March 20, 2020 COVID-19 Update

Compiled by Katherine Salciccioli MD

Contents include:

Articles reviewed:

- Estimating clinical severity of COVID-19 from the transmission dynamics in Wuhan, China (Nature Medicine)
- Cardiovascular Considerations for Patients, Health Care Workers, and Health Systems During the Coronavirus 2019 (COVID-19) Pandemic (JACC)

Article Title:	Estimating clinical severity of COVID-19 from the transmission dynamics in Wuhan, China
Authors:	Wu JT, Leung K, Busgman M et al
Full Citation:	Wu JT, Leung K, Busgman M et al, (2020). Estimating clinical severity of COVID-19 from the transmission dynamics in Wuhan, China. *Nature Med*. Published online 19 March 2020 at www.nature.com/naturemedicine

Study Question:

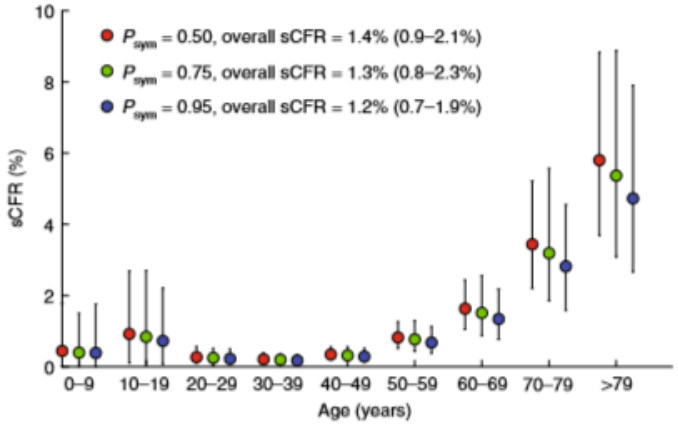
What is the symptomatic case fatality rate? Are there age-related differences?

Methods:

- Infection prevalence on commercial and charter flights (where all tested) used in combination with Wuhan numbers WITHOUT specific links to seafood market (ie from community spread) given concern that milder cases were unlikely to have been tested when health system overwhelmed (vs widespread testing on flights later in course)
- Age-structured transmission model was created using this prevalence data, Wuhan age distribution of cases and deaths, time between onset dates of 43 infector-infectee pairs (previously studied)
- Looked at IFR (infection fatality risk – chance of death for anyone with lab test positive COVID), sCFR (symptomatic case fatality risk – chance of death with positive lab test AND symptoms), and HFR (hospitalization fatality risk)

Results:

- Epidemic doubling time was 5.2 (6.4-6.1) days prior to quarantining
- Younger people much less likely to develop symptoms – age dependent curve, with risk of symptom development with relative increase of ~4% per year
- If symptoms develop, fatality risk for elderly (over 50 and increasing with age) > children > younger adults
- Overall sCFR (risk of death with symptoms and known COVID) = 1.2-1.4%



Conclusions:

- Even with aggressive community mitigation measures it seems likely that at least half the population will be affected given difficulty in controlling transmission
- sCFR may be a better measure to assess severity given current difficulties in ascertaining true denominator for IFR given high degree of asymptomatic infectees
- For now, sCFR of 1.2-1.4% appears much more deadly than 2009 flu (0.026% overall, 0.98% over 65y) but less so than SARS (9.6% overall, >40% over 65y) and possibly similar to 1918 influenza (although data to calculate sCFR not fully available, IFR 2.5%)

Perspective:

Overall, a model was created to help estimate severity while mitigating the effects of overwhelmed healthcare systems with limited testing. Children are less likely to be symptomatic but slightly more likely to die if symptomatic than younger adults, where older adults are both more likely to become symptomatic and more likely to die if symptoms develop. This model helps explain the dramatic differences in 'fatality rate' being seen between China, South Korea, and Italy and gives a nice framework for how to interpret infection vs symptomatic vs hospital fatality rate. While there are multiple assumptions made in applying data to their model, it helps put the current outbreak into context with previous pandemics.

Summary Written by:

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Topic Areas: COVID-19, fatality rate, severity, transmission, age-related differences

Article Title:	Cardiovascular Considerations for Patients, Health Care Workers, and Health Systems During the Coronavirus 2019 (COVID-19) Pandemic
Short Title:	CV considerations in COVID19
Authors:	Driggin E, Madhaven MV, Bikdeli B et al.
Full Citation:	Driggin E, Madhaven MV, Bikdeli B et al. (2020). Cardiovascular Considerations for Patients, Health Care Workers, and Health Systems During the Coronavirus 2019 (COVID-19) Pandemic. *J Am Coll Cardiol*. Published online 17 March 2020 at www.onlinejacc.org

Key Points:

- All data being used currently is based on retrospective, largely single-center series – no prospective cohort or randomized studies were included in the review –mainly from Chinese data, so any resulting biases are in the results
- High prevalence of CVD in patients with severe COVID19 infection: 17.1% HTN, 16.4% cardiac/cerebrovascular dz
- Higher case fatality rate in patients with CVD (10.5%), HTN (6.0%) vs overall 2.3% - prelim data from Italy appears to show similar increased mortality in patients with comorbidities
- Potential mechanisms for this increased risk: coincidence of CVD with aging/DM/HLD, role of COVID19 in worsening underlying CVD (not just CVD causing more severe COVID19 dz), differential expression of ACE2
- COVID19 will likely be more severe in heart transplant patients (as with all viral infections in solid organ transplants) – consideration should be given to testing donors and recipients
- CV sequelae of COVID-19 include myocardial injury (elevated troponin without ECG or echo changes), acute myocarditis (up to 7% of deaths in one small study of 68 deaths), and acute coronary syndrome (similar to flu)
- High prevalence of arrhythmias, although somewhat poorly described to date: up to 17% in study of 138 patients, much more common (44% vs 7%) in ICU vs acute care -> sustained tachyarrhythmias raise concern for myocarditis
- Heart failure was present in up to 23% of admitted patients – unclear if exacerbation of underlying ventricular dysfunction vs new insult
- Septic shock may be accompanied by cardiogenic shock, with mixed shock complicating support and mgmt. decisions
- Coagulation is abnormal in severe COVID19 with 71% of patients meeting criteria for DIC – D-dimer >1 um/dL was independently associated with death in 2 large studies; based on current data, recommend routine anticoagulation
- Multiple therapeutic drugs (antivirals, immunomodulators) are being investigated – many have CV effects and/or interactions with CV drugs requiring careful monitoring and management
- Insufficient data to suggest mechanistic connection between ACEi/ARB and contracting COVID or with illness severity once contracted, so no practice changes recommended at this time
- Consider external mechanical compression devices to protect healthcare workers during CPR
- Full, extensive cath lab and other procedure room cleaning is necessary following procedure on COVID19 patient
- Triaging outpatient visits to utilize telemedicine as much as possible is ideal as well as limiting elective procedures
- In preparing for hospital surges, consider minimizing invasive procedures (ie cath vs open surgery)
- Overall, ensuring continued CVD care in non-infected patients while hospital surges are occurring will be challenging
- Ongoing education, communication between societies (ie recent ACC and ESC consensus statements on ACEi/ARB use), ethical discussions will be needed in period of rapid change

Conclusions:

The cardiology community will play a significant role in caring for patients with COVID19 as well as continuing to provide care for the larger population with CVD. Provider safety can be optimized with telemedicine, delay of non-urgent care, and appropriate PPE use. Prospective trials are ongoing to better understand the relationship between COVID19 and CVD.

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