

AHA COVID-19 Clinical Guidance Series
Acute Coronary Syndromes

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Speaker 1:

Welcome and thank you for joining us for this podcast brought to you by the American Heart Association. This podcast is part of a series focused on sharing information with healthcare providers who are caring for patients during the COVID-19 pandemic.

Peter Mason:

Hi. My name is Peter Mason, and then this is your power bite, COVID-19 and its impact on acute coronary syndromes. COVID-19 has had a profound impact on the care of all patients, but especially those with cardiac disease. We know that patients with cardiovascular disease and cardiovascular disease risk factors are at particularly high risk of developing COVID-related morbidity and mortality. Interestingly and unexpectedly, during the COVID surge in the US and really throughout the globe, we've seen a dramatic drop in acute coronary syndrome presentations to the hospital and particularly those with ST-elevation myocardial infarction.

Peter Mason:

This phenomenon may actually reflect a bigger systemic problem and unintended consequences of the surge response and sheltering as patients have avoided emergency departments and hospitals for their non-COVID related conditions.

Jacqueline Tamis-Holland:

Hello, everyone, and welcome to this podcast on the management of patients with acute coronary syndromes during the COVID-19 pandemic. My name is Jacqueline Tamis-Holland, and I'm an interventional cardiologist working at Mount Sinai Morningside Hospital in New York City. I'm joined today by my co-host Dr. Peter Mason, who is also an interventional cardiologist, an associate professor of medicine, and director of the cardiac catheterization (cath) laboratory at Froedtert and Medical

College of Wisconsin. Peter, I understand your hospital had a very systematic approach to preparing for this pandemic. Can you tell me the measures you took in the cath lab to prepare for this surge?

Peter Mason:

Yeah, Jacqueline. In Milwaukee and the Froedtert Medical College of Wisconsin in particular, our surge planning began in early March and really greatly benefited from the experience and lessons learned from institutions and colleagues at COVID hotspots around the globe. As we were not really fully affected by the virus in our community, we dedicated our initial efforts to search planning and the definition of best practices within this really uncertain time.

Peter Mason:

Some of the critical things we did within the cath lab in the management of acute coronary syndrome (ACS) is to identify and procure the necessary personal protection equipment or PPE, develop lab policies and procedures for the management of patients with COVID-19 infection and those considered persons under investigation or PUI. We changed our staff models to encourage social distancing and safety, and we canceled elective cases to help promote social distancing and ensure patient and staff safety, as well as to conserve resources, both PPE and human, for surge response. For cardiac emergencies, we identified a dedicated COVID room and COVID supply cart.

Peter Mason:

We work with our emergency medical system (EMS) and emergency department (ED) colleagues to help identify at-risk and infected patients and developed guidelines for patient and staff safety. We had COVID working groups within our division and Heart and Vascular Service Line, which met regularly to discuss key information and developments, generate consensus on policies and procedures, and we help disseminate information, as well as operationalized changes in the management of ACS and other cardiac-related conditions. For ACS in particular, we stressed to our colleagues the importance of recognizing COVID-related complications, as well as recognizing the fact that many COVID patients hospitalized would have potentially incidental rises in their cardiac biomarkers.

Peter Mason:

We educated our colleagues about prevalence and potential problem and stressed the importance of fighting the infection first and treating only those with true ischemic syndromes or complications. Although contingency plans were developed for more drastic measures involving things such as lytics (thrombolytic agents) or ST-segment elevation myocardial infarction (STEMI), we did not formally change any of our protocols for ACS patient management. Now, approximately six to eight weeks later, our regional surge has passed us and it was not overwhelming. We're beginning to reopen our system for elective outpatient cardiac services. Jacqueline, I know New York has been one of the hardest hit cities in the entire world. What were your experiences in treating patients with ACS?

Jacqueline Tamis-Holland:

Before the big surge, Mount Sinai Morningside and other hospitals throughout the system sat down and really created policies, internal policies for how we would manage our patients with STEMI and NSTEMI during this time. Much like the policy created by Society for Cardiovascular Angiography and Interventions (SCAI) in the American College of Cardiology (ACC), we agreed that we would take all patients with STEMI to the cath lab when appropriate and to select only really moderate to high risk patients with non-STEMI for cath lab management. Shortly after this meeting though, there was a flood

of patients to our ER (emergency room). Our cath lab staff, our fellows, our nurse practitioners, our attendings, and our medical assistants were all sent and deployed to all other parts of the hospital.

Jacqueline Tamis-Holland:

Essentially our cath lab was literally closed with the exception of emergencies for the last six weeks. When reviewing our troponin data, we did find that almost 90% of our patients on admission had troponin testing done. Among those that had troponin testing done, about one-third of them had elevated troponins. Very few of our patients had levels greater than one. In almost all of these cases where we noted elevated troponins, we found that really nobody had... Very few had any accompanying clinical syndrome to suggest an ACS.

Jacqueline Tamis-Holland:

I think at the current time we'd all agree that the troponin positives we are seeing likely reflect myriad etiologies, including myocardial injury from either myocarditis or an unrecognized pulmonary embolism (PE) or some other form of a myocardial injury. Most of our patients are not really having a clinical syndrome, so it's less often a result of a type one or a type two infarction. In our hospital, only a small percentage of the troponin elevations were modest in size and this was usually seen in our older patients or patients with underlying risk factors.

Jacqueline Tamis-Holland:

Because we really didn't know the etiology for those patients with elevated troponins, particularly the modest ones, if there were no other underlying contraindications we treated them with standard guideline directed medical therapy. But a lot of our patients had contraindications and couldn't necessarily get one type of therapy. For the rest of the patients or for all of them, after optimization of their care and they were sent home, really nobody went to the cath lab. Only one of our patients with ACS went to the cath labs.

Jacqueline Tamis-Holland:

Over the next couple of weeks, now that those patients who have recovered and are doing well and our labs are starting to open up again, we're hoping to bring some of these patients back for further evaluation, particularly the ones who had a true clinical scenario of NSTEMI (non-STEMI). With respect to our STEMI, we saw a tremendous reduction in the overall cases, including the STEMI activations. Quite frankly, in the last six weeks, we haven't seen a single STEMI that actually underwent primary PCI (percutaneous coronary intervention). The few activations we did have were either false positive patients or patients who were terminally ill and really not an appropriate candidate for our labs, so that's why we never took anybody to the lab.

Jacqueline Tamis-Holland:

But when you look at the data from Dr. Sripal Bangalore and colleagues at NYU, you see that about half of patients with COVID and ST-elevations on EKG (electrocardiogram) were really STEMI mimics. They define STEMI mimics as patients with either nonobstructive disease or normal ejection fraction with no underlying symptoms. It seems that we're seeing in general that a large proportion of patients with STEMI on EKG are not actually STEMI at all. What about you, Peter? What's your sense of this STEMI volume?

Peter Mason:

Similar to your experience, we definitely saw a reduction in overall STEMI volume. I think this was coincident with the declaration of the national state of emergency on March 16th and there was constant safer at home order on March 23rd. That's when we really began to see a drop in ACS volumes and STEMI activations at our institution. This too was observed throughout the nation and globe. In a recent online ACC poll published earlier this week, over 95% of the 500 respondents reported decrease in STEMI volume at their institution with 56% reporting a greater than 50% decline. Then over the last two to three weeks, we've seen several publications that have helped validate this as a true global phenomenon.

Peter Mason:

From Spain, Rodriguez and colleagues reported a pooled analysis of their 71 hospital STEMI care network where they found that there was a 40% reduction in primary PCI in STEMI and a 50% reduction in ACS volume. From Austria, Dr. Metzler and colleagues reported a pool analysis of 17 public PCI centers and reported that between the first and fourth week of March, there was a 24 and 49% relative risk reduction or relative reduction, sorry, in STEMI and NSTEMI volumes respectively. Compared to historical trends, this represented a per month difference between observed and expected cases of approximately 275 cases.

Peter Mason:

Finally, from the US (United States) pool results from a nine high volume PCI center study reported a 38% reduction in STEMI activations during the month of March compared to the preceding two month period. Interestingly and anecdotally, over the last several weeks, we've seen a rise in ACS volume and STEMI activations compared to the preceding four or five week. Jacqueline, I know there are a number of concerns and theories about the observed drop in STEMI and ACS volume. What is your understanding and opinion about this?

Jacqueline Tamis-Holland:

Peter, there are two competing ideas for the reduction in STEMI numbers and some people have postulated that there may be biologically fewer MIs because there's a reduction in the number of people experiencing plaque rupture. In support of this, there is certainly more sheltering and family support going on now. Work hours are generally fewer. People are not commuting and people may be working less in general. Additionally, since people are not eating out and perhaps they're sleeping more, they may actually be following a healthier lifestyle.

Jacqueline Tamis-Holland:

On the other hand, studies have shown that in the early days after 9/11, the prevalence of post-traumatic stress disorder was 10 to 15%, which is much higher than we see during ordinary times. In keeping with this, during these stressful times during 9/11, they saw a 25% increase in AMI (acute myocardial infarction) volume in New York City during those times. I would suppose that in the current scenario, one would expect similar consequences. In my opinion, it's certainly a stressful time. People are more fearful about their health, the health of their loved ones. They have a lot of stress about work and about the economy.

Jacqueline Tamis-Holland:

Additionally, the data from the flu epidemic has shown, if anything, there's a six-fold higher number of infarctions during this time. Therefore, I would expect that this viral syndrome, which is much more

severe, would probably present with similar findings. Finally, let's face the facts. In New York City at least, a lot of our parks are closed. Our beaches are closed. Our gyms are closed. People are actually not following a healthy lifestyle as opposed to the idea of sheltering at home and having a better lifestyle. In the end, while I think it is possible that there are biologically fewer events, I think it is more likely that people are just not coming to the hospital. What do you think, Peter?

Peter Mason:

Yeah, I agree that the most likely explanation is that people are staying at home. Frankly, this is the most concerning explanation. Patients are frankly scared to even leave their homes, let alone to seek medical care in an emergency department or a hospital. I think certain patients may be confused about their symptoms and whether they're shortness of breath, fatigue or chest pain is caused by an infection or a cardiac process. Then anecdotally, I know that some patients have even said that they recognize that their symptoms were cardiac, but they self-sacrificed. They stayed at home assuming that their symptoms would get better or that their predicament did not warrant attention compared to those that were suffering from COVID.

Peter Mason:

Regardless, I think it's becoming clear that the global COVID pandemic and social distancing has had a huge impact on non-infection related medical care and outcomes. Recent CDC data and an article in *The New York Times* indicated that there's a very large mortality burden that exceeds the COVID statistics, as well as the historical trends. It's hypothesize that this gap is likely explained by an under reporting or under testing of COVID related deaths, as well as the unintended consequences that sheltering may have had on patient's access to medical care for non-COVID related conditions.

Peter Mason:

Again, from, I discussed earlier, Dr. Metzler and colleagues from Austria, but they estimated that about 270 people may have stayed home with their heart attack during the month of March. Then if they assumed a 40% mortality for the medical management of STEMI, that this could result in a theoretical death toll of about 110 patients due to undertreatment. Interestingly, this number, 110, actually exceeded the cumulative number of COVID related deaths in Austria on March 29, which was 97.

Peter Mason:

Yet to be determined more longer term implications may even be equally or greater concerning and that's the potential for us to see a surge of cardiac patients with sequela of untreated cardiac emergencies or acute phenomenon or even undertreated chronic cardiac disease. We might see an influx of patients with severe cardiomyopathy and cardiogenic shock, ventricular arrhythmias from their untreated demise, as well as mechanical complications from AMI, such as VSDs ventricular septal defects, free wall ruptures, ischemic MR (mitral regurgitation), and ventricular aneurysms.

Jacqueline Tamis-Holland:

Yes. Peter, we are seeing a little evidence of this right now in New York City. When we look at the calls to 911 for cardiac arrest and we look at that from last year at this time, there were 69 calls on average a day for cardiac arrests in New York City to 911. Of these, about 39% of those patients had died either in the hospital or on arrival. During the month of March to April this past month, there were an average of 195 calls to 911 for cardiac arrest during these times, which is practically three times as high as what they saw in the past year. Of these, two-thirds of the patients had died.

Jacqueline Tamis-Holland:

While I realize it is hard to tease out cardiac arrest from COVID versus those arrests that occurred from an AMI or a heart failure or arrhythmias, you'd have to think that at least some of this increase is attributed to the cardiac etiologies, such as arrhythmias, or maybe even mechanical complications of an infarct because of untreated infarcts. I want to thank you, Peter, for this great discussion. To sum it all up, I have a few important points that I really think we need to emphasize. During any public emergency or pandemic, hospitals need to prepare well in advance and create protocols and policies on how best to manage patients. Ensure adequate staffing and ensure adequate supplies.

Jacqueline Tamis-Holland:

Managing ACS during these times has really been a bit tricky as we are certainly seeing fewer ST-elevations infarctions and ST-elevations infarctions for other reasons beyond infarction, beyond an acute MI (myocardial infarction). We definitely see troponin elevations that may be often related to myocardial injury and not a true MI. Now, it's more important than ever that we rely on our good clinical judgment when deciding on how best to treat these scenarios. Despite our cath labs being prepared throughout the country, we instead have seen an overall reduction in the number of true cases of ACS. This, unfortunately, is likely related to a reduction in the number of patients who call for help.

Jacqueline Tamis-Holland:

This needs to change. Organizations such as AHA (American Heart Association) must emphasize to the public that time is muscle. If someone thinks they're having a heart attack, they need to call 911. EMS agencies and hospitals have really taken great precautions to ensure the safety of our patients. We are ready for you, and we are going to make your stay here safe. Please do not be afraid to call 911 and come to the hospital.

Peter Mason:

Thank you, Jacqueline. I really echo your comments and state that it's really our imperative that as we see the decline in COVID related infections and mortality, that we stress to the American public the importance of accessing medical care for both acute and chronic heart conditions. But we too, as you stated, have to make sure that we earn the trust of the public and making our healthcare system safe. Thanks, again. This has been a great discussion. For the audience out there, please return online to AHA Professional Heart Daily for additional podcasts planned for this series, which include COVID-19 and stroke, diabetics, pulmonary hypertension, and other concurrent cardiovascular diseases during this disruptive time in healthcare delivery.

Speaker 1:

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