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Glucocorticoids for croup in children

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Abstract

Background

Glucocorticoids are commonly used for croup in children. This is an update of a Cochrane Review published in 1999 and previously updated in 2004 and 2011.

Objectives

To examine the effects of glucocorticoids for the treatment of croup in children aged 0 to 18 years.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (the Cochrane Library, Issue 2, 2018), which includes the Cochrane Acute Respiratory Infections Group's Specialised Register, Ovid MEDLINE Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Ovid MEDLINE (1946 to 3 April 2018), and Embase (Ovid) (1996 to 3 April 2018, week 14), and the trials registers ClinicalTrials.gov (3 April 2018) and the World Health Organization International Clinical Trials Registry Platform (ICTRP, 3 April 2018). We scanned the reference lists of relevant systematic reviews and of the included studies.

Selection criteria

We included randomised controlled trials (RCTs) that investigated children aged 0 to 18 years with croup and measured the effects of glucocorticoids, alone or in combination, compared to placebo or another pharmacologic treatment. The studies needed to report at least one of our primary or secondary outcomes: change in croup score; return visits, (re)admissions or both; length of stay; patient improvement; use of additional treatments; and adverse events.

Data collection and analysis

One author extracted data from each study and another verified the extraction. We entered the data into Review Manager 5 for meta-analysis. Two review authors independently assessed risk of bias for each study using the Cochrane 'Risk of bias' tool and the certainty of the body of evidence for the primary outcomes using the GRADE approach.

Main results

We added five new RCTs with 330 children. This review now includes 43 RCTs with a total of 4565 children. We assessed most (98%) studies as at high or unclear risk of bias. Compared to placebo, glucocorticoids improved symptoms of croup at two hours (standardised mean difference (SMD) -0.65, 95% confidence interval (CI) -1.13 to -0.18; 7 RCTs; 426 children; moderate-certainty evidence), and the effect lasted for at least 24 hours (SMD -0.86, 95% CI -1.40 to -0.31; 8 RCTs; 351 children; low-certainty evidence). Compared to placebo, glucocorticoids reduced the rate of return visits or (re)admissions or both (risk ratio 0.52, 95% CI 0.36 to 0.75; 10 RCTs; 1679 children; moderate-certainty evidence). Glucocorticoid treatment reduced the length of stay in hospital by about 15 hours (mean difference -14.90, 95% CI -23.58 to -6.22; 8 RCTs; 476 children). Serious adverse events were infrequent. Publication bias was not evident. Uncertainty remains with regard to the optimal type, dose, and mode of administration of glucocorticoids for reducing croup symptoms in children.

Authors' conclusions

Glucocorticoids reduced symptoms of croup at two hours, shortened hospital stays, and reduced the rate of return visits to care. Our conclusions have changed, as the previous version of this review reported that glucocorticoids reduced symptoms of croup within six hours.

Plain language summary

Glucocorticoids for croup in children

Review question

We assessed the effectiveness of glucocorticoids for croup in children to determine if they reduced croup symptoms; minimised return visits to care; shortened length of stay; reduced the need for additional treatments; or had side effects.

Background

Croup causes the throat and windpipe to swell, resulting in hoarseness, a barking cough, and noisy breathing. Glucocorticoids can reduce swelling, making it easier to breathe.

This review was previously published in 1999 and updated in 2004 and 2011.

Search date

We searched for articles published up to 3 April 2018.

Study characteristics

We included 43 studies with 4565 children aged up to 18 years published from 1964 to 2013. The glucocorticoids investigated included beclomethasone, betamethasone, budesonide, dexamethasone, fluticasone, and prednisolone. Most studies (26, 60%) compared any glucocorticoid to placebo. Of these, 15 (58%) tested dexamethasone compared to placebo. Three studies compared 0.6 mg/kg to 0.15 mg/kg dosages of dexamethasone, a common clinical question. Half of the studies (22, 51%) described outpatients who presented to emergency departments or outpatient clinics, and 18 (42%) took place in North America, eight (19%) in Europe, seven (16%) in Asia, and 10 (23%) in Australia. Twenty-six (60%) studies compared glucocorticoids to fake treatment (placebo); four (10%) compared glucocorticoids to epinephrine; 11 (26%) compared one glucocorticoid to another; three (7%) compared one glucocorticoid to a combination of glucocorticoids; five (12%) compared glucocorticoids given in different ways; and four (9%) compared glucocorticoids given in different amounts.

Study funding sources

Funding sources included government (12%), academic or research institute (7%), industry (19%), or foundations (7%). More than half of studies (56%) did not report funding sources.

Key results

Glucocorticoids improved croup symptoms at two hours (moderate-certainty evidence), and the effect lasted at least 24 hours (low-certainty evidence). Glucocorticoids reduced rates of return visits, admissions, and readmissions (moderate-certainty evidence). When treated with placebo, 204 of every 1000 children will return for medical care. When treated with glucocorticoids, 74 to 153 of every 1000 children will return for medical care. Glucocorticoids reduced length of stay by 15 hours (range 6 to 24 hours), but made no difference in need for additional treatments. Of studies that compared glucocorticoids to placebo, 50% collected data on side effects. Four studies reported rare occurrences of secondary infections (e.g. pneumonia, ear infection). Most other side effects were not severe (e.g. emotional distress, hyperactivity, vomiting). We are not certain which type, amount, and administration mode (oral, inhaled, injected) of glucocorticoids is best for reducing symptoms of croup in children.

Quality of the evidence

Most studies (98%) had methods problems, reporting issues, or both.