

Characteristics and predictors of short-term 30-day in-hospital mortality in patients with severely exacerbated COPD with acute respiratory failure

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Short Title: Predictors of mortality in COPD patients with acute respiratory failure.

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ABSTRACT:

Background: Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory disease associated with high mortality when acutely exacerbated. However, the mortality may be higher in patients needing mechanical ventilation due to severely exacerbated COPD with acute respiratory failure. Hence, we performed a cohort study to investigate the predictors in these patients.

Methods: We retrospectively reviewed medical records of patients diagnosed with exacerbated COPD with acute respiratory failure, who had been treated with invasive mechanical ventilation or noninvasive positive pressure ventilation (NIPPV). We included patients admitted to our hospital, Kaohsiung Veterans General Hospital in Taiwan, from January 2011 to December 2021.

Multivariate logistic regression was used to conduct a nomogram for determining the predictors of short-term 30-day in-hospital mortality. Patients were excluded if they were aged below 20 years or had incomplete clinical or laboratory test data.

Results: We enrolled 384 COPD patients with acute respiratory failure and found that the short-term 30-day in-hospital mortality rate was 20% after ventilation in patients with severely exacerbated COPD with acute respiratory failure. Patients with age ≥ 70 years (P: 0.007, adjusted odds ratio (aOR): 2.21, 95% confident interval (CI): 1.25–3.92), shock (P < 0.001, aOR: 4.39, 95% CI: 2.26–8.55), high serum lactate > 4 mmole/L (P: 0.008, aOR: 2.82, 95% CI: 1.31–6.07), PaCO₂ < 50 mmHg (P: 0.003, aOR: 2.35, 95% CI: 1.33–4.14), and NIPPV (P < 0.001, aOR: 4.24, 95% CI:

2.29–7.84) were independent predictors for higher short-term 30-day in-hospital mortality rate in stepwise logistic regression analysis which showed significant predictive performance (c-statistic, 0.771; 95% CI, 0.712–0.830).

Conclusions: The established nomogram which is practical for clinical using with five significant factors showed impressive performance of mortality in patients with severely exacerbated COPD with acute respiratory failure. Age ≥ 70 years, shock, high serum lactate > 4 mmol/L, PaCO₂ < 50 mmHg, and NIPPV **may be** associated with higher short-term 30-day in-hospital mortality rates in these patients.

