



Clinical utility of the pediatric respiratory rate-oxygenation index

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Abstract

A recently published study evaluated the pediatric respiratory rate-oxygenation index to predict high-flow nasal cannula therapy failure in children. This commentary outlines limitations to the clinical applicability of the study results and suggestions for future research.

Keywords Bronchiolitis · High-flow nasal cannula · Pediatric intensive care · Respiratory failure

Dear Editor,

Respiratory rate-oxygenation index (ROX) was initially validated in adults with pneumonia, predicting the success of high-flow nasal cannula (HFNC) therapy [1]. We commend Yildizdas et al. [2] on their study evaluating pediatric respiratory rate-oxygenation index (p-ROXI) to predict HFNC failure in children 1 month to 18 years. Respiratory rate z-scores were used for age norm adjustment in a cohort mainly composed of patients with pneumonia/bronchopneumonia. There were few participants in each of the 7 other diagnostic categories with few to no failures. These are limitations to the bedside utility of the score, which may be overcome by studying more homogeneous cohorts constrained to one diagnostic category, and an age span corresponding to a fixed normal respiratory rate range to allow for more pragmatic use of raw values.

Infants with bronchiolitis are commonly treated with HFNC, increasingly outside of intensive care environments

[3, 4]. Identification of infants at high risk of HFNC failure may help guide escalation of care. The current study does not allow for adequate evaluation of the p-ROXI in infants with bronchiolitis as they represented a small proportion of the study sample (13.7%) and none experienced HFNC failure.

We conducted a single-centre retrospective feasibility analysis documenting HFNC failure rates (11.5%) in a convenience sample of 26 infants with bronchiolitis treated with HFNC in our intensive care unit during 4 consecutive viral seasons. Although centre-specific, our sample size calculation indicates the need to enrol 90 patients (9 failures) to achieve an AUC of 0.79 [2] or 50 patients (5 failures) to achieve an AUC of 0.87 [1] (two-sided significance level 0.05, power 0.8).

Initial data suggesting that p-ROXI may be useful in predicting HFNC failure in pediatric patients is promising but warrants further study before clinical application of the results at the bedside.

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Data availability Not applicable.

Code availability Not applicable.

Declarations

Ethics approval and consent to participate This study was approved by the IWK Health Research Ethics Board (#1026499).

Conflict of interest The authors declare no competing interests.

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