

UPDATE ALERTS

Update Alert 2: Ventilation Techniques and Risk for Transmission of Coronavirus Disease, Including COVID-19

We have updated the protocol of our living systematic review (PROSPERO registration: CRD42020178187). This most recent search update, which was done on 11 July 2020, identified 2756 citations. Of these, we included 3 observational cohort studies of patients with coronavirus disease 2019 (COVID-19) in the updated quantitative synthesis (1-3). One of the new studies compared bilevel positive airway pressure (BiPAP) with continuous positive airway pressure (CPAP) (1), 1 compared high-flow oxygen by nasal cannula (HFNC) with invasive mechanical ventilation (IMV) (2), and the last compared noninvasive ventilation (NIV) with IMV (3) (Supplement Table 1).

The first study compared BiPAP with CPAP in frail patients with COVID-19 who were deemed unsuitable for IMV by the treating team (1). We judged this study to be high risk of bias, with a Newcastle-Ottawa Scale score of 5. In the initial systematic review and the first update, we did not find any studies examining the comparative efficacy of CPAP or BiPAP in patients with COVID-19 (4, 5). This new study found a mortality rate of 40% in patients receiving BiPAP and 52% in those receiving CPAP; however, the sample size was low ($n = 28$; 5 received BiPAP and 23 received CPAP), contributing to imprecision and limiting conclusions.

The second study compared HFNC with IMV in patients with COVID-19 in the intensive care unit (2). We judged this study to be high risk of bias, with a Newcastle-Ottawa Scale score of 3. We previously included 2 studies that gave imprecise estimates of the comparative efficacy of HFNC or IMV on mortality in COVID-19 (6, 7). Mortality rate in the new study was 14% in patients receiving HFNC and 100% in those receiving IMV, although the sample size was low ($n = 13$; 7 receiving HFNC and 6 receiving IMV), limiting our ability to generate conclusions (Supplement Table 2).

The final study compared NIV with IMV in critically ill patients with COVID-19. This study was judged to be low risk of bias, with a Newcastle-Ottawa Scale score of 8 (3). The results suggested a lower mortality rate in those receiving NIV (odds ratio, 0.34 [95% CI, 0.16 to 0.71]). We compared this study with another found as part of our initial search (7). This demonstrated an inconsistent effect on mortality (hazard ratio, 0.75 [CI, 0.16 to 3.45]). This other study suggested a higher mortality in those treated with NIV (hazard ratio, 1.61 [CI, 0.84 to 3.09]) (very low certainty of evidence due to the nonrandomized study designs, imprecision, and inconsistency). In the prior searches, we identified 4 other cohort studies examining this effect (8-11). Including the new data, the results are imprecise and inconsistent when examining the effect of NIV versus IMV (Supplement Figure and Supplement Table 2).

In summary, the results suggest no change in the findings of the original systematic review. Noninvasive ventilation may have similar effects to IMV on mortality, but the evidence is uncertain (Supplement Table 2).

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