Airway Management in Critically Ill COVID-19 Patients

KATHERINE HELLER, MD
ASSISTANT PROFESSOR
UNIVERSITY OF WASHINGTON SCHOOL OF MEDICINE
DEPARTMENT OF ANESTHESIOLOGY
MEDICAL DIRECTOR: UWMC SICU
Disclosures

- (none)
• Staff safety
  o PPE
• Patient factors/ timing
• Adjuncts for oxygenation
• Intubation procedure
  o Preparation
  o Equipment/technique
  o Unusual situations
    ▸ Difficult airways
    ▸ Tracheostomy
    ▸ Emergencies
Opening Questions

- Please navigate to
  - pollev.com/katherinehel603
I have been or will be responsible for the airway management of known or suspected COVID-19 positive patients

yes

no
I have been or will be responsible for the airway management of known or suspected COVID-19 positive patients

- yes
- no
At my institution, known or suspected COVID-19 positive intubations are performed by:

- The ICU providers
- Anesthesiology providers
- A specialized or designated COVID-19 airway team
- Other
At my institution, most known or suspected COVID-19 positive intubations are performed with:

- videolaryngoscopy
- direct laryngoscopy
- no specific practice pattern
Priorities

- Priority #1: Staff Safety
Considerations for Staff

- **Procedural planning**
  - Appropriate PPE takes time
    - Avoid emergencies when able
    - **Consider rounding (remotely?) on known COVID patients**
Any airway management is an Aerosol Generating Procedure (AGP)
- Need respirator level protections
- airborne + contact/droplet
N95 vs PAPR

- N95
  - Pro
    - Easy to don
    - Fast
    - Allow use of stethoscope
    - More readily available
  - Con
    - Allows contamination of face and neck
    - Less comfortable
    - May not fit everyone
    - Fit can change

- PAPR
  - Pro
    - Comfortable
    - Protect face, neck, head
    - Reusable
  - Con
    - Require power source
    - Need assistance to don and doff
    - Noisy
Infection Control

- Choose what work for you and your institution
- More important to have clear protocols and expectations
- Minimize in room staff
- Have equipment easily available
- Filter in line on circuit
Infection control

- **Barrier Devices**
  - Not recommended
  - Additional encumbrance to intubation without proven benefit
    - Not a replacement for PPE
  - May actually increase risk [11]
    - Failed airway
    - Breach of PPE
  - FDA revoked EUA for barrier devices in 8/2020
Priorities

- Priority #2: Getting patient oxygen
When to Intubate

Harm from early intubation/mechanical ventilation

Harm from crash intubation
Considerations for the Patient

- Early studies in NY showed higher mortality with later intubation
  - Almost 70% mortality in mechanically ventilated patients overall
- More recently, no difference in mortality with later intubation
    - 75% required mechanical ventilation
    - 109 received HFNC initially
      - 71.6% of HFNC patients progressed to intubation
    - Time between ICU admit and intubation did not correlate to mortality
    - HFNC did not correlate with increased mortality
  - Overall mortality ~30%
  - Additional reviews also show no association between timing of intubation and mortality [3,4]
High flow and BiPAP

- **What to do?**
  - Evidence is lacking
- **Most larger institutions have moved to using HFNC and BiPAP in selected cases**
  - Ideally should occur in a negative pressure room
- **If they are already in use: continue!**
What do we know?

- Hypoxemia extremely common during intubation
  - >70% in one study [6]
- Apneic oxygenation acceptable
  - Consider bag-mask ventilation?
- Speed matters
- RSI currently recommended by most major societies
  - Do what makes sense in the clinical situation
Priorities

- Priority #3: have a plan (and a backup plan)
Intubation Preparation

- Don’t forget the basics
  - Good IV access, free flowing IV
    - Sedative and vasopressor drips available
  - Suction
  - Standard monitors
    - ECG
    - BP cuff cycling q3-5min
    - Pulse ox (audible)
  - ETCO₂
- Checklist
Intubation Preparation

- **Equipment**
  - Videolaryngoscope may aid in:
    - First pass success
    - Maintaining some degree of physical distance

- **Operator**
  - Able to function independently or with minimal assistance
  - Consider intubation/drug “packs”
    - Equipment tray
    - Drug tray
Intubation Preparation

- **Assign Roles**
- **Backup Plan**
  - The more difficult the airway, the more equipment gets opened
  - Trying to minimize apneic time whenever possible
Tips

- Focus on pre-induction positioning
  - “sniffing position”
    - Folded blankets > pillows
  - Ramp or reverse Trendelenburg for obese patients

Intubation Procedure

• Induction
  ○ Drug selection
    § Etomidate vs propofol vs ketamine
      ○ If using propofol, dramatically reduce dose
    § Rocuronium vs succinylcholine
      ○ Have long acting neuromuscular blockade available in either case

• Consider bundling care
  ○ Place lines
  ○ Proning?
Complications

- Hypoxemia
- Hypotension
- Pneumothorax/pneumomediastinum
  - Consider POCUS
- Cardiac arrest
- Worsening VQ match
  - Need for paralysis and proning
Difficult Airways

- Adjust preparation based on perceived difficulty
  - Anesthetic/airway history
  - Mallampati score
  - Hx OSA
  - Thyromental distance
  - Mouth opening
- Fiberoptic generally not recommended
- Tracheostomy is possible
  - Protocols available
  - Treat as a COVID-19 (+) OR case
Adjuncts

- **Bougie with preloaded ET tube**
  - Pro: may increase first pass success
  - Con: may require assistance from second operator

- **LMA**
  - Pro: may improve seal if mask ventilation proves necessary
  - Con: likely aerosol generating, not a definitive secured airway
Summary

- **Staff Safety**
  - Reasonable body of evidence that intubation can be safe with sufficient PPE and clear donning/doffing protocols
  - Slight preference for PAPR, but use what works for your facility

- **Preparation**
  - Minimize in room personnel
  - Amount of open/available equipment should scale to perceive airway difficulty
    - Be able to move quickly through alternate plans
    - Prioritize oxygenation
  - Focus on positioning
  - Consider drug and equipment “packs” to shorten set up time

- **NIV**
  - Prelim data on patients using HFNC or BiPAP shows 60-70% progress to mechanical ventilation [2-4,12]
Summary

- Intubation procedure
  - RSI
  - Consider VL
  - Expect hypoxemia and hypotension

- Difficult Airways
  - Assess in advance
  - **Greater perceived difficulty --> earlier intubation**
    - Involve your local experts in planning
  - Consider adjuncts and tracheostomy in emergencies
Questions?
References

1. Hyman, Jaime B. MD; Leibner, Evan S. MD, PhD; Tandon, Pranai MD; Egorova, Natalia N. PhD, MPH; Bassily-Marcus, Adel MD; Kohli-Seth, Roopa MD; Arvind, Varun BS; Chang, Helena L. MS; Lin, Hung-Mo PhD; Levin, Matthew A. MD. Timing of Intubation and In-Hospital Mortality in Patients With Coronavirus Disease 2019. Critical Care Explorations: October 21, 2020 - Volume 2 - Issue 10 - p e0254.


