

Hypertonic Saline Nebulization for Bronchiolitis

JOSEPH L MATHEW

*Advanced Pediatrics Centre, PGIMER, Chandigarh 160 012, India.
Email: jlmathew@rediffmail.com*

INTRODUCTION

Bronchiolitis is regarded as the most common lower respiratory tract infection among infants in developed countries(1). In our country too, it is a significant problem judging by the frequency of wheezing episodes among young infants, though it is difficult to routinely identify the causative virus(es). Management of bronchiolitis is often frustrating for physicians and care-givers because ‘nothing seems to work’ in most cases. There is lack of robust evidence for almost all the interventions that are usually tried, including inhaled epinephrine(2), bronchodilators(3), steroids(4), anticholinergics(5), antibiotics(6), surfactant(7) and chest physiotherapy(8). Some experts have questioned whether bronchiolitis can be treated at all(9), and current research data is far from adequate to draw definite conclusions. It has been suggested that hypertonic saline nebulization may be useful in making secretions less viscous and promoting their excretion, thereby resulting in clinical improvement. Despite the lack of sufficient data, many physicians use this, though sometimes more for psychological than clinical benefit. Against such a background, it is relevant to ask the clinical question, “*In infants with bronchiolitis (population), does hypertonic saline nebulization (intervention) result in better clinical response (outcome) compared to no intervention or nebulization with normal saline (comparison)*”.

EURECA RELEVANCE

Based on the foregoing, it is obvious that the clinical problem, intervention and outcomes of interest are all relevant in the context of our country, especially as winter is approaching.

CURRENT BEST EVIDENCE

A Pubmed search (21 October 2008), with the terms (*bronchiolitis saline*) resulted in 96 citations including a Cochrane review(10) that was published less than two weeks back. This systematic review included a detailed literature search upto November 2007 in five electronic databases. Additional search beyond 2007 in Pubmed and the Cochrane Central Register of Controlled Trials listed one more study(11), but no data were available. Therefore the recent Cochrane systematic review(10) comprises current best evidence. It included four methodologically acceptable randomised controlled trials(RCT) among 254 infants less than two years old, with a clinical diagnosis of bronchiolitis. The review showed that hypertonic saline nebulization resulted in shorter duration of hospitalization among admitted infants, and better clinical score among non-admitted infants, although it failed to reduce the rate of hospitalization among them. No adverse events were reported. The authors concluded that hypertonic saline is a clinically useful intervention in infants with bronchiolitis.

CRITICAL APPRAISAL

The Cochrane review(10) has several laudable features such as the inclusion of only RCT, participant profile corresponding to the usual clinical understanding of bronchiolitis without insistence on viral confirmation, uniform concentration of saline(3%) across trials, clinically important primary outcomes (length and rate of hospitalization), at least ten different important secondary outcomes including adverse events and appropriate statistical handling of data. What is surprising for a Cochrane review is that some of the

EURECA CONCLUSIONS IN THE INDIAN CONTEXT

- There appears to be limited benefit of hypertonic saline nebulization in infants with bronchiolitis.

usual rigorous methodological processes are conspicuous by their absence. These include the authors' restriction of literature search to conventional sources, thereby missing the additional study(11), lack of independent data extraction by two reviewers, absence of funnel plot to confirm/rule out publication bias and lack of reporting on most secondary outcomes.

It is even more surprising that based on the limited data, the authors have chosen to suggest that hypertonic saline nebulization is so beneficial as to be included in routine practice. Significant points against such a conclusion include (i) the limited number of subjects and consequent low power, (ii) the authors downplaying the non-superiority of hypertonic saline in terms of clinical score among admitted infants, (iii) failure to reduce hospitalization rate (primary outcome) among outpatient infants and (iv) combining the data of inpatients with outpatients. Further, (v) although the trials did not report any adverse event, the most important *viz.* induction of bronchospasm with hypertonic saline, is missing. This is obviously difficult to detect as the clinical manifestation *viz.* wheezing would be similar to the basic problem (bronchiolitis). It must be acknowledged that the Cochrane reviewers have touched upon some of these important issues in the Discussion section; therefore it is surprising that they have suggested hypertonic saline nebulization as a useful intervention in infants with bronchiolitis. Of course, it can be successfully argued that the review does show some beneficial effects for particular outcomes; however the lack of consistency across all relevant outcomes suggests that more information is required.

EXTENDIBILITY

Although none of the four trials were conducted in the setting of a developing country, the participant profile (infants less than two years, purely clinical

diagnosis, absence of virological confirmation, inclusion of admitted and non-admitted patients) is similar to that in our setting. Further, three of the four trials actually used additional bronchodilator in both intervention arms; the single trial which did not have this provision also ended up with physicians adding bronchodilators based on their discretion. Thus the clinical management also appears to be similar to what is routinely practised in our country. Hence there is no reason to suspect that the results would be significantly different. Therefore the evidence can be extended to our setting. The problem lies with interpreting the available evidence and for the reasons mentioned, it is difficult to be in agreement with the optimistic view presented in the Cochrane review until more robust evidence is available.

Competing interest: None stated.

Funding: None.

REFERENCES

1. Klassen TP. Recent advances in the treatment of bronchiolitis and laryngitis. *Pediatr Clin North Am* 1997; 44: 249-261.
2. Hartling L, Wiebe N, Russell K, Patel H, Klassen TP. Epinephrine for bronchiolitis. *Cochrane Database Syst Rev* 2004; 1: CD003123
3. Gadomski AM, Bhasale AL. Bronchodilators for bronchiolitis. *Cochrane Database Syst Rev* 2006; 3: CD001266
4. Patel H, Platt R, Lozano JM, Wang EEL. Glucocorticoids for acute viral bronchiolitis in infants and young children. *Cochrane Database Syst Rev* 2004; 3: CD004878.
5. Everard M, Bara A, Kurian M, N'Diaye T, Ducharme F, Mayowe V. Anticholinergic drugs for wheeze in children under the age of two years. *Cochrane Database Syst Rev* 2005; 3: CD001279.
6. Spurling GKP, Fonseka K, Doust J, DelMar C. Antibiotics for bronchiolitis in children. *Cochrane Database Syst Rev* 2007; 1: CD005189.

EURECA

7. Ventre K, Haroon M, Davison C. Surfactant therapy for bronchiolitis in critically ill infants. *Cochrane Database Syst Rev* 2006; 3: CD005150.
 8. Perrotta C, Ortiz Z, Roqué Figuls M. Chest physiotherapy for acute bronchiolitis in paediatric patients between 0 and 24 months old. *Cochrane Database Syst Rev* 2007; 1: CD004873.
 9. Calogero C, Sly PD. Acute viral bronchiolitis: to treat or not to treat-that is the question. *J Pediatr* 2007; 151: 235-237.
 10. Zhang L, Mendoza-Sassi RA, Wainwright C, Klassen TP. Nebulized hypertonic saline solution for acute bronchiolitis in infants. *Cochrane Database Syst Rev* 2008; 4: CD006458.
 11. Cuomo B, Cossettini M, Saretta F, Fasoli L, Guerrera T, Canciani M. Efficacy of hypertonic saline solution in infant with acute bronchiolitis. *Eur Resp J* 2007; 30 Suppl51: 501s.
-