

EDITORIAL

High flow oxygen therapy in the intensive care unit

M. van Eijk

Department of Intensive Care, University Medical Centre Utrecht, Utrecht University, Utrecht, the Netherlands

Correspondence

M. van Eijk - m.m.j.vaneijk-7@umcutrecht.nl

Keywords - oxygen therapy / hypoxic failure / HFOT

Respiratory failure is one of the most common symptoms with which patients are admitted to the intensive care unit (ICU) and a large portion of these patients suffer from hypoxaemic failure. The first-line treatment of hypoxaemic failure is the administration of supplemental oxygen. Traditionally, oxygen supplementation is initiated with 100% oxygen delivered via nasal cannulas, nose-mouth masks (with or without a Venturi system) or non-rebreathing masks in spontaneously breathing patients. Bubble humidifiers are sometimes used during this traditional method of oxygen supplementation, although the humidity of the delivered gas mixture is low.^[1] Furthermore, using these methods of administration, maximum oxygen flow is limited to 15 litres/minute, where the required inspiratory flow for patients with hypoxic failure is usually more than 30 litres/minute, sometimes exceeding to >120 litres/minute.^[2]

To avoid the detrimental effects of high flow dry air and increase the inspiratory flow of oxygen, high flow oxygen therapy (HFOT) (Optiflow®) is increasingly being used. In this edition of the Netherlands Journal of Critical Care, Endeman and colleagues review the indications for the use of HFOT in critically ill patients.^[3]

There is no doubt about the positive effects of HFOT and that invasive ventilation may be avoided in severely hypoxic patients.^[4] Furthermore, in hypoxic patients not requiring invasive ventilation, HFOT offers more comfort to the patient compared with other non-invasive ventilation methods and may lead to a shorter duration of supplemental oxygen therapy, due to the better sputum clearance using humidified air.^[5]

As HFOT has evident beneficial effects on outcome and patient comfort, it is gaining in popularity and is being used more and more outside the ICU, for example in the emergency department, intermediate care or coronary care units. Studies have shown that the use of HFOT outside the ICU may decrease the number of ICU admissions.^[6] This increasing use of HFOT, however, may pose some risks. HFOT may lead to a delay in consultation of an intensive care specialist, especially when the

upper limits of flow and FiO₂ are used. Prolonged use of high flow, high oxygen, may even mask deterioration of the patient and may lead to hypercapnia, despite adequate oxygenation. The use of HFOT outside the ICU (and thus without the possibility of 'upgrading' respiratory support) should be performed under close monitoring and with clear upper limits and protocols to ensure timely transfer to the ICU. Intensivists should work together with other specialists to make sure that HFOT is used in the appropriate patients and the limits of this method are recognised and respected.

Endeman and colleagues present a comprehensive review of the indications for HFOT in seriously ill patients, showing that HFOT is a valuable addition to the arsenal of respiratory support systems. HFOT should be used with caution as its use should not delay invasive respiratory support when it is necessary, especially if HFOT is used outside the ICU.

Disclosures

The author declares no conflict of interest. No funding or financial support was received.

References

1. Chanques G, Constantin JM, Sauter M, Jung B, Sebbane M, Verzilli D, et al. Discomfort associated with underhumidified highflow oxygen therapy in critically ill patients. *Intensive Care Med.* 2009;35:996-1003.
2. L'Her E, Deye N, Lellouche F, et al. Physiologic effects of noninvasive ventilation during acute lung injury. *Am J Respir Crit Care Med.* 2005;172:1112-8.
3. Endeman H, Terstappen E, Gommers DAMP. The use of high flow oxygen therapy (Optiflow®) in critically ill patients: a pragmatic review. *Neth J Crit Care.* 2019;27:225-228.
4. Frat JP, Thille AW, Mercat A, et al. High-flow oxygen through nasal cannula in acute hypoxemic respiratory failure. *N Engl J Med.* 2015;372:2185-96.
5. Schwabbauer N, Berg B, Blumenstock G, Haap M, Hetzel J, Riessen R. Nasal high-flow oxygen therapy in patients with hypoxic respiratory failure: effect on functional and subjective respiratory parameters compared to conventional oxygen therapy and non-invasive ventilation (NIV). *BMC Anesthesiol.* 2014;14:66.
6. Plate JDJ, Leenen LPH, Platenkamp M, Meijer J, Hietbrink F. Introducing high-flow nasal cannula oxygen therapy at the intermediate care unit: expanding the range of supportive pulmonary care. *Trauma Surg Acute Care Open.* 2018;3:e000179.