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## HOSPITAL CARE

# Rx for Bronchiolitis: Hypertonic Saline *Without* Albuterol

**Source:** Luo Z, Fu Z, Liu E, et al. A randomized controlled trial of nebulized hypertonic saline treatment in hospitalized children with moderate to severe viral bronchiolitis. *Clin Microbiol Infect*. Accepted manuscript online: 15 Jul 2010; doi:10.1111/j.1469-0691.2010.03304.x

To determine the efficacy and safety of nebulized 3% hypertonic saline (HS) without the addition of bronchodilators, Chinese investigators performed a randomized controlled trial in infants hospitalized with wheezing. The investigators included children younger than 24 months of age admitted with their first episode of wheezing consistent with viral bronchiolitis. Included children were classified as moderately to severely ill according to a clinical severity score.<sup>1</sup> Participants were randomized to receive multiple doses of either 3% HS or 0.9% normal saline (NS) via nebulizer. The solution was delivered in a double-blind fashion every two hours for three doses, followed by every four hours for five doses, then every six hours until discharge. Participants were examined at study entry and then every 12 hours; the clinical severity score was determined at each of these time points and patients were discharged when they had no respiratory signs or symptoms for 12 hours.

Data were analyzed on 112 of 126 enrolled children, including 57 randomized to HS (treatment group, mean age 5.9 months) and 55 to NS (control group, mean age 5.8 months). There were no significant differences between the two groups at baseline. Relief from wheezing, cough, and moist crackles occurred significantly earlier in the treatment group. Clinical severity scores decreased significantly more rapidly in the treatment group. The primary outcome, length of stay, was decreased by 1.6 days ( $P < .01$ ) in the treatment group. No adverse effects were noted and no child clinically deteriorated or needed intensive care support.

The authors conclude that inhaled HS without bronchodilators is effective and safe for moderately to severely ill children hospitalized for bronchiolitis, and reduces length of stay.

### Commentary by

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*Dr Garber has disclosed no financial relationship relevant to this commentary. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.*

Viral bronchiolitis is the leading cause of hospitalization in infants.<sup>2</sup>

### PICO

**Question:** Among hospitalized children under age 24 months with moderate to severe bronchiolitis, is hypertonic saline nebulization without bronchodilators more effective than normal saline nebulization in reducing length of stay and respiratory symptoms?

**Question type:** Intervention

**Study design:** Randomized clinical trial

Commonly used therapies such as bronchodilators and corticosteroids have not been more effective than placebo on clinically important outcomes; therefore current practice guidelines do not recommend routine use of these drugs.<sup>3</sup> Three percent HS has been effective in hospitalized patients with bronchiolitis, with a Cochrane review showing a decreased length of stay of 0.94 days, and statistically significant decreases in respiratory scores.<sup>4</sup> In an earlier paper, the authors of the current report studied HS with albuterol nebulized three times per day in infants hospitalized with mild to moderate bronchiolitis<sup>5</sup>; those results were consistent with the results of the Cochrane review and the current study. (See also *AAP Grand Rounds*, February 2010;23:16.<sup>6</sup>)

The only significant adverse effect of HS is bronchospasm, which generally occurs in predisposed individuals (asthmatics) at higher concentrations and doses.<sup>2</sup> Therefore, previous investigators have either combined HS with albuterol or epinephrine, or allowed other therapies to be given at the discretion of the attending physician.<sup>7</sup> Authors of a retrospective study examined the safety of HS without bronchodilators and found a low rate of adverse events, concluding that “additional clinical trials of 3% saline solution in bronchiolitis should evaluate its effectiveness in the absence of adjunctive bronchodilators.”<sup>2</sup>

The main limitation of the current study is the long length of stay which resulted from the conservative discharge criteria. Length of stay is objective and more clinically meaningful than transient improvements in subjective symptoms. The sustained decrease in symptoms and clinical severity scores, however, suggests that the length of stay would be decreased in hospitals employing more liberal discharge criteria.

With strong evidence that HS without adjunctive bronchodilators is safe and positively affects important clinical outcomes, we now have a genuine therapy for inpatients with bronchiolitis. It's time to actually do something and not just stand there.

### Editors' Note

This study's results seem almost too good to be true. Experience has taught us to be cautious and take such results with a grain of salt. However, evidence is emerging that HS might have a specific role in modifying the basic pathology of RSV bronchiolitis.<sup>8</sup> Our past treatments for bronchiolitis have been extrapolated from our management of asthma. Maybe that's why none of the asthma-like therapies worked well in children with bronchiolitis. The premise on which we based bronchiolitis treatment now appears simplistic. A different type of treatment seems to hold the promise of improving outcomes.

### References

1. Wang EFL, et al. *Am Rev Respir Dis*. 1992;145:106-109
2. Ralston S, et al. *Pediatrics*. 2010;126:e520-e525
3. AAP Subcommittee on Diagnosis and Management of Bronchiolitis. *Pediatrics*. 2006;118:1774-1793
4. Zhang L, et al. Nebulized hypertonic solution for acute bronchiolitis in infants (Review). *Cochrane Database of Systematic Reviews*. 2008, Issue 4. Art. No.: CD006458
5. Luo Z, et al. *Pediatr Int*. 2010;52:199-202
6. Grewal S, et al. *Arch Pediatr Adolesc Med*. 2009;163:1007-1012
7. Kuzik BA, et al. *J Pediatr*. 2007;151:266-270
8. Mandelberg A, et al. *Pediatr Pulmonol*. 2010;45:36-40

**Key words:** bronchiolitis, nebulized, hypertonic saline

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Lane Palmer, MD (Editorial Board Member) disclosed a Speaker's Bureau with Latorje.

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AAP Grand Rounds 2010;24;65

DOI: 10.1542/gr.24-6-65

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