PEDIATRICS PERSPECTIVES

Safely Doing Less and the New AAP Bronchiolitis Guideline

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Since acute viral bronchiolitis is thus a self-limited disease of relatively good prognosis, the principle of primum non nocere *should temper frustrated anxiety to do something—anything—to relieve severe dyspnea. Simple physical exhaustion may determine the fate of an infant laboring to meet his metabolic requirements for oxygen. His energies should not be frittered away by the annoyance of unnecessary or futile medications and procedures. Rest should be treasured.*

F. Howell Wright and Marc O. Beem[1]

It was 1965 when Drs F. Howell Wright and Marc O. Beem put forth this advice in the pages of *Pediatrics*. Nearly 50 years later, the publication of the 2014 American Academy of Pediatrics' Clinical Practice Guideline on the Diagnosis, Management, and Prevention of Bronchiolitis[2] reminds us just how little things have changed.

Current evidence suggests that the sage advice of Drs Wright and Beem largely has been ignored.[3,4] "Doing something" has trumped watchful waiting. Medications, tests, and procedures continue to be used profusely in spite of decades of research confirming their futility. In the updated 2014 guidelines, which include recommendations based on literature published since the last iteration, 10 of the 14 recommendations focus on tests or treatments to avoid. "Primum non nocere" appears to be the guiding principle behind these, with an emphasis on avoidance of interventions that lack a favorable risk-benefit ratio and with a focus on meaningful outcomes, such as hospitalization, length of stay, and symptom duration. Two recommendations in particular, 1 regarding trials of bronchodilators and 1 regarding continuous pulse oximetry, are sure to spark controversy.

THE ALBUTEROL "TRIAL"

The 2006 guidelines suggest that a "carefully monitored trial" of bronchodilators is an option and that further use is warranted only if improvement in respiratory status is documented and sustained. In the new update, the recommendation is simply to omit use of bronchodilators altogether. The initial 2006 recommendation that allowed for a trial was based in part on literature demonstrating a small reduction in the clinical score in patients who are given bronchodilators (in most recent meta-analysis, standardized mean difference on a 17-point scale of −0.3

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between treatment and control groups).[5] Although this reduction is statistically significant, the clinical impact is marginal. Regardless, although bronchodilators conclusively do not reduce admission risk or shorten length of stay, if there is even some probability of short-term clinical improvement, why not give albuterol a try?

The fact that close to two-thirds of patients hospitalized with bronchiolitis receive albuterol in the inpatient setting, for an average of 4 to 7 doses per patient, would suggest that positive "responses" to albuterol in practice are extremely common.[3] However, placebo-controlled trials of bronchodilators have demonstrated substantial improvements in clinical scores in both arms,[5] leading to the question of just how often the "improvements" we seem to encounter so commonly are truly medication-related. Because bronchiolitis is characterized by a waxing and waning course, improvements are expected in a portion of infants even in the absence of any intervention. Additionally, it is natural to be hopeful that our interventions will work, which may limit our ability to perform an unbiased assessment of response. Finally, and perhaps most importantly, our interventions usually occur with more than one therapy at a time. An infant who is provided suctioning, antipyretics, intravenous hydration, and bronchodilators over a brief period is likely to improve, and subsequently be labeled as a "responder," when in fact the bronchodilator only succeeded in causing tachycardia. The downside of such misattributions of causality is that the "albuterol responder" label may have untoward consequences: more albuterol doses (and possibly other asthma therapies; eg, corticosteroids) during the current illness, increased parental expectations during future illnesses, and strengthened physician convictions surrounding the positive value of bronchodilators in bronchiolitis.

No intervention is benign, as highlighted by a recent large randomized trial that compared nebulized racemic epinephrine with saline in children with bronchiolitis and showed no difference in outcomes or side effects between these 2 treatments. However, infants who were given frequent "around-the-clock" nebulized treatments (epinephrine or saline) had an increased length of stay and oxygen requirement when compared with infants who were given less frequent "on-demand" treatments, highlighting the idea that excessive treatments of any kind can cause meaningful harm.[5] Whether infants are harmed directly by the well-documented pharmacologic effects of bronchodilators (tachycardia, tremors, and hypoxemia),[6] or simply by rest disruption and the "… annoyance of unnecessary or futile medications and procedures,"[1] avoidance of an albuterol trial stays true to the principles espoused by Wright and Beem nearly half a century ago.

PULSE OXIMETRY: WHAT'S THE HARM?

Whereas the 2006 version of the guidelines suggested that continuous pulse oximetry is not "routinely needed" when a patient demonstrates clinical improvement, this new version allows clinicians to omit its use altogether. Understandably, some practitioners will be reluctant to avoid pulse oximetry, which is seen by many as a potentially life-saving device. However, this technology introduces the potential for overdiagnosis of hypoxemia, which can be the main determinant for admission and an important driver for length of stay in bronchiolitis.[4] In fact, in a recent publication not available to the guideline committee at the time of their update, Schuh and colleagues[7] demonstrate that pulse oximetry can be the only factor determining admission in children, regardless of their clinical appearance. The authors randomized children with bronchiolitis presenting to an emergency department to either having true oximetry values versus values that were artificially increased by 3 percentage points displayed to the treating physician. Those with falsely elevated values were 40% less likely to be hospitalized, but had no difference in complication or unscheduled visit rates. Although we must acknowledge that the pulse oximeter can be a valuable tool in the management of children with bronchiolitis, especially those who are critically ill, the heightened emphasis on the potential harms of this widespread technology is welcomed.

MOVING THE NEEDLE

The identification and correction of physiologic abnormalities is ingrained in medical culture and has been pervasive in the management of bronchiolitis. Whether it's the wheezing we identify with our stethoscopes or the hypoxemia we detect with our pulse oximeter, the default has been intervention. Implementation of guidelines that restrict these fundamental tendencies will be challenging, requiring determination and consistent messaging. The lessons that come out of implementation efforts will be constructive by developing shared baselines, improving communication, and breaking down silos between outpatient and inpatient providers. Demands from parents and other medical providers, such as nurses or respiratory therapists, will offer a different, but equally significant challenge. Efforts by groups, such as the Value in Inpatient Pediatrics network, the inpatient arm of the Quality Improvement and Innovations Network of the American Academy of Pediatrics, have already demonstrated the ability to move the needle in the direction of added

value through the elimination of unnecessary care via multicenter quality improvement collaboratives.[3]

This new and updated guideline for bronchiolitis is a true reflection of the past 50 years of research and clinical practice for this most vexing of pediatric illnesses. It is courageous in its bold, yet strongly evidence-based pronouncements to avoid care where the benefits do not clearly outweigh the harms. We hope that clinicians embrace these new recommendations that put the focus back on the patient and encourage practitioners to safely do less.

REFERENCES

1. Wright FH, Beem MO. Diagnosis and treatment: management of acute viral bronchiolitis in infancy. *Pediatrics*. 1965; 35(2):334–337
2. Ralston SL, Lieberthal AS, Meissner HC, et al; American Academy of Pediatrics. Clinical practice guideline: the diagnosis, management, and prevention of bronchiolitis. *Pediatrics*. 2014;134(5). Available at: www.pediatrics.org/cgi/content/full/134/5/e1474
3. Ralston S, Garber M, Narang S, et al. Decreasing unnecessary utilization in acute bronchiolitis care: results from the value in inpatient pediatrics network. *J Hosp Med*. 2013; 8(1):25–30
4. Quinonez RA, Garber MD, Schroeder AR, et al. Choosing wisely in pediatric hospital medicine: five opportunities for improved healthcare value. *J Hosp Med*. 2013;8(9): 479–485
5. Skjerven HO, Hunderi JO, Brügmann-Pieper SK, et al. Racemic adrenaline and inhalation strategies in acute bronchiolitis. *N Engl J Med*. 2013;368(24): 2286–2293
6. Gadomski AM, Scribani MB. Bronchodilators for bronchiolitis. *Cochrane Database Syst Rev*. 2014;(6): CD001266
7. Schuh S, Freedman S, Coates A, et al. Effect of oximetry on hospitalization in bronchiolitis: a randomized clinical trial. *JAMA*. 2014;312(7):712–718

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