Clinical Usage of High-flow Oxygenation in Postcardiac Surgery Patients

The Editor,

Respiratory problem and ventilation impairment in the postcardiac surgery extubation period in the Intensive Care Unit (ICU) are frequent. After a successful cardiac surgery, plan for patient extubation is necessary, while postextubation respiratory management is a challenging subject. Postextubation respiratory policy is a method to decrease the risk of early respiratory failure and reintubation, which is associated with a poor outcome.[1,2] Usually, early mobilization, incentive spirometry, respiratory physiotherapy, and mucolytic drugs applied in these situations. Traditional oxygen therapy by a nasal cannula, a simple facial mask or facial mask plus reservoir bag, and non-invasive ventilation including continues or bi-level positive airway pressure are alternative supportive methods for ventilation augmentation. There are published reports suggest that high-flow oxygen therapy (HFOT) could be a practical strategy in postextubation respiratory management.[1-3]

HFOT is a promising oxygen delivery device that is applying a nasal prong, an oxygen blender; a single heated circuit, and active humidifier. It acts as a bridge between low-flow oxygen therapies and nasal continuous positive airways pressure. At high-flow oxygen therapy as 2 L/kg/, applying an appropriate nasal cannula, a positive pressure between 4 cm and 8 cm H_2O could be achieved. Traditional oxygen therapy could deliver up to 16 L/min, while HFOT could supply up to 60 L/min, so HFOT has gained attention as an innovative method in respiratory care for postoperation patients.[1,3] Physicians apply HFOT to a variety of patients with different underlying diseases such as respiratory failure, exacerbation of chronic obstructive pulmonary disease, chronic bronchiectasis, early postextubation period, sleep apnea, and heart failure since it seems that there have been no big randomized clinical trials.[1,4,5] HFOT after planned extubation has been shown to help patients mechanically ventilated in the ICU.[1,6] It is increasingly used to improve oxygenation because of its ease of apply, acceptable, user-friendly, and clinical effectiveness.[1,5,7] We prescribed HFOT in our postcardiac surgery patients after extubation in the ICU. It is widely accepted that warm (32°C–35°C), humidified constant flow provided by HFOT has several preferences, including more stable inspiratory oxygen fraction values, anatomical dead space elimination, create a reservoir with high fraction inspiration of oxygen in the nasal cavity, decrease in work of breathing, gas exchange improvement conditioning, and a positive physiological effects such as a positive end-expiratory pressure with increased functional residual capacity, decreased dyspnea, lower work of breathing, and improved cardiovascular parameters.[1,5-7] Patients in the postoperation period randomly admitted to our open heart ICU (there are four ICUs in our educational hospital). Each ward has its own responsible and mechanical ventilation weaning strategy. Two of them insert HFOT in their protocol according to attending physician order. We consider 10 patients in each unit for our observation and follow-up. A common protocol for HFOT is the flow rate of 2 L/kg/min up to 10 kg body weight and 0.5 L/kg/min for each kilogram of patients' weight. We used a large-bore cannula with the initial flow 10 L/min in the postextubation period after cardiac surgery in ICU. The flow meter is adjusted to maintain SpO_2 in patient's pulse oximetry within target ranges of 92%–98% according to patient age, weight, arterial blood gas parameter, and concurrent disease.

Based on our observation, the main effective independent factor in early reintubation of our postcardiac surgery patients after planned extubation in ICU was their underlying cardiac problem, but all patients who supported by HFOT showed better arterial blood gas parameters in comparison with the patient who receives traditional respiratory care and support. The patient under HFOT showed improvement in oxygenation and CO_2 washout as well. Early reintubation risk (before 24 h) was the same in both groups, but after 24 h of planned extubation, patients who received HFOT have the better outcome. Based on our observation, the main problem in HFOT prescription was patient's level of consciousness, patient acceptance and tolerance, and medical history of sleep apnea besides; the common adverse effect of HFOT was trauma to the noise, mouth dryness, and gastric distension. Consequently, for the patients at risk of early respiratory failure in postcardiac surgery period especially in the patient with a concurrent respiratory problem who benefit from positive end-expiratory pressure or pressure support, HFOT may be a wise acceptable therapeutic policy. However, patients who treated with HFOT after cardiac operation need extra attention after extubation, to avoid risking delayed reintubation.

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Conflicts of interest

There are no conflicts of interest.

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