

## TAKE-HOME MESSAGE

Hypertonic saline solution is possibly effective in decreasing hospital admission and length of stay for infants with bronchiolitis.



## METHODS

## DATA SOURCES

PubMed and Virtual Health Library of the Latin American and Caribbean Center on Health Sciences Information databases were queried from inception until May 2015.

## STUDY SELECTION

Studies included randomized controlled trials comparing nebulized hypertonic saline solution with 0.9% saline solution or standard treatment of bronchiolitis in children younger than 24 months. Outcome measures were lengths of stay and admission rates; studies that enrolled patients who were intubated or had recurrent wheezing were excluded.

## DATA EXTRACTION AND SYNTHESIS

Study details were extracted with a standardized form. Two reviewers assessed the studies' risk of bias. For continuous outcomes, weighted mean difference between treatment groups was reported. Dichotomous data were reported as risk ratios. Random-effects models were used for meta-analyses, and heterogeneity was assessed with Cochrane Q tests and the  $I^2$  statistics.

## Is Nebulized Hypertonic Saline Solution Effective for Acute Bronchiolitis?

## EBEM Commentators

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## Results

Meta-analytic results for admission and length of stay.

Outcome	Number of Studies (Total Number of Patients)	Result	Risk of Bias
Decrease in admission	7 (951)	RR for HS=0.80 (95% CI 0.67, 0.96) for admission	4 studies "unclear or high risk" (significant benefit) 3 studies "low risk" (no significant benefit)
Decrease in LOS	15 (1,956)	LOS for HS=-0.51 days (95% CI -0.91 to -0.11 days)	8 studies "unclear or high risk" (greater effect) 7 studies "low risk" (lower effect)

RR, Relative risk; HS, hypertonic saline solution; LOS, length of stay.

Twenty-two trials contributed data to the meta-analyses. In the outpatient trials (n=7), the hypertonic saline solution groups had lower hospitalization rates and the hypertonic saline solution groups among the inpatient studies (n=15) experienced shorter lengths of stay. There were no significant adverse events reported in any of the hypertonic saline solution groups.

## Commentary

Zheng et al<sup>1</sup> found a decreased length of stay and hospital admission with hypertonic saline solution, although these results need to be tempered by the presence of substantial heterogeneity across studies

because of inconsistency in defining bronchiolitis. Bronchiolitis is a clinical syndrome as opposed to a specific pathologic process. In everyday practice, the clinical presentation of bronchiolitis overlaps that of a simple upper respiratory infection with an asthma exacerbation. Zheng et al<sup>1</sup> concluded that nebulized hypertonic saline solution is a safe and potentially effective treatment for infants with bronchiolitis but that further studies are required because of the insufficient quantity and quality of the existing evidence.

In 2015, the National Institute of Health and Care Excellence (NICE)<sup>2</sup>

published an evidence-based review for the diagnosis and treatment of bronchiolitis. This guideline agreed with Zheng et al that use of hypertonic saline solution in bronchiolitis produced a trend toward decreased admission rates and lengths of stay. The NICE guideline developers rated the study by Everard et al<sup>3</sup> as “moderate quality,” whereas the other studies were considered “very low or low quality.” Everard et al<sup>3</sup> reported no significant difference in length of stay between the hypertonic saline solution and control groups. In addition, the NICE<sup>2</sup> guideline emphasized that there was no difference between hypertonic saline solution and 0.9% saline solution for the outcomes of oxygen saturation, respiratory rate, or severity scores (60 and 120 minutes)

postintervention; NICE also takes into account cost-effectiveness. The NICE<sup>2</sup> guideline ultimately recommended against the routine use of hypertonic saline solution.

Both systematic reviews emphasized that the majority of studies demonstrating a larger effect for hypertonic saline solution compared with 0.9% saline solution were of high or uncertain risk of biases. In summary, the evidence for the use of hypertonic saline solution in bronchiolitis is evolving, and there is a need for rigorously designed studies focused on emergency department–relevant outcomes to provide guidance for emergency physicians.

Editor's Note: This is a clinical synopsis, a regular feature of the

*Annals'* Systematic Review Snapshot (SRS) series. The source for this systematic review snapshot is: **Zheng L, Mendoza-Sassi RA, Klassen TP, et al. Nebulized hypertonic saline for acute bronchiolitis: a systematic review. *Pediatrics*. 2015;136:687-701. <http://dx.doi.org/10.1542/peds.2015-1914>.**

1. Zheng L, Mendoza-Sassi RA, Klassen TP, et al. Nebulized hypertonic saline for acute bronchiolitis: a systematic review. *Pediatrics*. 2015;136:687-701.
2. NICE. Bronchiolitis in children: diagnosis and management. 2015. Available at: <http://www.nice.org.uk/ng9>. Accessed July 20, 2016.
3. Everard ML, Hind D, Ugongha K, et al; SABRE Study Team. SABRE: a multicentre randomized control trial of nebulised hypertonic saline in infants hospitalised with acute bronchiolitis. *Thorax*. 2014;69:1105-1112.

Michael Brown, MD, MSc, and Alan Jones, MD, serve as editors of the SRS series.

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