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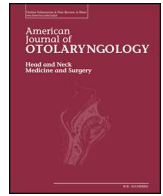
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Contents lists available at ScienceDirect

Am J Otolaryngol

journal homepage: www.elsevier.com/locate/amjoto

Early experience in tracheostomy and tracheostomy tube management in Covid-19 patients

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ARTICLE INFO

Keywords:
Tracheostomy
Covid-19
SARS-CoV-2

ABSTRACT

In Italy, we have experienced Europe's first and largest coronavirus outbreak. Based on our preliminary experience, we discuss the challenges in performing tracheotomy and tracheostoma care in the setting of a new pathogen.

1. Introduction

As of 05 April, 1,227,943 cases and 66,592 deaths have been reported in 208 countries around the world. The number of reported COVID-19 cases is rapidly increasing in most of the countries and the notification rate is increasing at similar trajectory as was observed in Hubei province in late January/early February.

In Italy, we have experienced Europe's first and largest coronavirus outbreak and the trend in the number of patients requiring admission to intensive care units (ICU) for long term mechanical ventilation has relentlessly increased in the last few weeks, with the risk that critical care beds, could become rapidly saturated.

Early tracheal intubation may be encouraged, as late or emergency tracheal intubation in rapidly deteriorating Covid-19 patients may be associated with greater risks, both to patients and healthcare professionals [1].

Since long-term mechanical ventilation for critically ill patients represents the most common situation for which tracheostomy is indicated, the Covid-19 pandemic is likely to significantly increase the numbers of patients requiring new tracheostomies.

Due to the lack of specific clinical experience, currently there are few published reports on tracheostomies performed in patients with Covid-19 [2–4].

1.1. Timing for tracheostomy

Decisions regarding the requirement for tracheostomy and the timing to perform tracheostomy in critically ill Covid-19 patients has no

specificity compared to another patient admitted to the ICU and should be taken balancing the risks and burdens to both patients and staff.

UCSF COVID-19 Clinical Working Group recommends that the tracheostomy should be ideally undertaken when the patient is Coronavirus negative (patients should have two negative COVID-19 PCR tests prior to surgery [5]). However it may not be clinically or practically feasible to wait for a negative result prior to undertaking tracheostomy.

Moreover, there may be some benefits to perform tracheostomy in Covid-19 patients earlier than in current practice.

First, considering the high risk of saturation of ICU beds, early tracheostomy allows for earlier and safer weaning attempts so increasing the availability of ICU beds (tracheostomized patients, potentially, can be managed in sub intensive care units or recovery rooms).

Secondly, early tracheostomy may decrease the use of sedative drugs that actually are running low in most countries.

However, since the “crisis” is evolving very quickly, the optimal timing (early or late) of tracheostomy in patients with Covid-19 is still unclear. The decision for tracheostomy will be made on a case-by-case basis after a multidisciplinary evaluation, considering the clinical situation and illness severity of patients, benefits or disadvantages of tracheostomy and hospital resources.

Albeit percutaneous tracheostomy, involving more extensive airway manipulation, increases the exposure to aerosolized secretions [6], in our Institution percutaneous tracheostomies performed by Intensivists are favored over open tracheostomies. Nonetheless, as most patients receive high dose heparin infusion, we have experienced a high rate of significant bleeding necessitating surgical control.

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For open tracheostomies we have established a Covid Airway Team within our department, constituted by 3 skilled head and neck consultants. No residents were involved.

Tracheostomies are performed at the bed-side in the ICU, to avoid unnecessary transport of patients and minimize the risk of surrounding environmental contamination.

Electrocautery should be avoided as much as possible because coagulation with diathermy can produce small particles that may act as a vehicle for the virus, so we start to perform tracheostomies using harmonic scalpel. Only cuffed non fenestrated tracheostomy tubes are positioned.

During surgery we wear enhanced personal protection equipment (PPE), which comprised standard PPE plus the use of shoe covers and a helmet with positive air-powered respirator to provide a complete barrier from the patient's respiratory droplets.

During the last 4 weeks, we performed 24 surgical tracheostomies. The median timing of tracheostomy was 10 days after intubation.

1.2. Tracheostomy care

Also tracheostomy tube management and decannulation process mark a significant point in-Covid-19 patients.

In our Institution, a ward dedicated to the rehabilitation of tracheostomized Covid-19 patients discharged from ICU, was provided.

It is an open ward containing cubicles of 3 patients and in line suction system is not available. All tracheostoma care procedures are performed at the bedside with all health care workers wearing third level PPE.

In our early experience this population is characterized not only by severe cognitive disorders but also by severe swallowing impairment, presumably related to the neuroinvasive propensity of CoVs [7] and the prolonged use of sedative drugs.

To minimize the risk of healthcare workers contamination, swallowing rehabilitation is not carried out by speech therapists, but by experienced staffing nurse with the supervision of an ENT consultant.

Once the patient has reached a satisfactory swallowing function and a good ability to manage oral secretions, the nasogastric tube is removed and the cuff of the tube is deflated, starting some days trial of cuff deflation.

A daily multidisciplinary evaluation (pneumologist, anesthesiologist, infectious disease specialist and otolaryngologist) is carried out to assess medical and respiratory status changes from baseline.

Reinflation of the cuff will only occur if the patient shows signs of deterioration.

Despite empirical approach, due to the lack of previous experience, all the patients are tolerating continuous cuff deflation at the first attempt.

Tracheostoma tube change is limited to a single time, to reduce the size of the tube and replacing cuffed with uncuffed tube.

After multidisciplinary agreement, we start with a tracheostomy tube capping trial consisting on the ability to breathe through the mouth with the tracheostomy tube closed with a cap for almost 7 days (this prolonged time is due to the significant rate of late medical decline reported in the Covid-19 cohort patients [8]) and no need of tracheal suction. Only two patients out of 21 experienced weaning failure related to the deterioration of his cognitive status, with the need to remove the cap.

At present, 14 patients were decannulated (median time of 12 days after tracheostomy) and, after 2 negative tests for Covid-19 at 24-hour intervals, they are waiting to be referred to a dedicated community care service.

The British Association of Otorhinolaryngology – Head and Neck Surgery (ENT UK) has made the following recommendations to reduce risks of aerosolization and environmental contamination: keep the cuff inflated and delay tracheostomy tube change until COVID-19 has passed [9].

Unfortunately, it is not always practically feasible to adhere to guidelines and recommendations. During a new public health crisis threatening the world, each of us has to relate to local hospital resources. As in line suction system is not available in our dedicated ward, it is ineffective to maintain the cuff inflated to avoid environmental contamination. Moreover, “early” cuff deflation and tube change may facilitate the procedure of rehabilitation. It is pleonastic to emphasize that during tracheostomy care maneuvers, healthcare workers are equipped with full PPE. Currently, none of the faculty has been infected.

2. Conclusion

As Covid-19 infection is a novel disease, there is a lack of specific experience.

We have summarized our experience in performing tracheostomy and tracheostoma care in the setting of a new pathogen. Given the rapid evolution of the current Covid-19 pandemic this will be an early experience that is likely to change over time, so we encourage all our colleagues to share their experience.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Funding

Not applicable.

Authors' contributions

Ottavio Piccin and Pietro Marrè have made substantial contributions to conception and design, have been involved in drafting the manuscript and revising it critically for important intellectual content.

Riccardo Albertini, Umberto Caliceti, Ottavio Cavicchi, Eleonora Cioccoloni, Marco Demattè, Gian Gaetano Ferri, Giovanni Macrì, Irene Pelligra, Domenico Saggese, Patrizia Schiavon, Vittorio Sciarretta and Giovanni Sorrenti have been involved in reviewing the manuscript and have given final approval of the version to be published.

Declaration of competing interest

The authors have no funding, financial relationship or conflicts of interest relevant to this article to disclose.

Acknowledgments

We are very grateful to all the members of our junior staff (Andi Abeshi, Giuseppe Caccamo, Vitaliano Carusi, Paolo Cozzolino, Pasquale D'Alessio, Gabriella De Santi, Janan El Alouani, Maria Grazia Lo Russo, Giulia Mattucci, Rosa Maria Minniti, Rosario Mollo) for their valuable collaboration.

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