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doi: 10.1016/j.bja.2020.04.005
Advance Access Publication Date: 11 April 2020

Fibreoptic tracheal intubation in COVID-19: not so fast

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Keywords: airway management; apnoeic oxygenation; COVID-19; high-flow nasal oxygen; tracheal intubation

Editor—Wu and colleagues[1] recently described the use of high-flow nasal oxygen (HFNO) during fibreoptic tracheal intubation in critically ill patients with coronavirus disease 2019 (COVID-19). This study was undertaken on the premise that fibreoptic tracheal intubation reduces the risk of virus transmission to the healthcare worker compared with laryngoscopy. The authors stated that they used fibreoptic bronchoscopy to 'reduce tracheal intubation-induced coughing and subsequent spread of virus'. However, the use of a neuromuscular blocking agent (used for all patients) eliminates coughing and increases the likelihood of intubation success with laryngoscopy.[2] Furthermore, the authors stated that HFNO use is 'not associated with an increase in air or surface contamination' based on a recent study in critically ill patients with bacterial pneumonia.[3] However, whilst this study demonstrated no greater risk of contamination with HFNO when compared with a control group using oxygen mask, contamination was indeed detected in both groups. In the study by Wu and colleagues,[1] there was no use of an oxygen mask in the control arm during the apnoea period, whilst use of HFNO persisted in the intervention arm. Therefore, we cannot conclude, based on their evidence, that HFNO does not cause greater aerosolisation.

The degree of aerosolisation that is necessary to create a significant risk of COVID-19 infection to the clinician is perhaps the more relevant question, and this remains unknown. The fact that the six anaesthesiologists who undertook the study are 'currently not infected' is a positive observation, but is not an indicator of safety; this is a small number, and the rate of infection by any method of intubation is not known to be as high as 1:6 with adequate personal protective equipment.

The primary endpoint of 'intubation time' was defined as the period from the beginning of bronchoscopy until proper tracheal tube placement was confirmed. The intubation time was 7 s shorter in the HFNO arm *vs* face-mask arm. Whilst reaching statistical significance, this is arguably clinically insignificant. The higher minimum Spo_2 of 94% *vs* 91% during tracheal intubation with HFNO *vs* standard mask oxygenation is also clinically insignificant, particularly given that there was no difference between both groups in the incidence of Spo_2 <80% during intubation. The time period between the onset of apnoea and the verification of tracheal tube position is a more classical measure of the time it takes to intubate a patient, as this best represents the period where the patient is depleting their preoxygenation reserves. This period was 60 s longer than the 'intubation time' quoted, as the anaesthesiologists first waited 60 s to enable a dose of rocuronium 1 mg kg^{-1} to take effect. Based on the figures supplied, it took an estimated 2 min and 20 s from the onset of apnoea to intubate 75% of the patients. As tracheal intubation via laryngoscopy would likely not have taken this long, this represents an unnecessarily long duration of exposure. Furthermore, the authors expressed a desire to avoid bag-mask ventilation as it intensifies viral spread. However, in taking longer to secure the airway, the likelihood of oxygen desaturation was increased, which may then paradoxically require bag-mask ventilation. Bag-mask ventilation is more likely to be avoided by performing laryngoscopy in the first instance.

Whilst fibreoptic intubation may allow the anaesthetist to stand a greater distance away from the airway, optimal technique involves holding the controller vertically above the airway, limiting the distance achieved from the patient. Additionally, there is greater contact with the airway as the scope is typically stabilised with the hand over the nose or mouth—areas that can have a significant viral load. The authors do not state whether they performed nasal or oral fibreoptic intubations. This is of relevance when HFNO is being used as a nasal route of tube passage greatly limits oxygen insufflation through the nare used for the bronchoscope.

The merits of using HFNO during the preoxygenation phase of the study, as seen in this RCT, are questionable. A recent study has indicated that face-mask preoxygenation is superior to HFNO preoxygenation, likely because a tight-fitting face mask prevents entrainment of room air, and implies that any benefit from HFNO arises with apnoeic oxygenation alone.[4] For anaesthetists attempting this technique, the benefits of both a face mask and HFNO can be harnessed by using a face mask

alone for preoxygenation followed by HFNO insufflation during the apnoeic period.[5,6]

The authors concluded that HFNO 'provided a shorter intubation time and less frequent incidence of desaturation during attempts at fibreoptic tracheal intubation compared with preoxygenation by face-mask ventilation'. Irrespective of the superiority of one method over another, neither of these has been compared with the standard of care of rapid sequence intubation, and both may represent inferior alternatives.

Declaration of interest

The author declares that they have no conflicts of interest.

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doi: 10.1016/j.bja.2020.04.005
Advance Access Publication Date: 10 April 2020

Rapid ramp-up of powered air-purifying respirator (PAPR) training for infection prevention and control during the COVID-19 pandemic

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Keywords: airway management; anaesthesia; COVID-19; infection prevention and control; PAPR; tracheal intubation

Editor—Singapore's first coronavirus disease 2019 (COVID-19) patient was diagnosed on January 23, 2020. This triggered an urgent ramp-up of just-in-time (JIT) training to expedite development of infection prevention and control capabilities in the Department of Anaesthesiology, Intensive Care, and Pain Medicine of Tan Tock Seng Hospital in anticipation of a rapidly escalating COVID-19 pandemic.

Frequent involvement in aerosol-generating procedures (AGPs) such as tracheal intubation, extubation, and open airway procedures including tracheostomy and bronchoscopy[1] exposes our staff to high risk of contamination. Proper use of a hooded powered air-purifying respirator (PAPR) offers better protection against respiratory pathogens during AGPs, with an assigned protection factor (APF) of up to 1000 compared with an APF of 10 for a N95 respirator.[2] Our hospital uses two types of PAPRs: the 3M™ Jupiter™ with 3M™ HT-101 Lightweight Hood (Fig 1) and the 3M™ Versaflo™ TR-300 with 3M™ Hood Assembly S-855. In the initial phase of our pandemic response plan, our department prioritised JIT resources for infection prevention and control measures against AGP, with a focus on PAPR training, as these are infrequently used, and their effectiveness requires a high level of staff involvement.

Development of a PAPR training programme

Pre-requisites

All staff had been N95 mask-fitted and had undergone two PAPR training sessions with competency checks, one each for Jupiter™ and Versaflo™ PAPRs. These covered the basic operation and donning and doffing of the PAPRs.

Timeline

Our department's infection prevention and control team was formed on January 28, 2020 and aimed to complete departmental PAPR training before Singapore progressed to a heightened risk. We allocated 2 weeks each for the training of Jupiter™ and Versaflo™ PAPR, and this allowed comprehensive one-on-one training for all 96 anaesthetists within February 2020.