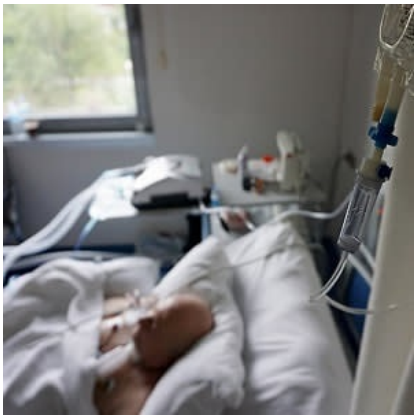
ICU
MANAGEMENT & PRACTICE

Early extubation plus NIV better than standard extubation in hypoxaemic patients



In patients recovering from hypoxaemic acute respiratory failure, early extubation followed by immediate noninvasive ventilation (NIV) reduced the days spent on invasive ventilation without affecting intensive care unit (ICU) length of stay. These findings are from a new multicentre randomised controlled trial conducted by Italian and Chinese researchers. Although a post hoc analysis suggests that surgical patients are the best candidates for this approach, further studies are necessary to confirm these findings.

NIV can be used at an early stage of acute respiratory failure (ARF) to prevent the need for invasive mechanical ventilation (i-MV) and its associated risks. There is evidence indicating NIV may facilitate withdrawal of i-MV and shorten ICU length of stay (LOS) in hypercapnic patients, while data are lacking on hypoxemic patients.

The current RCT was designed to determine whether NIV after early extubation reduces the duration of i-MV and ICU LOS in patients recovering from an episode of hypoxaemic ARF, but still dependent on inspiratory pressure support and high levels of positive end-expiratory pressure (PEEP) as opposed to a conventional approach with the endotracheal tube in place. Highly selected non-hypercapnic hypoxemic patients were randomly assigned to receive NIV after early or standard extubation.

The study was conducted from 13 October 2013 to 19 October 2016 in nine ICUs of academic hospitals, i.e., six in China and three in Italy. Co-primary end points were duration of i-MV and ICU LOS. Secondary end points were treatment failure, severe events (haemorrhagic, septic, cardiac, renal or neurologic episodes, pneumothorax or pulmonary embolism), ventilator-associated pneumonia (VAP) or tracheobronchitis (VAT), tracheotomy, percent of patients receiving sedation after study enrolment, hospital LOS, and ICU and hospital mortality.

This trial included 130 patients, 65 randomised to undergo early extubation and immediate NIV (treatment group) and 65 receiving standard extubation (control). The researchers reported these key findings:

- Duration of i-MV was shorter in the treatment group than for controls [4.0 (3.0–7.0) vs. 5.5 (4.0–9.0) days, respectively, p = 0.004], while ICU LOS was not significantly different [8.0 (6.0–12.0) vs. 9.0 (6.5 –12.5) days, respectively (p = 0.259)].
- Incidence of VAT or VAP (9% vs. 25%, p = 0.019), rate of patients requiring infusion of sedatives after enrolment (57% vs. 85%, p = 0.001), and hospital LOS, 20 (13–32) vs. 27(18–39) days (p = 0.043) were all significantly reduced in the treatment group compared with controls.

- There were no significant differences in ICU and hospital mortality or in the number of treatment failures, severe events, and tracheostomies.

"Considering the accumulating evidence in favour of high-flow oxygen therapy (HFOT) through a nasal cannula for patients with hypoxaemic ARF, some may argue that we should have considered HFOT rather than NIV," the researchers wrote. "Nevertheless, at the time the study was designed, evidence on the role of HFOT in hypoxaemic patients was still missing. Moreover, since our patients were extubated early while dependent on both PEEP and PS [pressure support], we still consider NIV the most proper strategy."

The reduction of i-MV days and of some related side effects confirms the findings of studies where NIV was used to improve the process of withdrawing mechanical ventilation in hypercapnic patients. However, the present study was unable to demonstrate a reduction in ICU LOS, suggesting that factors other than the duration of intubation, such as illness severity, reason of admission, age, comorbidities, and hospital stay before ICU admission, potentially influenced this outcome variable, the researchers point out.

A key limitation is that the study includes a highly selected population of patients with hypoxaemic ARF of varied etiology, as indicated by the low enrolment rate in relation to the relatively high numbers of recruiting centres, which indicates limited generalisability. In addition, the use of different interfaces, humidifiers, and ventilators may raise a concern about internal validity.

Source: Intensive Care Medicine
Image Credit: iStock

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