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Successful oxygenation during anesthesia induction using a high-flow nasal cannula in a patient with severe hypoxemia due to lung cancer

Hiroyuki Seki*, Yoshihiko Deguchi, Tomomi Ogihara and Takashi Ouchi

To the Editor,

Tracheal intubation in severe hypoxemia patients remains challenging. Although mask ventilation using an anesthesia circuit can deliver high-concentration oxygen, ventilation must be stopped while attempting tracheal intubation, which may result in deterioration of hypoxemia in respiratory failure patients. Herein, we report a case of successful oxygenation during anesthesia induction using a high-flow nasal cannula (HFNC) in a lung cancer-associated severe hypoxemia patient.

A 64-year-old man (160 cm, 59.2 kg) with a history of upper right lobectomy was scheduled for left lower lobectomy for lung cancer. A week before admission, he presented bloody sputum and exacerbating dyspnea. Preoperative respiratory function tests revealed obstructive respiratory impairment (forced expiratory volume in the first second (FEV1) 1.96 L and FEV1/forced vital capacity ratio 59.6%). He was then admitted to our hospital 1 day preoperatively. On admission, the room-air SpO2 was 90% and dropped to 85–88% during conversation; it further deteriorated to 82% with coughing. He had severe chest pain due to pleurisy and could not take a deep breath. In the operating room, he was in the lateral position on the bed, and the SpO2 was 69%. Despite administering 10 L/min oxygen using a face mask, the SpO2 did not exceed 90%. We decided to apply a HFNC for anesthesia induction. Three minutes after administering oxygen (50 L/min; FIO2, 92%) through the HFNC, the SpO2 was elevated to 98% and maintained at 97–98%. Propofol (120 mg) and rocuronium (50 mg) were administered 4 min later, and the trachea was intubated with a 37-Fr double-lumen tube 2 min after the administration of rocuronium without a drop in the SpO2.

After intubation, the SpO2 remained stable and the surgery was completed without further complications. After extubation, the patient was transferred to the intensive care unit. The SpO2 was maintained at 99–100% using a facemask (O2, 5 L/min), and the patient was transferred to the surgical ward the day after the surgery.

Accurately placing a double-lumen tube in the trachea takes a longer time compared to a standard tube. While attempting tracheal intubation, oxygen cannot be delivered through a facemask, which might cause desaturation, especially in severe hypoxemia patients. While HFNC has been used in critical care medicine, it has recently gained attention for its potential roles in perioperative settings [1–3]. HFNC has several advantages over conventional oxygen devices. First, it can supply high-concentration oxygen without interfering with transoral procedures such as orotracheal intubation. Second, the high flow rate generates low-level positive airway pressure. A previous study demonstrated that HFNC could maintain oxygenation even in apneic patients for up to 30 min [4]. These HFNC features can be advantageous in cases of tracheal intubation which are expected to take a longer time in severe hypoxemia patients.

In conclusion, HFNC can be useful when tracheal intubation is expected to take a longer time in severe hypoxemia patients.

The patient provided written informed consent for the publication of this case report.

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Abbreviation
HFNC: High-flow nasal cannula

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HS, YD, and TO participated in the care of the patient. YD obtained consent from the patient. HS prepared the manuscript. All authors read and approved the final manuscript.

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Competing interests
None

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