


The Office of Continuing Medical Education & Professional Development

Safe Intubation and Ventilation in the time of COVID in Rural

Rural Videoconference 2019-2020

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Paul Parks
MD, FRCPC - Emerg




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Faculty/Presenter Disclosure

Faculty Dr. Paul Parks

Financial Affiliations


- Clinical Lecturer, University of Calgary
- Emerge Physician, AHS
- President of Section Emergency Medicine, AMA



Panelist Dr. Sean Spence
Intensivist and Internist, Chinook Regional Hospital

Moderator Dr. David Topps

- Professor, Family Medicine and Director, Rural CPD, Cumming School of Medicine, University of Calgary

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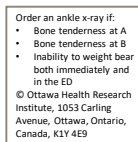
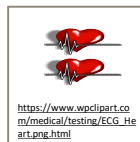
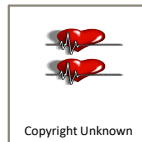
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Learning Objectives

- Identify strategies to ensure safe intubation in very ill patients when resources are limited
- Perform effective post intubation care to patients in rural areas in the time of COVID
- Apply ventilation strategies in rural areas in the time of COVID

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Overarching GOALS



- Provide AHS and Canadian resources
- Practical tips for you and your team
- Encourage Simulation and Practice
- Reinforce the Golden Rule

There is no emergency in a Pandemic

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Not going to talk about



- PPE
- COVID pathophysiology, diagnosis, management
- Assumption: Patient with low sats, URTI symptoms and in Alberta (i.e. COVID19 highly probable).

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Oxygenation and Temporizing



- Aim for 88-94%
- High FLOW NP 5-10L **AND** NRB 15L
 - Nothing humidified (increases aerosolization)
- Awake Repositioning
- *** CPAP / BiPap***
- May allow temporization and avoiding intubation and transfer to a higher level of care

Lower O2 okay – esp “Happy Hypoxemic”

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Stony Brook Medicine Resuscitation & Acute Critical Care



Q 2 hours, ask patient to switch between the following positions; bed adjustments will be required between positions:

1. Left Lateral Recumbent



2. Right Lateral Recumbent



3. Sitting Upright 60-90 degrees



4. Lying Prone in bed (If patient is on CPAP, ask LIPs if they still want to prone)



10-15 Minutes after each position change, check to make sure that Oxygen Saturation has not decreased. If it has, try another position.

Positions Changes to Counter Hypoxemia

If patient has a significant drop in Oxygen saturation, follow these steps:

1. Ensure the source of the patient's Oxygen is still hooked up to the wall and is properly placed on the patient (this is a common cause of desaturation)
2. Ask patient to move to a different position as above
3. If after 10 minutes, the patient's saturations have not improved to prior levels, speak with LIP about escalation of oxygen modality vs. trial of additional positions

Intubation Required?



- Back to BASICS – do what you know
- NP and NRB maximized – leave until ready
 - take time to prepare, team safety and min re-entry
- Leave Upright while preparing
- Most experienced provider – get help if you can

IO – if IV access is an issue
Dissociation? – slow ketamine 1mg/kg

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Intubation – when you're it




- Team = MD, Airway assist, clinical assist, support outside?
 - 2 people if very limited resources
- STOP – check PPE, PPE buddies
- Equipment and Plan BEFORE ENTERING

www.aimeairway.ca

COVID-19 AIRWAY CHECKLIST		
STOP BEFORE ENTERING ROOM		
SLOW DOWN CHECK PPE		
TEAM	EQUIPMENT	PLAN
<input type="checkbox"/> PPE Spotter <input type="checkbox"/> Primary team <input type="checkbox"/> MD: Intubator/Lead <input type="checkbox"/> Airway assistant* <input type="checkbox"/> Clinical assistant* <input type="checkbox"/> Support team <input type="checkbox"/> MD: Intubator assist + cardiac arrest lead <input type="checkbox"/> Airway assistant* <input type="checkbox"/> Review roles <small>*RT, Medic, Nurse</small>	<input type="checkbox"/> AIRWAY ASSIST KIT <input type="checkbox"/> INTUBATION KIT <input type="checkbox"/> Supplies from COVID CART <input type="checkbox"/> Two bougies <input type="checkbox"/> Towels/ramp for positioning <input type="checkbox"/> KIT DUMP Sheets <input type="checkbox"/> Video-laryngoscopy check <input type="checkbox"/> Ventilator + extra filter <input type="checkbox"/> IV equipment <input type="checkbox"/> Medications (w/flush): RSI (induction/paralytic) Pre-dosed vasopressor Post ETI sedation/analgesia	<input type="checkbox"/> SUMMARIZE PLAN <input type="checkbox"/> Preoxygenation <input type="checkbox"/> Plan A: MAC VL + BOUGIE <input type="checkbox"/> Plan B: Alternative <input type="checkbox"/> Plan C: Exit strategy <input type="checkbox"/> Plan D: Emergency strategy <input type="checkbox"/> Encountered difficulty <input type="checkbox"/> Cardiac arrest <input type="checkbox"/> Circuit disconnection ADDRESS QUESTIONS ?





Modified RSI, Meds, Video Laryngoscopy

Sux: 2mg/kg

- Simplify: RSI, Ketamine 1.5mg/kg + Rocuronium 1.5mg/kg
- Upright, apneic CPAP, NO ACTIVE BAGGING
- Glidascope or similar if available
- Bougie is an excellent assist

INTUBATION

PREOX

- ☐ NP 5-10LPM
- ☐ Filtered NRB 15LPM
- OR
- ☐ Filtered CPAP: BVM 15LPM w/PEEP 10cmH2O
- ☐ NP 5-10LPM or proximal inline 5-10LPM
- ☐ Ketamine 1mg/kg PRN if dissociation needed


RSI/DSI

3-5min / SATS >90% Minimize flow


MAY NOT OBTAIN

- ☐ Head up 25°/Sniff position
- ☐ Ketamine 1-1.5mg/kg (if not given in preox OR no longer dissociated)
- ☐ Rocuronium 1.5 mg/kg
- ☐ Apneic CPAP + OPA until laryngoscopy
- ☐ 50 second count
- ☐ Place tube (see algorithm)

ANTICIPATE DE SAT



Closed loop Communication



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Post-Intubation

- Cuff up before ventilation / viral filters
- OG before CXR
- Allow to run drier re fluids
- **RAAPID** – now that they are hooked up call for advice

Hypotension isn't common
Sedation protocols post intubation

POST INTUBATION

- ☐ Inflate cuff before ventilation
- ☐ Connect directly to ventilator w/viral filter
- ☐ Confirm tube placement by capnographic waveform - secure
- ☐ **Suction Required: Clamp tube; connect inline suction**
- ☐ **Hypotension: Rescue Pressor + infusion PRN**
Norepi, Epi, Phenylephrine
- ☐ **Initial Ventilator: Vt 6-8mL/kg if Driving pressure < 15, Pplat < 30**
Reassess and titrate as needed **PEEP 10-12, FiO2 1.0, RR 16**
- ☐ **Sedation-Analgesia: Ketamine/Propofol/Fentanyl**
Bolus doses should be available

CIRCUIT DISCONNECTION

Place finger over tube and attach filter

Exit one-by-one
Doff with a spotter

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Rural Ventilation Algorithm

Initial Ventilator Settings For: Normal Lungs*

- Mode: Volume Ventilation (CMV)
- FiO2 to maintain SpO2 > 90%
- Rate: 12
- Vt: 6-8 mL/kg
- I:E 1:3
- PEEP: 5-8
- Sensitivity/Flow Trigger: 2

Alarm Settings for Normal Lungs

- High Pressure: 40
- Low Pressure: 5
- Min Volume: Expected +/- 3 Liters
- Rate: 30
- Vt: Expected +/- 150 mLs
- Apnea Time: 20 seconds

* If intubating after a trial of BiPAP, you may choose to use some of the BiPAP settings for continuity.

1. Replace circuit filter with a HME
2. Use the Rural Ventilation Project Monitoring and Evaluation Sheet to chart parameters

Perform baseline assessment including CXR, ECG, ABG, inspection, auscultation, vitals, and SpO2.

Respiratory Disease Present?

Obstructive Lung Disease

- Mode: Volume Ventilation (CMV)
- FiO2 to maintain SpO2 > 90%
- Rate: 12
- Vt: 6-8 mL/kg
- I:E 1:3
- PEEP: 10-12
- Sensitivity/Flow Trigger: 2

Restrictive Lung Disease

- Mode: Volume Ventilation (CMV)
- FiO2 to maintain SpO2 > 90%
- Rate: 15
- Vt: 6-8 mL/kg
- I:E 1:3
- PEEP: 10-12
- Sensitivity/Flow Trigger: 2

Is the Clinical Status Stabilizing?

No

Consider:

- Sedation
- Suction Lower Airway
- Bronchodilators
- Adjust Inspiratory Time to optimize exhalation

Yes

Continue to reassess q4h. At 4 hours complete patient assessment including ABG must be done.

- Avoid oxygen toxicity by using the lowest FiO2 possible to maintain SpO2

THERAPY COMPLICATIONS

- Confusion, agitation (sedation required)
- Hypotension (regular monitoring essential)
- Gastric Insufflation (may require placement of an NG tube)
- Pneumothorax (regular vitals and auscultation, as appropriate)

Vent Settings

- Mode – Volume Ventilation (CMV)
- FiO2 – start at 100%, lower for SpO2 90-96%
- Rate: usually 16 or higher for COVID pts
- Vt = 4-8ml/kg
- I:E = 1:3
- PEEP = usually around 8

<https://insite.albertahealthservices.ca/main/assets/tms/ppc/tms-ppc-resp-algorithm-invasive-2019.pdf>


Can talk to an RT via RAAPID

DOFFING = High Risk!

- Risk to staff and rest of ED
- Take Your Time
- PPE Buddy
- Lots of hand washing steps

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Important to consider



- Mortality is very high in intubated COVID19 patients
 - Caution and team protection is essential
- Formal and Informal Sims
 - Go through the steps, it will surprise you what your team learns

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ILI / COVID-19 Airway Management Best Practice Considerations V3, March 2020

Preparation

1. PPE: Don full PPE including N95 respirator, goggles, face shield, gown and gloves. PPE application of PPE should be verified by an observer prior to patient contact
2. Early airway assessment for predictors of difficulty and consultation as necessary
3. Consider early, controlled intubation and avoid NIV, HHFO and other AGMP as appropriate
4. Minimize staff exposure:
 - a. Minimize personnel in the room as able
 - b. Negative pressure room with anteroom if available (or neutral pressure room with door closed)
 - c. Ensure HMEF is between the mask/ETT and BVM at all times
5. Intubation should ideally be performed by most experienced practitioner for first pass success
6. Prepare necessary equipment and drugs outside of room

Suggested Roles and Organization

Intubation Plan

- ✓ Optimize pre-oxygenation using nasal prongs 5L/min O₂ & tight fitting BVM with 15L O₂ and PEEP valve = 5 cm H₂O; reserving 2 person 2 handed BVM manual ventilation if non-invasive O₂ delivery is failing and SpO₂ < 70%
- ✓ Video laryngoscopy recommended as Plan A.
- ✓ Best pharmacotherapy determined by MRHP on case-by-case basis to minimize risk of cough and aerosol generation
- ✓ If no contraindications, Modified RSI (avoid coughing and facilitate first pass success)
 - o apneic oxygenation with 5L/min O₂
 - Use higher mg/kg dose of muscle relaxants to ensure rapid onset of optimal intubation conditions (Allow 1 minute for adequate muscle relaxation):
 - Rocuronium 1.2-1.6 mg/kg (IBW)
 - Succinylcholine 1.5-2 mg/kg (TBW)
 - Avoid ventilation during apneic period unless life threatening hypoxemia (SpO₂ < 70%)
- ✓ Wait until cuff up post-intubation to ventilate

Post-Intubation

- Confirm ETT position with ETCO₂ and CXR
- Closed suction system; avoid circuit disconnections and clamp ETT for planned disconnection
- Lung protective ventilation strategy (6-8 mL/kg Vt IBW; Pplat < 30 cm H₂O; Optimal PEEP)
- Strategies for failing gas exchange: deep sedation and paralysis; permissive hypercapnia; prone positioning
- Maintain Circuit & Contact Isolation & N95 mask as per IDSC

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Review and Practice Now

- <https://insite.albertahealthservices.ca/Main/assets/tls/ep/tls-ep-covid-19-respiratory-management-of-adult-patients.pdf#search=respiratory%20management%20of%20confirmed%20and%20suspected%20Covid%2019>

Lessons we learned by practicing



- Changing into full intubation PPE needs planning
 - Swap nurses, double gloves, N95 masks...
- IV and intubation supplies into a plastic container ready to go
- Anything that goes into the room becomes “dirty”
- PPE buddy system
- Doffing properly is really hard and requires practice
- Sims are NOT just about the passing a tube



Excellent Resources

- <https://criticalcarerechscn.com/>
- Has all AHS files and resources referenced in this talk
- <http://www.aimeairway.ca/>
- Excellent videos, resources, and check list from our Canadian Emergency airway experts
- https://site.cmg.io/scnresearch/ESICM_Webinar_Infographic-How_to_Ventilate_COVID-19.JPG