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Funding: None
Conflicts of interest: None
Word Count: 900
Keywords: coronavirus; COVID-19; intensive care unit; tracheotomy; viral load
Abstract

Timing of elective tracheotomy in ICU intubated COVID 19 patients is still unclear. Recent recommendations and guidelines describe the surgical steps in order to achieve maximum protection of the involved medical staff and propose a delay of the procedure, so the viral load is decreased. Most authors of these recommendations agree that tracheotomy should be performed after at least 14 days from intubation but data on this subject is still lacking. We discuss the issue of timing for such a procedure in regard to viral load and propose that the decision should be predominately based on its calculation.
The disease caused by COVID-19 has rapidly swept across the world. Otolaryngologists are continuously adapting their practices, since early reports from the first centers involved in treating the pandemic indicated an increased risk for contamination for medical personnel in close contact with mucus membranes of the upper respiratory tract \(^1\).

The risk of operating room contamination and transmission of COVID-19 to health care professionals during tracheotomy is known since the Sars–CoV epidemic in 2003 \(^2\). As cases of COVID-19 worldwide are still on the rise, the need of longer ICU hospitalization of these patients accompanies the increased demand for tracheotomies due to prolonged intubation. However, timing to perform a tracheostomy on ICU intubated COVID 19 patients is still unclear.

The American Academy of Otolaryngology – Head & Neck Surgery (AAO-HNS) issued a position statement on March 27, 2020 (revised on April 2) with recommendations for tracheotomy during the COVID-19 pandemic. Similar recommendations have been issued by other national Otolaryngology societies or institutions, but few address the issue of when to perform the procedure in these patients. For such a decision one has to balance between the advantages of tracheostomy and the possibility of transmission to all involved personnel, including surgeons, operating room nurses, ICU and all post-ICU ward staff that will be implicated in the decannulation procedure.

Decision for a tracheostomy might be furthermore influenced by other factors such as institutional policies, local medical practices and expertise and most importantly adequacy and availability of Personal Protective Equipment (PPE). Since tracheotomy is considered a highly aerosol generating procedure (AGP), the highest level of PPE should be used not only while performing the procedure, but also during every nursing or medical action taken around the...
tracheotomized patient (suction, tube replacement etc.). Aerosolized viral particles are considered to transmit for up to 3 hours, perhaps more \(^1\).

The AAO-HNS recommends performing a tracheostomy no earlier than 2 to 3 weeks after intubation, but practices vary widely and others \(^3\) propose this timing to 7 days if patients are far from reaching weaning targets, even though the authors of the latter paper acknowledge that there is a lack of data regarding this topic. ENT UK \(^4\) updated its former recommendations in association with the British Laryngological Association to include timing of tracheostomy and suggest waiting until day 14 of intubation to allow prognostic information to become clear and potentially for viral load to decrease.

The first series with tracheotomies from Italy just published \(^5\) reports a mean waiting time of 14 days. The authors specifically underline that timing has yet to be defined.

The issue of viral load monitoring is addressed also in the AAO-HNS recommendations that propose negative viral testing if possible, prior to a tracheotomy. However, negative testing may not be a realistic option as this may delay tracheostomy causing serious adverse events or complications. Therefore, another factor has gradually been discussed in the literature; the viral load. Recommendations from the New York Head and Neck Society published recently \(^6\) as well as institutional guidelines from a large academic center in San Francisco \(^7\) address the issue of viral load as an indication for a safe tracheotomy.

David et al. propose waiting at least 21 days from intubation time before the procedure.

Miles et al. \(^6\), among others cite the studies of To et al. and Zou et al. \(^8\) that show the evolution of viral load in various samples including saliva and endotracheal aspirates during the days following symptom onset. The authors propose tracheotomy after at least 21 days from
symptom onset (and not from intubation) a statement that seems to be in contrast to other recommendations that specifically address the question of timing considering the intubation period. Perhaps the authors imply that tracheostomy should be considered at least 21 days from symptom onset in order to have a possible small virus load, since as the evolution of viral load shows that it is considerably lower after that time in nasopharyngeal swabs.

In general, a question exists of what the appropriate viral load for a safe tracheotomy should be. This issue has not been mentioned by any of the papers published before this paper is written and may be the key to safe tracheostomy.

Viral load is measured in cycle threshold (Ct) values of Orf1b on reverse-transcriptase–polymerase-chain-reaction (RT-PCR) assay of samples (in either nasopharyngeal swab, morning saliva or endotracheal aspirates). Higher viral loads are inversely related to Ct value, since less cycles are needed to trace the virus. As one can realize from the paper of To et al., there is a difference of viral loads between saliva and the trachea on a given time, with the latter showing higher loads that decrease over a longer period, long after 21 days from symptom onset. Most patients are intubated between 4 and 14 days from hospital admission.

Since the presence of the virus in the tracheal secretions is actually what exposes the surgical team to a contamination danger, endotracheal aspirates should be predominately tested for viral load before a tracheostomy in these patients is considered. Viral load with a Ct value close to 40 lowers the risk of contamination, but this has to be further evaluated with more studies.

Institutional demands might be accordingly adjusted.

We propose this information to be incorporated within recommendations and the issue of viral load should be seriously taken into account.
References


