



The Noninvasive Ventilation Outcomes (NIVO) score: prediction of in-hospital mortality in exacerbations of COPD requiring assisted ventilation

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The NIVO score was created to predict in-hospital mortality in exacerbations of COPD requiring assisted ventilation. Prospective validation under real-world conditions in 10 UK hospitals shows it easily outperforms existing alternative scores. <https://bit.ly/3oKMZdl>

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Abstract

Introduction Acute exacerbations of COPD (AECOPD) complicated by acute (acidaemic) hypercapnic respiratory failure (AHRF) requiring ventilation are common. When applied appropriately, ventilation substantially reduces mortality. Despite this, there is evidence of poor practice and prognostic pessimism. A clinical prediction tool could improve decision making regarding ventilation, but none is routinely used.

Methods Consecutive patients admitted with AECOPD and AHRF treated with assisted ventilation (principally noninvasive ventilation) were identified in two hospitals serving differing populations. Known and potential prognostic indices were identified *a priori*. A prediction tool for in-hospital death was derived using multivariable regression analysis. Prospective, external validation was performed in a temporally separate, geographically diverse 10-centre study. The trial methodology adhered to TRIPOD (Transparent Reporting of a Multivariable Prediction Model for Individual Prognosis or Diagnosis) recommendations.

Results Derivation cohort: n=489, in-hospital mortality 25.4%; validation cohort: n=733, in-hospital mortality 20.1%. Using six simple categorised variables (extended Medical Research Council Dyspnoea score 1–4/5a/5b, time from admission to acidaemia >12 h, pH <7.25, presence of atrial fibrillation, Glasgow coma scale ≤14 and chest radiograph consolidation), a simple scoring system with strong prediction of in-hospital mortality is achieved. The resultant Noninvasive Ventilation Outcomes (NIVO) score had area under the receiver operating curve of 0.79 and offers good calibration and discrimination across stratified risk groups in its validation cohort.

Discussion The NIVO score outperformed pre-specified comparator scores. It is validated in a generalisable cohort and works despite the heterogeneity inherent to both this patient group and this intervention.

Potential applications include informing discussions with patients and their families, aiding treatment escalation decisions, challenging pessimism and comparing risk-adjusted outcomes across centres.