

General COVID Overview

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COVID-19 Diagnosis/Presentation

- Cough (65 - 80%)
- Febrile on presentation (85% febrile during illness)
- Dyspnea (20 - 40%)
- URI symptoms (15%)
- GI symptoms (10%)



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COVID-19 Lab Results

CBC: Leukopenia & Lymphopenia

- Our immune system mounts a fight against coronavirus using one of two different methods
 1. White blood cells produce antibodies that attach to foreign substances → White blood cells reduce the viral replication
 2. Immune system produces chemicals that help regulate the intense response generated by fighting an infection.
 3. Cytotoxic T lymphocytes are necessary for the control of viral infections. As a viral infection overwhelms the system, the bone marrow is unable to keep up with the demand of producing more lymphocytes.
- The lower the white blood cell count the more acutely ill the patient is, and outcomes become poorer.

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COVID-19 Lab Results

BMP: ↑ BUN/Creatinine

1. The COVID-19 virus infects the cells of the kidneys
2. Lower levels of oxygen in the blood can result kidney injury. As the body shunts blood and nutrients to vital organs, the kidneys take a back seat to the heart, lungs, and brain.
3. Cytokine storm: Cytokines are small proteins that help communicate to the immune system to fight an infection. A large influx of cytokines can cause severe inflammation in an attempt to kill the virus leading to systemic inflammation damaging healthy tissue including the kidneys.

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COVID-19 Lab Results

LFTs: ↑ AST/ALT/Tbili

- Cytokine Storm and Hypercoagulability: Inflammatory proteins produced during the infection significantly alter the function of platelets, making them "hyperactive" and more prone to form dangerous and potentially deadly blood clots
- Liver damage leads to a decreased production in thrombopoietin (hormone) and a reduction of platelet counts in blood.

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COVID-19 Lab Results

↑ D-dimer, CRP, and LDH

- D-dimer is a biomarker to rule out venous thromboembolism (DVT, PE, DIC). Hypercoagulability in patients can lead to dangerous clotting in vital organs leading to Disseminated intravascular coagulation.
- CRP (c-reactive protein) increases when inflammation is present in the body. Elevated CRP can indicate risk for developing coronary artery disease.
- LDH tests look for signs of damage to the body tissues. LDH is an enzyme found in almost every cell in your body, including your blood, muscles, kidneys, and pancreas.

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COVID-19 Lab Results

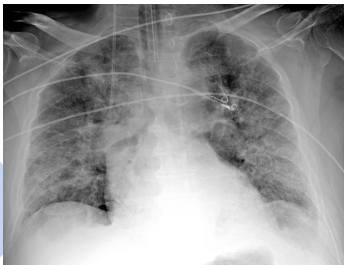
↑ IL-6 and Ferritin

- IL-6 stimulates the acute phase inflammatory and auto-immune response processes. It also is an important mediator in immune-induced fevers. Fevers help immune cells crawl along blood vessel walls to attack invading microbes.
- Ferritin is a protein that binds to iron. Elevated ferritin indicates the presence of viruses and bacteria in the body. COVID damages hemoglobin causing an overload of iron in the tissues. Increases in ferritin are linked for poor patient outcomes.

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COVID-19 Imaging Results


CXR: hazy **bilateral**, **peripheral** opacities



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COVID-19 Imaging Results

CT: **Ground glass opacities**, crazy paving, consolidation
(almost always bilateral, rarely unilateral)



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COVID-19 Treatment Options

- **Isolation**
 - Droplet/Contact versus Airborne/Contact
- **Fluid sparing resuscitation**
 - Early fluid resuscitation is essential in preventing the development of multiorgan dysfunction; however, as ARDS progresses excessive fluid can have a detrimental impact on patient outcomes due to the inflammatory response state.
- **Empiric antibiotics**
 - Can be initiated for bacterial pneumonia in patients with COVID-19 but is not part of daily therapy
- **Mechanical Ventilation for ARDS**
 - Due to stiff lungs and increasing oxygenation demands
- **Investigational Therapies**
 - Remdesivir
 - Oseltamivir
 - Lopinavir/ritonavir
 - Tocilizumab
 - Corticosteroids
