

## Podcast Contributor Show Notes

### COVID CARDIOLOGY

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**Twitter:** @amalmattu

**Tweet:** [broken heart emoji] COVID-19 causes STEMI's, arrhythmias and heart failure?!? [mind blown emoji] @amalmattu & @mizuhomorrison discuss the cardiovascular effects of COVID-19 & recent CONSENSUS STATEMENT guidelines for management in this covid era. #COVIDFOAM #meded

**Summary:** COVID-19 causes STEMI's, arrhythmias and myocarditis?!? Emergency medicine and cardiology guru Amal Mattu, MD chats with Mizuho Morrison, DO on the cardiovascular effects of COVID-19. They discuss: the known pathophysiology of how viral infections affect the heart; Review the new consensus statement from the Society of Cardiovascular Angiography and interventions (SCAI), American College of Cardiology (ACC), and the American College of Emergency Physicians (ACEP) on how to manage STEMIs; and lastly discuss how cardiac arrest management differs in this COVID era.

**TAGS:** cardiology, infectious disease, covid

#### References:

1. Mahjid, M. Payam, S. et al. Potential Effects of Coronaviruses on the Cardiovascular System: A Review [published online ahead of print, 2020 Mar 27]. *JAMA Cardiol.* PMID 32219363
2. Mahmud E, Dauerman HL, et al. Management of Acute Myocardial Infarction During the COVID-19 Pandemic, CONSENSUS STATEMENT from the Society of cardiovascular angiography and interventions (SCAI), American College of Cardiology (ACC), and the American College of Emergency Physicians (ACEP). *Journal of the American College of Cardiology* (2020), doi <https://doi.org/10.1016/j.jacc.2020.04.039>. PMID:32330544
3. Edelson D, Sasson C. et al. Interim Guidance for Basic and Advanced Life support in Adults, Children and Neonates with suspected or confirmed COVID-19. *Circulation* AHA April 2020. PMID: 32270695

4. Stefanini GG, Azzolini E, et al. Critical Organizational Issues for Cardiologists in the COVID-19 Outbreak: A Frontline Experience From Milan, Italy [published online ahead of print, 2020 Mar 24]. *Circulation* 2020. PMID: 32207994

## Segment notes

### Cardiovascular effects of COVID 19

myocardial infarction, arrhythmias, myocarditis...these are just some of the cardiovascular effects of COVID 19. Im mizuho morrison...and EP...and here to shed some light on the troublesome sequelae that this virus is causing and how to manage these in the covid era is emergency physician and cardiology guru Dr. Amal mattu from University of Maryland in baltimore...

### 3 clinical cases:

- **40-50 yo CV risk factors**, covid type sx, 12 lead ECG on arrival STEMI in LAD → should go to CATH lab (Cath was negative), Covid 19 + = final dx: myocarditis looking like a STEMI
- **53 yo male STEMI** on ECG anterior wall → cath lab (more hx +fever, +cough), cancel CATH and send pt to ED with myocarditis presumptive Dx. In ED, repeat 12 lead, pt has new RBBB with STEMI across precordium (looks like an evolving anterior stemi) trop rising. Covid +. Still dont want to do cath. Day 3 they finally do CATH and find a large clot in LAD. EF is now 30% bc they waited 3 days to cath.
- **ICU Case:** 54 yo woman +covid admitted to ICU, intubated. Day 7 pt starts to improve, but day 8, she deteriorates and develops heart failure, day 9 she dies of myocardial decompensation.

### Miz: So what does COVID 19 do to the heart?

#### Amal talking points:

- Pt not dying of hypoxemia
- Pt dying of cardiac problems instead...so what is going on??
- Sxs of improvement in pulmonary function and a week in to dz they would die of cardiac failure
- STEMI common (myocarditis)
- So what is going on?? Pulmonary disease causing cardiac sequelae
  - Viral infections (influenza in particular) is often associated with cardiovascular implications (spanish flu)
  - Often sx develop day 7-10 in a delayed fashion
  - Hence cardiovascular events were the main cause of death in previous mini-pandemics
- No large studies on this b/c it doesn't exist (mostly case series, reports, editorials)

**3 major ways that viral infections affect the heart:** (Mahjid, M. Payam, S. et al. Potential effects of Coronavirus on the cardiovascular system a Review. JAMA Cardiology 2020)

1. MI risk
2. Heart failure risk
3. Arrhythmia risk - V fib, A fib, proinflammatory effects, myocarditis

**Miz: Explain to me how viruses can INDUCE MI?!**

**Amal: Handful of mechanisms**

- Inflammation → plaques rupture
- Viruses induce inflammation, increases vulnerable plaques → lead to MI (type 1, thrombotic occlusion)
- Hypercoagulability (PE/DVT/MI)
- Sympathetic stimulation

**Miz: and what about heart failure? Is this simply due to heart muscle dying from missed MI?**

**Amal:**

- Mechanisms leading to heart failure:
  - Sympathetic stimulation increasing O2 demand
  - But also myocarditis (decreases cardiac function) → heart failure
  - (article by Driggen et al. J. Amer Coll Cardio 2020, pre-journal publication)
    - Myocarditis attributed to cause of death
  - Pro-inflammatory cytokines → cause myocardial depression and decrease systolic function

**MIZ: So what about troponins? Should we be drawing and checking these more often to detect myocardial injury? Or detect severity?**

**AMAL:**

**Miz: In the 3 cases you mentioned, the first two cases where they presumptively made the myocarditis vs. STEMI dx...are there any distinct differences between these two on ECG??**

**AMAL:** can't tell diff

**MIZ: So what do we do? If we can't distinguish myocarditis vs. stemi that suggests they need to go to CATH first?! But the push back we are often getting from CARDS is that they dont want these COVID pts in cath lab...so what do we do?!**

**AMAL:** thrombolytics

- ACC survey
- CONSENSUS STATEMENT Society of cath lab organizations and interventional cardiology counsel as well as ACEP came out with recommendations recently
  - Literature has show that PCI is better than lytics for the last 30 years...why are we going to throw away good solid evidence?!
    - PCI should still be gold standard (optimal way of treating)
    - Echo may be reasonable

- May be longer door-balloon times (national data registry is now accounting for delays)

**MIZ: so we are NOT going to be held to the strict 90 min rule?!**

**MIZ: What about STEMI mimics? Are we seeing more of those?**

**Amal:** pocus

**MIZ: For those of us who just can't get a pt to cath lab...What harm could we be doing using LYTICS?**

**Amal:**

- Myocarditis complications
- Risks of bleeding
- Rescue PCI may still be needed

**Miz: So I work in one place that doesn't have a cath lab...what should we be doing in those shops?**

**Amal:**

- joint decision making with cardiology (get help!) discuss plan of care
- Assume every pt is covid + use PPE in all cases

**Miz; Ok last topic...CARDIAC ARREST and COVID**

**AMAL:** AHA CIRCULATION update 2020

- Reducing provider exposure (PPE)
- Limit personnel
- Mechanical compression devices
- Airway issues that lower risk of aerosolization
  - Viral filter
  - intubation early and connect to vent early
  - Avoid bagging if possible
  - VL > DL
  - **MIZ: Amal, What about compressions during intubation...should we be pausing compressions during intubation ?**
    - Hold compressions & use Clear sheet/box
    - Most experienced provider
    - Avoid BVM if possible go with passive oxygenation, may need to bag them
  - Consider appropriateness of resuscitation

**TAKE HOME POINTS**

**References:**

5. Mahjid, M. Payam, S. et al. Potential Effects of Coronaviruses on the Cardiovascular System: A Review [published online ahead of print, 2020 Mar 27]. *JAMA Cardiol.* PMID 32219363
6. Mahmud E, Dauerman HL, et al. Management of Acute Myocardial Infarction During the COVID-19 Pandemic, CONSENSUS STATEMENT from the Society of cardiovascular angiography and interventions (SCAI), American College of Cardiology (ACC), and the American College of Emergency Physicians (ACEP). *Journal of the American College of Cardiology* (2020), doi <https://doi.org/10.1016/j.jacc.2020.04.039>. PMID:32330544
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