

Randomised controlled trial

Pulse oximetry may lead to unnecessary hospital admissions for infants with bronchiolitis and mild hypoxaemia

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Commentary on: Schuh S, Freedman S, Coates A, *et al.* Effect of oximetry on hospitalization in bronchiolitis: a randomized clinical trial. *JAMA* 2014;312:712–18.

Context

Viral bronchiolitis is a leading cause for infants to be admitted to hospital. Hospitalisation rates for bronchiolitis increased more than twofold between 1980 and 2000, a period during which pulse oximetry was introduced into routine practice. Practice guidelines from the American Academy of Paediatrics have stressed that oxygen is not required in otherwise stable infants with saturations greater than 90%.¹ However, prior work using surveys and observational data suggests that arbitrary oximetry thresholds in the mild hypoxaemia range (90–95%) may be an important driver for clinicians to decide to admit patients to the hospital.^{2,3}

Methods

This was a randomised controlled trial that assessed the hypothesis that increasing the displayed oximetry value by three percentage points for infants with mild to moderate bronchiolitis would reduce admissions to hospital. Two hundred and thirteen infants were randomised in a paediatric emergency department who were otherwise healthy, with a bronchiolitis score in the mild to moderate range, and oximetry levels at triage of 88% or higher. After triage, half of the infants were monitored with altered pulse oximeters that displayed three points above the measured value, while the control group received true oximetry. All clinicians were blinded to the intervention other than the triage nurse, who documented the original saturation after disposition was determined, and a research nurse. Outcomes included hospitalisation within 72 h of enrolment and unscheduled revisits for care. Statistical analysis included bivariate and multivariate comparisons.

Findings

In the control group, 41% of infants were hospitalised, compared to 25% in the altered oximetry group, a statistically significant absolute

difference of 16% (95% CI 3.6% to 28.4%, $p=0.005$) in the bivariate analysis. In the multivariate logistic analysis, infants in the control group had four times the odds of hospitalisation compared to the altered oximetry group (aOR 4.0, 95% CI 1.6 to 10.5, $p=0.009$). There was no significant difference in unscheduled visits between the control group and the altered oximetry group (21.3% vs 14.3%, difference 7%, 95% CI –30% to 17%, $p=0.18$).

Commentary

This trial used an innovative approach to demonstrate that inappropriate use of pulse oximetry may be driving unnecessary admissions to hospital for infants with bronchiolitis. Pulse oximetry is a useful tool that can detect hypoxaemia that is not apparent on clinical examination. For infants with bronchiolitis, however, it should be used judiciously, as transient decreases can occur with mucus plugging of the airways. When monitored continuously, even healthy infants may have occasional drops in oxygen saturation below 90%.⁴ Prior observational research has differed on whether mild hypoxaemia in the 90–94% range may predict more severe disease.¹ However, this study uses an experimental design to demonstrate that, although small differences in oxygen saturation do appear to drive the decision to hospitalise infants they do not appear to be associated with return visits. In fact, revisits were lower in the altered oximetry group (14% vs 21% for true oximetry).

Limitations of the trial include its single centre design and the relatively small proportion (13%) of infants with saturations below 94%. This was primarily a study of mild hypoxaemia, and its findings should be interpreted cautiously for more severely affected infants. Other outcomes such as symptom severity and home care for bronchiolitis after discharge were not assessed, although these may be important considerations for families.

Implications for practice

This study suggests that mild decreases in oxygen saturation may be used inappropriately to determine hospitalisation. These findings support published guidelines that mild hypoxaemia above 90% should not be used as a sole factor to initiate oxygen or hospitalise an infant with bronchiolitis.

Competing interests None.

Provenance and peer review Commissioned; externally peer reviewed.



References

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