CARING FOR PATIENTS WITH SEVERE COVID-19

Prepared for healthcare workers and citizens of United States Associated Pacific Islands

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DISCLAIMER

The content in this presentation is evidence based where referenced and, if not referenced, is mere recommendation based upon anecdotal reports, retrospective data, case reports or expert opinions.
IDENTIFYING SEVERE DISEASE

• Severe disease is defined as hypoxia (oxygen saturation < 93% breathing room air), the need for supplemental oxygen or the need for ventilatory support. – US Food and Drug Administration

• Some add tachypnea (respiratory rate > 30), partial pressure of arterial oxygen to fraction of inspired oxygen ratio < 300 and 50% increase in pulmonary infiltrates in 24-48 hours.
RISK FACTORS FOR SEVERE DISEASE

- Diabetes mellitus
- Obesity
- Cardiovascular disease
- Hypertension
- Chronic lung disease
- Chronic kidney disease
- Cancer (particularly hematologic malignancies, lung cancer, and metastatic disease)
- Smoking
## LABORATORY FEATURES ASSOCIATED WITH SEVERE DISEASE

### Elevations in:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Possible Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRP</td>
<td>&gt; 100 mg/L (normal &lt; 8 mg/L)</td>
</tr>
<tr>
<td>LDH</td>
<td>&gt; 245 units/L (normal &lt; 210 units/L)</td>
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<tr>
<td>CPK</td>
<td>&gt; 2x the upper limit of normal</td>
</tr>
<tr>
<td>Ferritin</td>
<td>&gt; 500 mcg/L</td>
</tr>
<tr>
<td>Ddimer</td>
<td>&gt; 1000 ng/mL (normal &lt; 500 ng/mL)</td>
</tr>
<tr>
<td>Troponin</td>
<td>&gt; 2x the upper limit of normal</td>
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</table>

### Decrease in:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Absolute lymphocyte count</td>
<td>&lt; 800/microL (normal range for age &gt; 21 years: 1800-77/microL)</td>
</tr>
</tbody>
</table>
INITIAL EVALUATION

• Pulse oximetry
• Chest Xray – to assess extent of lung involvement, and evidence of secondary bacterial pneumonia
• ECG – to evaluate the QT interval, arrhythmias and acute myocardial injury
• Laboratory:
  • Basic metabolic panel
  • CBC
  • Inflammatory markers – CPK, LDH, CRP, d-dimer, ferritin
CHEST IMAGING – CXR IS SUFFICIENT
ACUTE RESPIRATORY DISTRESS SYNDROME

• ARDS is an acute, diffuse, inflammatory lung injury that leads to increased pulmonary vascular permeability, increased lung weight, and a loss of aerated tissue.

• Clinical hallmarks of ARDS are hypoxemia and bilateral radiographic opacities, while the pathological hallmark is diffuse alveolar damage (i.e., alveolar edema with or without focal hemorrhage, acute inflammation of the alveolar walls, and hyaline membranes).
ARDS TIMELINE

• Rapid progression based upon anecdotal reports (12-24 hours).
• Development of ARDS: 8-12 days of symptoms onset.
• Mechanical ventilation: 10.5-14.5 days of symptom onsets.

Wang et al., JAMA, 2020; Huang et al., Lancet, 2020; Zhou et al., Lancet, 2020
MANAGEMENT OF HYPOXEMIA

• Preferred oxygen delivery is standard nasal cannula, venturi mask and mask with reservoir (non-rebreather mask).

• Avoid high flow nasal cannula (HFNC) and non-invasive positive pressure ventilation (NIPPV). General consensus (limited data) suggests that HFNC and NIPPV increase the risk of viral transmission.

• Patients on nocturnal NIPPV at home should continue their nocturnal NIPPV. Use under strict airborne precautions. Use an in-line viral filter. Ensure masks/devices fit well and there is no air leak.
MORE ABOUT OXYGENATION

• Minimize oxygen toxicity. Adjust inspired oxygen for a goal O2 saturation 88% or above. If there is evidence of poor perfusion, target 90% or above.

• Prone positioning can be done with a ventilator or without a ventilator.
  • With a ventilator, prefer 16hrs or more before returning to supine.
  • Without a ventilation, recommend turning left decubitus, prone, right decubitus, each position for as long as tolerated (goal 2 hours).

• Avoid using IV fluids unless a patient has evidence of hypoperfusion. In patients with mild volume depletion due to GI losses or poor intake, strongly prefer oral rehydration. In patients with hypotension / shock, use small boluses of 250 – 500ml.
  • Hypervolemia is associated with worsening oxygenation and poorer outcomes in ARDS

BEST PRACTICES:
DO THE THINGS WE KNOW IMPROVE A PATIENT’S OUTCOME

USUAL STRESS ULCER PROPHYLAXIS.
NUTRITIONAL SUPPORT.
VTE PROPHYLAXIS. *
ANTIBIOTIC STEWARDSHIP.
GLUCOSE CONTROL GOAL CAPILLARY BLOOD GLUCOSE < 180.
Venous thromboembolism is common in acutely ill patients with COVID-19, with reports of up to 43% (20-43%) of patients in the intensive care unit (ICU), even when prophylactic anticoagulation is used.

Venous thromboembolism is approximately 20% in non-ICU hospitalized patients.

- If a patient takes full dose anticoagulation at home, continue it in the hospital or change to injectable (heparin or low molecular weight heparin - lovenox).
- If a patient has evidence of acute thrombosis, treat empirically with full dose heparin or lovenox.
- In non-ICU patients, standard DVT prophylaxis is appropriate.
- In ICU patients, consider intermediate dose anticoagulation (lovenox 0.5mg/kg BID)
DO THINGS TO HELP PREVENT TRANSMISSION AND TO KEEP YOURSELF HEALTHY

• Wear personal protective equipment (PPE) when working directly with patients. Take your time to put it on and take it off correctly.

• Wear a mask at all times.

• Wash your hands.

• Do not use nebulized medicines. If a patient needs bronchodilator, use a metered dose inhaler.

• Go outside, eat, sleep.
COVID-19: CURRENT POTENTIAL THERAPIES

• Remdesivir:
  • Possibly reduces time to recovery.
  • No effect on mortality to date.
  • Use for 10 days in mechanically ventilated patients. Use for 5 days in non-ventilated patients.
  • Do not use with GFR < 30 or with ALT > 5x ULN. Stop use if either develops.
  • Do not use with hydroxychloroquine due to drug interactions.

• Dexamethasone 6mg daily for 10 days or until discharge (whichever is shorter).
  • For patients needing supplemental oxygen or ventilation (severe disease)
  • Decreased mortality.
  • Unknown if equivalent dose of other steroid has the same effect (roughly 40mg prednisone or 32mg of methylprednisolone).

COVID-19: CURRENT POTENTIAL THERAPIES

• Do not start ACE I or ARB to treat COVID, but continue if patient takes it chronically (and no contra-indication).

• Hydroxychloroquine:
  • Controversial and conflicting data.
    • Current bulk of the data suggest no mortality benefit.
    • Does not appear to have a role in prophylaxis.
  • Side-effects.
  • Drug interactions.

RECOVERY trial investigators. No clinical benefit from use of hydroxychloroquine in hospitalized patients with COVID-19.
WHO. "Solidarity" clinical trial for COVID-19 treatments: Update on hydroxychloroquine.
Boulware, D. 2020 Jun 3;NEJMoa2016638. doi: 10.1056
ALLOCATION OF RESOURCES

- Part of planning for scarcity is ensuring that a fair system of decision-making for allocation is in place. – World Health Organization
- Discuss how resources such as oxygen, ICU beds, and ventilators will be used in advance.
- Be sure to include representatives from various parts of the healthcare system such as physicians, nurses, and clergy.
- Be clear and consistent in how resources are utilized.
THERE IS NO LIMIT TO HUMAN KINDNESS

• Basic palliative care, including relief of dyspnea or other symptoms and social support, should be practiced by all doctors, nurses, social workers and others caring for persons affected by COVID-19.

• Palliative care includes but is **not limited to end-of-life care.**
MENTAL HEALTH CONSIDERATIONS

- Fear, anxiety, depression, guilt.
- Social stigmatization.
- Isolation and quarantine worsen psychosocial stress.

- Involve mental health professionals, social workers, clergy and other community members for counselling and support.
- If possible, use of telephones and/or smartphones and other technology can help patients connect with family and others.
- Consider low doses of medication to help decrease anxiety, depression and insomnia.
PEOPLE WITH SEVERE DISEASE DO GET BETTER
Woman, 99, recovers from COVID-19 at UT Health Pittsburg
THANK YOU