Dexamethasone reduced the incidence of returning to medical care and sleep loss in children with mild croup. Fewer children in the dexamethasone group than the placebo group reported more severe symptoms on day 1, but this difference disappeared by day 3. Patients in the dexamethasone group had lower payer, family, and societal costs than those in the placebo group.

Commentary

Croup is a common cause of upper respiratory obstruction in children, and although it is self limiting, it places a large burden on the healthcare system.¹ Since the late 1980s, clear benefit of intramuscular dexamethasone for children admitted to hospital with croup has been established.² The study by Bjornson *et al* adds to the current body of research on oral dexamethasone for children with mild croup, who are treated on an outpatient basis.³ This study has many strengths including use of a multicentre randomised trial design; a reliable and valid croup symptom scale; a wide range of outcomes (including social factors and a cost analysis); monitoring for adverse events; an appropriate sample size to achieve 80% power; intention to treat analysis; and almost complete follow up. Data about whether the parent informants were the primary caregivers would have provided readers with information about possible informant effects on such outcomes as the number of hours of lost sleep and stress on the parent as the main caregiver.

The major study finding of reduced return visits for medical care, while modest in effect, is important from both parental and healthcare perspectives. In addition, reduced return visits likely led to decreased stress for children with croup. The findings are consistent with a recent systematic review by the Cochrane Acute Respiratory Infections Group.³ Given the improved patient and parental outcomes, low complication rate, reduced costs, and consistency of the findings with a recent systematic review, the findings support a change in practice. Nurses and nurse practitioners should work collaboratively with physicians to develop best practice primary care guidelines for children with mild croup and teach parents about the importance of dexamethasone as a single dose treatment for mild croup.

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- 1 Feldman ME. Croup. In: Feldman W. *Evidence-based pediatrics*. Hamilton [Ontario]; St Louis: BC Decker, 2000:177–90.
- 2 Kaijrys SW, Olmstead EM, O'Connor GT. Steroid treatment of laryngotracheitis: a meta-analysis of the evidence from randomized trials. *Pediatrics* 1989;**83**:683–93.
- 3 Russell K, Wiebe N, Saenz A, *et al*. Glucocorticoids for croup. *Cochrane Database Syst Rev* 2004;(1):CD001955.