

COVID-19 SUMMARY of current available information

This personally compiled, comprehensive information about the COVID-19 virus is from a frontline, clinical standpoint and action/decisions/options in management available in most hospital settings.

This contains information from medical specialists working on the frontline and are intended for general informational purposes only and do not address individual circumstances. It is not a substitute for professional medical advice, diagnosis, or treatment and should not be relied on to make decisions about your health. Never ignore professional medical advice in seeking treatment.

Stay Safe,

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Observation: Diagnosis may not be available due to lack of available testing, false negatives or delay in results.

Nursing Review Recommendation: On patient reviews, please provide details of following high-risk markers: Total WBC with ALC (absolute lymphocyte count), Platelets, Procalcitonin, CRP, AST/ALT, LDH, Troponin, D-Dimer, Covid-19 testing, Ferritin

1) Symptoms: cough, fever, myalgia, dyspnea (less common headache, hemoptysis, vomiting and diarrhea) usually in absence of nasal congestion, sore throat conjunctivitis, rash, photophobia

- a. Most common symptoms: cough (59-82%), fever (44-85%)—45% on presentation 85% during illness, dyspnea (19-55%), myalgia/malaise (up to 75)
- b. Other less common symptoms: headache, hemoptysis, vomiting, diarrhea, URI

2) Labs: WBC with ALC (absolute lymphocyte count), Platelets, Procalcitonin, CRP, LFTs, Troponin, D-Dimer, Covid-19 testing, Ferritin

- a. **Leukopenia or Normal WBC:** median WBC was 4.7
- b. **Lymphopenia:** (ALC less than 1500 in 80% of patients—more severe if less than 800—Profound Lymphopenia (100% ICU patients)
- c. **Platelets:** Mild thrombocytopenia is common, median 168,000, rarely less than 100
- d. **D-Dimer:** Ddimer elevation (elevated in 46% of patients), elevation at admission predicts higher mortality
- e. **LDH:** elevated LDH above 250 however LDH elevated (37% non-severe patients and 72% ICU patients);
- f. **Elevated ALT/ALT/Tbili:** AST/ALT, sometimes alk phos. Usually in 70-100 range. No fulminant hepatitis. Notably, higher transaminitis at admit (150-200) correlates with clinical deterioration and progression to ARDS. LFTs typically begin to bump in 2nd week of clinical course.) Elevated in 20% non severe and 40% severe)
- g. **CRP:** can track with disease severity. If normal in severe patient, consider alternative diagnosis such as heart failure. Non-hypoxic patients with mean of 11 and hypoxic patients with mean of 66. Surviving patients with mean of 40 while patients who died had a median of 125.
- h. **Procalcitonin:** elevated level early in disease suggests and alternative diagnosis (pneumonia, pyelo) late in disease process should raise concern for bacterial superinfection (Most common co-infection: Mycoplasma pneumonia (8.6%)
- i. **Troponin, BNP;** usually normal at onset of disease. If elevation occurs (usually around day 4) if is a strong predictor of mortality and tends to increase daily. Used to surveil for myocarditis, not ACS. Interestingly, in Washington State ICU patients, there

have been cases where patient with ARDS improved and then suddenly decompensated with EF less than 10%, arrhythmias as cause of death, in setting of normal cardiac enzymes.

j. Cr: usually mild AKI (Cr <2)

k. Covid-19 PCR testing: sensitivity around 75%, in high risk patients conversion to positive test took a period of days with CT showing changes before PCR

3) Radiographic: CXR, CT, lung ultrasound (see B lines and pleural thickening), Echo (for EF)

a. CXR: early may have subtle changes but rarely clear, then hazy bilateral PERIPHERAL and BASAL opacities. May be reported as reticulonodular, ground glass, focal consolidation or pulmonary edema.

b. CT: bilateral ground glass opacities, as disease progresses may become consolidation, and more lung segments become involved

i. UNCOMMON to see pleural effusion, masses, cavitation or lymphadenopathy

ii. All radiographic modalities are non-specific and cannot differentiate between Covid-19 and other pulmonary diseases

4) Co-Morbidities: Hypertension, Diabetes, CV disease, COPD, Cancer

a. #1 Hypertension (58% of ICU patients, present in 36% deaths), Diabetes, Cardiovascular disease and COPD-- less strongly associated with progression to critical care, cancer

5) NOSOCOMIAL RISK: Health Care Worker/Recently Hospitalized patient: in China: 12.3% of cases were infected in hospital and 29% of cases were health care workers.

a. SOFA -higher score predicts mortality

b. Pulse oximeter reading important; "Silent hypoxemia"—hypoxemia without dyspnea

THEORETICAL TIMELINE:

Incubation: median 4 days with range up to 14 days

DAY 1-5: Stage 1: Early infection: Patients often don't require hospital admission: mild constitutional symptoms, fever, dry cough, diarrhea headache: Clinical signs: lymphopenia, increased PT, increased D Dimer and mild increase LDH:

Day 6-7: Stage 2: Pulmonary Phase: Abrupt deterioration after being stable for several days: Dyspnea, hypoxemia, abnormal imaging on CXR, labs now show transaminitis and normal procalcitonin, CRP and ferritin often moderately elevated

Day 9-10: Stage 3: Hyperinflammatory Phase: ARDS/ Sepsis syndrome/Cardiac Failure. Elevated inflammatory markers: Marked elevation of CRP, D-Dimer and Ferritin. May see elevated Troponin, pro BNP and procalcitonin if superinfection

Day 10-12: Typical transfer to ICU: ARDS

Day 15: 33% non-survivors develop cardiomyopathy—usually low EF with normal troponin. Of note, only 1% survivors develop acute cardiac injury or acute renal injury. (in China, average length of stay was 21-22 days)

TESTING

Nasal swabs more accurate than oral, can be falsely negative until 6 days after symptom onset.

TREATMENT

Oxygen: Ideally high flow nasal cannula Target 92-96%--excess may be harmful and drain hospital supply

Antibiotics: Empiric Ceftriaxone and Azithromycin or Doxycycline USE MDI if indicated, Avoid nebulized albuterol (unless filter set up)

Aggressive repletion of K, MG in patients with QT prolongation (chloroquine and hydroxychloroquine cause QT prolongation)

INTUBATION-lung protective ventilation with permissive hypercapnia (perhaps to pH 7.15), there may be a role for helmet interface if available, or CPAP with viral filter

Vasopressor to support MAP

AVOID

Avoid steroids—contraindicated early in infection, may be indicated in hyper inflammatory stage.

Avoid NSAIDS nephrotoxic and may up-regulate the ACE 2 receptor thus worsening infection

Avoid fluid overload

Avoid NIPPV (aerosolizes virus)

POTENTIAL DRUGS

Remdesivir: Gilead drug, currently shown in animals to be effective against SARS -CoV1 and Mers-CoV viruses. Clinical trials underway and compassionate use program. Supply is limited and must be obtained directly from drug company.

Chloroquine: Available. Blocks Sars-COV2 virus but no clinical studies to confirm. Minimal data showing benefit for HCQ and Azithromycin therapy (one small non RCT study)

FOR FURTHER CONSIDERATION

Latest info from Italy about utilizing **U/S for the assessment of the lungs** early in the management process, searching for infiltrate and keeping individuals in the hospital

Use of awake ECHO for the serious cases with a much better response (60%)