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Shedding Light on the Brain After COVID-19: Assessing the Spectrum of Neurological Risk

Dr. Wilner:

Although respiratory symptoms are the most common complaint associated with COVID-19 infections, neurologists have been faced with a myriad of symptoms including encephalopathy, stroke, and Guillain-Barre syndrome. So, to shed some light on the spectrum of neurologic symptoms that occur with COVID-19, today we're sitting down with an expert from New York City, an early epicenter of the disease.

You're listening to *NeuroFrontiers* on ReachMD. I'm Dr. Andrew Wilner, and joining me is Dr. Jennifer Frontera, a neurocritical care specialist and professor of neurology at the NYU Grossman School of Medicine. Dr. Frontera, welcome to the program.

Dr. Frontera:

Great to be here. Thanks for having me.

Dr. Wilner:

To start us off, Dr. Frontera, can you describe your medical background that led to your research on COVID-19?

Dr. Frontera:

Sure, so I am a neurointensivist and a stroke physician. I primarily work in the ICU setting and during the surge in New York that began almost a year ago in March 2020, I was covering not just neurocritically ill patients, but also COVID patients at that time and, you know, we had quite a number of patients and really were practicing, at that point, disaster medicine with huge numbers of patients that have outstripped our personal and hospital resources for a period of time.

Dr. Wilner:

And has that changed? Is that better now?

Dr. Frontera:

It's substantially better. We certainly learned from the spring, and so our January surge was not nearly as overwhelming as it was in the springtime. I think we've also had fewer patients – just really a fraction of what we saw in the spring, in terms of ICU level COVID-19 patients. So it's been much more manageable, and we had some systems in place to try to deal with the influx of patients that we really were not prepared for at all in the spring.

Dr. Wilner:

Well, you're a neurocritical care specialist, so most of your time is spent in intensive care unit, I imagine, with a lot of patients who probably aren't speaking, right? They're hooked up to various machines, including ventilators. And I'm a neurologist and I'm here in Memphis, Tennessee and we've also seen COVID patients, many of them ending up in the ICU. But what are neurologists being called for? What are the neurologic complications of COVID-19?

Dr. Frontera:

Yeah, so back in the spring we started looking at this prospectively. We had a little bit of lead time, based on what had happened in China and in Italy prior to our surge in New York City. And so, we had to set ourselves up to prospectively follow the patients that we saw as neurologists across the NYU enterprise, which comprised of four hospitals basically seeing COVID patients. So, we prospectively captured the neurological complications that we saw in these patients, who were primarily hospitalized for COVID-19. At that time in the spring, a lot of folks who had primary neurological injury did not present to the hospital, unfortunately. So, a lot of people that had strokes and so forth stayed home, because of fear of contracting COVID by going to the hospital. So, a lot of what we were

initially seeing was complications of COVID itself. The most common thing we saw was, as you had kind of alluded to earlier, encephalopathy or altered mental status. That was by far the most common complication – 50% of all of the neurological events that we documented were encephalopathy, most frequently due to hypoxia but also due to uremia, because renal failure is common in severe COVID. And you know, we also saw septic encephalopathy and then a spattering of other things like hyponatremia. Very early in the pandemic, we noticed that these patients were coming in with relatively severe hyponatremia to the, you know, 100 to 120 – like, extremely low sodiums that's been seen in respiratory illnesses like Legionella, but quite unique and related to IL-6 levels for COVID patients, so kind of a variety of SIADH we were seeing in these patients. So, hyponatremic encephalopathy was also something that we observed. You know, the things that get a lot of media attention, like strokes and intracerebral hemorrhages, were also on the list of top neurological events in these patients with COVID.

Dr. Wilner:

For those just tuning in, you're listening to *NeuroFrontiers* on ReachMD. I'm Dr. Andrew Wilner, and I'm speaking with Dr. Jennifer Frontera about the latest data on the neurological impacts of COVID-19.

So, Dr. Frontera, I understand you've been able to take what you did in New York and nationalize it. Can you tell me about the national database?

Dr. Frontera:

Yeah, so we got funding from NIH and NINDS to set up NeuroCOVID Biobank and Databank. And so basically, we developed common data elements to capture different neurological events. In this particular databank, we're looking at both new neurological events in the context of recent COVID infection, but also worsening of underlying neurological diseases. So, we are interested in, you know, does someone's multiple sclerosis get worse? Does their dementia progress at a higher pace than it would if they did not have an infection? So those are some of the questions we're also hoping to answer and of course, you know, the database is set up so that it can be longitudinal as well. We use a specific type of identifier, called a global unique identifier, which allows the data that's coming from different sites to still be identified, but we can go back and try to link it to, data that we collect moving forward. So, that's kind of a special feature and so we are hoping to gather longitudinal data so that we can understand basically long-term sequelae of COVID, which is right now a major question. you know, what's going on and how long do these effects last?

Dr. Wilner:

So, let's get a little granular. Give me an example. I'm in my clinic, I see a patient. The patient has Guillain-Barre syndrome. We send him to the hospital, and the patient says, "Oh, yeah, I had COVID a month ago." So, thinking, well is this related - it's not related – I don't know. So, I'm gonna just go take care of the patient, but how do I get this patient in the database, or do I?

Dr. Frontera:

So, what we're doing right now is basically recruiting sites. So interested sites can email us. We have a website that we can provide the link for. And so what we do have to do is set up a formal data use agreement between institutions, but we certainly are interested in not just capturing like – what's going on at large academic centers, but also what's happening in community centers and different population types – maybe rural and urban, as well as suburban – so we can, you know, understand if we're seeing things that are regional, or things that may vary based on what types of exposures folks have. So the way to get involved really is to start off by emailing our group and we can onboard sites that are interested. There is some remuneration for the data entry component of this because we understand that, you know, it does take up folks' time to enter this kind of data and try to enroll these patients. But, you know, the bigger the representation we can have of the U.S. population and its diversity, the better our understanding will be of how common events are and who is most at risk.

Dr. Wilner:

Well, before we wrap up, Dr. Frontera, can you just tell me a little bit more what's happening in New York City? Is everyone vaccinated now?

Dr. Frontera:

We are getting there. I think certainly here we have much more demand than we have supply, so there has been some vaccine hesitancy in certain populations, but I think there's been a lot of efforts to kind of overcome any cynicism or skepticism about vaccination in those communities. So, I think at this point, we have a very high demand and ideally the supply chain will try to keep up with that demand and we'll continue vaccinating folks, so we can get back to some semblance of normality – whatever that may be – moving forward.

Dr. Wilner:

Well I certainly look forward to reading the papers that are gonna come out from the database. Dr. Frontera, it's been a pleasure to discuss COVID-19 with you. Thank you very much for joining me on the program.

Dr. Frontera:

Thanks very much for having me.

Dr. Wilner:

I'm Dr. Andrew Wilner. To access this and other episodes in our series, visit ReachMD.com/NeuroFrontiers, where you can be part of the knowledge. Thanks for listening.