Suctioning in Bronchiolitis and the Need for More Trials

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Viral bronchiolitis is a common and morbid condition and has been the subject of numerous investigations. Randomized clinical trials (RCTs) on pharmacologic interventions or advanced forms of respiratory support, such as high-flow nasal cannula, have had disappointing results, generally demonstrating that commonly administered therapies do not provide clear benefits to patients. Therefore, published recommendations mostly endorse supportive care, which for inpatients largely involves oxygen support, hydration, and nasal suctioning.1 For outpatients, nasal suctioning is often offered.

Although the practice of nasal suctioning has intuitive appeal and appears to be relatively safe and cheap, there has never been robust evidence to inform the practice. RCTs addressing the core components of supportive care for bronchiolitis, including suctioning, are scarce. Because RCTs are challenging to do well, especially in children, we have come to rely extensively on observational studies to try to better understand the efficacy of various practices. Unfortunately, the biases introduced by confounding make it challenging to establish causal links between associations described in these types of investigations.

For example, one prior single-center retrospective study2 demonstrated that hospitalized infants with bronchiolitis who had lapses in suctioning and infants who underwent deep suctioning appeared to have longer hospital length of stay. Although that investigation appropriately used propensity matching to adjust for covariates, confounding is still a reasonable explanation for one or both of these associations. A similar association between nasopharyngeal (ie, deep) suctioning and prolonged length of stay was noted in another single-center retrospective investigation.3 Is scheduled suctioning actually beneficial? Is deep suctioning truly harmful, or are patients who undergo deep suctioning simply more ill in ways that are challenging to ascertain by medical record review? We need experimental designs to get trustworthy answers to these types of questions. One prior RCT4 comparing bulb syringes and nasal-oral aspirators demonstrated no significant difference in return visits, although it was a single-center trial with premature termination.

Schuh et al5 at Sick Kids Toronto have once again stepped up to try to answer some of the most basic, yet important, questions surrounding the routine management of infants with bronchiolitis. They report on an RCT comparing 2 forms of suctioning for infants with bronchiolitis seen in an emergency department and subsequently discharged home.

The authors enrolled 367 infants aged 1 to 11 months who were randomized to enhanced suctioning (a battery-operated suction device) or minimal suctioning (a bulb syringe). Parents were instructed to use the device prior to feeding over the ensuing 72 hours. Although there were no statistically significant differences between enhanced vs minimal suctioning in terms of unscheduled visits, overall parental satisfaction with care, normal sleeping, or normal parental sleeping, there was a difference in the primary outcome of additional resource use (26.2% vs 37.0%; absolute risk difference, 0.11; 95% CI, 0.01-0.20).5 This outcome was an aggregate of unscheduled bronchiolitis visits and/or use of an additional suctioning device (beyond the study-assigned device). Additionally, parents reported being more satisfied with the enhanced-suctioning device.

Before we immediately start recommending the enhanced device to all of our families, a few more details of this study warrant consideration. First, lumping unscheduled visits with the use of an additional suctioning device into an aggregate primary outcome raises some questions. Many would consider unscheduled visits to be a more clinically meaningful outcome than simply using an alternative device. Second, most parents were already providing some form of suctioning prior to the...
emergency department visit. In the minimal suctioning group, 61.4% were using mouth-to-nose suction and 21.7% were using bulb suction.5 If mouth-to-nose is actually more effective than bulb suctioning, then the 61.4% of patients who were previously using this form of suctioning were effectively downgraded to the bulb suction. Indeed, 97 participants randomized to the minimal suctioning group wound up undergoing mouth-to-nose suctioning and hence met the primary outcome definition of additional resource use. Interestingly, 68 infants in the enhanced-suctioning group also underwent nose-to-mouth suctioning, indicating that some parents might have preferred that technique over the battery-operated device.5

Most of us who manage bronchiolitis regularly will acknowledge the intense desire by clinicians and parents to do something for infants who are struggling to breathe and eat. What can we take away from this trial5 to inform our clinical practice? We can expect that most families are already performing some form of suctioning before they present to the emergency department and have a reasonable chance of being unsatisfied with recommendations to use a bulb syringe. For families that are not suctioning or only using a bulb syringe, upgrading to a mouth-to-nose or battery-operated device is a reasonable recommendation, although costs should be a consideration. Schuh et al5 note that bulb syringes are substantially cheaper than battery-operated devices ($5 vs $45). If affordability is an issue, clinicians and parents can be comforted by the findings in this trial5 that the most expensive device does not appear to confer meaningful clinical outcomes over the cheapest. Parents are less satisfied with minimal suctioning and may be more likely to try something else, but there is no evidence that the more expensive approach leads to better outcomes for their infants.

The lack of blinding in this trial5 coupled with the high preenrollment use of suctioning devices unfortunately were substantial limitations. Similarly, premature termination hindered the one prior RCT on this topic.4 RCTs are difficult. They require considerable amounts of resources and time, and sometimes they do not answer the questions as adequately as we had hoped, but these challenges should not dampen our enthusiasm to continue to push for RCTs to answer these types of important clinical questions.

More RCTs are indeed warranted to better define the role of suctioning in bronchiolitis. On the inpatient side, such trials could compare different frequencies of suctioning (ie, every 4 hours, every 8 hours, as-needed, and so forth) and different techniques (eg, use of saline drops, different depths of suctioning, and different devices). Short-term physiologic responses might be more objective measures of efficacy compared with satisfaction measures, as the latter may be biased in favor of more advanced technologies. Similarly, subsequent outpatient trials could compare mouth-to-nose with a battery-operated device, examine the use of saline drops and sprays, and compare different frequencies of suctioning.

Such trials will take initiative, careful planning, funding, hard work, and time. Although this degree of investment may veer us toward the temptation of simpler designs, we should remain wary of the potential for nonexperimental designs to yield wrong answers. Schuh et al5 continue to set the bar high with their methodologic rigor. Let’s follow their lead.
REFERENCES


