Case Report

Tracheostomy in a patient with COVID-19: a case report

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Abstract

Some of coronavirus disease 2019 (COVID-19) patients with prolonged ventilation may require tracheostomy, which is an aerosol-generating procedure and poses a significant risk of viral transmission. We report our experience of the management of a patient with COVID-19 who underwent surgical tracheostomy and describe several essential infection control principles. In our patient, on the 14th day after intubation, an open tracheostomy was carried out because of the prolonged tracheal intubation and unsuccessful extubation attempts. Meticulous attention was paid during surgery to decrease the infection risk. Appropriate protection, infection control and teamwork are essential to perform open tracheostomy in COVID-19 positive patients safely with minimal risks to healthcare professionals.

INTRODUCTION

For the last few months, healthcare systems worldwide have been facing a novel disease officially termed “coronavirus disease 2019 (COVID-19)” [1]. The China Centre for Disease Control and Prevention discovered the virus called novel coronavirus 2019, which was considered as the cause of a number of lower respiratory tract infections [1]. The World Health Organization renamed it to the novel coronavirus severe acute respiratory syndrome 2 (SARS-CoV-2). In total, \(-5\%\) of patients with COVID-19 are critically ill and need mechanical ventilation [2, 3]. Some of these patients with prolonged ventilation may require tracheostomy, which is an aerosol-generating procedure (AGP) and poses a significant risk of viral transmission [4]. We could find only one other report of tracheostomy in a patient with COVID-19 [5]. We report our experience of the management of a patient with COVID-19 who underwent surgical tracheostomy and describe several essential infection control principles.

CASE REPORT

This report was approved by the ethics committee of our clinical center.

An 81-year-old man had slight fever, fatigue and dry cough for 5 days and was admitted to our hospital. He had hairy cell leukemia since 1993, Hodgkin lymphoma since 2002 and cervical kyphosis. His chest radiograph showed both-side, lower zone patchy consolidation. The polymerase chain reaction test for SARS-CoV-2 was positive. He received intensive drug treatment, including chloroquine phosphate, lopinavir, ritonavir, antibiotics, and respiratory care. His respiratory condition deteriorated, and he underwent tracheal intubation. On the 14th day after intubation, an open tracheostomy was carried out because of the prolonged tracheal intubation and unsuccessful extubation attempts. The patient’s condition was optimized before transfer from the intensive care unit (ICU) to the operating theater. Before
incising the trachea, the cuff of the endotracheal tube was deflated, the tube was advanced forward 3 cm to prevent aerosol generation if the cuff would be ruptured and the cuff is re-inflated, thus establishing a closed circuit. After preoxygenation, the ventilator was turned off, the incision was made above the level of the tube cuff and rescue sutures around the third tracheal ring were inserted. The anaesthesiologist deflated cuff and pulled out the intubation tube up to the level of the cricoid cartilage. No 8.5 cuffed non-fenestrated tracheostomy tube with an attached syringe to cuff was introduced, the cuff was inflated, the tube was connected to a ventilator and mechanical ventilation was restarted. The tracheostomy tube was fixed to the neck skin to avoid accidental extraction. The endotracheal tube was removed from the mouth under a large piece of clear plastic in which it was immediately wrapped and disposed of in a plastic bag. After the operation, the patient was reconnected to the portable monitor and ventilator and transferred back to the ICU by a separate transport team. The patient’s condition did not improve despite intensive treatments, and he died 10 days after surgery. All members of the surgical team remained well at 2 weeks after the procedures.

DISCUSSION

Tracheostomy is AGP and may facilitate the transmission of SARS-CoV-2 to healthcare professionals. Therefore, tracheostomy should be performed in patients with COVID-19 only when deemed absolutely necessary and is indicated when a primary extubation is not possible or has failed, when prolonged endotracheal intubation is considered inappropriate for the patient and when a repeated change of endotracheal tube is required. Tracheostomy also allows a lower requirement for sedation thereby facilitating less invasive nursing care. The optimal timing of tracheostomy is unclear. It is currently recommended that tracheostomy should not be performed before 14 days of endotracheal intubation [6]. To decide whether a tracheostomy should be performed, repeated careful discussions are required.

There was the alternative of performing a percutaneous or open tracheotomy. We decided against a percutaneous tracheostomy because of difficult neck anatomy. Also, percutaneous tracheostomy involves more extensive airway manipulation that results in increased aerosolization risks compared with open tracheostomy [7].

The possible locations for elective tracheostomy are operating room (OR) or intensive care room. Our surgery was performed in a normal OR with closed doors during the procedure while there is no negative-pressure OR at our hospital. There are technical challenges to bed side tracheostomy in the ICU like suboptimal positioning of the patient on a wide pneumatic ICU bed and inadequate lighting.

It is recommended to establish a dedicated team to carry out tracheostomy in patients with COVID-19. Experienced team minimize time spent in OR and avoid self-contamination. Our surgical team consisted of two otolaryngologists, including an anesthesiologist, a respiratory technician and a nurse. Another surgeon, anesthetist and team of OR staff were on standby in the adjacent OR to allow for rapid take over in case of problems.

Reliable use of PPE significantly reduces the risk of infection. Surgeons who might be involved in carrying out surgical procedures for patients with COVID-19 should become familiar with PPE. PPE comprises cap, goggles with an anti-mist screen, N95 mask covered by surgical mask to facilitate multi-layer doffing, facial shield, disposable water-resistant surgical gown, double surgical gloves and plastic shoe covers [8]. Surgeons who wear spectacles should plan enough time to try and adjust the goggles and facial shield and to check the field of vision. The donning and removal of PPE are sequential processes and were closely supervised by dedicated infection control nurse, as improper removal may result in operator contamination.

Meticulous attention would be paid during surgery to decrease the infection risk. The cuff of the endotracheal tube should not be perforated during the procedure. The mechanical ventilation should be stopped while incising the trachea and inserting the cuffed non-fenestrated tracheostomy tube. Monopolar and bipolar diathermy are considered AGP, but the evidence is rather weak. The appropriate hemostasis is crucial, and we used bipolar diathermy and suction throughout the procedure, as coagulation anomalies are not uncommon in patients with COVID-19.

Professional associations of otorhinolaryngologists have recently developed protocols for tracheostomy in patients with COVID-19 based on previous experience, especially in patients with SARS. However, there are some differences in recommendations, and the conclusion is that we need clinical experience in treating patients with COVID-19 to obtain accurate recommendations. Therefore, appropriate protection, infection control and teamwork are essential to perform open tracheostomy in COVID-19 positive patients safely with minimal risks to healthcare professionals.

CONFLICT OF INTEREST STATEMENT

None declared.

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