

A Randomized Trial of High-Flow Oxygen Therapy in Infants with Bronchiolitis

AIM:

To investigate whether the early use of Nasal High Flow (NHF) compared with standard oxygen therapy (SOT), reduces the need to escalate the level of care in infants with bronchiolitis.

METHOD:

Patient group

Infants <12 months of age presenting to the Emergency Department (ED) with bronchiolitis and hypoxia ($SpO_2 < 92\%/94\%$ dependent on hospital guideline).

Study design

Prospective open label multicenter randomized controlled trial conducted in 17 EDs and associated general pediatric wards across Australia and New Zealand.

Outcome measures

- Primary outcome: Treatment failure during hospital admission requiring escalation of respiratory support and/or Pediatric Intensive Care Unit (PICU) admission. Escalation of therapy occurred if 3 out of 4 criteria were met: persistent tachycardia, tachypnea, hypoxemia, and/or hospital early warning tool activated.
- Secondary outcomes included transfer to tertiary institution, admission to intensive care, length of hospital stay, length of ICU stay, duration of oxygen therapy, intubation rates, and adverse events.

Treatment regimen

- Infants were randomized to receive NHF therapy or SOT via nasal cannula
- NHF was delivered at a rate of 2L/kg/min using Optiflow™ Junior (Fisher & Paykel Healthcare).
 - FiO_2 was adjusted to maintain SpO_2 between 92% (or 94%) and 98%.
 - NHF was stopped once infants were able to maintain SpO_2 in the target range on room air for at least 4 hours.
- SOT was delivered at flows up to a maximum of 2L/min to maintain SpO_2 between 92% (or 94%) and 98%.

- Parameters recorded included SpO_2 , heart rate, respiratory rate, respiratory effort, oxygen/ FiO_2 administered, NHF flow rate, therapy and medications, temperature and blood pressure.

RESULTS:

1,472 infants were enrolled over three years. Baseline characteristics were similar between the groups. Respiratory syncytial virus was the most common viral cause and premature birth was the most common coexisting condition.

Outcomes

- The primary outcome of treatment failure was significantly different between groups. Escalation of care was required in 87 of 739 infants (12%) on NHF therapy and 167 of 733 infants (23%) on SOT ($p < 0.001$).
- Rescue therapy with NHF was given to all infants in the SOT group requiring escalation of therapy.
 - 102 of 167 infants (61%) responded to rescue NHF therapy and 65 were transferred to PICU.
- 12 infants required intubation; 4 in the SOT group and 8 in the NHF group ($p = 0.39$).
- There was no significant difference in the length of hospital stay, length of ICU stay, or the duration of oxygen therapy.
- No serious adverse events were reported other than one pneumothorax in each group.

CONCLUSIONS & KEY POINTS

- Early use of NHF across the ED and pediatric ward is an effective strategy in reducing the escalation of therapy and level of care required in young infants with bronchiolitis, compared to standard oxygen therapy
- Fisher and Paykel Healthcare Ltd. provided some product support for this study