

AIRWAY MANGEMENT NARRATIVE:

The I.C. Cordes College of Airway Knowledge

Correspondence Course: COVID-19 [source: Dr. Carleton].

This will seem like a random statement, but please bear with me: I keep bees. The site where I keep the bees is on the grounds of a Franciscan convent north of town. The hive sits next to the convent cemetery, where generations of Sisters lay in rest. I sometimes walk through the cemetery in moments of contemplation and pay respect to the generations of self-sacrificing women that lie there. Highest on the gentle slope of the plot there is a row of headstones that share a commonality – the Sisters they identify were young when they died, and their deaths occurred in 1918 and 1919. Why? These were the years of the Spanish Influenza, a scourge that killed millions in the wake of the First World War and struck these Sisters down as they gave service to the poor and ill.

We also are charged with the care of the poor and ill. We also face an epidemic viral illness that will have a heavy impact on our lives in and out of the emergency department. While COVID-19 is much less dangerous than the Spanish Flu, it is a worthy goal to take every reasonable measure to avoid contracting it both for our health, that of our families, and for maintaining our workforce to do our essential work.

The EMcrit article recently distributed through the departmental email warrants careful reading. The article points out that the novel coronavirus largely spreads through droplets. However, several situations are described where the virus also spreads through aerosols, a much more daunting mode to defend against. These situations include: intubation, bag-mask ventilation, and respiratory endoscopy.

Upping our game regarding personal protection against such spread is critical. Personal protection is a habit, so start getting into the habit NOW. Hand washing, appropriate use of masks, gloves, eye protection and gowns, shoe covers, keeping your hands away from your face, not having food and drink in patient care areas – all are essential. How many of us wear our scrubs home? Our work shoes? The non-protective, personal clothing we commonly wear at work? This has to stop if we are to avoid being quarantined, and thus useless, as a workforce. I will leave any specific recommendations on this front to the Ops Team. Purely on the basis of statistics and the case-fatality rate of the infection, somebody in our extended work family may die of this. Think of the Sisters in that cemetery. We can do more to avoid adding another self-sacrificing soul to their ranks.

This brings us to the airway portion of this missive. See? I told you there was an I.C. Cordes connection...

We have largely transitioned to disposable blades and endoscopes – a good thing from an infection-control standpoint. But the camera heads, cables, monitors, buttons, knobs, handles, surfaces, drawers, baskets, etc., etc., associated with these tools are in constant danger of being contaminated with droplets, aerosols and fomites during airway procedures. With gloved hands we touch the patient's face, then touch all of these objects. Later, we inadvertently touch these same objects bare-handed. We set the endoscope or blade on the drapes or linens covering the patient then later brush a sleeve up against these same drapes and linens, then put our elbows on a desk, then our hands, then later touch our faces. If patient secretions were paint, our clothing, shoes, keyboards, and all of our airway gear would be colorfully speckled by the end of each shift.

So, what to do? Control what we can. Personal protective gear, droplet or airborne precautions, hand hygiene – all are under our control and should be, or should become, second nature. Admit it, though – we currently do not do this well. We have to change how we handle our airway equipment.

For any patient with any infectious potential, do the following:

- Airborne precautions.
- Double glove: After completing the intubation and bagging/disposing of the blade or scope, but before touching anything else, remove the outer gloves to avoid transferring contaminants to other objects in the room.
- For the blades that come in peel-packs, keep the blade on the peel-pack before use, and put it back on the peel-pack after use until it can be bagged and taken to processing (reusable), or bagged and discarded (disposable).
- Toss out any disposable components as soon as possible after use. Never set them naked on a countertop. Put them in a bag, seal it, and YOU throw them away...don't pass it, and the potential for contamination, off to someone else. If you put the object in the bag wearing the gloves you wore to intubate the patient, the bag is contaminated. See above section on double gloving.
- When an endoscope is hanging from the claw on the tower, the wand may touch the cables for the camera and/or light source. Avoid this, both before and after intubation.
- After each use, wipe the buttons on the C-Mac or aScope monitors, and on the on/off switches of the tower, the Xenon light source, and the video processor. Wipes that are effective against the novel coronavirus and carry the manufacturer's blessing use hypochlorite bleach, 0.1% to 1.0%. The equipment should remain wet after wiping for two minutes to ensure disinfection. Our currently stocked Clorox wipes (blue-capped containers) contain 0.55% hypochlorite bleach – perfect! The green-capped Clorox wipes contain hydrogen peroxide. While effective for disinfection, they are not approved by Storz for use on their equipment. But...these are currently what is in use by Respiratory Therapy throughout the hospital on all of the intubation gear, and the hospital Infection Control office also endorses their use for surface decontamination. But if you have blue-capped wipes, use these preferentially.
- After each use, wipe the cables of the S-imager, older C-Mac connector, Berci-Kaplan camera head, fiberoptic light sources, King Vision monitor, etc., with the wipes.
- After each use, wipe the power cable for the airway tower or C-mac/aScope monitor if you touched them proximate to the procedure.
- If you opened a drawer on the tower after touching the patient, wipe the drawer-pull.

And so on, and so on, and so on...

It may be recommended that we “designate the most experienced...professional available to perform intubation, if possible” and “avoid trainee intubations of sick patients during this time.” We are a training program, and trainees can apply airborne precautions just like everyone else. I suspect the reasoning behind this is to minimize attempts, and the possibility of aerosolization. We will likely have only the attending and R-2 as the physician component of the intubation team for suspected COVID-19 patients. Which person is primary and which assists is still up in the air. In any case, strive for excellence (DASH-1A). Also, used VL for suspected COVID-19 patients to minimize attempts and the potential for aerosol spread of infection.

It may be recommended that we “avoid awake [endoscopic] intubation unless specifically indicated”...it makes patients cough, after all. Also, atomized local may aerosolize virus with coughing. We now use these techniques only when specifically indicated, so continue to do what’s best for the patient.

Bagging aerosolizes viruses. Use low tidal volumes and minimize bagging time, if possible, to mitigate this. Place a high efficiency, hydrophobic filter between the mask and the resuscitation bag when bagging and always have the white, plastic filter on the exhalation valve of the bag.

It is recommended that we “ensure placement of a high efficiency hydrophobic filter between the facemask and breathing circuit or in between facemask and reservoir bag”. These filters are kept in a bin on the south wall of SRU-1 at the far left. Respiratory knows where they are, and currently uses them between the patient and the vent or BiPAP circuit.

Preoxygenation or apneic oxygenation with HFNC, while a terrific modality, is not recommended – if the patient opens their mouth, it flushes aerosolized virus into the room. Regular apneic oxygenation with a nasal cannula may also do this, so consider preoxygenating with a BVM by tidal breathing, filtered as discussed above, with a PEEP valve and a tight mask seal, and apneic oxygenation by this same method.

If the patient required BiPAP, use a ventilator to deliver pressure support and PEEP emulating BiPAP, rather than using the standard Bi-level machine. The Bi-Level machine has a filter between the patient and the machine, but exhausts exhaled patient gases through an unfiltered grating on the side of the machine, potentially spreading infectious material.

Post-intubation management should employ a lung protective strategy (T.V. 6mL/kg, Pplat <30, SaO₂ 88% - 95%, pH > 7.25), and exhaled gas from the ventilator should be filtered. Talk to Respiratory Therapy to ensure this is happening.

The above recommendations stem from the following references:

Kamming, et al. Anaesthesia and SARS, Br J Anaesth 2003; 90: 715-718.

Wax, et al. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients, Can J Anesth 2019. <https://doi.org/10.1007/s12630-020-01591-x>

More recommendations will follow and the situation is evolving daily, but get this on your radar screen NOW. It doesn’t matter if you think that concern for the coronavirus is overstated, and that unreasoning panic is in the air. We have a standard of care to maintain, and until that standard is revoked, modified, or becomes untenable due to personnel attrition, we must maintain it.

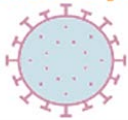
3 STEPS

TO INTUBATE SAFELY WITH SUSPECTED COVID-19

Airway Management strategy that protects both patients and staff.

Minimize
Aerosolization
of Virus

Prevent Spread



- Early Tracheal Intubation instead of Bi-PAP or HFNO.
- Intubate in a negative pressure room and avoid nebulization.
- HEPA filters for positive pressure ventilation (PPV).
- Rapid sequence intubation for apnea and lack of cough. Use higher dose paralytics.
- PPV, high-flow oxygen and manual bagging only if clinically necessary.
- Immediate endotracheal tube cuff inflation before PPV.
- Limit ventilator disconnects. If needed, do so at end-expiration.

Maximize First
Attempt Success

Patient Safety



- Use a checklist and closed-loop communication.
- Most experienced clinician should intubate.
- Use video laryngoscopy (VL) if available.
- Have all necessary equipment at the bedside.
- Robust preoxygenation with 100% O2 for 3-5 min.
- Early placement of a supraglottic airway instead of manual bagging for rescue oxygenation.
- Second clinician with personal protective equipment (PPE) outside of the room for immediate assistance.

Reduce Personnel
Exposure

Limit Contamination



- Enhanced respiratory PPE with N95 mask or PAPR and observer-ensure donning compliance.
- Use double-glove technique.
- Use VL for indirect tracheal intubation if available.
- Limit to a 3-person intubation team when possible (RN, RT and Intubator).
- Placed soiled equipment in double sealed biohazard bags.
- Proper coached doffing procedure with hand hygiene.