ABSTRACT

The safety of healthcare workers is a priority for public health protection. This is the basic principle we teach apprentices in paramedics, nursing and medicine. Only a safe specialist can help those in need. The COVID-19 pandemic suddenly appeared and resulted in more attention being paid to the possibility of droplet transmission. Until now, medical staff only paid attention to blood-borne and contact infections, and the air-borne route was underestimated. Current painful experiences raised by SARS-CoV-2 require us to verify the current procedures performance and introduce the principles of safe for the staff to perform endotracheal intubation with appropriate protection measures. Healthcare workers should use barrier surgical caps, goggles or face shield, FFP3 mask, protective gowns, double gloves and utilize proper hand washing technique. Additionally, some protective barriers might be used to minimize aerosol dispersion during endotracheal intubation.

KEY WORDS: COVID-19, coronavirus, SARS-CoV-2, intubation, aerosol, risk, safety.
INTRODUCTION

The current COVID-19 epidemic has spread throughout the world and has shaken the healthcare system in many countries [1]. At the same time, in the first days and weeks we did not have adequate knowledge as how to properly deal with new epidemiological threats [2]. Fortunately, the prompt development of communication that has taken place in recent decades has enabled scientists to quickly exchange experiences and learn new procedures to ensure workers safety. The endotracheal intubation procedure is treated as a standard procedure performed in patients in life-threatening issues and during surgery [3, 4].

The universality of this procedure meant that those performing intubation approached this procedure negligently and without appropriate security measures. Current experience with the SARS-CoV-2 epidemic has led to a greater understanding and putting an emphasis on the role of airborne drip infections [2, 5]. This made medical staff aware of the need to take care not only of contact and blood-borne infections against which we protect ourselves with gloves and aprons, but also of the airway [3, 4, 6]. Ultimately, it is necessary to isolate the aerosol environment generated during intubation from the respiratory tract of personnel. In addition, care should be taken to minimize contact infections, hence the need to limit the number of people involved in the procedure, disinfection of equipment and devices and the widespread use of disposable equipment. It should be understood that the aerosol formed during intubation can fill the room in which the patient stays and stay in the air for several minutes, constituting potential infectious material within a few seconds [5-7]. The diameter of the aerosol droplets is below 5-10 μm, which means that typical surgical masks and non-woven aprons do not protect properly [1].

The intubation procedure is a procedure performed swiftly and promptly, often under the time pressure, hence it is generally believed that the use of appropriate protection measures falls to the background [3, 5]. Therefore, it becomes even more important to formulate practical principles for the use of protective measures. Then, continuous training of employees in this area cannot be overestimated [6-9]. The following paper is a set of rules and guidelines of various organizations responsible for occupational safety in healthcare while performing endotracheal intubation as an aerosol generating procedure.
METHODS

A review of the available literature discussing the influence of endotracheal intubations as an aerosol generating procedure on the safety of healthcare workers has been performed and conclusion were drawn for practical enhancements that need to be implemented in all critical care areas where intubation is performed.

GUIDELINES OF SCIENTIFIC SOCIETIES

1. The safety of medical workers is a top priority. One should take care of the appropriate protective measures long before the procedure is carried out. Adequate resources and appropriate training should be mobilized.

2. Acquaint the staff with the proper hand disinfection. Ensure adequate cleaning and disinfection times. Appropriate antiseptics must be available. A proper hand washing technique with cleaning of all surfaces of the hands is essential.

3. The nose and mouth must be protected with an FFP3 mask, which should be confirmed by a seal test. For this purpose, after putting on and adjusting the mask (mainly by pressing a metal strip over the nose), exhale the air rapidly. If there are no air leaks around the mask, this indicates a good fit of the mask.

4. Ensure the least number of personnel involved in the procedure. Other employees not involved in intubation must leave the room.

5. For quick intubation, the procedure should be performed by the most experienced team member.

6. The monitoring device, venous access, instruments, medication, respirator/ventilator and suction system must be checked before commencing the procedure.

7. Fiberoptic intubation increases an aerosol formation, especially in awake patients.

8. Use assist in a pressure on the larynx. If the intubation attempt is unsuccessful, ventilate the patient with low volumes.
9. Pre-oxygenating the patient with 100% oxygen for 5 minutes reduces the need for mechanical ventilation.

10. Make sure there is a suitable filter between the face mask and the ventilation system (optimally HEPA or ULPA).

11. Patient’s head might be isolated from the proceduralist by a plastic transparent shield/box, plastic tent or a foil drape.

12. Confirm the correct positioning of the endotracheal tube in the trachea during intubation.

13. Introduce mechanical ventilation through the tube and a filter, and stabilize the patient's breathing.

14. After the procedure, disinfect all equipment that has been used. Disposable devices should be discarded.

15. After removing the protective equipment (barrier apron or overalls, gloves, footwear, cap, mask), avoid touching your face and hair before you disinfect your hands.

16. Wear head protection. Protective caps and goggles or visors/faceshields are recommended.

The above set of guidelines are being continuously updated and information provided by relevant organizations should be followed, including the World Health Organization and Center for Disease Control and Prevention [9-13].

**CONCLUSIONS**

The safety of healthcare workers is a priority for public health protection. This is the basic principle we teach apprentices in paramedics, nursing and medicine. Only a safe specialist can help those in need. The COVID-19 pandemic suddenly appeared and resulted in more attention being paid to the possibility of droplet transmission. Until now, medical staff only paid attention to blood-borne and contact infections, and the air-borne route was underestimated. Current painful experiences raised by SARS-CoV-2 require us to verify the current procedures performance and introduce the principles of safe for the staff to perform endotracheal intubation with appropriate protection measures.
Disclosure statement

The authors did not report any potential conflict of interest.

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