A New Score for Predicting Failure of Noninvasive Ventilation

Daniel M. Lindberg, MD

Five clinical criteria strongly predicted need for intubation in patients with respiratory failure.

Use of noninvasive ventilation (NIV) can avoid intubation in some patients with respiratory failure by temporarily supporting ventilation during initial treatment, but many patients fail NIV and ultimately need intubation. Patients at risk for NIV failure may benefit from early intubation or close observation. These authors derived and validated a score to predict NIV failure in patients with hypoxemic respiratory failure admitted to a respiratory intensive care unit in China.

In a derivation cohort of 449 patients, researchers used stepwise multivariable regression analysis to identify parameters measured 1 hour after initiation of NIV that predicted NIV failure. Each of the five parameters identified — Heart rate, Acidosis, Consciousness (defined by the Glasgow Coma Scale [GCS] score), Oxygenation, and Respiratory rate (HACOR) — was assigned points such that the combined HACOR score ranged from 0 to 25 points, with higher scores indicating higher likelihood of NIV failure. The score was then validated in a second cohort of 358 patients.

Among all patients, 46% ultimately failed NIV. For predicting need for intubation, the HACOR score 1 hour after initiation of NIV had an area under the receiver operating characteristics curve of 0.88 in the derivation cohort and 0.91 in the validation cohort. Overall, only 18% of patients with a score ≤5 failed NIV, compared to 78% with a score >5.

Comment: There is some risk of circularity bias here, and some parameters assigned high points in the HACOR score (e.g., GCS score <13, PaO₂/FiO₂ <125) seem like obvious triggers for intubation. Nevertheless, the HACOR components make clinical sense and the score predicted failure well. The HACOR score is a reasonable tool to use when you are unsure about whether to use NIV.

Citation(s):

Copyright © 2016. Massachusetts Medical Society. All rights reserved.