Evidence-based Ventilation Strategies for COVID-19

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Disclosures Related to this Lecture

I do not have relationship(s) with commercial interests related to this lecture.
I do have the following relationship(s) with commercial interests.

NAME OF COMPANY: Cytovale, Inc©
RELATIONSHIP: Consultant (sepsis biomarkers)
RECEIVED: honoraria

A commercial interest is any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients.
Objectives

• Discuss the evidence-based approach to non-invasive and invasive ventilation of the acute respiratory failure patient
• Review the approach at UMCNO to patients with respiratory failure from COVID-19
• Discuss “Closed Circuit” Non-invasive ventilation
Evidence-based Management of COVID ARDS: A Timeline

**ICU Admission**

- **Support with HFNC**
  - or-
  - NIPPV (if COPD, HF, obese, weakness)

**Intubation**

- **Tidal volume = 6 x PBW**
  - (Men ≈ 420cc)
  - (Women ≈ 360cc)

- **ARDSnet High PEEP ladder**
  - (up to 24 peep)

- **ARMA 6 vs 12 cc/kg PBW**

**High vs Low PEEP**

- **PROSEVA Prone Positioning**
  - Prone in first 24hrs if PaO2/FiO2 <150
  - (impute P/f from S/f)
  - 16hrs prone
  - 8 hrs supine

**Steroids**

- **COPD Asthma Chronic Steroids Refractory Shock**

**FACTT Conservative Fluids**

**ABC Trial**

- **Diuresis**
  - If on little or no pressors

- **SAT/SBT daily**

**Extubation**

- **Stop when P/f >150 in the supine position**

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*Note: ABC Trial refers to the Administration of Balanced Crystalloids Trial.*
UMC Covid-19 Critical Care Guidelines – 03/25/20

**VENTILATION**
- Avoid Nebulizers
- BiPAP for COPD/CHF/OHS
- HIFNC with Caution

- 4-6 cc/kg PBW Tidal Volume
  - pH < 7.2
  - pH ≥ 7.2
  - RR to 34
  - Re-Check pH

- ARDnet High PEEP Ladder
  - pH ≥ 7.2
  - SAO2 ≤ 96%
  - FiO2 ≥ 55%
  - PRONE POSITIONING*
    - Requires adequate nursing resources
  - Prone @ 4pm Supine @ 8am
  - Continue as Long as
    - SAO2 ≤ 96%
    - FiO2 ≥ 55%
  - In Supine Position

- LABS
  - ≤ 1 Daily
    - CBC
    - BMP
  - = 1 Daily ABG if
    - On Nimbex
    - Not breathing over vent
    - Unable to measure SaO2

**FLUID MANAGEMENT**

1. Don’t Volume Resuscitate
   - Unless Marked Signs of Hypovolemia
2. Limit IV Med Volume

**PRESSORS**

- None
- Low
- High

- Lasix Dosing:
  - Creatinine X 40 q12
  - Creatinine X 40 q24

**REFRACTORY HYPOXEMIA**

- Lasix Works: I/O even/- in 24 hrs
- Lasix Doesn’t Work: I/O + in 24 hrs

**SEDATION**
- Covene DVT Prophylaxis
- No insulin drip for Hyperglycemia
- Trophic tube feeds unless vomiting

- Prone/Desat?
  - No
  - Yes

**LIGHT SEDATION**

- Fentanyl (if available)
- Precedex
- Propofol
- Propofol +/- Versed

**HEAVY SEDATION**

- Nimbex (do not wean)
  - Turned up until no breathing over vent/
  - No movement to pain

**Hemodialysis**

- CRRT strongly discouraged due to resource needs and filter clogging from hypertiglycemia; requires ICU director approval and adequate nursing resources given 1:1 nursing needs.

**Once Daily Nimbex Off Trial**
COVID-19 Resources

Summary of recommendations on the initial management of hypoxic COVID-19 patients

COVID-19 with hypoxia

- **DO IT:** Endotracheal intubation
- **DO IT:** Expert in airway to intubate
- **DO IT:** Use N-95/FFP-2 or equivalent and other PPE/infection control precautions
- **DO IT:** Minimize staff in the room

**Indication for endotracheal intubation?**

- Yes
  - **DO IT:** Monitor closely for worsening
- No
  - **DO IT:** Tolerating supplemental oxygen?
    - Yes
    - **DO IT:** Target SpO2 92% to 96%
    - No
    - **DO IT:** Tolerating HFNC
      - **CONSIDER:** HFNC
      - Not tolerating HFNC or HFNC is not available
        - **CONSIDER:** a trial of NIPPV
          - **DO IT:** Monitor closely short intervals
          - **DO NOT:** Delay intubation if worsening

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Note:
- N-95/FFP-2 are facial masks
- HFNC = high-flow nasal cannula
- NIPPV = noninvasive positive-pressure ventilation
- PPE = personal protective equipment
- SpO2 = peripheral capillary oxygen saturation

“In adults with COVID-19 and acute hypoxemic respiratory failure, if HFNC is not available and there is no urgent indication for endotracheal intubation, we suggest a trial of NIPPV with close monitoring and short-interval assessment for worsening of respiratory failure.”

“The risk of potential transmission with NIPPV to healthcare workers is unknown.”
“ATS/CHEST recommendation:

For patients at high risk for extubation failure who have been receiving mechanical ventilation for more than 24 hours, and who have passed an SBT, we recommend **extubation to preventive NIV**

(strong recommendation, moderate certainty in the evidence)"
SAT/SBT*: 
- SAT: all sedation off
  (okay to leave dexmedetomidine at half dose)
- SBT: pressure support 5, PEEP 5, FiO₂ 40%

Extubate to 6 L/min nasal canula
(If COPD, HF, morbid obesity, or weakness, extubate to Bipap)

Up Pressure support
- and -
Up PEEP until passes

Fails nasal cannula

At least once daily trial off Bipap

*Bipap Contraindications
- Vomiting tube feeds in past 24 hours
- Facial trauma/surgery
- Facial hair
- Copious secretions
- Severe hemodynamic instability

UMCNO COVID Ventilator Liberation Guidelines 4.4.20
“Closed Circuit” Bipap
Works Cited


• SCCM Surviving Sepsis Guidelines Management of COVID-19. 2020