

The suggested management of endotracheal intubation in a patient infected with or suspected of SARS-CoV-2 infection

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Dear Editor,

I have read with great interest the paper by Wujtewicz *et al.* [1] on what anaesthetists should know about SARS-CoV-2 infection.

The airway management guidelines for endotracheal intubation presented in the above study (Table 2) are extremely important for anaesthetists. The tracheal intubation of a patient infected with SARS-CoV-2 is one of the procedures posing the greatest threat to those performing it due to the aerosol generated during the procedure. To ensure the safety of patients and the personnel involved, the procedure should be standardised; therefore, I suggest that it should be described in detail. I present below a collection of recommendations based on available literature. To reduce the risk of exposure of the medical staff performing the procedure, several different measures ought to be taken:

- an intubation kit containing the endotracheal tubes of at least four sizes (7–8 for women and 8–9 for men) should be prepared; it is recommended to use the endotracheal tubes with subglottic suctioning, second generation supraglottic devices, face masks, oropharyngeal tubes, short intubation stylet and long Bougie, Magille's forceps, Pean's forceps, and suctioning tubes;
- appropriate personal protective equipment should be used while working in close proximity to the patient infected with SARS-CoV-2;
- it is advisable to use additional barriers protecting from aerosol spread during the procedure, e.g. covering the patient's headrest with a transparent foil;
- the patient should wear a face mask until the procedure is initiated;
- preoxygenation should be carried out using a tightly applied, two-handed grip face mask; a VE (not CE) grip is recommended to maintain maximum tightness;
- preoxygenation should be carried out using the lowest effective oxygen flow;
- preoxygenation should be reduced to a minimum: 3–5 minutes only in patients expected to have short safe apnoea times due to their general condition;
- high-flow nasal oxygen therapy or continuous positive airway pressure is not recommended for preoxygenation;
- care should be taken to ensure that the patient is properly positioned for intubation; in obese patients, in particular, it is essential to raise the headrest to increase the effectiveness of preoxygenation and to improve the conditions for performing laryngoscopy;
- the number of staff members performing intubation should be reduced to a minimum;
- the management plan ought to be prepared and discussed with team members;
- since the number of intubation attempts should be limited, the procedure should be performed by the most experienced team member;
- anaesthesia for intubation should be carried out using the rapid sequence induction (RSI) protocol;
- cricoid pressure should be used, whenever indicated;
- the recommended intravenous anaesthetics include propofol 1.0–1.5 mg

Anaesthesiol Intensive Ther 2020; 52, 5: 438–439

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- kg⁻¹ in cardiovascularly stable patients and etomidate 0.2–0.03 mg kg⁻¹ or addition of ketamine 1–2 mg kg⁻¹ (a dose of 50 mg is usually sufficient) in patients with anticipated circulatory instability, used to prevent a rapid and significant decrease in arterial blood pressure during the induction of anaesthesia;
- appropriate vasoactive drugs have to be available in case of hypotension after the administration of anaesthetics;
- rocuronium 1.2 mg kg⁻¹ or succinylcholine 1.5 mg kg⁻¹ should be administered for relaxation of striated muscles;
- to reduce the risk of coughing during the laryngoscopy attempts, haemodynamically stable patients can receive intravenous lidocaine 1.0–1.5 mg kg⁻¹;
- bag-valve-mask ventilation of non-intubated patients should be avoided; in cases of clinically significant reductions in saturation, the emergency use of a supraglottic airway device should be considered to improve oxygenation;
- in patients with anticipated significant reductions in blood oxygen saturation during induction, a 60-second supply of low-flow oxygen through a tightly adhering face mask or a nasal catheter may be considered; high oxygen flows should be avoided due to possible leakage and aerosol generation;
- an intubation attempt should be undertaken after reaching complete neuromuscular blockade, confirmed by a neuromuscular blockade monitoring device, or after waiting at least 60 seconds from the supply of a muscle relaxant;
- laryngoscopy should be carried out using the devices, which is most likely to lead to a successful outcome at the first attempt; it is advisable to use a video laryngoscope;
- to avoid additional actions during intubation, in each case it is recommended to place a guidewire through the endotracheal tube during preparations for intubation;
- it is recommended to insert the endotracheal tube so that the cuff is 1–2 cm

below the vocal cords to prevent too deep placement of the endotracheal tube and pulling it up, which can cause irritation of the larynx and cough;

- to avoid the spread of bronchial tree secretions through the lumen of the endotracheal tube, the guidewire should be removed with great caution;
- the correct placement of the endotracheal tube should be confirmed capnographically and by auscultation;
- if the endotracheal tube has been placed in the oesophagus, it should not be removed immediately; intubation with another endotracheal tube of a smaller diameter should be attempted; if successful, the tube can be removed from the oesophagus;
- in the case of desaturation or serious difficulties in visualising the entrance to larynx, a second generation supraglottic device should be used for preoxygenation before another attempt of endotracheal intubation; the fibrescopic insertion of the tube through the lumen of the supraglottic device can be considered;
- the tracheal extubation, as a procedure potentially generating aerosol due to the stimulation of the cough reflex, should be carried out using the same level of personal protective equipment as during the use of additional physical protective barriers may be reasonable;
- to reduce the risk of coughing after extubation, intravenous lidocaine or dexmedetomidine can be administered.

The procedure of endotracheal intubation is associated with a high risk of aerosol generation and should therefore be carried out with appropriate personal protective equipment; moreover, steps should be taken to reduce the risk and intensity of aerosol formation. It is crucial to use the protective barriers, rapid sequence induction and video laryngoscope-assisted visualisation of the glottis, which is found to be most effective.

The suggested management was developed on the basis of numerous reports discussing the problems associated with interventions in patients with COVID-19 and is a compilation of recommendations and experiences

presented in them. For this reason, the text does not contain references to respective literature reports concerning individual issues; instead, a list of all papers referred to is attached.

ACKNOWLEDGEMENTS

1. Financial support and sponsorship: none.
2. Conflict of interest: none.

REFERENCES

1. Wujtewicz MA, Dylczyk-Sommer A, Aszkielowicz A, Zdanowski S, Piwowarczyk S, Owczuk R. COVID-19 – what should anaesthesiologists and intensivists know about it? *Anaesthesiol Intensive Ther* 2020; 52: 34-41. doi: <https://doi.org/10.5114/ait.2020.93756>.
2. Cook TM, El-Boghdady K, McGuire B, McNarry AF, Patel A, Higgins A. Consensus guidelines for managing the airway in patients with COVID-19: guidelines from the Difficult Airway Society, the Association of Anaesthetists the Intensive Care Society, the Faculty of Intensive Care Medicine and the Royal College of Anaesthetists. *Anaesthesia* 2020; 75: 785-799. doi: [10.1111/anae.15054](https://doi.org/10.1111/anae.15054).
3. Zuo M, Huang Y, Ma W, et al. Expert recommendations for tracheal intubation in critically ill patients with novel coronavirus disease 2019. *Chin Med Sci J* 2020; 35: 105-109. doi: [10.24920/003724](https://doi.org/10.24920/003724).
4. Luo M, Cao S, Wei L, et al. Precautions for intubating patients with COVID-19. *Anesthesiology* 2020; 132: 1616-1618. doi: [10.1097/ALN.0000000000003288](https://doi.org/10.1097/ALN.0000000000003288).
5. Meng L, Qiu H, Wan L, et al. Intubation and ventilation amid the COVID-19 outbreak: Wuhan's experience. *Anesthesiology* 2020; 132: 1317-1332. doi: [10.1097/ALN.0000000000003296](https://doi.org/10.1097/ALN.0000000000003296).
6. Aminnejad R, Salimi A, Saeidi M. Lidocaine during intubation and extubation in patients with coronavirus disease (COVID-19). *Can J Anesth* 2020. doi: <https://doi.org/10.1007/s12630-020-01627-2> [Epub ahead of print].
7. Yao W, Wang T, Jiang B, et al. Emergency tracheal intubation in 202 patients with COVID-19 in Wuhan, China: lessons learnt and international expert recommendations. *Br J Anaesth* 2020; 125: e28-e37. doi: [10.1016/j.bja.2020.03.026](https://doi.org/10.1016/j.bja.2020.03.026).
8. Brown S, Patrao F, Verma S, Lean A, Flack S, Polaner D. Barrier system for airway management of COVID-19 patients. *Anesth Analg* 2020; 131: e34-e35. doi: [10.1213/ANE.0000000000004876](https://doi.org/10.1213/ANE.0000000000004876).
9. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. *Can J Anesth* 2020; 67: 568-576. doi: <https://doi.org/10.1007/s12630-020-01591-x>.
10. Orsen BA. Recommendations for endotracheal intubation of COVID-19 patients. *Anesth Analg* 2020; 130: 1109. doi: [10.1213/ANE.0000000000004803](https://doi.org/10.1213/ANE.0000000000004803).
11. Peng PW, Ho PL, Hota SS. Outbreak of a new coronavirus: what anaesthetists should know. *Br J Anaesth* 2020; 124: 497-501. doi: <https://doi.org/10.1016/j.bja.2020.02.008>.
12. Canelli R, Connor CW, Gonzalez M, Nozari A, Ortega R. Barrier enclosure during endotracheal intubation. *N Engl J Med* 2020; 382: 1957-1958. doi: [10.1056/NEJMc2007589](https://doi.org/10.1056/NEJMc2007589).
13. Sorbello M, El-Boghdady K, Di Giacinto I, et al. The Italian coronavirus disease 2019 outbreak: recommendations from clinical practice. *Anaesthesia* 2020; 75: 724-732. doi: [10.1111/anae.15049](https://doi.org/10.1111/anae.15049).