AEROSOL DELIVERY IN RESPIRATORY SYNCYTIAL VIRUS BRONCHIOLITIS: HOOD OR FACE MASK?

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Objectives To compare the utility of the hood versus the face mask for delivery of inhaled medications to infants hospitalized with viral bronchiolitis.

Study design Randomized, double-blinded, controlled trial; 49 hospitalized infants with viral bronchiolitis, age 2.75 ± 2.2 months (mean ± SD), were grouped to either the hood (n = 25) or the mask (n = 24). Each subject received inhalation treatments with the use of both devices. Half of the Hood Group received the active drug treatment (1.5 mg epinephrine in 4 mL saline [3%]) via hood followed immediately by placebo treatment (normal saline) via mask, whereas the other half received the opposite order. Half of the Mask Group received the active drug treatment via mask followed immediately by placebo treatment via hood, whereas the other half received the opposite order. Therapy was repeated 3 times daily until discharge. Outcome measures included clinical scores and parental preference.

Results Percent improvement in clinical severity scores after inhalation was significant in both groups on days 1, 2, and 3 after admission (Hood Group: 15%, 15.4%, and 16.4%, respectively; Mask Group: 17.5%, 12.1%, and 12.7%, respectively; $P < .001$). No significant difference in clinical scores improvement between groups was observed. Eighty percent (39/49) of parents favored the hood over the mask; 18% (9/49) preferred the mask and 2% (1/49) were indifferent.

Conclusions In infants hospitalized with viral bronchiolitis and in whom aerosol treatment is considered, aerosol delivery by hood is as effective as by mask. However, according to parents, the tolerability of the hood is significantly better than that of a mask. *(J Pediatr 2005;147:627-31)*

ORIGINAL ARTICLE

Nebuliser hood compared to mask in wheezy infants: aerosol therapy without tears!

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Background: Small volume nebulisers (SVNs) with masks commonly provide aerosol therapy for infants with lung diseases. However, infants and toddlers are often disturbed by and thus reject masks.
Aims: To compare the lung deposition efficiency of the "usual" SVN aerosol mask and a prototype hood attached to an SVN. The advantage of the hood is that no mask is needed and medication can readily be administered during sleep.
Methods: ^{99m}Tc salbutamol solution was administered at random by SVN plus mask or hood to 14 wheezy infants (mean age 8 (SD 5) months). The dose and distribution of salbutamol were evaluated using gamma scintigraphy. Clinical response, tolerability by the infants, and parent preference were also compared.
Results: Mean total lung deposition was 2.6% with the hood and 2.4% with the mask ($p > 0.05$). Variability with the mask was greater than with the hood (coefficient of variation (CoV) 54% *v* 39%). Both treatments provided similar clinical benefit and side effects as reflected in improved oxygen saturation, reduced respiratory frequency, and increased heart rate. Infants accepted the hood better than the mask and there was a positive correlation between poor acceptance and upper airways and stomach deposition for both treatment modalities. Parents preferred the hood treatments.
Conclusions: Aerosol therapy by hood is as efficient as by mask but provides a better therapeutic index. It is much better tolerated by infants and preferred by parents. Hood nebulisation is a simple and patient friendly mode of aerosol therapy in wheezy infants.

ORIGINAL ARTICLE

Hood versus mask nebulization in infants with evolving bronchopulmonary dysplasia in the neonatal intensive care unit

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Objective: To compare infants' discomfort, nursing-time and caregiver preference, and assess the clinical efficiency (as a secondary outcome) of hood versus facemask nebulization in infants with evolving bronchopulmonary dysplasia (BPD) in the neonatal intensive care unit.

Study Design: A prospective, open, randomized, controlled crossover clinical trial. In total, 10 infants with BPD who were on inhaled beta-agonist bronchodilators and corticosteroids were randomly assigned to receive their nebulized treatments either by a facemask, or by a hood for 2–3 days, and then crossover to receive the same treatments with the other technique for another 2–3 days. Infants' discomfort, nursing-time, caregiver preference and clinical efficiency were compared.

Results: At baseline there was no significant clinical difference between the groups. Nurse-time required for administering the hood nebulization (mean±s.e.m.: 1.9±0.1 min) was significantly shorter than the time for mask nebulization (12.0±0.6 min, $P<0.0001$). Infants' discomfort score was significantly lower (0.1±0.04) for hood versus mask nebulization (2.5±0.2, $P<0.0001$). Nurses and parents unequivocally preferred the hood treatment. During both mask and hood nebulization therapies (2–3 days) clinical efficiency was comparable. While both methods caused an immediate (20 min post) clinical improvement, the immediate respiratory assessment change score was significantly greater for the hood versus the mask nebulization (0.62±0.27 versus 0.13±0.14, $P<0.05$).

Conclusions: Nebulization of aerosolized medications in infants with evolving BPD by hood was less time-consuming for caregivers and was much better tolerated by the infants while being at least as effective as the conventional facemask nebulization.

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Keywords: bronchopulmonary dysplasia; hood; inhalation; mask; nebulization; neonatal intensive care unit

Introduction

Aerosol medications are commonly used in infants with bronchopulmonary dysplasia (BPD).[1,2] Most devices for administering aerosol medications to infants and neonates are derived from those developed initially for delivery of asthma medications to adults and older children. Most of these devices were modified for use by infants simply by adding a small facemask covering the mouth and nose, which provides the interface between aerosol generator and patient. For optimum therapy, the edge of the mask must fit tightly to the infant's face, and that may agitate the infant.[3] It has been shown that with jet nebulization even a one cm gap between the mask and the face reduces the dose delivered by 50%.[4] The current practice in most Neonatal Intensive Care Units (NICU) requires that the nurse will open the incubator, hold the baby in a semiseated position and attach the mask to the infant's face, during the entire nebulization period (Figure 1). This is an elaborate and time-consuming task for a busy nurse in the NICU. Thus, there is clearly a need to develop a more acceptable and patient friendly interfaces for improving aerosol delivery to infants.[5,6]

As no facemask is required and nothing touches the face, a hood interface should provide a logical and compelling, infant friendly alternative for delivering nebulized drugs to infants. Furthermore, oxygen is routinely given via hood to infants in the NICU. Amirav *et al.*[7] recently demonstrated scintigraphically that inhalation via hood in wheezy infants achieved a comparable lung deposition of salbutamol to that of a conventional facemask.

We hypothesized that hood and mask nebulization would provide a comparable clinical response, but that the hood would be less time-consuming and better tolerated by the infants. The present study was designed to evaluate infants' discomfort, nursing-time and caregiver preference, and the clinical efficiency of hood versus facemask nebulization of aerosolized medications in infants with evolving BPD in the NICU.