The Role of Respiratory Therapist in Isolation Room

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Publication Date: 5th February, 2020

Abstract

Background: It is an occupational hazard for respiratory therapists (RTs) to be exposed during aerosol-generating procedures such as endotracheal intubation. RTs may serve as laryngoscopists or provide ventilation support and initiate mechanical ventilation, depending on the hospital.

Methodology: A fluorescent marker was sprayed by an atomizer using three different methods of endotracheal intubation. PPE alone, a polycarbonate intubating box, or a coronavirus flexible enclosure. A black light was used to check the laryngoscopist and the supporting RT for contamination with the fluorescent marker.

Results; Both the laryngoscopist and the RT were severely contaminated when only PPE was used. The laryngoscopist's contamination was only detectable on the gloves when using the intubating box; the gown and face shield remained uncontaminated.

Conclusions; Respiratory therapist emotions shifted dramatically throughout the COVID-19 pandemic. All of the Respiratory therapist have developed a self-copying style that has assisted them in improving their psychosocial behaviour in preparation for the pandemic. Frontline Respiratory therapist positive and negative emotions intertwined and coexisted during the outbreak.

Keywords: COVID-19, respiratory therapist, isolation room for COVID-19, RTs

1. Introduction

SARS-CoV-2 (severe acute respiratory syndrome coronavirus) emerged from China in 2019 and caused a pandemic.1 Data on the potential for aerosol-generating procedures to transmit SARS-CoV-2 to health care workers, specifically respiratory therapists (RTs), is accumulating, but it is still insufficient. SARS-CoV-2 remained viable in aerosols generated during an experiment for 3 hours and remained stable on certain surfaces (e.g., plastics and stainless steel) for up to 72 hours after application to these surfaces.[1]

It is an occupational hazard for respiratory therapists (RTs) to be exposed during aerosol-generating procedures such as endotracheal intubation. RTs may serve as laryngoscopists or provide ventilation support and initiate mechanical ventilation, depending on the hospital. [2]

Bag-valve-mask ventilation, noninvasive ventilation, endotracheal intubation, bronchoscopy, cardiopulmonary resuscitation, and tracheostomy are examples of aerosol-generating procedures that have the potential for virus transmission to health care workers during the procedure. These high-risk procedures are frequently performed in critical care units with RTs participating as laryngoscopists or assisting with airway management and mechanical ventilation.[3]

2. Literature review

Since late 2019, healthcare professionals around the world have been dealing with the health needs of people who have contracted the novel infectious disease Coronavirus (COVID-19). Aerosols, which are the primary

source of infection through close person-to-person contact and contact with a contaminated surface, can transmit the infection. This disease can be fatal for certain groups of people, including the elderly and those with underlying diseases. There is no cure for this rapidly fatal disease.[4]

All intensivists must be able to manage ventilation. Understanding how to use a ventilator correctly takes time to learn, and knowing how to increase oxygenation levels appropriately becomes an art as well as a science. This is one of many instances where tele-ICU assistance can make a significant difference. A critical care specialist with extensive training and experience can virtually enter the room with a bedside nurse, respiratory therapist (RT), or provider and walk them through various modes and methods of ventilation, providing real-time support while assessing the patient's response to vent changes. [5]

Staff who had cared for COVID-19 patients went about their normal clinical duties while wearing a surgical mask and monitoring themselves for fever and respiratory symptoms. If an employee wore insufficient personal protective equipment (PPE) during close contact, the employee was taken off duty while an infectious diseases team assessed the risk of transmission and planned subsequent management. All staff members' temperatures were taken twice daily with hospital-issued oral digital thermometers and entered into electronic records that were monitored by administrative personnel. Web-based forms were developed to facilitate entry via personal smartphones. Employees with a fever or respiratory symptoms were screened at the staff clinic.[6]

Patients can be assigned to a tele-ICU Respiratory Therapist (RT) after being placed on a ventilator. The RT safely performs virtual rounds using high-definition audio/visual equipment, gathering information and providing a constant and clear flow of that information to ensure appropriate patient vent management with minimal virus exposure for bedside clinicians.[7]

When confronted with the realities of COVID-19 patient isolation and PPE requirements, code leadership by a tele-ICU intensivist allowed the number of staff responding on-site to be reduced to only essential personnel. The teleintensivist adds another set of eyes to the bedside clinicians as well as a clinician who is removed from the inherent chaos of the situation. During this critical time, the expertise and leadership of an Intensivist can be invaluable.

Hand contact on a contaminated surface, followed by touching the mouth, nose, or eyes, transmits the virus to another person. Infected aerosol particles created during a sneeze or cough can survive in the air for up to three hours.5 These SARS-CoV-2 airborne particles can then be inhaled by another person or land on the mucosal membranes of the eyes.[8]

Two goals should guide anaesthesia planning: patient safety and infection prevention. Infection prevention entails minimising aerosol-generating procedures (for example, airway manipulation, face mask ventilation, open airway suctioning, and patient coughing). General anaesthesia is preferable to regional anaesthesia. Awake intubation should be avoided because both patient coughing and atomized local anaesthetic can cause virus aerosolization.[9]

3. Methodology

simulated patient with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection in an ICU setting requiring endotracheal intubation involving a laryngoscopist, a nurse, and an RT supporting the laryngoscopist. All participants wore appropriate personal protective equipment (PPE). A fluorescent marker was sprayed by an atomizer during the procedure using 3 different methods for endotracheal intubation. The 3 techniques included PPE alone, a polycarbonate intubating box, or a coronavirus flexible enclosure, which consisted of a Mayo stand with plastic covering. The laryngoscopist and the supporting RT were assessed with a black light for contamination with the fluorescent marker.[10]

Virus transmission to medical personnel can occur through direct, indirect, or close contact with patients via fluids such as saliva or respiratory secretions. Contact, droplet, airborne caused by droplet nuclei (aerosols),

and fomites entailing contact with a contaminated surface or object are all possible modes of SARS-CoV-2 transmission to health care workers performing or assisting with a procedure involving infected airway secretions such as endotracheal intubation.[11]

Preventing virus transmission from patients to health care workers, who can then infect other members of the care team, remains an important strategy for reducing or preventing secondary virus transmission and thus disease-related morbidity and mortality, as well as preventing shortages of medical manpower and expertise needed to care for these critically ill patients.[12]

The mannequin was positioned in the ICU bed with the head of bed elevated to approximately 20° and the bed height as low as possible, as would be typical for an ICU patient, during the simulation exercise examining the effects of using no additional protective equipment beyond the wearable PPE to shield the laryngoscopist from the patient. The Glo Germ delivery began when the mannequin was activated, at which point the care team approached the patient bed and prepared the intubation equipment for use. The laryngoscopist and the assisting RT provided supplemental oxygen to the patient via bag-valve-mask ventilation while the ICU nurse prepared the equipment.[13]

4. Results

Both the laryngoscopist and the RT were severely contaminated when only PPE was used. The laryngoscopist's contamination was only detectable on the gloves when using the intubating box; the gown and face shield remained uncontaminated; the RT was still grossly contaminated on the gloves, gown, neck, and face shield. Both the laryngoscopist and the RT were better protected when using the coronavirus flexible enclosure system, with contamination detected only on the laryngoscopist's and the RT's gloves.

For endotracheal intubation, an aerosol-generating procedure commonly performed in the ICU, we used the recommended PPE technique (ie, N95 mask, face shield, hat, impervious gown, gloves, and videolaryngoscopy). Traditional videolaryngoscopy with no other novel protective techniques resulted in the greatest exposure to both the laryngoscope and the assisting RT. The laryngoscopist's exposure was reduced by the intubation box, but not by the assisting RT.

The flexible coronavirus enclosure contaminated the care providers the least, and the contamination was limited to their gloves. In our simulation, the significant exposures of both the laryngoscopist and the RT visually demonstrated the vulnerability of the RT in either role during this representative aerosol-generating procedure. Furthermore, the findings suggest that not all provider-protective strategies are equally effective.

5. Discussion

The use of an intubation box, also known as an aerosol box, as a barrier during intubation has previously been described; this box is a transparent plastic cube designed to cover the patient's head and has two circular apertures through which the clinician can reach to perform intubation. The use of this box during endotracheal intubation in simulated environments limited contamination to the proceduralist, with the gloved hands and gowned forearms that entered the box displaying contamination as well as the interior of the box, this box allowed less contamination than laryngoscopy without its use, regardless of whether a direct or video-assisted technique was used.[14]

A comprehensive programme for the use of personal protective equipment (PPE) was implemented. Healthcare personnel were medically cleared and trained in the use of personal protective equipment (PPE). They were also taught how to clean, disinfect, store, and inspect their personal protective equipment for damage. [15]

Routine postoperative visits were discontinued and replaced with phone calls where possible to reduce staff movement around the hospital. Non-urgent preoperative assessment clinic visits have also been rescheduled. Patients with COVID-19 were not cared for by pregnant or immunocompromised staff.

A fitted, NIOSH-certified N95 respirator, eye protection (either goggles or full-face shield), cap, gown, and gloves are the minimum standard of PPE for any staff caring for a patient with confirmed/suspected COVID-19 infection.5 Double gloves should be considered, with the outer pair being changed when contaminated. Because transmission is still possible despite N95 protection, personnel involved in aerosol-generating procedures can wear a PAPR .[16]

6. Conclusions

Respiratory therapist emotions shifted dramatically throughout the COVID-19 pandemic. All of the Respiratory therapist have developed a self-copying style that has assisted them in improving their psychosocial behaviour in preparation for the pandemic. Frontline Respiratory therapist positive and negative emotions intertwined and coexisted during the outbreak. In the beginning, negative emotions predominated, while positive feelings emerged gradually. While caring for COVID-19 patients, self-coping methods and psychosocial development were important factors in Respiratory therapist mental health.[17]

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