

Effect of postextubation high-flow nasal cannula vs conventional oxygen therapy on reintubation in low-risk patients. A randomized clinical trial.

AIM:

To determine whether nasal high flow (NHF) oxygen therapy would reduce the need for reintubation compared with standard oxygen therapy when given immediately after planned extubation in mechanically ventilated patients at low risk for reintubation.

METHOD:

Patients receiving mechanical ventilation for >12 hours at seven intensive care units (ICUs) in Spain over the period September 2012 to October 2015 who passed a spontaneous breathing trial and were deemed at low risk for reintubation were eligible for inclusion in the study. Patients were randomized to receive NHF or standard oxygen therapy for the first 24 hours after extubation. NHF oxygen therapy (Optiflow™; Fisher & Paykel Healthcare) via a nasal cannula was initiated at a flow rate of 10 L/min, which was increased in 5 L/min increments; temperature was set to 37 °C unless this was too hot for the patient. Standard oxygen therapy was given via nasal cannula or nonrebreathing facemask. For both forms of oxygen therapy, the inspired oxygen fraction (FiO₂) was adjusted to maintain peripheral oxygen saturation (SpO₂) at >92%.

Demographic and clinical variables within the first 24 hours after admission were recorded. Arterial blood gases, Acute Physiology and Chronic Health Evaluation (APACHE) II score and use of steroids were determined at extubation. Variables recorded at 72 hours after extubation were extubation-related complications, nasal septum and skin trauma, reasons for intubation and time to reintubation. All patients were followed until hospital discharge, and total stay in the ICU and hospital was determined. In addition, patient status at discharge was noted.

The primary study endpoint was the rate of reintubation within 72 hours of extubation. Secondary endpoints included postextubation respiratory failure, respiratory infection, sepsis and multiorgan failure, length of stay and mortality in the ICU and hospital, reintubation and adverse events.

RESULTS:

Of the 1739 weanable patients who received mechanical ventilation for >12 hours over the study period, 527 were included and randomized to NHF (n=264) or standard (n=263) oxygen therapy (mean age 51.4 years, 62% male). Demographic and clinical characteristics were similar in the two treatment groups, apart from a lower incidence of neurologic comorbidities in the NHF (7.8%) versus standard (12.9%) oxygen therapy group.

No adverse events occurred during the study.

The reintubation rate at 72 hours was 4.9% in the NHF group compared with 12.2% in the standard oxygen group (absolute difference 7.2%, 95% confidence interval [CI] 2.5 to 12.2%; p=0.004). This difference was largely due to a lower incidence of respiratory-related reintubations in the NHF versus standard oxygen therapy group (1.5% vs 8.7%; absolute difference 7.2%, 95% CI 3.6 to 11.4%; p=0.001). NHF oxygen therapy was independently and inversely associated with both all-cause (odds ratio [OR] 0.32, 95% CI 0.16 to 0.66) and respiratory-related (OR 0.17, 95% CI 0.06 to 0.51) reintubation. The number needed to treat with NHF oxygen therapy to prevent one reintubation was 14 (95% CI 8 to 40).

For secondary endpoints, the rate of post-extubation respiratory failure was significantly lower in the NHF group (8.3% vs 14.4% in the standard therapy group; difference 6.1%, 95% CI 0.7 to 11.6%; p=0.03). There were no statistically significant differences between the NHF and standard oxygen therapy groups with respect to median time to reintubation, respiratory infections, sepsis, organ failure, time to reintubation, length of stay in the ICU or hospital, and ICU or hospital mortality.

CONCLUSION:

Use of NHF oxygen therapy reduced the risk of reintubation within 72 hours compared with standard oxygen therapy in extubated patients at low risk for reintubation.

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