



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

Use of non-invasive ventilation for patients with COVID-19: a cause for concern?

The potential for transmission of coronavirus disease 2019 (COVID-19) from patients to health-care workers has caused concern, particularly among patients requiring advanced respiratory support, high flow rates of oxygen, or aerosol-generating procedures. The notion that patients with known or suspected COVID-19 with respiratory failure should be intubated and ventilated early in the disease course without the option for less invasive treatments, including continuous positive airway pressure (CPAP) or non-invasive ventilation (NIV), has been suggested. However, WHO guidelines for the management of respiratory failure in COVID-19 advocate the use of CPAP or NIV, provided that appropriate personal protective equipment (PPE) is worn.¹

Early intubation of a patient with known or suspected COVID-19 with respiratory distress could result in the intubation and mechanical ventilation of patients who would have otherwise improved on CPAP or NIV, and the unnecessary intubation of patients who are initially suspected to have COVID-19 but test negative for the virus. Additionally, unnecessary intubation and ventilation of one patient might deny what might be life-saving treatment for another patient in resource-limited settings. Resorting to less invasive respiratory support when the capacity for mechanical ventilation has been reached could also raise anxiety among many staff, who might believe that they are being

exposed to a high-risk procedure due to a scarcity of health-care resources.

Of 138 patients who were hospitalised with confirmed COVID-19 in Wuhan, China, in January, 2020, 40 (29%) patients were health-care workers who were presumed to have contracted the virus in hospital.² Of these health-care professionals, 31 (78%) worked on general wards, 7 (18%) in the emergency department, and 2 (5%) in the intensive care unit (ICU).² The risk of transmission was highest among health-care workers who had been exposed to patients with COVID-19 with low clinical suspicion and, therefore, were unlikely to have worn PPE.

A good interface fitting for CPAP or NIV systems minimise widespread dispersion of exhaled air and, consequently, should be associated with low risk of airborne transmission from patients. With the use of PPE on the ICU, use of NIV during the severe acute respiratory syndrome epidemic was not associated with an increased risk of transmission of the virus to health-care workers; whereas, endotracheal intubation was associated with an increased risk of aerosolisation and infection of health-care workers.³ The notion that early intubation avoids use of CPAP or NIV, therefore decreasing risk of viral transmission with the use of PPE, is debatable.

We also challenge the notion that NIV only temporarily improves oxygenation and breathing in these patients, without necessarily changing the natural disease course. In patients with Middle East respiratory syndrome and acute hypoxaemic respiratory failure, NIV failure was high and was not associated with improved outcomes.⁴ However, the

clinical severity and mortality from Middle East respiratory syndrome was markedly greater than from severe acute respiratory syndrome or COVID-19. In a series of 20 patients with severe acute respiratory syndrome, endotracheal intubation was avoided in 14 (70%) patients with the use of NIV.⁵

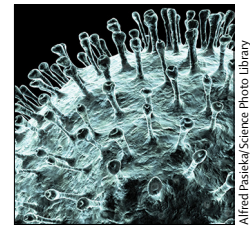
We accept that the risk of COVID-19 transmission to health-care workers is not negligible and that many health-care workers have been infected at work. The solution is to keep health-care workers safe, thereby facilitating the provision of best patient care.

MS and DB are involved in the development in a not-for-profit open source continuous positive airway pressure device. NA and DH declare no competing interests.

*Nishkantha Arulkumaran,
David Brealey, David Howell,
Mervyn Singer
nisharulkumaran@doctors.org.uk

Bloomsbury Institute of Intensive Care Medicine, University College London, London WC1E 6BT, UK (NA, DB, MS); and Critical Care Unit, University College London Hospital, London, UK (NA, DB, DH, MS)

- 1 WHO. Clinical management of severe acute respiratory infection when novel coronavirus (2019-nCoV) infection is suspected: interim guidance. Jan 28, 2020. <https://apps.who.int/iris/handle/10665/330893> (accessed March 13, 2020).
- 2 Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA* 2020; **33**: 1061–69.
- 3 Fowler RA, Guest CB, Lapinsky SE, et al. Transmission of severe acute respiratory syndrome during intubation and mechanical ventilation. *Am J Respir Crit Care Med* 2004; **169**: 1198–202.
- 4 Arabi YM, Arifi AA, Balkhy HH, et al. Clinical course and outcomes of critically ill patients with Middle East respiratory syndrome infection. *Ann Intern Med* 2014; **160**: 389–97.
- 5 Cheung TM, Yam LY, So LK, et al. Effectiveness of noninvasive positive pressure ventilation in the treatment of acute respiratory failure in severe acute respiratory syndrome. *Chest* 2004; **126**: 845–50.



Alfred Paekel/Science Photo Library

Lancet Respir Med 2020
Published Online
April 20, 2020
[https://doi.org/10.1016/S2213-2600\(20\)30181-8](https://doi.org/10.1016/S2213-2600(20)30181-8)