

A Seattle Intensivist's One-pager on COVID-19

Nomenclature

Infection: Coronavirus Disease 2019 a.k.a. COVID-19
Virus: SARS-CoV-2, 2019 Novel Coronavirus
NOT "Wuhan Virus"

Biology

- 30 kbp, +ssRNA, enveloped coronavirus
- Likely zoonotic infection; source/reservoir unclear (Bats? / Pangolins? → people)
- Now spread primarily **person to person**;
 - Can be spread by asymptomatic carriers!
- Viral particles enter into lungs via **droplets**
- Viral S spike binds to ACE2 on type two pneumocytes
- Effect of ACE/ARB is unclear; ACE vs ARBs may even have opposite effects
- Other routes of infection (contact, enteric) possible but unclear if these are significant means of spread

Epidemiology

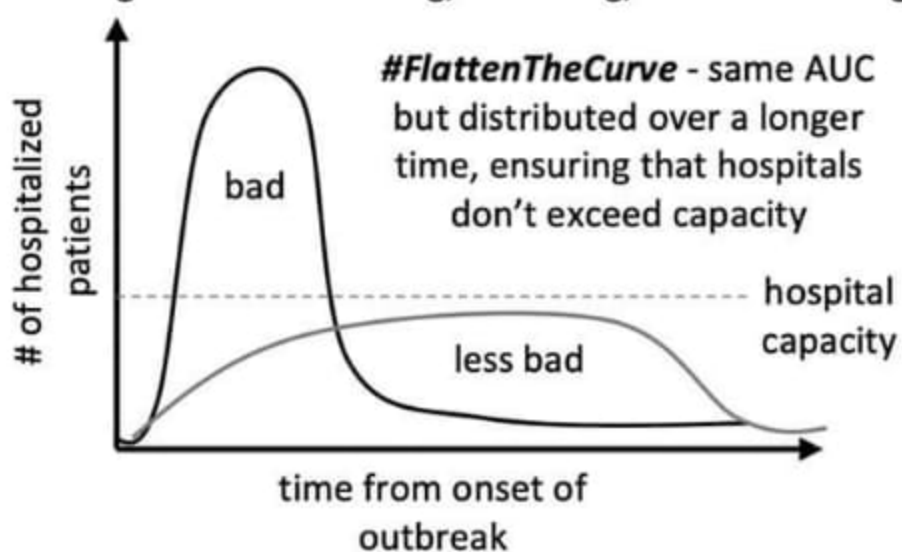
- Attack rate = 30-40%
- $R_0 = 2-4$ (similar to influenza)
- CFR = 3.4% (worldwide numbers)
- Incubation time = 4-14 days typically (up to 24 days)

Timeline:

- China notifies WHO 2019-12-31
- First US case in Seattle 2020-1-15
- WHO Declared pandemic 2020-3-11
- National emergency 2020-3-12

Disease clusters: SNFs, Conferences, other

Strategies: contact tracing, screening, social distancing



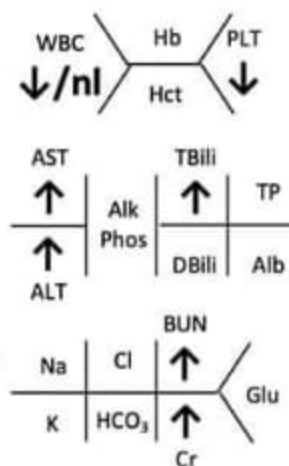
Diagnosis/Presentation

Symptoms

- 65-80% cough
- 45% febrile on presentation (85% febrile during illness)
- 20-40% dyspnea
- 15% URI symptoms
- 10% GI symptoms

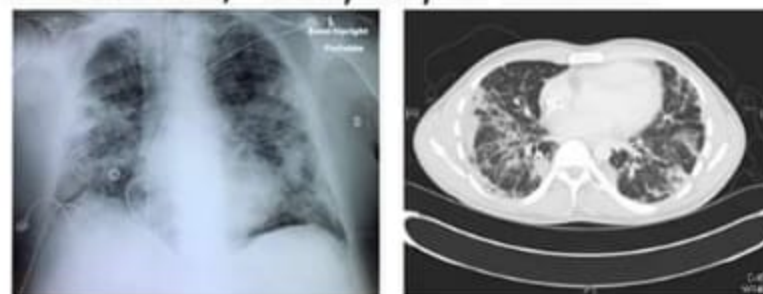
Labs

- CBC: Leukopenia & **lymphopenia** (80%+)
- BMP: ↑BUN/Cr
- LFTs: ↑AST/ALT/Tbili
- ↑ D-dimer, ↑ CRP, ↑ LDH
- ↑ IL-6, ↑ Ferritin
- ↓ Procalcitonin
- *PCT may be high w/ bacterial superinfxn*



Imaging

- CXR: hazy **bilateral, peripheral** opacities
- CT: **ground glass opacities** (GGO), crazy paving, consolidation, *rarely may be unilateral*



- POCUS: numerous B-lines, pleural line thickening, consolidations w/ air bronchograms

Isolation

- Phone call is the best isolation (e.g. move to telemed)
- Place patient in mask, single room, limit/restrict visitors

Precautions

- **STANDARD + CONTACT** (double glove) +
- Either **AIRBORNE** (for aerosolizing procedures: intubation, extubation, NIPPV, suctioning, etc) or **DROPLET** (for everything else)
- N95 masks must be fit tested; wear eye protection
- PPE should be donned/doffed with trained observer
- Hand hygiene: 20+ seconds w/ soap/water or alcohol containing hand gel

Treatment

- Isolate & send PCR test early (may take **days** to result)
- GOC discussion / triage
- Notify DOH, CDC, etc
- **Fluid sparing** resuscitation
- ± empiric antibiotics
- Intubate early under controlled conditions if possible
- Avoid HFNC or NIPPV (aerosolizes virus) unless individualized reasons exist (e.g. COPD, DNI status, etc); consider **helmet mask** interface (if available) if using NIPPV
- Mechanical ventilation for ARDS
 - **LPV** per ARDSnet protocol
 - 7 P's for good care of ARDS patients: e.g. **PEEP/Paralytics/Proning/inhaled Prostacyclins**, etc
 - ? High PEEP ladder may be better
 - ? ECMO in select cases (unclear who)
- Consider using POCUS to monitor/evaluate lungs
- Investigational therapies:
 - Remdesivir --| block RNA dependent polymerase
 - Chloroquine --| blocks viral entry in endosome
 - Tocilizumab --| block IL-6
 - Corticosteroids --| reduce inflammation
- None of these investigational therapies are proven, but literature is evolving quickly.

Prognosis

- **Age** and **comorbidities (DM, COPD, CVD)** are significant predictors of poor clinical outcome; admission **SOFA** score also predicts mortality.

- Lab findings also predict mortality
 - ↑ d-dimer,
 - ↑ ferritin
 - ↑ troponin
 - ↑ cardiac myoglobin
- Expect prolonged MV
- Watch for complications: Secondary infection (VAP), Stress CM, etc

