

McMaster COVID-19 Primer

Overview

Virus = SARS-CoV2, zoonotic origin

Incubation period:

- Up to 14 days
- Average time to sx: 4-5 days
- Evidence of ASYMPTOMATIC shedding (no symptoms but infective)

Mode of transmission:

- Droplet
- Contact (via fomites)
- Risk of airborne transmission w/ aerosol generating medical procedures (AGMP)¹

Risk Factors for Severe Disease:

- Chronic lung disease
- Immunocompromised (chemotherapy, biologics, chronic steroids)
- Underlying malignancy
- Diabetes
- Age > 65
- Cardiac comorbidities (HTN, CAD)
- CKD
- Chronic liver disease

Clinical Presentation – highly varied! If sx acute resp illness, swab!

- Fever – 45% febrile at pres.
- Cough (60-80%)
- Sore throat (14-61%)
- Dyspnea (19-40%)
- URTI sx (5-25%)
- Headache (14%)
- GI sx (4-9%, may precede resp sx)
- Anosmia

Lack of travel does NOT rule out COVID-19 - ++ community spread

Disease Course and Progression

- % Disease severity: mild-mod 81%, severe 14%, ICU 5%
- Can progress to ARDS/hypoxemic resp failure (median time 8-12 days) → **WARNING: can be rapid deterioration**
- Profound cytokine activation syndrome (CAS) – massive inflammatory response (likely drives ARDS, shock, and multisystem organ failure)
- Cardiac: myocarditis, cardiomyopathy, arrhythmia, cardiogenic shock

Laboratory/diagnostic findings

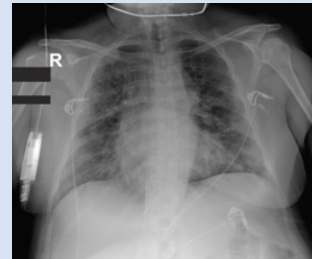
- CBC: ↑WBC + neutrophils (not always), ↓lymphocyte, ↓platelets
- Metabolic panel: ↑BUN, ↑Cr, ↑AST/ALT/tBili
- Inflammatory: ↑CRP, ↑LDH, ↑Ferritin, ↑d-dimer
- Cardiac: ↑troponin (most common, 7-22% in admitted pt in China), ↑pro-BNP, ECG ST ↑ (case reports – diffuse ↑ or localizes to vasc. territory)

Lab Markers of Disease Severity

↓lymphocyte, ↑CRP, ↑LDH, ↑Ferritin, ↑d-dimer, ↑AST/ALT, ↑troponin

Imaging findings

CXR: hazy, BILAT, periph opacities
May not see CXR Δ if very early in dz



CT: GGO², crazy paving³, BILAT



Think about mimickers!

- PE
- MI
- CHF exacerbation
- COPD exacerbation
- Bacterial CAP (consider Legionella)
- Subdiaphragmatic causes of ARDS (e.g pancreatitis)

Clinical Red Flags: Involve ICU early!

- altered LOC
- sat <90% on >6L NP → no improvement w/ venturi mask
- resp distress (incr WOB, accessory muscle use, not speaking full sentences)
- rising pCO₂ (means WOB too high, pt fatiguing and can't blow off CO₂)
- hemodynamic instability despite conservative fluid resuscitation
- severe comorbid illness/high risk for clinical deterioration
- need invasive BP monitoring/frequent labs (arterial line)

¹AGMP = intubation, non-invasive positive pressure ventilation (NIPPV) like BiPAP/CPAP, CPR, high flow nasal cannula (Optiflow), nebulizers, bag mask ventilation, bronchoscopy, chest physio, induced sputum, airway suctioning, high frequency oscillatory ventilation

²GGO = ground glass opacities, seen in setting interstitial lung process (in this case, viral pneumonia)

³Crazy paving = GGO + superimposed intra/interlobular thickening

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Approach to patient with suspected COVID-19

Initial management:

1. **Don PPE**
2. ABCs, IV, O2, Monitors
3. Respiratory status evaluation
4. Conservative fluid resuscitation
5. Consider antibiotics
6. Think about mimickers
7. Reassess!

Initial Assessment:

1. Focused history of symptoms
2. Identify high risk groups
3. Focused physical exam
 - a. Vitals, O2, resp distress/exam
4. Send initial investigations while doing initial management

Initial Investigations

- Labs: CBC +diff, lytes, Mg/Ca/Phos/albumin, BUN, Cr, INR, PTT, AST,ALT,ALP, tBili, ABG/VBG, lactate, troponin
- Micro: BCx x2, NPS (resp viruses+SARS-CoV2), consider urine legionella Ag
- Diagnostics/rads: ECG, CXR; avoid CT chest in initial Mx unless considering PE
- **Note: NPS PCR 95% sensitive if done within 5-7 days of symptoms**
- Order sputum/ETA/BAL for COVID-19 if pneumonia and no other diagnosis

Initial Management

#1: Don PPE – mask, face-shield, gown, gloves

#2: ABCs, IV, O2, monitors – if any concerns re: stability –call SMR/staff!

- Airway patency? If taking to you, patent airway
- Breathing – any resp distress, increased WOB, accessory muscle use?
- Circulation – vitals – hypotension, tachycardia? Cool extremities & peripherally shut down? (think cardiogenic shock)

#3: Evaluate respiratory status/oxygenation: consider intubation early!

- Suppl O2, target sat >92% (unless COPD/CO2 retainer, then 88-92%)
- If requiring >6 L nasal prongs → change to Venturi mask (VM)
 - o If FiO2 req > 60% on VM or respiratory deterioration, alert SMR, may need ICU admission
- DO NOT USE NIPPV (BiPAP/CPAP), Optiflow and nebulizers (aerosol risk)
- Puffers: NOT routine
 - o Use via MDI if underlying COPD/asthma

#4: Fluid conservative resuscitation:

- Do NOT aggressively fluid resuscitate – risk of worsening resp failure

#5: Consider empiric antibiotics based on clinical suspicion of CAP

- CTX 2g IV q24h + Doxycycline 100 mg po/IV q12h (mild CAP)
- CTX 2 g IV q24h + Levofloxacin 750 mg po/IV q24h (mod-severe CAP)
- +/- Oseltamivir 75 mg po BID

#6: Think about mimickers

- Don't get COVID-19 tunnel vision!
- Consider alternate diagnoses outlined above (MI, PE, AECOPD, etc.)

#7: Reassess!

- always re-evaluate your patient after interventions

Goals of care

- At time of presentation, please clearly discuss and document patient's wishes regarding escalation of care in the event of clinical deterioration

Other considerations

Unclear Role for Steroids

- no definite evidence of benefit based on SARS, MERS, influenza data, potential harm
- only use if other indication (stress dose for chronic pred use, AECOPD)

?NSAIDs/ACE inhibitors/ARBs

- no definite evidence to suggest they cause harm
- CCS guidelines: strongly discourage discontinuing ACEi/ARB for COVID-19 pt.
 - o Can hold if other reason: hypotension, AKI, hyperkalemia

Additional resources:

Sunnybrook Donning and Doffing video:

<https://www.youtube.com/watch?v=syh5UnC6G2k>

<https://covidprotocols.org/>

References:

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UpToDate March 2020 "Coronavirus 19 Disease (COVID-19)."

Images: <https://radiopaedia.org/articles/covid-19-3>