2. Strategies for Caring for the COVID Positive Patient

Pathophysiology of COVID-19

- COVID-19 is classified as an infectious inflammatory disease
- In a severe case, an acute respiratory distress syndrome (ARDS) clinical picture evolves
  - ARDS is an acute inflammatory lung injury due to activation of circulating neutrophils that migrate to the lungs and release the content of their cytoplasmic granules. This is called the respiratory burst and is designed to kill microorganisms, but unfortunately, also damages the capillary walls in the lungs, leading to protein-rich exudate, erythrocytes, and platelets. This inflammatory exudate leads to fibrin accumulation, which causes structural remodeling and pulmonary fibrosis
- Patients with severe cases can also go into septic shock due to the “cytokine storm”
  - Massive inflammation and systemic vasodilation can be caused by cytokines that are released with a large and severe viral load
    - Cytokines are a broad and loose category of small proteins that are important in cell signaling
  - Sepsis is considered a 3-pronged cascade that occurs in response to severe infection:
    - Inflammation
    - Suppression of the immune system
    - Activation of the coagulation cascade

Characteristics of COVID-19 Patients (in one cohort, based on information to date)

- A 1:1 ratio of males (50.7%) and females
- Overall median age of 57.0 years
- Most common clinical manifestations
  - Fever (91.7%)
  - Cough (75.0%)
  - Fatigue (75.0%)
  - Gastrointestinal symptoms (39.6%)

Based upon available information to date, those at high-risk for severe illness from COVID-19 include:
- People aged 65 years and older
- People who live in a nursing home or long-term care facility
- Other high-risk conditions could include:
  - People with chronic lung disease or moderate to severe asthma
  - People who have serious heart conditions
  - People who are immunocompromised including cancer treatment
  - People of any age with severe obesity (body mass index [BMI] >40) or certain underlying medical conditions, particularly if not well controlled, such as those with diabetes, renal failure, or liver disease might also be at risk
- People who are pregnant should be monitored since they are known to be at risk with severe viral illness, however, to date data on COVID-19 has not shown increased risk

- Imaging
  - Bilateral ground-glass or patchy opacity (89.6%) was the most common sign of radiological finding

- Lab findings
  - Lymphopenia (75.4%) and eosinopenia (52.9%) were observed in most patients.
  - Blood eosinophil counts correlate positively with lymphocyte counts in severe (r = .486, P < .001) and non-severe (r = .469, P < .001) patients after hospital admission.
  - Significantly higher levels of D-dimer, C-reactive protein, and procalcitonin were associated with severe patients compared to non-severe patients (all P < .001).
COVID-19: General Treatment and Nursing Considerations

- **Infection Prevention**
  - Prevent spread with isolation & strong infection prevention protocols
    - Standard precautions and transmission-based precautions (contact, droplet, airborne, plus eye protection)
    - Clean environment frequently
  - If patient is too sick to remain home, can be admitted on medical/surgical unit or to critical care unit (ICU), depending on manifestations

- **Treatment – Supportive Therapy**, similar to (or consistent with) in-hospital influenza management
  - Rest
  - Vital signs monitoring
  - Nutrition support
  - Fluid and electrolyte balance management
  - Lab monitoring to evaluate organ function
  - Chest imaging: Xray or computerized tomography (CT) scan
  - Oxygen therapy to support goals for oxygen saturations
    - Nasal Cannula to Mechanical Ventilation with proning and/or extracorporeal membrane oxygenation (ECMO) as needed

- **Medications**
  - At present, there is no evidence from randomized controlled trials (RCTs) to support specific drug treatment
  - Symptomatic treatment of fever (e.g., acetaminophen)
  - **Conservation Bronchodilator Therapy Strategies**
    - To deliver bronchodilator therapy to either persons under investigation (PUI) or confirmed COVID-19 patients, inhalers are preferred over nebulizers in order to limit the risk of viral exposure to other patients or staff due to aerosolization. There is currently a nationwide shortage of albuterol and ipratropium.
      - Patients with documented reactive airways disease who are COVID-19 positive or PUI may receive albuterol metered dose inhalers (MDIs).
        - Patients ruled out for COVID-19 should be switched to nebulized albuterol once the MDI canister is depleted.
        - Mechanically ventilated patients on continuous nebulized epoprostenol may receive albuterol MDIs.
- Dose for patients on mechanical ventilation: 4 Puffs every 1-6 hours
- All other patients should receive nebulized albuterol.

- Manage and prevent complications
  - Antibiotics for secondary infection
  - Recognize septic shock early; fluids and vasopressors for shock
  - Gastrointestinal (GI)/venous thromboembolism (VTE) prophylaxis
  - Prevention of pressure injury, falls, catheter associated urinary tract infection (CAUTI), central line-associated bloodstream infection (CLABSI), ventilator associated pneumonia (VAP), etc.

References