



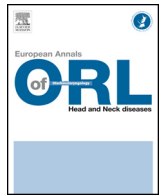
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COVID-19: Preliminary recommendations from the SFORL

## French consensus regarding precautions during tracheostomy and post-tracheostomy care in the context of COVID-19 pandemic



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### ABSTRACT

Tracheostomy post-tracheostomy care are regarded as at high risk for contamination of health care professionals with the new coronavirus (SARS-CoV-2). Considering the rapid spread of the infection, all patients in France must be considered as potentially infected by the virus. Nevertheless, patients without clinical or radiological (CT scan) markers of COVID-19, and with negative nasopharyngeal sample within 24 h of surgery, are at low risk of being infected. Instructions for personal protection include specific wound dressings and decontamination of all material used. The operating room should be ventilated after each tracheostomy and the pressure of the room should be neutral or negative. Percutaneous tracheostomy is to be preferred over surgical cervicotomy in order to reduce aerosolization and to avoid moving patients from the intensive care unit to the operating room. Ventilation must be optimized during the procedure, to limit patient oxygen desaturation. Drug assisted neuromuscular blockage is advised to reduce coughing during tracheostomy tube insertion. An experienced team is mandatory to secure and accelerate the procedure as well as to reduce risk of contamination.

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## 1. Introduction

The objective of this paper was to present information and advice to health care professionals concerning post-tracheostomy care in the COVID-19 pandemic context [1,2]. Procedures are susceptible to change on a day-to-day basis, as the epidemic evolves and according to the technical and human resources available and scientific evidence concerning SARS-Cov-2.

## 2. Precautions to be taken when performing post-tracheostomy care

Definition of patient COVID 19 positive and COVID 19 negative status before tracheostomy care.

Confinement having been pronounced for the entire French territory, we can no longer, regarding the rapidity of the spread of this pandemic, consider any region or patient as not being at risk of excreting the SARS-Cov-2 virus. If the patient cannot, in the absence of clinical signs, have a chest CT-scan and a nasopharyngeal viral sample systematically before tracheostomy care, he/she should

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be considered as COVID-19 positive and the measures mentioned below should be applied in wherever possible:

- surgical hand scrub and/or friction with hydro-alcoholic solution before and after each treatment;
- wear surgical gown and an overall that you change with your clothes at the end of the day;
- dressing and undressing must be done within the room. This dressing consists of:
  - an apron or a gown,
  - head protection with a hood cap rather than with a simple cap in order to better prevent any skin exposure,
  - FFP2 (N95) mask, protective glasses (possibly a dive mask), non-sterile gloves.

Care givers must ensure that all the equipment, in particular the suction probe, is ready.

For tracheostomy change, abundant spraying of 5% lidocaine into the tracheostomy tube, followed by an aspiration a few minutes later, is useful.

If the patient is ventilated on the tracheostomy cannula, the anesthesiologist is asked to sedate the patient and perform a neuromuscular block to reduce any risk of coughing during the change of the cannula.

All disposable material that has been in contact with the cannula or trachea (filters, suction probes) during the post-tracheostomy care must be eliminated through the infectious waste circuit.

It is possible to use a room without air treatment provided that [3]:

- the bedroom door is kept closed;
- the patient's room is regularly ventilated;
- the air pressure in the room is maintained at zero.

The duration of contagiousness is still uncertain but is probably more than 25 days [4]. These instructions are therefore valid throughout the management of the tracheotomized patient in the absence of validated data on virus excretion.

When the post-tracheostomy care is performed at home or in a health care facility different from a hospital or a clinic, there has usually been no recent diagnostic assessment and the caregiver does not know whether his or her patient is infected with SARS-Cov2 or not. Hence, the following precautions are justified: FFP2 (N95) mask, protective glasses (possibly a dive mask), gown, cap or hood cap. All disposable material that has been in contact with the cannula or trachea (filters, suction probes) must be eliminated through the infectious waste circuit.

In order to limit the risks of contamination of the patient's environment, the cannula should ideally be connected to an HME filter and covered by a surgical mask.

### 3. Scheduled tracheostomy for a COVID-19 positive patient ventilated through an oro- or naso-tracheal tube

It is critical to properly define when patients should be regarded as COVID-19 positive and COVID-19 negative in order to adapt the level of precautions when performing a tracheostomy. Confinement having been pronounced for the entire French territory, we can no longer currently or in view of the rapidity of the spread of this pandemic consider regions and patients without risk of infection with COVID 19.

A patient can nevertheless be considered COVID-19 negative if, less than 24 hours before the procedure, there are no clinical manifestations of COVID-19, the Nasopharyngeal viral swab is negative

and a chest-CT scan does not show bilateral peripheral alveolo-interstitial pneumonitis characteristic of COVID-19 infection.

#### 3.1. Indications

The indication for tracheostomy and the choice of the technique is a multidisciplinary medical decision made by the anesthesiologist in charge of the patient, in discussion with the ENT surgeon. In the context of the COVID-19 epidemic, the strategy adopted by more and more intensive care units consists in early tracheostomy to wean off intubation in selective patients with severe ARDS and transfer them to a ventilatory weaning unit thus creating room for new patients in ICU [5–7].

As far as possible (except absolute vital emergency) the tracheostomy must be done in an intubated patient.

#### 3.2. Techniques

Two techniques are possible, the percutaneous technique and the cervicotomy technique. In accordance with the recommendations of French Anesthesiology and ENT Societies (SFAR and SFORL), in the COVID-19 context [2], the percutaneous technique is to be preferred to reduce aerosolization and the risk of viral contamination for the nursing staff and to avoid having to move the patient to an operating room. The surgical technique is recommended in the event of anatomical contraindications, failure of the percutaneous technique or exhaustion of the percutaneous kits. Some technical points are recommended [8]:

For the percutaneous technique, it requires:

- a remote fibroscope and video screen;
- optimizing oxygenation with 100% FiO<sub>2</sub> and adapting resistance levels with the fibroscope in the intubation probe due to a high risk of rapid desaturation and hypoxic cardiac arrest;
- a valve filter to insert the fibroscope in a closed circuit;
- patient apnea should be available on demand during stages which are at risk of aerosolization (at risk of spreading of the virus);
- if possible: a drug assisted neuromuscular block to reduce any risk of coughing.

For the cervicotomy technique:

- minimize the use of electrocoagulation which can generate aerosolization of the virus when the trachea is open;
- when possible, use a sterile transparent interface between the patient and the surgeon, in order to limit the risk of contamination;
- if possible: carry out a drug assisted neuromuscular block to reduce any risk of coughing when opening the trachea;
- stop ventilation just before the trachea is incised;
- once the trachea is open and a cannula or endotracheal tube is inserted, connect the ventilation circuit to the cannula or the inserted endotracheal tube to resume ventilation of the patient;
- a reinforced endotracheal tube should be privileged in the tracheostomy if the patient requires ventilation in a prone position, and the cannula fixed to the skin;
- suture the cannula particularly if a prone position of the patient is planned.

Tracheostomy under local anesthesia is not recommended. However, if it is necessary, it is recommended to inject 5 cc of Lidocaine 5% intratracheally through the tracheal wall, before the incision of the trachea is performed in order to reduce the cough reflex.

Whichever the procedure, an experienced team must be in charge, especially when opening the trachea because patient desaturation is may be rapid.

Health security tips encompass the drastic limitation of the number of caregivers present in the operating room, performing the tracheostomy procedure in the intensive care unit, if possible, in order to avoid contamination during transport of the patient to the operating room, and an appropriate surgical dressing which should consist of:

- head protection with a hood cap rather than with a simple cap in order to better prevent any skin exposure;
- full face shield/visor or airtight protective glasses (possibly dive masks);
- FFP2 (N95) or FFP3 mask;
- headlight covered by a head cap;
- an impermeable protective apron or an overcoat that must be worn under the surgical gown as it is not sterile.

The team must ensure that all the necessary equipment (suction catheters, cannula...) is ready before starting the procedure.

## Disclosure of interest

The authors declare that they have no competing interest.

## References

- [1] Wei WI, Tuen HH, Ng RW, Lam LK. Safe tracheostomy for patients with severe acute respiratory syndrome. *Laryngoscope* 2003;113(10):1777–9.
- [2] Recommandations des sociétés savantes française d'ORL et Chirurgie Cervico-faciale (CNPORL S, SFORL, Collège Français d'ORL & CCF) 2020.
- [3] Recommandations d'experts portant sur la prise en charge en réanimation des patients en période d'épidémie à SARS-CoV2 SRLF-SFAR-SFMU-GFRUP-SPLF-SPLF; 2020.
- [4] To KK-W, Tsang OT-Y, Leung W-S, et al. Temporal profiles of viral load in posterior oropharyngeal saliva samples and serum antibody responses during infection by SARS-CoV-2: an observational cohort study. *Lancet Infect Dis* 2020, [http://dx.doi.org/10.1016/S1473-3099\(20\)30196-1](http://dx.doi.org/10.1016/S1473-3099(20)30196-1) [S1473-3099(20)30196-1].
- [5] Abe T, Madotto T, Pham T, et al. Epidemiology and patterns of tracheostomy practice in patients with acute respiratory distress syndrome in ICUs across 50 countries. *Crit Care* 2018;22(1):195.
- [6] Proposition du groupe de travail « APHP-Réanimation »; 2020. Cerf C, Delmazure J, Demoule, Federici A, Goutorbe P, Leguen M, Meaudre E, Morawiec E, Parquin F, Roux D, Vuillard C.
- [7] Phua GC, Govert J. Mechanical ventilation in an airborne epidemic. *Clin Chest Med* 2008;29(2) [323-328, vii].
- [8] Morvan JB, Pasquier Y. Escarment. Protocole « Trachéotomie » EMR SSA-Mulhouse, Service de santé des armées; 2020.