American Society of Anesthesiologists®

Common Vignettes When Caring for ICU Patients with COVID-19

Clinical Vignette #1 – Emergency Intubation

A 77-year old man with diabetes, hypertension, COPD was admitted for management of presumed COVID-19 infection complicated by progressive respiratory failure. He requires immediate tracheal intubation due to progressive deterioration in his oxygen saturation.

Since the risk to both the patient and providers is extremely high, the intubation must be performed by the anesthesiologists with the greatest experience and skill in emergency airway management. To ensure rapid and successful intubation, a second anesthesia provider is required to be present.

The procedure includes the following requirements in addition to those required for other intubation procedures:

- Prior to performing the intubation, as is true for all intubations, the providers review the patient's medical history, anesthesia history, laboratory results, and formulate an anesthetic plan for securing the airway.
- Both anesthesia providers must **don personal protective equipment** consisting of hand washing, and application of gown, gloves, N95 mask, face shield, and head covering.
- Both providers obtain the necessary equipment and medications to accomplish the tracheal intubation, including **a special video laryngoscope and other equipment** to increase the likelihood of successful intubation on the first attempt.
- The **two anesthesia providers work alone** enter the patient's room to minimize exposure of other health care personnel during the high risk of exposure to aerosolized secretions.
- The two anesthesia providers administer high flow oxygen by mask, general anesthesia, and muscle paralysis; the video laryngoscope is inserted into the patient's mouth to visualize the vocal cords, and pass a **larger than normal tracheal tube** into the larynx, to allow for adequate air exchange and suctioning of secretions.
- The anesthesia providers connect the tracheal tube to a ventilator, suction the airway, adjust the ventilator settings to optimize oxygenation and **ensure that there are no leaks in the system that would put others at risk of exposure to secretions**.
- The two anesthesia providers must carefully **doff their personal protective equipment** to avoid contaminating themselves as they remove their gown, gloves, face shield, head covering, and shoe covers, carefully washing their hands with the removal of each item they touch.

Total time = 60 minutes

Clinical Vignette #2 – Anesthetic Management for COVID Patient Requiring Surgery

An 80-year old man with diabetes, renal failure (on dialysis through a percutaneous catheter), hypertension, mild heart failure, and respiratory failure has required mechanical ventilation for the past two weeks due to COVID-19 infection. Because he will require long term mechanical ventilation and support in the ICU setting, he now requires tracheostomy and creation of an arterial-venous fistula for longer term dialysis.

To accomplish the surgical procedures, the anesthesia providers must take extra precautions and modify the anesthetic plan to ensure safety for the patient and all health care personnel:

- The procedures must be performed in the operating room, rather than the ICU to minimize risk to all providers and optimize patient safety.

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- **Two anesthesia providers are required** to facilitate transport of the patient to and from the operating room and completion of the procedures.
- The patient's medical history, anesthesia history, laboratory results are reviewed; the anesthesia providers discuss the patient's status, risks and **recent course of care with the ICU physicians, nurses and respiratory therapists**. They formulate a plan and prepare for transport of the patient
- The anesthesia providers don personal protective equipment (PPE) including hand washing and application of gown, gloves, N95 mask, face shield, and head covering.
- After donning PPE, the **2 anesthesia providers enter the patient's room alone** to minimize risk to other providers. Additional airway management equipment is taken into the room to facilitate reintubation in case the airway becomes dislodged during transport.
- Prior to initiating the transport, the **anesthesia providers assess the patient's pain and level of sedation and/or paralysis** to determine if additional medications are required to facilitate safe transport.
- Transport monitor is brought into the room to ensure ongoing monitoring of blood pressure, and heart rate during transport.
- The **route of transport** from the ICU to the operating room is determined to minimize exposure of other health care personnel or patients during the transport
- A **specific operating room** is used for surgical procedures for COVID-infected patients. The operating room has been specifically prepared with extensive terminal cleaning between cases, minimal equipment and supplies, and with restricted access.
- Preparation of the operating room prior to transport requires **sufficient time to reduce likelihood of persistent aerosolization of secretions** and provide terminal cleaning between cases. All of the anesthesia monitors and gas machine have been covered with a plastic drape to minimize secretions contaminating the surfaces directly. Special care must be taken to secure medications and equipment without contamination by those coming into direct contact with COVID patients and their secretions.
- The two anesthesia providers must **remain with the patient continuously** are not able to care for other patients or respond to other emergencies within the operating suite, because of the need for PPE while caring for this COVID patient.
- During the surgical procedure, the anesthesia providers support the patient's ventilation, oxygenation, blood pressure, and heart rate.
- After completion of both surgical procedures, the patient is returned to the ICU while continuing full support of oxygenation and blood pressure as well as providing additional support if there is any deterioration in the patient's condition.
- Once in the intensive care unit, the anesthesia providers connect the patient to the intensive care unit monitors, **stabilize the patient's ventilation and vital signs.** They report the patient's course and the patient's response to the anesthetic intervention to the intensive care unit physicians.
- The two anesthesia providers must carefully **doff the PPE** to avoid contaminating themselves as they remove their gown, gloves, face shield, head covering, and shoe covers, carefully washing their hands with the removal of each item they touch.

Total time for transporting the patient back to the ICU and for transfer of care = 60 minutes

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Clinical Vignette #3 – Prone Positioning of the Patient with Corona-19

A 65-year old, 120-kg man with diabetes, asthma, hypertension, and respiratory failure has required mechanical ventilation for the past two days due to COVID-19 infection. His respiratory status continues to deteriorate despite maximal mechanical support, respiratory treatments, and mechanical chest physical therapy. Despite all of these efforts, the team is unable to provide acceptable blood oxygen levels for his vital organs.

As a last effort before placing the patient on extracorporeal membrane oxygenation, the critical care physicians make the decision to turn the patient prone as a maneuver to better match blood flow with the better ventilated areas in his anterior chest. To accomplish this prone positioning, the critical care providers must take extra precautions to ensure safety for the patient and all health care personnel:

- Prior to proning a patient, the patient's **physicians must confirm that the patient is currently stable** enough to withstand the potential perturbations that can occur with turning from supine to prone. Although the patient is in extremis, they still must be optimized for such a procedure.
- Given the repeated fluctuations in COVID patient stability and the heightened possibility for them to decompensate during this maneuver, this **medical decision to prone the patient** for more optimal ventilation and gas exchange is very challenging.
- Specifically, **an anesthesiologist must evaluate the patient's airway to anticipate its difficulty**, and how to manage it properly if issues with it were to occur during patient position changes.
- **Several providers (often times 8) are required** to turn the patient from a supine position to prone position.
- All providers who enter the room, including **physicians, nurses, respiratory therapists, and nursing assistants** must **don personal protective equipment (PPE)** including hand washing and application of gown, gloves, N95 mask, face shield, and head covering.
- **After donning PPE, the providers all enter the patient's room, at which time they give their undivided attention to this patient and are not able to care for other patients within the unit.**
- **Airway management equipment and prepared induction medications are also brought into the room** in case the tracheal tube becomes dislodged as the patient is turned and repositioned. Dislodgement of the tracheal tube is not always obvious and would require an anesthesiologist's expertise to diagnosis and then emergently treat and manage reintubation.
- Extreme caution is taken to ensure that the **central line through which life-sustaining medications are delivered is not dislodged**, as well as the arterial line is not dislodged, that would lead to unintentional arterial bleeding and loss of invasive monitoring capability during this high risk position change.
- **All providers must touch the patient** and exert themselves to physically turn the patient prone in a coordinated teamwork effort.
- All anterior body prominences and pressure points must be padded with adhesive coverings to **avoid injury to soft tissue areas of the eyes, ears, and nerves** supplying his extremities as well as avoid pressure injuries on bony prominences.
- A combination of purposely placed pillows, foam pads, and face cushion are secured in place via 45 degree turns of the patient both left and right, passing 3 layers of tightly rolled sheets under and above the patient, while the anesthesiologist protects the safety of the airway. These movements also put the tracheal tube at risk of migration resulting in extubation or movement deeper into the trachea interfering with oxygenaton.

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- When turning the patient, the coordination is provided by the anesthesiologist that is ensuring the endotracheal tube remains in proper position. The turning requires vigilance to ensure the head and neck remain in neutral position with a stable grip to prevent injury or extubation. All lines must also be continuously monitored to ensure that they remain in proper position.
- After turning the patient, **ventilation and hemodymanics are carefully reevaluated** and adjustments are made to ensure patient safety.
- All providers must **doff their PPE** to avoid contaminating themselves as they remove their gown, gloves, face shield, head covering, and shoe covers, carefully washing their hands with the removal of each item they touch.
- For patients who require prone position, the timing of the changes in position and duration of prone positioning are determined by patient condition and local institutional guidelines. With each change in position to prone and supine positioning, all of the above precautions must be performed again to ensure patient safety.

Total time for turning the patient between prone or supine positioning is 45 minutes, unless the patient's condition becomes unstable or any dislodging of the airway and intravascular catheters have not been dislodged. If so, the time to complete each positioning change is as high as 90 minutes.

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