

ERCAST Show Notes

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COVID-19: Inside New York City

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In this episode I speak with Dr. Reuben Strayer, emergency physician at Maimonides Medical Center in Brooklyn, NY. The news is rife with reports of New York's escalating COVID-19 cases and there are lessons we can learn from how they are responding.

Discussion includes

- Managing a massive surge (which is only going to get worse)
- Ventilator allocation planning
- Hot/Warm/Cold zones
- High Flow Nasal Cannula O2 for preox
- Use (or non use) of non-invasive ventilation
- Variations in COVID presentation
- COVID and cardiac arrest
- In harm's way when PPE runs out

- **In one week, Strayer's ED went from seeing 300-400 patients/day with a variety of complaints to 200-300 patients/day, HALF afflicted by COVID-19.**
 - His department is split into 3 zones:
 - Acute care hot zone --
 - For COVID patients who need resuscitation and/or aerosol-generating procedures.
 - Providers wear the highest level of PPE.
 - Acute care warm zone --
 - For COVID patients who don't need aerosolized procedures.
 - Lower level of PPE.
 - Cold zone --
 - Subacute area for people suspected NOT to have COVID.

- Lower level of PPE. Providers wear N95 masks under a surgical mask with goggles, even if seeing ankle sprains or working at their desk.
 - “Wearing good but not perfect PPE is far better than wearing no PPE.”
- **PPE is reused, in hopes of not running out.**
 - For the past few weeks, providers have used one N95 mask per shift. If they had been using N95s as single use devices, they would have run out long ago.
 - Every effort is made to minimize exposure to viral particles. This means keeping the N95 on under a surgical mask as long as they can.
- **Reuben’s thoughts on COVID and cardiac arrest. Is resuscitating these patients worth the risk?**
 - If the patient codes in the ICU due to COVID pneumonia, further resuscitation should not be done since there is nothing additional to offer that patient (other than ECMO),
 - If an unknown, undifferentiated cardiac arrest patient comes to the ED, treat the patient as you would anyone in arrest, but use maximal PPE.
 - A potential modification to your arrest algorithm is to place an LMA (with a filter if you have one) rather than doing bag-valve-mask ventilation. BVM is thought to be more aerosol-generating.
- **How deeply should we put ourselves in harm’s way if we run out of PPE?**
 - If you don’t have any PPE, then you shouldn’t expose yourself to heavy doses of the virus.
 - You can argue that it’s unethical and irresponsible to refuse to provide care to patients because you deem your PPE to be imperfect. Contrary to this, some describe the COVID+ patient as akin to a disaster zone and you only enter a zone when the scene is safe. If you enter without PPE, that is not a safe scene.
 - Strayer believes that we can avoid completely running out of PPE by reusing the PPE that we have. This means using one mask per shift, bringing it home in a sealed bag, potentially bleaching it and reusing it.
- **What should be our approach to non-invasive ventilation?**
 - Unless you have viral filters for the inspiratory and expiratory arms of non-invasive ventilatory machines, they are hazardous to use.
 - Without proper viral filtration, COVID virus will essentially be spewed into the atmosphere by these machines.

- If you have viral filters, non-invasive ventilation is an excellent option, especially if you have a dearth of ventilators.
- **High-flow nasal cannula (HFNC) has been used with great success in managing non-crashing but dyspneic, hypoxic patients.**
 - HFNC has been helpful both to relieve severe dyspnea as well as to correct extreme hypoxia.
 - It is too early to say how these patients will fare in the long run. But even if many ultimately require intubation, having an option for delaying intubation if ventilators are scarce is helpful.
 - This can be delivered using a dedicated device with humidified HFNC capacity. The advantage is that you can titrate FiO₂ and flow rate independently. Alternatively, you can use a conventional nasal cannula at the highest rate tolerable to the patient.
- **COVID patients present in 3 ways to the ED:**
 - Mildly ill with a little dyspnea, fever, malaise, and no hypoxia.
 - These patients go home.
 - Moderately ill with more significant dyspnea and hypoxia.
 - These are first put on nasal cannula O₂. Most are admitted, but some improve to the point of being able to go home in a few hours. In the ideal world, you would send them home on home O₂.
 - If they fail nasal cannula O₂, HFNC is started.
 - Severely ill patients clearly need to be intubated from the outset.
 - These patients are preoxygenated with nasal cannula and non-rebreather, unless they were already on HFNC and then they're intubated with HFNC in place.
- **Now that the surge has happened with COVID in Strayer's ED, what has surprised him about how things are playing out?**
 - First, Strayer is confident that the surge hasn't yet happened. He is anticipating "mountains of patients" and despite their aggressive preparation, he fears they are not going to have the capacity to care for everyone who'll need it over the next month.
 - He is surprised by how little PPE we have. It is astounding how quickly hospitals are getting to the point of needing to ration PPE to providers.
 - He's surprised by how few non-COVID patients have been coming to his ED. Patient volumes are dramatically down.
- **Who is being quarantined in New York City?**
 - New York officially disbanded quarantine for asymptomatic patients or providers.

- For providers with a positive COVID test, the policy is to stay home until you've been asymptomatic for 3 days and ≥ 7 days from the onset of illness.
- **How are COVID tests being used?**
 - It's been a roller-coaster. They went from having access to no tests, to very limited tests, to plenty.
 - When the testing capacity increased, they were testing lots of patients, and virtually all were coming back positive.
 - Now they have reverted back to having limited (if any) tests. Currently, only people who are sick are tested, and with the high prevalence of COVID in the community, the results are almost always positive and rarely helpful.
- **Are chloroquine or hydroxychloroquine being prescribed?**
 - Due to dwindling supply and insufficient supporting science, at Strayer's institution hydroxychloroquine is only given to very sick patients and with ID approval.
- **What is the protocol for ventilator sharing and/or rationing?**
 - Strayer's hospital is enacting a shared ventilator policy. The question is how much COVID patients will be harmed by sharing a ventilator with another person vs. the benefit of sharing. They are hoping that 1 ventilator can safely be used for multiple patients.
 - New York State has developed a ventilator allocation guideline which Strayer simplified and shared on [his blog](#). The blog also includes a comprehensive [intubation checklist](#).
 - The [Ventilation Allocation Protocol](#) has several steps:
 - 1) **Assess for exclusion criteria.** Excluded are patients who've had a cardiac arrest, those who wouldn't normally meet ICU admission criteria based on their prognosis (ie. metastatic cancer, severe dementia), those who are DNR/DNI, and patients who the provider believes has a condition that would severely limit the prognosis despite maximal care.
 - 2) **Assign priority: blue, red, yellow, green.** This is based on a quantification of short term mortality using the [SOFA score](#). It considers a series of organ systems and uses surrogates for organ dysfunction as a way of determining short term mortality.
 - Blue (SOFA >11) -- Lowest priority for a ventilator due poor prognosis and being the least likely to benefit.
 - Red (SOFA <7) -- Highest priority for a ventilator and most likely to survive.

- Yellow (SOFA 8-10) -- 2nd priority due to being less likely to survive.
 - Green -- No ventilator required.
- 3) **For patients on ventilators, reassess priority at 48 and 120 hours.** As you approach a potential scarcity of ventilators, you need to assess and triage the patients currently on ventilators to identify those who might need to be removed from them (blue category patients) in order to free up a ventilator for a triage category red or yellow patient.
- When the number of red priority patients is greater than the number of ventilators available, ventilators are assigned by randomization or lottery. Physician judgement and other clinical factors are not used to further sub prioritize patients.
- **What's it like doing a 12 hour ED shift in PPE?**
 - Being in an N95 for 12 hours is uncomfortable, gives Strayer a headache, and prevents him from being able to eat/drink.
 - But he isn't super concerned about the discomfort given the larger context of what's happening now and what he's expecting to occur in the very near future.
- **How does Strayer anticipate his future shifts will look like in the next few weeks?**
 - He's anticipating needing to work 12 hours on and 12 hours off every day for some period of time while in the worst phase of this disaster.
 - He's preparing for shifts of 6 consecutive hours in the hot zone in maximal PPE doing resuscitations, intubations, and managing cardiac arrest. No time to eat. No time to use the bathroom.

References:

1. EM Updates [Ventilation Allocation Protocol](#), March 20, 2020
2. EM Updates [Airborne Isolation / COVID19 Intubation Checklist](#), March 14, 2020
3. van Doremalen N, et al. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. N Engl J Med. 2020 Mar 17. [PMID: 32182409](#).