



Predictors of Intubation in Patients With Acute Hypoxemic Respiratory Failure Treated With a Noninvasive Oxygenation Strategy

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OBJECTIVES: In patients with acute hypoxemic respiratory failure, noninvasive ventilation and high-flow nasal cannula oxygen are alternative strategies to conventional oxygen therapy. Endotracheal intubation is frequently needed in these patients with a risk of delay, and early predictors of failure may help clinicians to decide early. We aimed to identify factors associated with intubation in patients with acute hypoxemic respiratory failure treated with different noninvasive oxygenation techniques.

DESIGN: Post hoc analysis of a randomized clinical trial.

SETTING: Twenty-three ICUs.

PATIENTS: Patients with a respiratory rate greater than 25 breaths/min and a PaO₂/FIO₂ ratio less than or equal to 300 mm Hg.

INTERVENTION: Patients were treated with standard oxygen, high-flow nasal cannula oxygen, or noninvasive ventilation.

MEASUREMENT AND MAIN RESULTS: Respiratory variables one hour after treatment initiation. Under standard oxygen, patients with a respiratory rate greater than or equal to 30 breaths/min were more likely to need intubation (odds ratio, 2.76; 95% CI, 1.13-6.75; p = 0.03). One hour after high-flow nasal cannula oxygen initiation, increased heart rate was the only factor associated with intubation. One hour after noninvasive ventilation initiation, a PaO₂/FIO₂ ratio less than or equal to 200 mm Hg and a tidal volume greater than 9 mL/kg of predicted body weight were independent predictors of intubation (adjusted odds ratio, 4.26; 95% CI, 1.62-11.16; p = 0.003 and adjusted odds ratio, 3.14; 95% CI, 1.22-8.06; p = 0.02, respectively). A tidal volume above 9 mL/kg during noninvasive ventilation remained independently associated with 90-day mortality.

CONCLUSIONS: In patients with acute hypoxemic respiratory failure breathing spontaneously, the respiratory rate was a predictor of intubation under standard oxygen, but not under high-flow nasal cannula oxygen or noninvasive ventilation. A PaO₂/FIO₂ below 200 mm Hg and a high tidal volume greater than 9 mL/kg were the two strong predictors of intubation under noninvasive ventilation.

Résumé en anglais

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