

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" NOT "China Virus"

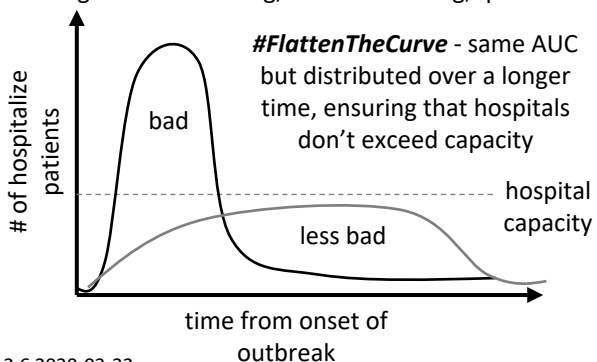
Biology

- **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 droplet nuclei**
 - CDC/WHO recommend AIRBORNE isolation
- **Viral S spike binds to ACE2** on type two pneumocytes
- **Effect of ACE/ARB is unclear; not recommended** to change medications at this time.
- Other routes of infection (contact, enteric) possible but unclear if these are significant means of spread

Epidemiology

- Attack rate = **30-40%** (China)
- $R_0 = 2-4$
- Case fatality rate (CFR) = 2.3% (China)
- Incubation time = **3-14 days** (up to 15 days)
- Viral shedding – **median 20 days** (max 37 days)
- Breakdown of disease severity
 - **80%** Non-severe (mild pneumonia)
 - **15%** Severe (hypoxia, respiratory distress)
 - **5%** Critical (respiratory failure)

Disease clusters: SNFs, conferences, cruise ships, etc.
 Strategies: handwashing, social distancing, quarantine



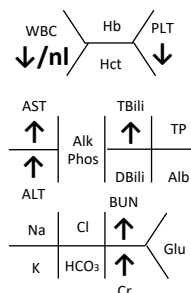
Diagnosis/Presentation

Symptoms reflecting recent **US experience**

- 50-80% **cough**
- 45% **febrile** on presentation (85% febrile during illness)
- 20-40% dyspnea
- 15% URI symptoms
- 10% GI symptoms

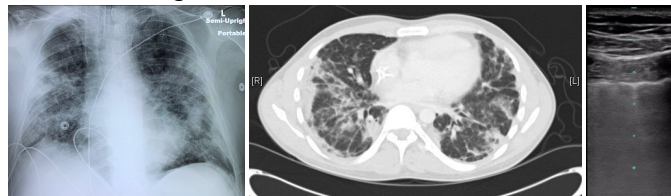
Labs

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



Imaging – (NOT diagnostic, 17% have **negative CT on presentation**)

- **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
- Move ventilator controls and IV pumps OUTSIDE the room if possible (conserve PPE, reduce exposure, save time)

Precautions

- **In correct sequence: STANDARD + CONTACT** (double glove) + either **AIRBORNE** (for aerosolizing procedures: intubation, extubation, NIPPV, suctioning, etc) or **DROPLET** (for everything* else; **ideally** airborne); **improvised cloth masks likely ineffective**
- N95 masks must be fit tested; wear eye protection
- PPE should be donned/doffed with trained observer
- Hand hygiene: 20+ seconds w/ soap/water (likely more effective than alcohol containing hand gel)

Treatment

- Isolate & send PCR test early
- GOC discussion / triage
- **Fluid sparing** resuscitation ± empiric antibiotics
- Intubate early under controlled conditions: **RSI**, no bagging, **VL**, have suction & capnography connected to avoid circuit breaks.
- Avoid NIPPV (aerosolizes virus) unless **individualized** reasons exist (e.g. COPD, DNI status, etc); consider **helmet mask** interface (if available) if using NIPPV; avoid nebulizers; avoid bronchoscopy
- 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 **screen for cardiomyopathy**
- Investigational therapies: consider **clinical trial**, see **CDC** for details:
 - **Remdesivir** - not approved; compassionate or RCT
 - **Hydroxychloroquine** (HCQ), **Chloroquine** (CQ) – available; HCQ has greater activity in vitro than CQ. **Minimal** data for HCQ+Azithro (reduced viral load in small non RCT study)
 - **Tocilizumab** – available; investigational for pt in **shock**
 - **Lopinavir/ritonavir** – available; recent **negative RCT**
 - Oseltamivir - **not** recommended (no evidence of efficacy)
 - **Corticosteroids** – **not** recommended (may be **harmful**)

Prognosis

- **Age** (see figure) and **comorbidities** (**DM** 7.3%, **COPD** 6.3%, **HTN** 6%, **CVD** 10.5%, **cancer** 5.6%) are significant predictors of poor clinical outcome; admission **SOFA** score also predicts mortality.
- High mortality (**50-80%**) in intubated pt w/ comorbidities
- Lab findings predict mortality (**↑ d-dimer**, ferritin, troponin, cardiac myoglobin)
- Expect prolonged MV
- Complications: 2° infection (VAP) (31% in **Chinese cohort**), **Cardiomyopathy** (33% in **US cohort**)

