

Risk of Transmission of Infection from Patients with COVID-19 on HVNI

The COVID-19 pneumonia presents a challenge during clinical management. With all infectious respiratory diseases the opportunity for nosocomial transmission during the provision of respiratory therapy and procedures is an important consideration. No clinical evidence to date has been published establishing the specific dynamics of such potential transmission during the care of patients with COVID-19 using HVNI. Absent that specific research, other guidance is important for consideration.

Respiratory Care Committee of the Chinese Thoracic Society - COVID-19 appeared in China, and to date the proportion of serious disease has been presented and managed in China. In a recent consensus guidance published in *Zhonghua Jie He He Hu Xi Za Zhi* (2020 Feb 20; 17(0):E020. DOI: 10/3760/cma.j.iss.1001-0939.2020.0020) the Respiratory Care Committee of the Chinese Thoracic Society have set out guidelines for management in the article “Expert consensus on preventing nosocomial transmission during respiratory care for critically ill patients infected by 2019 novel coronavirus pneumonia”¹. The committee acknowledges that there is a risk of nosocomial transmission, and specifically recommend the use of High Flow Nasal Cannula with the addition of a facemask to prevent droplet dispersal during the therapy.

World Health Organization (WHO) – WHO has issued an interim guidance document (Clinical management of severe acute respiratory infection when novel coronavirus [2019-nCoV] infection is suspected Interim guidance 28 January 2020) which calls for the use of high-flow nasal oxygen (HFNO, HFNC, HVNI) and Non-invasive Ventilation in the management of COVID-19². The specific guidance is: “High-flow nasal oxygen (HFNO) or non-invasive ventilation (NIV) should only be used in selected patients with hypoxemic respiratory failure. The risk of treatment failure is high in patients with MERS treated with NIV, and patients treated with either HFNO or NIV should be closely monitored for clinical deterioration.” The therapies are listed as “Consider: the intervention may be beneficial in selected patients (conditional recommendation) OR be careful when considering this intervention.” Thus, due clinical consideration is recommended.

EmCrit Project - [Dr. Josh Farkus](#), of the popular Emergency Medicine Provider FOAMed site, has developed a [COVID-19 web page](#). In it, he provides recommendations on the use of HFNC and NIV and specifically addresses the question of increased risk of infection with the use of HFNC. (See italicized text below.)

- *The potential weakness of HFNC is concern that it could increase transmission to healthcare workers. However, this remains unknown. Reasons that HFNC might not increase viral transmission are:*
 - *HFNC supplies gas at a rate of ~40-60 liters/minute, whereas a normal cough achieves flow rates of ~400 liters/minute ([Mellies 2014](#)). Therefore, it's doubtful that a patient on HFNC is more contagious than a patient on standard nasal cannula who is coughing.*
 - *HFNC typically requires less maintenance than invasive mechanical ventilation. For example, a patient who is on HFNC watching television may be less likely to spread the virus compared to an intubated patient whose ventilator is alarming every 15 minutes, requiring active suctioning and multiple providers in the room.*

- *The intubation procedure places healthcare workers at enormous risk of acquiring the virus, so intubation with a goal of reducing transmission is probably counterproductive (Table 2 in [Tran 2012](#)).*
- *Existing evidence does not support the concept that HFNC increases pathogen dispersal substantially (although the evidence is extremely sparse). This includes a small study of patients with bacterial pneumonia ([Leung 2018](#)) and an abstract regarding particulate dispersal by volunteers ([Roberts 2015](#)).*

Meta-analysis of the risk of transmitting SARS to healthcare workers, due to various interventions. Intubation and associated procedures carry the most risk (red arrows). HFNC actually trended towards reduced risk of transmission. This suggests that using HFNC to avoid intubation might reduce transmission risk. (Tran K et al.)

It is important to note that other more specific cautionary notes have been published, with rationale to avoid the use of HFNC and NIV in these patients³. Certainly such discussion should be taken into account when making the clinical decision to use any specific therapy on a COVID-19 patient.

References

1. Respiratory care committee of Chinese Thoracic S. [Expert consensus on preventing nosocomial transmission during respiratory care for critically ill patients infected by 2019 novel coronavirus pneumonia]. *Zhonghua jie he he hu xi za zhi = Zhonghua jiehe he huxi zazhi = Chinese journal of tuberculosis and respiratory diseases*. 2020;17(0):E020.
2. Organization WH. *Clinical management of severe acute respiratory infection when Novel coronavirus (2019-nCoV) infection is suspected: Interim Guidance*. WHO reference number: WHO/nCoV/Clinical/2020.3 20 January 2020 2020.
3. Cheung JC-H, Ho LT, Cheng JV, Cham EYK, Lam KN. Staff safety during emergency airway management for COVID-19 in Hong Kong. *The Lancet Respiratory Medicine*. 2020.