

Subject Area:

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Tracheostomy in COVID-19-infected patients

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Abstract

Purpose

To evaluate the modifications in the indications and technique of tracheostomy for prolonged-intubated COVID-19-infected patients.

Methodology

Commissioned by the Ministry of Health in Egypt, different guidelines for tracheostomy for COVID-19 patients were revised. A guideline was adopted and modified to meet the equipment provided by facilities assigned to contain the current pandemic. The understanding of staff and the applicability of the new guidelines were evaluated using a mini-summative quiz answered by 117 tracheostomy team members in facilities around Grand Cairo, Egypt.

Results

The percentages of consistent answers for questions 1–6 were 94, 90.60, 89.70, 95.70, 61.50, and 93.20%, respectively. A total of 86 (73.5%) individuals achieved score more than 80%. Moreover, 41 (35%) individuals achieved perfect score.

Conclusion

The novel guidelines are well understood and applicable. Remarks that emerged regarding diathermy use should be taken in consideration. Continuous assessment of these guidelines is needed as the pandemic goes on altering its manner and our strategies along with it.

Keywords: COVID-19, guidelines, tracheostomy

INTRODUCTION

As the novel COVID-19 pandemic continues to spread, more patients will need hospitalization. Some publications estimate that 5–20% of hospitalized patients are admitted to ICU, and up to 88% of them need mechanical ventilation [1–3].

Prolonged mechanical ventilation requires tracheostomy, which offers a sealed system for respiratory support. Tracheostomized patients are usually not or reducibly sedated with the advantage of less intensive nursing care, and this may reduce ventilation time. It is usually scheduled after 7–10 days of invasive mechanical ventilation in ordinary conditions [4]. The usual debate between percutaneous tracheostomy (PT) and surgical tracheostomy (ST) is settled in favor of the latter in the COVID era.

PT is relatively contraindicated in high positive end-expiratory pressure or fraction of inspired oxygen requirement, marked obesity, coagulopathy, and hemodynamic instability [5]. All the previous conditions are most likely to be associated

with COVID-19-infected patients [1]. Adding to these contraindications, PT may require bronchoscopy and serial dilations during tracheal entry, which will increase the chance of aerosolization risks compared with ST [6].

The previous lesson of PT versus ST was learnt during the SARS outbreak [7]. Therefore, it is not unwise to explore more lessons to formulate guidelines for tracheostomy that would meet our needs and equipment, together with other published guidelines at the beginning of the novel pandemic and chose what is best in our condition.

These guidelines are not complete without the personnel who understand and implement them. Summative assessment is the

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process that measures the extent to which the most important outcomes at the end of the instruction have been reached [8]. So, we tried by using a summative quiz to measure the extent to which the tracheostomy teams understand and implement the novel guidelines.

METHODOLOGY

Commissioned by the Ministry of Health, the guidelines were revised; the 'ENT-UK tracheostomy during the COVID pandemic' guideline was chosen being the most dedicated, comprehensive yet simplified one [9]. After being modified to our needs, it was distributed as a part of the ministry booklet 'Management Guidelines for Covid-19 Patients with Special Medical Conditions. Egypt, April 2020; pp.: 58–61' to the isolation facilities (Figs. 1–6).

After being approved by our local Ethical committee and confirming consistency with all local laws and the principles of Declaration of Helsinki, A mini-summative quiz was formulated of six multiple choice questions with three choices each (Fig. 7). Questions reflect the novel items in the guideline that is to be emphasized.

The subjects targeted by this quiz were the otolaryngologists and anesthesiologists among the tracheostomy teams

designated in the isolation facilities among the area of Grand Cairo (Cairo, Giza, and Qalyubiyya).

A total of 117 team members (specialty and facility were not specified) were able to answer our mini quiz despite their busy schedule in the isolation facilities. The participants were instructed to choose only one consistent answer for each question.

The results of the quiz were tabled and statistically analyzed.

RESULTS

Results for the quiz answers are summarized and tabled (Fig. 8). The percentages of consistent answers were calculated (Table 1). The question with the most consistent answers was no. 4 (95.7%), whereas the question with least ones was no. 5 (61.5%). The average of consistent answers was 87%.

The frequency of scores was calculated (Table 2). A total of 41 (35%) participants achieved full mark, 45 (38.5%) participants got 5/6 score, 27 (23%) participants got 4/6 score, and only four (3.5%) participants got 3/6 score. No participants

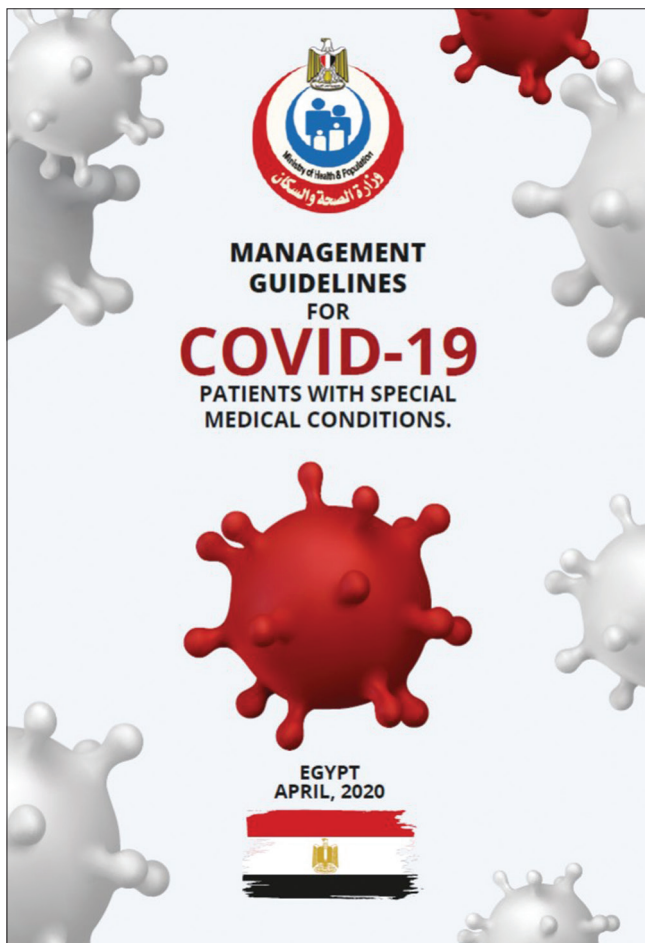


Figure 1: Cover page for the guidelines booklet distributed in the isolation facilities.

COVID-19 Management with Special Co morbidities	
Revised by	
Name	Affiliation
Dr.Hossam Hosny Masoud	Professor of Chest Diseases, Head of Pulmonary Hypertension Unit, Faculty of Medicine, Cairo University
Dr.Gehan Elassal	Professor of Pulmonary Medicine Ain Shams University
Dr.Samy Zaki	Professor of Hepatogastroenterology and Infectious Diseases, Al Azhar University
Dr.Amin Abdel Baki	Consultant of Hepatology, Gastroenterology and Infectious Diseases, National Hepatology and Tropical Medicine Research Institute (NHTMRI), Cairo, Egypt
Dr.Hamdy Ibrahim	General Director of Directorate of Fever Hospitals, MOHP
Dr.Wagdy Amin	Director General for Chest Diseases,MOHP
Dr.Akram Abdelbary	Professor of critical care medicine, Cairo University Chairman elect of ELSO SWAAC chapter
Dr.Ahmad Said Abdel Mohsen	Lecturer of critical care medicine, Faculty of Medicine, Cairo University
Dr.Mohamed Hassany	Fellow of Infectious Diseases and Endemic Hepatogastroenterology, National Hepatology and Tropical Medicine Research Institute
Dr.Alaa Eid	Head of Preventive Medical Sector MOHP
Dr.Noha Asem Mohamed	Minister's Advisor for Research and Health Development. Chairman of Research Ethics Committee MOHP. Lecturer of Public Health, Cairo University.
Dr.Ehab Kamal	Consultant Tropical Medicine Researcher of Tropical Medicine. Medical Division National Research Center
Dr. Mohammed Mourad Youssif	Consultant Obstetrician & Gynecologist El-Galaa Maternity Teaching Hospital
Dr. Ahmed M. Mustafa	Head of Hearing & Speech Institute-ENT consultant
Dr. Ehab K. Sefin	Ass. consultant of ENT- Hearing & Speech Institute
Dr. Mohammad M. Gaballah	Fellow of ENT- Hearing & Speech Institute.
Dr. Mohamed Salah Eldin Zaki	Professor of internal medicine and nephrology (National Institute of Urology and Nephrology)
Dr. Hesham Mohamed Elsayed	Professor of internal medicine and nephrology (Ain Shams University)
Dr. Hussein Saeed El Fishawy	Professor of internal medicine and nephrology (Cairo University)
Dr Naglaa S. Bazan	Fellow(Lecturer)and Head of Clinical Pharmacy, Critical Care Medicine Department, Head of Clinical Pharmacy Inspection Department, Cairo University Hospitals
Dr. Khalid M. Taema	Assistant Professor of Critical Care Medicine, Faculty of Medicine, Cairo University

Figure 2: Names and affiliations of the revising committee commissioned by the Ministry of Health to prepare the guidelines booklet, page: 1.

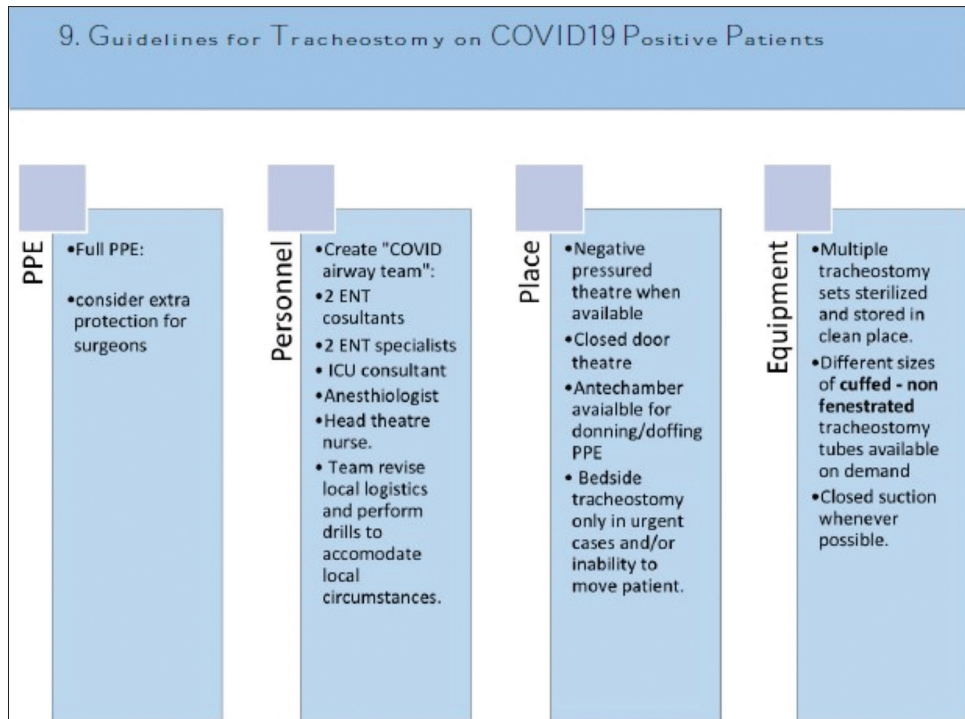


Figure 3: Logistics for tracheostomy in the booklet, page: 58.

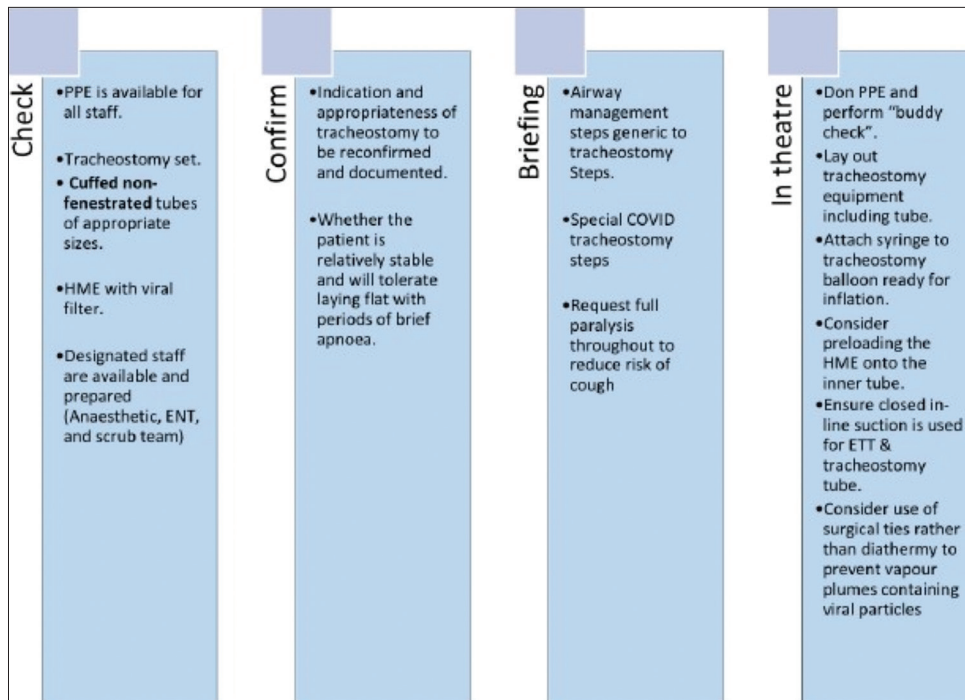


Figure 4: Preoperative steps before tracheostomy, page: 59.

got score below 3/6. Overall, 86 participants (73.5%) achieved score above 80%.

DISCUSSION

As the novel pandemic continues to spread, the rate of hospitalization, ICU admission, and mechanical ventilation

is expected to increase. Subsequently, tracheostomy rate is expected to increase as well. Being an aerosol-generating procedure, tracheostomy harbors great hazard of infection transmission to the performing team. So, guidelines for tracheostomy needed an update to cope with the new situation.

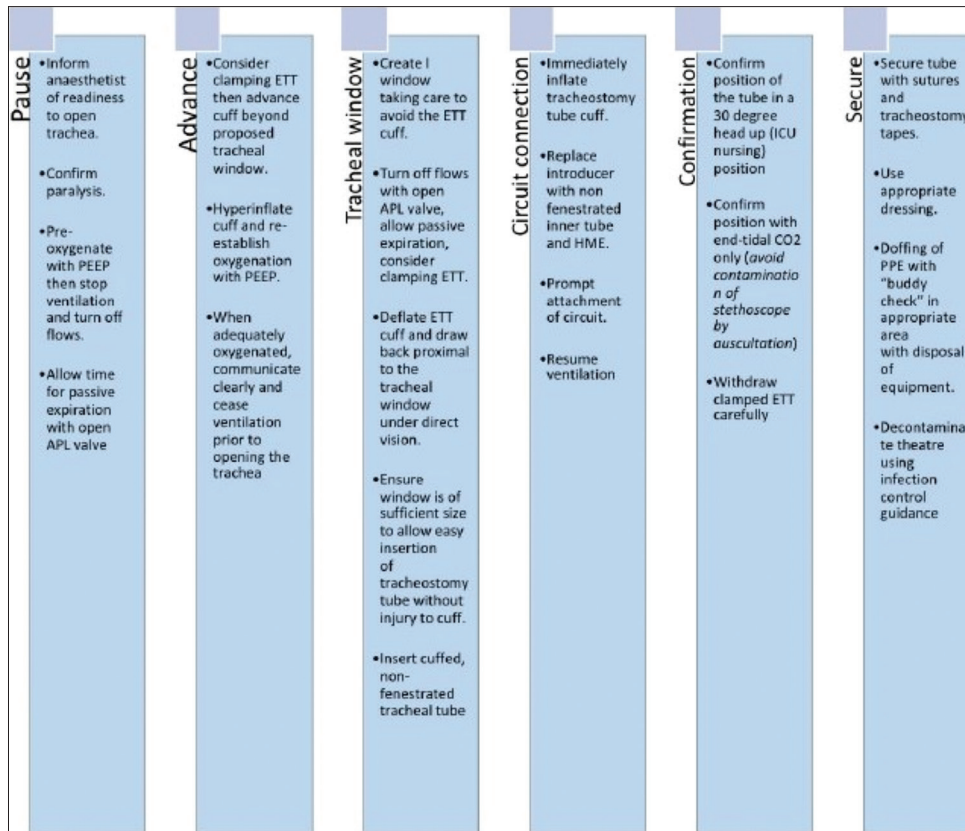


Figure 5: Procedure steps with special modifications to avoid aerosolization, page: 60.

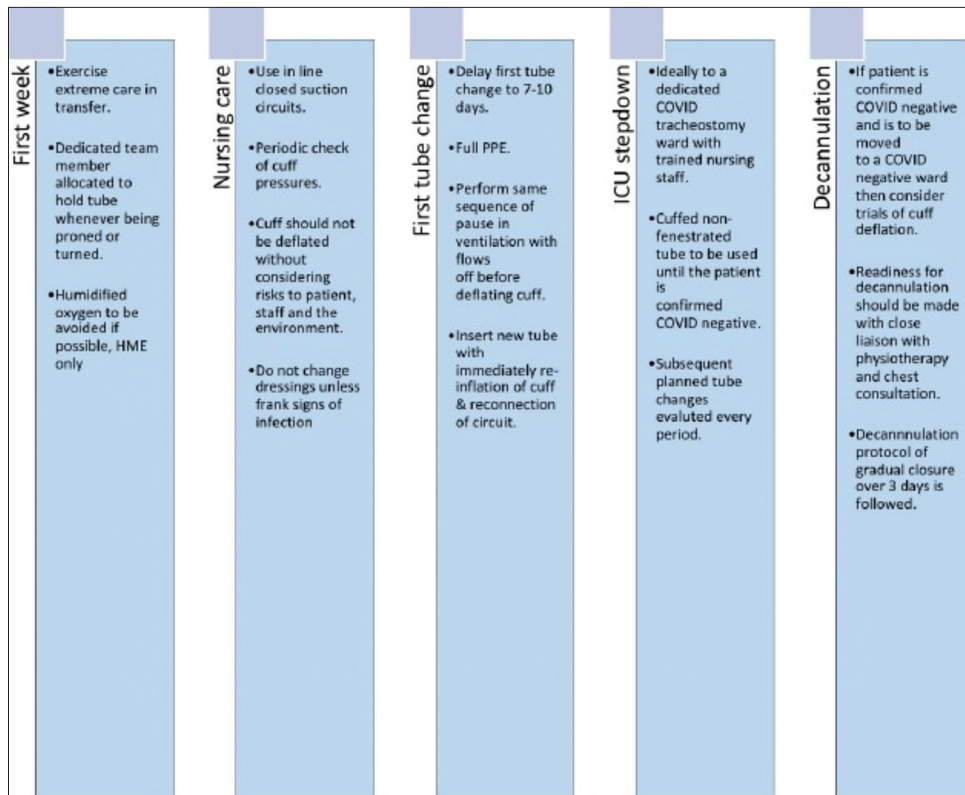


Figure 6: Postoperative care for tracheostomy tube, page: 61.

Choose only one answer:

1- Bedside tracheostomy vs. theatre tracheostomy:
 a) Bedside is preferred.
b) Theatre is preferred.
 c) Both are the same.

2- All are true regarding tracheostomy in COVID except:
a) Spontaneous breathing is a must during tracheostomy
 b) Buddy check while donning PPEs before surgery.
 c) HME with viral filter is essential.

3- Regarding the procedure, all are true except:
 a) Clamp Endotracheal tube (ETT) then advance cuff beyond proposed tracheal window.
 b) Cease ventilation to achieve apnoea prior to opening the trachea.
c) Confirm position of tracheostomy tube by auscultation of equality of air entry in both lungs.

4- Regarding the anaesthesia activity around tracheal opening time:
 a) Pre-oxygenate with PEEP then stop ventilation and turn off flows.
 b) Allow time for passive expiration with open Adjustable pressure-limiting (APL) valve.
c) Withdraw ETT under direct vision with hyper-inflated cuff.

5- Regarding diathermy during operation:
 a) Must use.
b) Better avoided.
 c) Bipolar diathermy is preferred over monopolar diathermy.

6- Postoperative care includes, except:
 a) Use inline closed suction circuits for suction from the tube.
b) Frequent change of dressing is mandatory.
 c) Delay tracheostomy tube change up to 10 days postoperatively.

Figure 7: Quiz formulated for summative assessment in the form of multiple choice questions, consistent answer is highlighted in yellow.

Table 1: The percentages of consistent answers for each question

Question numbers	Percentage of consistent answers
Question 1	94
Question 2	90.60
Question 3	89.70
Question 4	95.70
Question 5	61.50
Question 6	93.20

Table 2: The frequency of scores among participants who took the quiz

Scores	Frequency
3/6	4
4/6	27
5/6	45
6/6	41

Revising the literature for similar situation in the past, scanty research was found addressing tracheostomy during SARS outbreak in beginning of the millennium [10–12]. Depending on them while exploring the way cautiously, new guidelines are being published consecutively. The main two questions needed to be answered in the new guidelines are: when and how to perform tracheostomy to COVID-19-positive patients?

The answer of the first question ranged from not to do it at all until the patient is negative [13,14]. Some European medical communities adopted a local policy of about 14 days before tracheostomy [15], whereas others did not answer the question, leaving the decision to the team to make in every

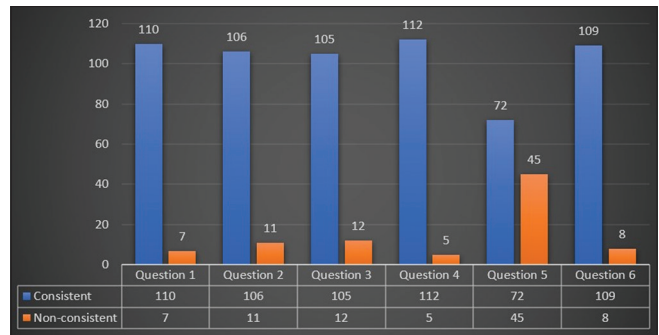


Figure 8: Chart and table showing the distribution of consistent and nonconsistent answers for each question in the quiz.

case individually [9,16]. We found that the latter is the best, and adopted it in our chosen guideline, as the decision depends on many variables including the patient him/herself and the burden on the equipment and personnel in the isolation facility.

Regarding the second question, almost all guidelines agreed upon certain parameters regarding usage of full personal protection equipment, paralysis of patient to avoid cough, and full apnea upon opening the trachea [6,9,13–17] while performing ST. Some guidelines advocated PT as an alternative to ST [6,15,16], but we discarded this option owing to the reasons mentioned before and to meet with our local expertise and resources.

After updating and distributing the new guidelines in a very short notice to the performing teams, evaluation of the understanding and implementation of these guidelines was necessary. A summative quiz was formulated to measure the extent of understanding and evaluate the implementation of the updated guidelines.

Results for the quiz were encouraging. Overall, 73.5% achieved score above 80%, with 35% achieving full mark. Regarding individual questions, the question with most consistent answers was no. 4 (95.7%). The consistent answer to this question was statement ‘c’ (Fig. 6), which mentioned a condemned practice in both old and new guidelines which should be excepted. This reflected the awareness of the participants about what has changed and what has not in the new updates. However, the question with the least consistent answers was no. 5 (61.5%); the consistent answer to this question was statement ‘b’ (Fig. 6), which discourage the use of diathermy during surgery to prevent viral transmission via vapor plumes.

By revising the answer of question 5 with a random sample, many have stated that they often had to use diathermy either mono or bipolar to control troublesome wound oozing that was incontrollable by compression or ligation. They referred to the anticoagulation therapy given to many patients as a part of their treatment protocol in the isolation facilities. The ones who gave nonconsistent answers in the sample recorded their awareness with the new guidelines regarding diathermy use, but they preferred to give answer from the ground, with the actual performance done.

CONCLUSION

The novel guidelines are well understood and applicable. Remarks about diathermy use should be taken in consideration. A proposed addition to guidelines is to use low-power diathermy under the umbrella of powerful suction to eliminate vapor plumes as much as possible. Continuous assessment of these guidelines is needed as the pandemic goes on altering its manner and our strategies along with it.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Grasselli G, Zangrillo A, Zanella A, Antonelli M, Cabrini L, Castelli A, *et al.* Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy region, Italy. *JAMA* 2020; 323:1574–1581.
- Yang X, Yu Y, Xu J, Shu H, Xia J, Liu H, *et al.* Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med* 2020; 8:475–481.
- Bhatraju PK, Ghassemieh BJ, Nichols M, Kim R, Jerome KR, Nalla AK, *et al.* Covid-19 in critically ill patients in the Seattle region – case series. *N Engl J Med* 2020; 382:2012–2022.
- Griffiths J, Barber VS, Morgan L, Young JD. Systematic review and meta-analysis of studies of the timing of tracheostomy in adult patients undergoing artificial ventilation. *BMJ* 2005; 330:1243.
- Huang CS, Chen PT, Cheng SH, Chen CK, Hsu PK, Hsieh CC, Shih CC, Hsu WH. Relative contraindications for percutaneous tracheostomy: from the surgeons' perspective. *Surg Today* 2014; 44:107–114.
- Tay JK, Khoo ML, Loh WS. Surgical considerations for tracheostomy during the COVID-19 pandemic: lessons learned from the severe acute respiratory syndrome outbreak. *JAMA Otolaryngol Head Neck Surg* 2020; 2020:31.
- Chee VW, Khoo ML, Lee SF, Lai YC, Chin NM. Infection control measures for operative procedures in severe acute respiratory syndrome-related patients. *Anesthesiology* 2004; 100:1394–1398.
- Webdesign I. Are assessments formative or summative? *Onlineassessmenttool.com* [Internet]. *Onlineassessmenttool.com*. 2020. Available from: <https://www.onlineassessmenttool.com/knowledge-center/assessment-knowledge-center/are-quizzes-formative-or-summative/item10638>. [Last Accessed 16 April 2020].
- Jacob T. [Internet]. *Tracheostomy.org.uk*. 2020. Available from: http://www.tracheostomy.org.uk/storage/files/ENT_UK%20COVID%20tracheostomy%20guidance_compressed.pdf. [Last Accessed 2 March 2020].
- Wei WI, Tuen HH, Ng RW, Lam LK. Safe tracheostomy for patients with severe acute respiratory syndrome. *Laryngoscope* 2003; 113:1777–1779.
- Ahmed N, Hare GM, Merkle J, Devlin R, Baker A. Open tracheostomy in a suspect severe acute respiratory syndrome (SARS) patient: brief technical communication. *Can J Surg* 2005; 48:68–71.
- Kwan A, Fok WG, Law KI, Lam SH. Tracheostomy in a patient with severe acute respiratory syndrome. *Br J Anaesth* 2004; 92:280–282.
- Sommer DD, Engels PT, Weitzel EK, Khalili S, Corsten M, Tewfik MA, *et al.* Recommendations from the CSO-HNS taskforce on performance of tracheotomy during the COVID-19 pandemic. *J Otolaryngol Head Neck Surg* 2020; 49:1–4.
- Michetti CP, Burlew CC, Bulger EM, Davis KA, Spain DA. Performing tracheostomy during the Covid-19 pandemic: guidance and recommendations from the Critical Care and Acute Care Surgery Committees of the American Association for the Surgery of Trauma. *Trauma Surg Acute Care Open* 2020; 5:e000482.
- Takhar A, Walker A, Tricklebank S, Wyncoll D, Hart N, Jacob T, *et al.* Recommendation of a practical guideline for safe tracheostomy during the COVID-19 pandemic. *Eur Arch Otorhinolaryngol* 2020; 277:2173–2184.
- Givi B, Schiff BA, Chinn SB, Clayburgh D, Iyer NG, Jalisi S, *et al.* Safety recommendations for evaluation and surgery of the head and neck during the COVID-19 pandemic. *JAMA Otolaryngol Head Neck Surg* 2020; 2020:31.
- Heyd CP, Desiato VM, Nguyen SA, O'Rourke AK, Clemmens CS, Awad MI, *et al.* Tracheostomy protocols during COVID-19 pandemic. *Head Neck* 2020; 24:1297–1302.