COVID-19 and Severe Acute Respiratory Infection

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COVID-19 and Severe Acute Respiratory Infection

Steven Hatch, MD, MSc
PEER/Liberia COVID Seminar
USAID PEER/Liberia Partnership
Objectives

• Characterize current & near-future epidemiology of COVID-19 outbreak
• Provide general clinical features of SARI due to COVID
• Outline clinical management of COVID
There are many respiratory viruses

- Influenza (A, B, ~C)
- Parainfluenza (4 types)
- RSV
- Adenoviruses
- Metapneumoviruses
- Rhinoviruses
- ...and...
Coronavirus

- “Corona” from Latin for *crown* as virus looks like a crown on EM
- Many coronaviruses in circulation among humans
- Usually cause mild dz (colds)
- Circulate in *other* animals too
- SARS & MERS both coronas
89,527 total cases

3,056 deaths

67 countries with cases

Countries with confirmed cases:
- China: 80,174 Cases
- Republic of Korea: 4,212 Cases
- Italy: 16,855 Cases
- Iran (Islamic Republic of): 9,780 Cases
- International conveynce (Diamond Princess): 706 Cases
- Japan: 289 Cases
- Germany: 129 Cases
- Singapore: 106 Cases
- France: 100 Cases
- United States of America: 62 Cases
- Kuwait: 56 Cases
- Bahrain: 47 Cases
- Spain: 46 Cases
- Thailand: 42 Cases
- United Kingdom: 36 Cases
- Australia: 33 Cases

Data source: WHO, National Health Commission of the People's Republic of China
Coronavirus disease (COVID-19) Situation Dashboard

697,244 confirmed cases
33,257 deaths
203 countries, areas or territories with cases

The server has encountered a temporary error due to increased activity on the dashboard, please try again in 30 seconds or refresh the page.
Coronavirus disease (COVID-19) Situation Dashboard

- **827,419** confirmed cases
- **40,777** deaths
- 205 countries, areas or territories with cases

Map showing cases in various countries, with a focus on Liberia.

Countries, areas or territories with cases:
- United States of America: 163,199 cases
- Italy: 105,792 cases
- Spain: 94,417 cases
- China: 82,638 cases
- Germany: 67,366 cases
- France: 51,477 cases
- Iran (Islamic Republic of): 47,593 cases
- The United Kingdom: 25,154 cases
- Switzerland: 16,108 cases
- Turkey: 13,531 cases
- Belgium: 12,775 cases
- Netherlands: 12,595 cases
- Austria: 10,182 cases
- Republic of Korea: 9,887 cases
- Canada: 7,695 cases

Last updated: 01/04/2020 18:00 CET
Clinical presentation: *not* really like flu

- Incubation period ~5-6 days (range 1-14)
- Fever (~90%)
- *Dry* cough (67%)
- Fatigue (38%)
- Sputum production (33%)
- Dyspnea *in only* ~15% of pts
- HA, myalgias/arthralgias, sore throat, chills *all* ~12-15%
Clinical presentation con’t & labs

• Diarrhea (10%? Maybe more in US?)
• Myocarditis; pulmonary embolism (?)
• Exam: +/- rales (can have them but also can be absent)
• “Imaging findings out of proportion to exam”
• Characteristic labs: *leukopenia, thrombocytopenia*
• *Mild transaminitis*
• Elevated LDH, CRP, ferritin, D-dimer
From WHO-China Joint Mission Report:

~80% of cases are mild-moderate

~14% severe
~6% critical

Most recover....

but some die....

CFR ~2.5% (Maybe?)
So how are we supposed to triage COVID cases?

• Have high suspicion for patients with key risk factors
• They are very similar to Comm Acq’ed Pneumonia scores:
  • Age >60
  • Cardiovascular disease
  • DM (pay attention to A1C!)
  • HTN
  • Active cancer
• Note: this does *not* appear to affect children especially badly (only 2.5% of total cases in China were age <19)
Diagnosis

• PCR (NAAT): nasopharynx, oropharynx, or both

• This is a difficult test to perform correctly!

• “A number of factors could lead to a negative result in an infected individual” (poorly obtained, too early, too late, not handled/shipped properly)

Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected
Interim guidance
13 March 2020

Clinical Case Definitions

- Severe:
  - RR >30
  - O2 sat <93%
  - PaO2/FiO2 ratio <300 (if ABG available)
  - Infiltrates on CXR >50% within 24-48 hrs

- Critical:
  - Respiratory failure
  - Shock
  - Multiple organ dysfunction
Quick word about Infection Control and Prevention

Infection Prevention and Control (IPC) Training

Novel Coronavirus (COVID-19): Preparedness and Response

We need to become hypervigilant about fomites

Hand Hygiene

- Best way to prevent the spread of germs in the health care setting and community
- Our hands are our main tool for work as health care workers- and they are the key link in the chain of transmission
COVID is (essentially) not airborne

• Spread by droplets & fomites
• Medical (surgical) masks OK for PPE
• N95 masks only required if doing CPR or intubation (aerosol-generating procedures)
Treatment

- No proven specific antiviral at this time, but some have tried...
- Hydroxychloroquine (more on this shortly)
- Remdesivir (nucleoside analogue)
- Favipiravir (RNA polymerase inhibitor)
- Extreme caution with IV fluids (worsening pulm edema)
- Steroids do not seem to help
- Oxygen!
- Manage comorbidities: CAD, Type 2 DM, AKI don’t stop
- Abx for pneumonia (Ceftriaxone, Azithro)
- Anti-influenza (oseltamivir) if influenza circulating
Hydroxychloroquine

- 36 pts in France
- 20 – drug
- 16 – no drug

Graph shows percentage of PCR positive patients, much lower in pts who got drug

So it works!

(Um...right?)
<table>
<thead>
<tr>
<th>Patient</th>
<th>Treatment</th>
<th>Why Not Studied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hydroxychloroquine</td>
<td>Transferred to ICU</td>
</tr>
<tr>
<td>2</td>
<td>Hydroxychloroquine</td>
<td>Transferred to ICU</td>
</tr>
<tr>
<td>3</td>
<td>Hydroxychloroquine</td>
<td>Transferred to ICU</td>
</tr>
<tr>
<td>4</td>
<td>Hydroxychloroquine</td>
<td>Died</td>
</tr>
<tr>
<td>5</td>
<td>Hydroxychloroquine</td>
<td>Left Hospital</td>
</tr>
<tr>
<td>6</td>
<td>Hydroxychloroquine</td>
<td>Stopped treatment / Nausea</td>
</tr>
</tbody>
</table>
Risk for Health Care Workers

• Remember: fomite & droplet transmission is how this virus spreads (not airborne)

• So adequate PPE with strict adherence to procedure dramatically reduces workplace risk

• From Joint WHO-China commission report: “transmission within health care settings and amongst health care workers does not appear to be a major transmission feature of COVID-19 in China...investigations among HCW suggest that many may have been infected within the household rather than in a health care setting”
¿Questions?