Article:
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Declarative Title: Initial use of high flow oxygen did not reduce duration of oxygen therapy in infants with bronchiolitis.

STUDY DESIGN

Design: Randomised controlled trial

Allocation: Randomised manually with stratification for gestational age

Blinding: Unblinded

STUDY QUESTION

Setting: A tertiary paediatric centre in New South Wales, Austalia

Patients: Infants presenting to the emergency department or paediatric ward with a diagnosis of moderately severe bronchiolitis who required oxygen therapy.

Intervention: Initial treatment with standard low flow or high flow (1l/kg/min up to a maximum of 20l/min), warm humidified oxygen.

Outcomes: Primary: time to weaning off oxygen. Secondary: 24 hour event-free survival (ie without treatment failure), proportion of serious events, transfer to ICU, length of stay, acceptability of treatment.

Follow-up period: 30 days post discharge.

MAIN RESULTS:

The results are summarised in table 1 below.

Outcomes	**Low flow group**	**High flow group**	**Hazard Ratio (95% CI)**
Time to weaning off oxygen	24 hours	20 hours	0.93 (0.7-1.2)
Length of stay	2.0 days	2.0 days	-
% not experiencing treatment failure at 24h	60%	90%	0.3 (0.2-0.6) P<0.001

Table 1: Summary of results.

CONCLUSION:
In infants with moderate bronchiolitis, initial use of high-flow warm humidified oxygen did not reduce time to weaning off oxygen or length of stay compared to conventional low-flow oxygen, however treatment failure was significantly lower in the high flow group.

ABSTRACTED FROM:
Kepreotes, E., Whitehead, B., Attia, J., Oldmeadow, C., Collison, A., Searles, A., Goddard, B., Hilton, J., Lee, M. & Mattes, J. 2017, "High-flow warm humidified oxygen versus standard low-flow nasal cannula oxygen for moderate bronchiolitis (HFWHO RCT): an open, phase 4, randomised controlled trial", The Lancet, vol. 389, no. 10072, pp. 930-939.

Bronchiolitis is a common reason for hospital admission in both well infants and those with existing co-morbidity; additionally it is the commonest cause of non-elective admission to paediatric intensive care units (PICU)[i]. The search for improved therapies, therefore, is understandable.

In recent years, treatment with high-flow oxygen therapy has become increasingly prevalent[ii]. Despite this, there is still a perceived lack of evidence of benefit and no mention of it is made in the most recent NICE guidelines[iii].

The study by Kepreotes *et al.* is a well-conduced randomised controlled trial which was adequately powered and had a comparable population to many British hospitals. Their choice of primary outcome, however, is unusual, in that high flow oxygen is rarely used as initial therapy, aside from in infants presenting with significant respiratory distress. Therefore, the finding that it does not decrease time to weaning of oxygen or length of hospital stay is largely unsurprising – many infants randomised to receive high flow oxygen might not have been offered it in routine practice outside of the study protocol.

Interestingly, however, their secondary outcome of time to treatment failure notes significant difference between groups. Furthermore, switch to high flow therapy prevented the need for PICU admission in a significant number of patients who were initially randomised to receive low flow therapy. This study's flow rate of 1l/kg/min is lower than that used in many other studies[iv] (and presumably most hospitals), where 2l/kg/min is more common. One therefore wonders whether PICU

admissions would be even lower should higher flow rates have been used.

This study provides evidence to support the use of high-flow oxygen in infants with bronchiolitis who have persisting respiratory distress on conventional, low-flow therapy. Further studies, with time to treatment failure or PICU admission rates as primary outcomes, would further strengthen this evidence base. Additionally, studies looking at flow rates reflecting those used in common practice would be valuable.

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[i] Schlapbach, L.J., Straney, L., Gelbart, B., Alexander, J., Franklin, D., Beca, J., Whitty, J.A., Ganu, S., Wilkins, B., Slater, A. and Croston, E., 2017. Burden of disease and change in practice in critically ill infants with bronchiolitis. European Respiratory Journal, 49(6), p.1601648.

[ii] McKiernan, C., Chua, L.C., Visintainer, P.F. and Allen, H., 2010. High flow nasal cannulae therapy in infants with bronchiolitis. The Journal of pediatrics, 156(4), pp.634-638.

[iii] National Institute for Health and Care Excellence (2015). Bronchiolitis in children: diagnosis and management. NICE guideline (NG9).

[iv] Mikalsen, I.B., Davis, P. & Øymar, K. 2016, "High flow nasal cannula in children: A literature review", Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, vol. 24, no. 1.