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)
- R0 = 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

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**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

**Viral shedding**
- Incubation time = 2-22 days
- Case fatality rate (CFR) = 2.3% (likely more effective than alcohol containing hand gel)
- Attack rate = 4-15%
- "Wuhan Virus" NOT "China Virus"

**N95 masks must be fit tested; wear eye protection**
- Place patient in mask, single room, limit/restrict visitors
- Move ventilator patients 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

**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)

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**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

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**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)

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