Clinical Factors Associated with an Increased Risk of Death at and During Hospitalization for an Acute Exacerbation of COPD (AECOPD) and for a Short Period after Discharge

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Chronic obstructive pulmonary disease (COPD) is a major cause of morbidity and mortality worldwide. Acute exacerbations of COPD (AECOPD) are unfavourable events interrupting the stable phase of disease and that in some cases require admission to hospital; this aspect may influence the general prognosis during hospitalization and for a short period after discharge. In this editorial, we have highlighted some aspects related to the close link between AECOPD and all-cause mortality; we report several clinical factors that may be defined as risk factors for mortality at admission, during hospitalization and for a short period after discharge. These predictors of death in AECOPD may help physicians to accurately predict prognosis and therefore, behave differently in the clinical management of COPD patients.

Key words: Chronic obstructive pulmonary disease; Acute exacerbations of COPD; Hospitalization; Prognosis; Predictors

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about the diagnosis and management of AECOPD\textsuperscript{23} and several studies published over the last decade have investigated and founded clinical factors that potentially could be determinants of mortality for hospitalized patients with AECOPD, nothing has been reported on specific and useful recommendations for patients at risk of death. In fact, the possibility of having reliable screening criteria capable of identifying early on patients at a higher risk of death in the “critical period” of hospitalization and in the early post-discharge period could be useful to physicians in the management of these patients at risk. This aspect may in fact, be true especially when defining the prognosis of patients and then, adjusting levels of care and treatments, or optimizing timing of discharge and planning a follow-up visit.

With regards to variables influencing survival and related to the general characteristics of patients, age at admission\textsuperscript{12-13,18}, particularly in older patients\textsuperscript{12,13,16,17}, has been seen to be an important indicator of poor prognosis during hospitalization\textsuperscript{9,12-17} and in the post-discharge period\textsuperscript{12,15}. Moreover, the presence of associated comorbidities to COPD\textsuperscript{9,12,13,17}, may worsen the prognosis of AECOPD patients; in this context, cardiovascular disease plays a special role\textsuperscript{13,14,16}.

Related to the severity of COPD, several factors have been defined as risk factors. In particular, it has been demonstrated that patients with chronic respiratory failure and previous need for long-term home oxygen therapy (LTOT\textsuperscript{18,19}) or non-invasive mechanical ventilation\textsuperscript{17}, patients with high values at admission of dyspnoea perception\textsuperscript{23,15,17,19}, and patients with very severe airflow obstruction (forced expiratory volume in the 1st second, FEV\textsubscript{1} \(< 15\text{\%} \text{ of predicted}\)\textsuperscript{18,19} have an increased risk of death related to AECOPD.

With regards to clinical signs of AECOPD severity, the use of accessory inspiratory\textsuperscript{15,16,17} or expiratory muscles\textsuperscript{11}, paradoxical breathing\textsuperscript{15,17}, cyanosis\textsuperscript{13}, lower limb oedema\textsuperscript{13}, and impaired neurological status\textsuperscript{13,17}, especially with a Glasgow score < 1\textsuperscript{13} were found to be important factors related to mortality of AECOPD patients at and during hospitalization. Moreover, general blood gas alterations\textsuperscript{12,14,18-19}, in particular hypercapnia\textsuperscript{12,14,19} or hypoxaemia\textsuperscript{13,18}, have been found to be strong predictors of mortality. Notably, a very recent study\textsuperscript{12} demonstrates that the severity of respiratory acidosis in AECOPD increases progressively the risk of death during hospitalization (pH = 7.25-7.35 versus pH > 7.35 Odds Ratio-OR = 1.58 with a 95\% Confidence Interval-CI 1.28-1.94; p < 0.001). The need for ventilatory support, moreover, increases significantly the risk of death during hospitalization (OR = 3.66, 95\% CI 2.99-4.48, p < 0.0001)\textsuperscript{12}.

In the context of post-discharge mortality, early hospital readmission for a new event of AECOPD (for example, in a period within 30 days from discharge) is a variable that “per se” influences readmission for a new event of AECOPD (for example, in a period after discharge). In this context, cardiovascular disease plays a special role\textsuperscript{13,14,16}.

Finally, in order to define a specific score evaluating the prognosis of hospitalized AECOPD, an English prospective study\textsuperscript{20} involving more than 900 patients has found the five strongest independent predictors of death during hospitalization (extended MRC Dyspnoea Score, coexistent pneumonia, consolidation, acidemia, and atrial fibrillation), then combined into a clinical prediction score (DECAF, Dyspnoea, Coexistent Pneumonia, Consolidation, Acidemia and atrial Fibrillation). Supported by an internal bootstrap validation, the DECAF score\textsuperscript{20} demonstrates excellent ability in the discrimination of patient deaths during hospitalization (area under the receiver operator characteristic curve-AUC = 0.86, 95\% CI 0.82 to 0.89). Moreover, in the subgroup of patients with coexistent pneumonia, DECAF exhibit a strong and significant prediction of in-hospital mortality power better than CURB-65 (Confusion, Urea, Respiratory Rate, Blood pressure, Age > 65) score\textsuperscript{25} (AUC = 0.77 vs 0.66, p = 0.003)\textsuperscript{24}.

In conclusion, several clinical factors may be defined as risk factors for mortality at admission, during hospitalization and for a short period after discharge. In this context of looking for predictors of death in AECOPD, the possibility to have specific clinical prediction tools may help physicians to accurately predict prognosis and therefore, behave differently in the clinical management of patients. Now, a very interesting question that remains to be answered is: are there any clinical factors that are potentially modifiable by specific physician intervention?

\section*{CONFLICT OF INTERESTS}

The authors declare that they do not have conflict of interests.

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