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Effects of intubation timing in patients with COVID-19 throughout the four waves of the pandemic: a matched analysis

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In patients who require intubation and invasive mechanical ventilation due to COVID-19-associated acute respiratory failure, delays in implementation may increase the risk of mortality https://bit.ly/3fZLCIP

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Abstract

Background The primary aim of our study was to investigate the association between intubation timing and hospital mortality in critically ill patients with coronavirus disease 2019 (COVID-19)-associated respiratory failure. We also analysed both the impact of such timing throughout the first four pandemic waves and the influence of prior noninvasive respiratory support on outcomes.

Methods This is a secondary analysis of a multicentre, observational and prospective cohort study that included all consecutive patients undergoing invasive mechanical ventilation due to COVID-19 from across 58 Spanish intensive care units (ICUs) participating in the CIBERESUCICOVID project. The study period was between 29 February 2020 and 31 August 2021. Early intubation was defined as that occurring within the first 24 h of ICU admission. Propensity score matching was used to achieve a balance across baseline variables between the early intubation cohort and those patients who were intubated after the first 24 h of ICU admission. Differences in outcomes between early and delayed intubation were also assessed. We performed sensitivity analyses to consider a different time-point (48 h from ICU admission) for early and delayed intubation.

Results Of the 2725 patients who received invasive mechanical ventilation, a total of 614 matched patients were included in the analysis (307 for each group). In the unmatched population, there were no differences in mortality between the early and delayed groups. After propensity score matching, patients with delayed intubation presented higher hospital mortality (27.3% *versus* 37.1%; p=0.01), ICU mortality (25.7% *versus* 36.1%; p=0.007) and 90-day mortality (30.9% *versus* 40.2%; p=0.02) compared with the early intubation group. Very similar findings were observed when we used a 48-h time-point for early or delayed intubation. The use of early intubation decreased after the first wave of the pandemic (72%, 49%, 46% and 45% in the first, second, third and fourth waves, respectively; first *versus* second, third and fourth waves p<0.001). In both the main and sensitivity analyses, hospital mortality was lower in patients receiving high-flow nasal cannula (HFNC) (n=294) who were intubated earlier. The subgroup of patients undergoing noninvasive ventilation (n=214) before intubation showed higher mortality when delayed intubation was set as that occurring after 48 h from ICU admission, but not when after 24 h.

Conclusions In patients with COVID-19 requiring invasive mechanical ventilation, delayed intubation was associated with a higher risk of hospital mortality. The use of early intubation significantly decreased throughout the course of the pandemic. Benefits of such an approach occurred more notably in patients who had received HFNC.