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Tracheostomy in Patients with Covid-19: Current Recommendations

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Abstract

Background: COVID-19 continues to present uncertainty regarding the possibilities of treatment in critically ill patients, due to the uncontrolled spread of the pandemic, intensivists and acute care surgeons have had difficulties treating patients with COVID-19 who are critically ill; Tracheostomy is a common procedure in these patients who require a prolonged period of mechanical ventilation and there are various recommendations and precautions that must be taken when it is necessary to implement it.

Methodology: A narrative review was carried out through various databases in August 2021, the search and selection of articles was carried out in journals indexed in first and second languages.

Results: Currently, due to the high morbidity rate due to the COVID-19 pandemic, many of the most serious patients have required vital interventions to prolong their lives, among which the tracheostomy helps to reduce the incidence of ventilator-acquired pneumonia, reducing the mortality, duration of mechanical ventilation, ICU stay, sedation and laryngotracheal stenosis in survivors, this procedure, its due recommendations, provides a faster and more effective recovery.

Conclusions: Tracheostomy is a procedure that is highly described in the literature, with precise and well-defined indications for its performance; at the time of carrying it out, we must have special measures in case it is carried out in patients with COVID-19.

Introduction

In December 2019, authorities in Wuhan, China, reported 27 cases of pneumonia of unknown cause, which were later, identified [1]. The Corona virus that causes the COVID-19 infection and the pandemic is called Severe Acute Respiratory Syndrome Corona Virus 2 [SARS-CoV-2]. In Colombia, the first case of COVID-19 was reported on March 6, 2020 and three days later on March 9, 2020 the world health organization declared this disease a global emergency due to its high transmissibility and its fatal consequences [2-3]. This virus can have multiple manifestations, the most common of which include cough, sore throat, anosmia, and for patients with a more serious clinical picture, respiratory distress may occur which requires emergency hospitalization; the most critical patients are commonly the elderly, and those with underlying pathologies such as cardiovascular diseases, diabetes, chronic respiratory diseases and autoimmune diseases. Due to the uncontrolled spread of the pandemic acute care intensivists and surgeons have struggled to treat critically ill COVID-19 patients when it comes to critical care decision-making [4].

Tracheostomy is a common procedure in critically ill patients who require a prolonged period of mechanical ventilation. The use of tracheostomy can facilitate weaning from ventilation and potentially increase the availability of Intensive Care Unit [ICU] beds [5]. The use of tracheostomy is an established therapy with recognized benefit when perform ed early [within 7 days of MV]. This includes a reduction in the incidence of ventilator-acquired pneumonia, reduction in

mortality, duration of MV, ICU stay, sedation, and laryngotracheal stenosis in survivors [6].

Materials and Methods

A narrative review was carried out, in which different databases were used such as Scielo, PubMed, Science Direct, Academic Google, among others. The selection of articles was made through indexed journals in English, Spanish and Portuguese languages from 2010 to 2021. As keywords, the following terms were used according to the DeCs and MeSH terms: Tracheostomy, COVID-19, surgical treatment, recommendations. In this review, 25 original and review publications related to the subject under study were identified, of which 17 met the inclusion criteria used. Within the inclusion criteria, it was found that they were full-text articles that at the time of the search allowed the reading of the abstract, that were related to the subject studied, that were within the established years. Exclusion criteria: That their publication date was less than 2010 and that they did not allow the full text to be read.

Results

Some patients with COVID-19 have the possibility of requiring surgery; this can occur either due to concomitant diseases or due to the existence of complications that occur from the same disease. In a study carried out, the admission of 699 suspected or confirmed SARS-CoV-2 patients was evidenced for 4 months. Of these 42 patients [6%] required surgical treatment during their stay. The most frequent indication for surgical treatment was prolonged intubation to remove mechanical ventilator support in 16 patients [38%], so the most frequent surgery was tracheostomy [7].

Tracheostomy [TQT] is one of the oldest known procedures and one of the most frequently used in intensive care units; the main patients in whom it is used are those with respiratory failure who require mechanical ventilation [7-8]. In the past, TQT performed in the Intensive Care Unit [ICU] was classified as a procedure with high mortality. However, with the advent of smaller devices and more practical instruments, this procedure has become easier to perform [8].

The terms tracheostomy and tracheostomy are currently used interchangeably; tracheostomy refers to the surgical opening of the anterior wall of the trachea; while the term tracheostomy consists of making a similar opening, but in this the trachea is fixed to the skin of the neck [9].

Tracheostomy is used in critically ill patients, assisting in long-term Invasive Mechanical Ventilation [IMV] and also in weaning from ventilation [10]. Recently a systematic review showed that an early tracheostomy, referring to the one performed in the first 7 days after endotracheal intubation [IOT], is associated with a reduction in IMV time, mortality and permanence in ICU [11].

TQT is a procedure that is characterized by a large generation of aerosols, thus being essential to use measures to prevent the spread of the virus in patients suffering from COVID-19. For this same reason, health personnel, including head and neck surgeons, otorhinolaryngologists, thoracic surgeons, anesthesiologists and nursing personnel suffer from a high risk of contagion during these types of interventions [12].

Considering the increase in tracheostomies in patients with C OVID19, the following recommendations are proposed that are based on the most current literature, both on the protection of health personnel, as well as on the appropriate guidelines to correctly perform the surgical airway and how to reduce aerosols at the time of the procedure [13].

Crown: Tracheostomy Protocol

If we talk about the most common general indications within tracheostomy we find: prolonged mechanical ventilation, difficulty in weaning from mechanical ventilation, efficient management of secretions, neurological damage that prevents spontaneous ventilation, head and neck surgeries and less commonly, upper airway obstructions [OVAS], based on international studies [14].

Regarding the indications for TQT in patients with COVID-19, they are basically the same as in patients in general, however, it is essential to always take into account the latest reports of direct laryngeal involvement caused by SARS-CoV-2, producing edema and ulceration, a situation that is enhanced by the prolonged use of Invasive Mechanical Ventilation [IMV], for this reason it is vitally important that it is recommended that if significant laryngeal edema is evident during laryngoscopy, the use of intubation and opt for TQT [15].

In the literature, it is widely described that the use of early TQT decreases the days of IMV use, mortality and ICU stay compared to a TQT that is performed late, however, in patients infected with SARS-CoV-2 is not clear the right moment for its realization. Taking into account current reports, it is recommended that the surgical management of the airway [VA] differs by up to 10 days and is only carried out if it is strictly necessary, thus avoiding the generation of aerosols and consequently avoiding the risk of infection of health personnel [15].

Regarding the percutaneous and surgical TQT technique, there is no consensus in the literature regarding which of these two techniques is better; international studies report that both techniques present a similar risk in terms of complications and mortality. In COVID-19 patients there are no clear recommendations on which of the techniques to prefer, however, we must bear in mind that in surgical CTT there is less production of aerosols, so this route is preferable in patients with COVID-19.

Taking into account the antecedents described above and using the acronym C-O-RO-NA Table 1, the following recommendations are made based on the current literature on tracheostomy to minimize infection by healthcare personnel.

Table 1: Crown protocol for adequate surgical intervention.

"C" coverage	The use of PPE is necessary: •Masks: for your safety and protection against aerosols, the most recommended are FFP2, FFP3 or N95. •Face / eye protection: visor, surgical mask with integrated visor or full face mask. •Disposable fluid resistant surgical clothing. •Use of sterile gloves to allow palpation
"OR" operation room (surgical ward)	Follow recommendations to avoid contagion of personnel •Pavilion preparation: it is preferred to use central pavilion with Negative Pressure (PN) or its ICU defect since these have PN, the procedure can also be performed in an isolated room. •Measures for staff: for the procedure to be as safe and fast, they must have an anesthesiologist and two trained surgeons (head and neck surgeons, otolaryngologists and / or chest surgeons)
"O" for open (to open the windpipe)	To carry out a good procedure it is recommended •Patient in supine position, with hyperextension of the neck and anesthesia with deep muscle relaxation to avoid the reflex of coughing and movements. •Stop ventilation prior to insertion of the cannula and quickly and effectively ensure the position of the cannula in the trachea with rapid inflation of the cuff. •At the end of the procedure, the PPE should be checked by another person to reduce contamination.
"NA" for nurse and airway management	Maintain exclusive care of the procedure •Periodically check the cuff •Avoid humidified circuits, to reduce the risk of contamination •Avoid changing the TQT tube

Discussion

Recommendations

They were made based on the available evidence and the recommendations of scientific societies, these recommendations are mainly based on the possibility of viral transmission to health workers involved in the procedure or the subsequent care of these patients, therefore, a viral decrease in these patients is a decrease in the risk of contagion (Table 2).

Table 2: Opinion of the different scientific societies regarding the tracheostomy of COVID-19 patients.

British Laryngology Association (BLA) and ENT-UK	New York Head and Neck Society	American Academy of Otolaryngology-Head and Neck Surgery
Suggest tracheostomy should be considered after at least 14 days of intubation in COVID-19 patients	They recommend waiting up to 21 days after the onset of symptoms to perform a tracheostomy in COVID-19 patients, except for situations where there are significant improvements in the patient's prognosis.	They advise waiting at least 2-3 weeks with negative COVID-19 tests before considering the procedure

The Spanish society of otorhinolaryngology and head and neck surgery, based on the article by Wi et al. of 2003 in relation to tracheostomies performed by the "Severe Acute Respiratory Syndrome" (SARS) make the following recommendations:

General Recommendations

- Use of standard tracheostomy surgical material.
- Limit the use of ultrasonic electric cutting and coagulation systems or any other that can spread airborne particulates.
- Use closed circuit suction systems with antiviral filter.
- Only essential personnel should remain during the procedure.
- The procedure will be approached by the most experienced personnel for a limited time possible.
- Use appropriate protection measures.

Recommendations in programmed tracheostomy (intubated patient)

- Before opening tracheaEstablish adequate pre-oxygenation for the patient (100% oxygen 5 minutes).Complete muscle relaxation of the patient throughout the procedure and especially when removing the tubes and decannulation, to avoid coughing and aerosolization.
- Perform tracheostomy, withdraw the endotracheal intubation tube until the balloon cannula can be placed without completely removing it; inflate the cannula balloon
- Connect the ventilator and when correct ventilation is verified (preferably by capnography), the endotracheal tube will be withdrawn and the tracheostomy tube is fixed with tape and silk stitches. The balloon from the cannula is NOT deflated once mechanical ventilation has started.

Recommendations in urgent tracheostomy (non-intubated patient)

On occasions determined by the patient's ventilator deterioration, a tracheostomy may be needed in an emergency situation in patients not previously intubated.

- Establish adequate pre-oxygenation for the patient (100% oxygen 5 minutes).
- Complete muscle relaxation to avoid movements of the patient, as well as coughing.
- Place the tracheostomy tube and inflate the balloon.
- Connect the mechanical ventilator and proceed to stabilize the patient.
- Fix the cannula.
- If a cricothyroidotomy has been performed, once the patient has been stabilized, a regulated tracheostomy will be performed using a different incision, the cricothyroidotomy incision will be closed after removal of the cricothyroidotomy cannula and placement of the cannula tracheostomy.
- Connect the mechanical ventilator and check patient ventilation.

Conclusion

Tracheostomy is a procedure widely described in the literature, and its performance has precise and clear indications. A tracheostomy will produce a large amount of aerosols, so when performing operations, we must take special measures to prevent operations on COVID-19 patients. For this reason, it is always recommended to use personal protection elements to minimize infection by healthcare personnel, the acronym CO-RO-NA helps not to forget the basic steps when performing the test technology.

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