COVID-19 Nursing Education

Rayan Ihle, MD
CAMC Adult Critical Care Services
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COVID-19: The Virus

“Enhanced Droplet Precautions”

- Spreads through droplets but high contamination factor
- It is most contagious first three days after onset of symptoms
- Spread may be possible in asymptomatic carriers

Incubation: 5 days mean Onset to medical visit 6 d

Median incubation period is 4-5 days (range: 2-14 days)

SARS-CoV2: The Illness

Most patients had mild to moderate disease, but nearly 20% had severe or critical illness.

**COVID-19: Wide Spectrum of Disease**

<table>
<thead>
<tr>
<th>Mild Illness</th>
<th>Uncomplicated URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate Pneumonia</td>
<td>Pneumonia without need for oxygen</td>
</tr>
<tr>
<td>Severe Pneumonia</td>
<td>Pneumonia with dyspnea, Respiratory distress, SpO2 &lt;93%, P/F ratio &lt;300</td>
</tr>
<tr>
<td>Critical Illness</td>
<td>Respiratory failure, shock, MOSF</td>
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</table>

Of 1,099 hospitalized COVID-19 patients (through 29-Jan-2020), 5% were admitted to the ICU. (Guan et al. NEJM 2020)
Distribution of Symptomatic COVID-19 In China

- 70.0% Not Hospitalized
- 30% Hospitalized
Distribution of Symptomatic COVID-19 in China

- 70.0% Not Hospitalized
- 21% Non ICU Hospitalized
- 9.0% ICU Hospitalized

Legend:
- Not Hospitalized
- Non ICU
- ICU
Distribution of Symptomatic COVID-19 in China

- 70.0% Not Hospitalized
- 21% Non ICU Hospitalized
- 4.5% ICU w/o Vent
- 4.5% ICU w/o Vent
- 0% ICU Intubated
Distribution of Symptomatic COVID-19 In China

- Not Hospitalized: 70.0%
- Non ICU Hospitalized: 21%
- ICU w/o Vent: 4.5%
- Vent w/o Prone: 3.0%
- Proned Vent: 1.5%

Up to 80% Have No Symptoms
SARS-CoV-2 Critical Illness

Complications

- Pneumonia
- Critically ill
  - ARDS 30%
  - Septic Shock
  - Renal Failure 20%
  - Liver failure
  - Cardiomyopathy 30%
  - Arrhythmia 15%
- Bacterial co-infection is low

Labs

- Low lymphocytes, high neutrophils, low platelets
- High LFTs
- High LDH, CRP, Ferritin
- Low Procalcitonin
- High IL-6 (proinflammatory)
- Highest mortality seen with High D-Dimer and lymphopenia
ARDS

Mortality 50-60%

EARLY GOAL CLARIFICATION
Care of the ICU Patient
The Enemy of Good is Perfect

Goals saturations
90-96%

No higher than
96%

Oxygen Targets

Mortality

SPO₂

90% 92% 96%
Oxygen Therapy

- Conventional NC
- [High Flow Nasal Cannula]
- Dry Venti Mask
- BiPAP to be avoided
  - High rate of failure
  - Aerosol Generating
- Early Intubation

Inconclusive Evidence for Role of Helmet Oxygen Therapy
What is an “Aerosol Generating Procedure”?
## CAMCs Mitigations for AGPs

<table>
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<th>Category</th>
<th>Mitigation</th>
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| Intubations   | Intubation Team with Least number in the room  
Avoiding BMV if able (preoxygenate with NRB)  
Intubation Box  
Ventilated Procedure Room |
| BiPAP         | Avoiding BiPAP if able with Early Intubation  
If not able, N95 for caregivers  
Special filters on circuits |
| Nebulizers    | Using MDIs in unintubated patients, Self directed  
If unable to coordinate, then Self administered neb  
If unable to coordinate, the Neb with RTN95  
RT Evaluate and Treat: All Respiratory Therapy Protocols |
| Bronchoscopy  | Avoid if possible  
Least number in the room |
Intubation: An Aerosol Generating Procedure

- **Early Intubation**
  - For escalating O2 requirements >4-6L or hypercapnea pH <7.32
  - High risk of failure >60% VM

- **Intubation SBAR**
  - Allow time for PPE
  - Notify anesthesia of Covid Status
  - Discuss pertinent labs
  - Vent set up and ready in room

- **Plan for Self-Extubation**
  - Discuss sedation plan and Hang prior to start of procedure

- **Limit Exposure**
  - 3-4 people: RT, RN, 1-2 Anesthesia

- **Most Experienced in the room**
  - Anesthesia team preferably (teams at all hospitals, all shifts x PM TVH)
  - In emergency, No residents intubating

- **First Pass Success**
  - True RSI with paralytic
  - Glidescope
  - Backup of LMA if failure

- **Limiting Emitting Aerosols**
  - Inflate cuff before bagging
  - Clamp ETT when disconnecting circuit for shortest amount of time
  - Tape hemostats to ventilator at bedside
Ventilator Management

- ARDSnet management
- Low Vt 4-8 ml/kg of Ideal Body Weight (need height)
  - Average Males 500ml, Females 350ml
- Keep Pplat <30cmH20
- High PEEP

- Recent Medscape article from NY EM-CC doc to treat like HAPE?
  - Podcast after 9 days of experience
  - No evidence to support or refute
Adjuvants

Proning

- Daily time 12-18hrs
- Manual preferred
  - Less complications
  - More comfortable
  - Less resource utilization
  - Easier to assess
  - Education 10d ago

Paralysis

- Intermittent boluses recommended over infusion
  - Less complications
  - Less utilization
- If a drip is needed
  - Lowest possible dose for vent synchrony
- Daily Paralytic Holiday
  - Up to 48hrs
Adjuvants

Dry Lungs Are Happy Lungs

- AVOID FLUIDS AS MUCH AS POSSIBLE
- Risk of ARDS and worsening hypoxia
- Give No Fluids over Boluses over MIV Fluids
- Give Lasix to promote net diuresis

PUMP U UP

- Steroids in Viral ARDS have no mortality benefit
- May increase risk of mortality as seen in SARS CoV-1, influenza, MERS
  - Promote viral replication vs slow clearance
- One study specifically in Covid-19
  - 83 patients with ARDS
  - HR 0.38 (0.20-0.72)
- Final recs: Consider giving if another reason
  - AECOPD (40mg pred x5d)
  - ARDS (High Meduri 2/kg vs Lower Meduri 1/kg)
  - Septic Shock (HC 50q6h)
Good Supportive Care

- Limit Sedating Agents
  - Particularly Benzos
  - Daily SATs-Stop infusion and start $\frac{1}{2}$ rate. Use PRNs over drips

- High incidence of arrhythmia
  - Keep K>4, Mag >2
  - Avoid QTc Prolonging medications

- Monitor for CHF
  - Dry Lungs

- Glycemic control
  - Goals <180

- Chemical DVT prophylaxis
  - High Ddimers? Risk
  - Lovenox over Heparin
  - Ensure dosed for BMI

- Early Enteral Nutrition
  - ASPEN recommends early TF even if proned/paralyzed/ECMO

- Early de-escalation of antibiotics
  - Guide by Procalcitonin

- Address GOALS of care EARLY

- Assess for trach potential d10-12
Specific Drugs??

- Hydroxychloroquine
  - Azithromycin
- Immunomodulators
- Convalescent Plasma
- Lopinavir/Ritonavir
  - IVIG
  - Ivermectin
We Can Do It!