

# Stroke Care Trends During the COVID-19 Pandemic

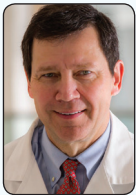
Three neurointerventionalists share their experiences treating stroke amidst the pandemic, thoughts on why some institutions are seeing a lower incidence of stroke, and a look at the Society for NeuroInterventional Surgery's public awareness initiative.

**WITH DOROTHEA ALTSCHUL, MD, FAHA; RICHARD P. KLUCZNIK, MD;  
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**Dr. Milburn, you moderated a Society of NeuroInterventional Surgery (SNIS) webinar relatively early in the pandemic in which Dr. J Mocco at Mount Sinai in New York shared some startling anecdotal experiences regarding the increase of stroke and a possible overlap with COVID-19, while others on the call reported seeing fewer strokes. Since then, lower-than-usual stroke volumes have been formally reported, but COVID-19 does appear to be associated with stroke in some patients. What factors do you think are leading to the discrepancy?**

**Dr. Milburn:** The evidence that COVID-19 is associated with thrombosis and stroke has become clear, so we expect that the true incidence of stroke in this population is increased. Many of these strokes occur after the patient already has severe respiratory disease, and deficits may not be recognized due to sedation on a ventilator in the intensive care unit. Still, there is no reason why our noninfected population should see a change in stroke incidence, and the COVID-19 effect should be additive, not decreased.

Therefore, any decline in stroke intervention volumes must be due to patients not seeking medical care in the same way. We can assume that patients and their families fear approaching the hospital due to fear of contracting the virus, which is tragic.

**Dr. Klucznik:** Clemens Schirmer, MD, et al recently published a paper on this topic in the *Journal of NeuroInterventional Surgery*.<sup>1</sup> Overall, we think there are two main causes: (1) people are afraid to seek care, and (2) families are not as physically close as they normally would be. First, as Dr. Milburn said, we think that people are afraid to call 911 or go to the hospital; they may have symptoms but are so afraid of getting COVID-19 that they won't go to the emergency room.

But, importantly, the family dynamic has also been affected during the pandemic. Daughters and sons would normally have more contact and check on their parents during the day or just stop by the house. They may sit there for a while and have a cup of coffee. When the pandemic started, the visits were replaced by phone calls. This is also true for nursing homes. Previously, the family would go to the nursing home and visit for a while. Now, when a stroke begins to happen, it is less likely anyone will be around to observe the signs, such as slurring speech during that cup of coffee.

The true incidence of stroke is probably the same as pre-COVID-19—and possibly higher in younger people.

Another question to consider is what is currently known about the nature of stroke in patients with COVID-19? We follow our body colleagues, who have noticed an increase of pulmonary embolism and deep vein thrombosis. The disease also causes lung problems, which can also lead to pulmonary embolism. Overall, we think that patients with COVID-19 may be slightly more thrombogenic, and there could be a higher incidence of younger people who are COVID-19–positive and having strokes.

**Dr. Altschul:** I believe certain subgroups of stroke have increased. As has been mentioned, there were reports of some centers seeing more large vessel occlusions (LVOs), more thrombectomies performed, and higher stroke incidence in younger patients. There were also reports of a higher incidence of stroke specifically in patients with COVID-19. Reports surfaced that COVID-19 causes increased thrombogenicity (ie, blood clot formation), and, hence, it is conceivable that there is an increased incidence in strokes in patients who also had COVID-19.

However, I do believe that we need more data on what these changes in stroke admissions mean on a population level. We could be seeing selection bias. For

example, patients with minor stroke symptoms may have stayed home, while those with more obvious larger stroke symptoms presented to the emergency room or called 911. The fact that a higher number of younger patients presented with stroke could also mean there was a selection bias (eg, younger patients more readily called 911 than older patients). During the height of the pandemic, tough decisions had to be made, and perhaps fewer elderly patients were coming in from nursing homes, for example. We will have more data as time goes on. At one point, and this is from the epicenter in northern New Jersey, we had discussions about whether we would offer any treatment to COVID-19–positive stroke patients older than a certain age. Luckily, it never came to us having to defer treatment due to lack of resources, but we were very close.

### As of late May 2020, how would you describe the incidence of ischemic stroke presentation in New Orleans?

**Dr. Milburn:** Ochsner Medical Center is the hub of a busy 53-hospital stroke network centered in New Orleans, Louisiana. Starting with the week of March 15, we experienced an abrupt and dramatic decrease in stroke intervention volumes that coincided with a 50% decline in telestroke consults from our system. After about a month, telestroke and interventional volumes began trending upward, but volumes even in early June were still below normal.

### Dr. Altschul, what have you seen in northern New Jersey?

**Dr. Altschul:** When comparing February 2020 to April 2020, we saw approximately 40% fewer strokes in the emergency room. The numbers, however, may need to be adjusted a bit because our stroke coordinator and data analysts had to be redeployed to other areas during the height of the pandemic, and we are only now catching up with all the data. Interestingly enough, the thrombectomy numbers remained steady throughout those weeks. This would suggest that strokes with LVOs, which have the more obvious stroke symptoms, did not decline during the pandemic.

### What differences have you seen in COVID-19–positive stroke patients from the stroke population you've previously observed?

**Dr. Milburn:** During the pandemic, patients are presenting later, and many have already completed their strokes. This correlates with the experience from most other centers in the United States. I would differentiate strokes we would treat endovascularly from strokes

overall. The hospital may have seen an increase in stroke volume, but most of these were in people with severe systemic COVID-19 infections requiring ventilator support and the strokes identified only after extubation. We have not noticed a significant difference in the age of patients who presented with stroke as reported in New York, Philadelphia, and the lay media.

### **What has SNIS recommended to members to ensure the safety of staff and patients during the pandemic?**

**Dr. Klucznik:** SNIS published a paper on this topic in the *Journal of NeuroInterventional Surgery* on guidelines for treating patients with COVID-19.<sup>2</sup> The anesthesiologist wears full protective gear, which includes a motor that circulates air so that they are fully protected when intubating a COVID-19 patient. After the patient is intubated, the room is shut down for approximately 8 minutes. Then, we'll start the case with everyone in full gear.

At our facility, we have assigned a room for potential COVID-19–positive patients. We were down one room as a new one was being installed, but now we have three, allowing for cleaning to occur after a COVID-19–positive patient is treated, and two other functioning rooms in case other strokes arrive.

We also have a protocol for when we're finished. We take off the first layer, wash our hands, come back, put on gloves, take off the second layer, wash our hands again, put on gloves, and take off the third layer. This is all done carefully so there's no exposure.

### **Dr. Altschul, what changes to room setup and workflow has your group initiated to ensure safety?**

**Dr. Altschul:** We went through many changes. All stroke patients were considered patients under investigation for COVID-19, and they received a swab for PCR whether or not they had symptoms. Our biplane fluoroscopy room was switched to a negative pressure room. All patients were intubated in the negative pressure suite with only one nurse and one anesthesiologist in the room. After the circuit was closed, we allowed 5 minutes of recirculation before the rest of the staff entered the room. All staff wore personal protective equipment for the entire procedure. Luckily, we never had to cut down on staff. Disposition from the angiography suite had to be adjusted as well. In the beginning of the pandemic, it took about 8 to 12 hours to receive the COVID-19 results, but later on with the rapid test, we usually had the test results back by the end of the procedure. It was important to know whether a patient was positive or negative to send them to the appropriately designated area for postoperative care.

### **Has your communication with patients after treatment and discharge changed during the pandemic?**

**Dr. Altschul:** Yes, for the better! I can now FaceTime into the unit, and I use televisits for follow-up care. I sincerely believe this had made the care and communication better, even though it took away the ability to examine the patient. Appropriate communication and education are key factors in lowering readmission rates, and teleconsultation has made a big difference. My patients were also beyond grateful during this crisis. Having this bond and sense of community with them gave me a new appreciation of the importance of the stroke care we can provide as stroke surgeons to our patients, even in moments of crisis.

### **Dr. Klucznik, what plans does the Society have for public awareness and outreach?**

**Dr. Klucznik:** We have started a campaign with this main message: *Don't be afraid to call 911*.

We're also encouraging families to check on each other. This will be at least a 6-month campaign funded by our industry partners. We're working hand-in-hand with them to get the word out.

### **Dr. Milburn, the sight of you playing a guitar is a familiar one for your colleagues and friends. What led you to pick it up and play "Six Feet Away" with Dr. Guilherme Dabus to share a public awareness message during the COVID-19 pandemic?**

**Dr. Milburn:** Guilherme is a gifted guitarist, and we have always wanted to collaborate musically. This serious problem of declining stroke volumes was talked about by many, and we all know the powerful reach that social media can provide. People react to music on an emotional level—far beyond what we could achieve speaking to a camera. We harnessed the power of our national society and our fellow board members and journal editors, who provided even greater inspiration with their cameos and held signs to raise stroke awareness. SNIS Executive Director Marie Williams was a great help and inspiration throughout the process, bringing us all together like a seasoned video producer.

### **How would you summarize the public awareness goals of the song and video, as well as the SNIS initiatives during COVID-19?**

**Dr. Milburn:** We must educate the public that thrombectomy for emergent LVO stroke is the most powerful treatment in all of medicine, but they need to act quickly to receive a benefit. The risk of contracting COVID-19 by

## "SIX FEET AWAY"

*Excerpt from a public awareness song written by James Milburn and Guilherme Dabus, to the tune of "Turn The Page" by Bob Seger*

She walks into the hospital,  
No fever? Let her through  
They're masking all the faces  
But eyes tell her the truth  
They pretend it doesn't bother them  
But you know that isn't true

Maybe they can't hear him talk  
Maybe then he can't walk  
What are they to do?  
Need to make your plan  
Get daddy to the hospital  
Someone save him, yes they can

### CHORUS

Well here I am, on the road again  
Here I am, up on a stage  
Here we are, staying far away  
There we go, turn the page

Waiting for our patients,  
Are there any beds?  
Some people too scared to come  
Staying home instead  
Fear is taking over  
Help us get this out of their heads

Later in the evening as you lie awake in bed  
Echoes of the sirens are still ringing in your head  
Better days in front of us  
Let's put this in God's hands

### CHORUS

Well here I am, on the road again  
Here I am, up on a stage  
Here we are, staying far away  
Singing songs, six feet away  
Singing songs, six feet away  
Singing songs, six feet away

**To watch the music video, please visit:**

[bit.ly/SNIS6ftAway](https://bit.ly/SNIS6ftAway)

going to the hospital is minimal because precautions and sterility are at an all-time high, and the chance of receiving benefit is great. Our team is gratified by the public response to the video, and we hope many more people will watch and learn the important message. Please share the link with your friends and colleagues!

Additionally, "Get Ahead of Stroke" is a national public awareness and advocacy campaign founded in 2016 by SNIS and supported by a coalition of organizations with the goal of improving outcomes from stroke. More information can be found at [getaheadofstroke.org](https://getaheadofstroke.org).

### **Dr. Altschul, as someone who uses social media and online resources to spur educational dialogue among colleagues, what opportunities do you see on these channels for patient and public awareness?**

**Dr. Altschul:** Whether we want it or not, our world has been forced to quickly morph into a new virtual reality. More people than ever had to use online accounts to fulfill basic needs, from schooling to grocery delivery and health care. More people than ever sought to connect virtually to keep in touch using different internet platforms. I think there are huge opportunities to educate patients and spread news quickly. Even patients can participate in these public awareness efforts by spreading news and educating their circle of friends. If there is one silver lining of this crisis, it must be that the ease of access to medical information, virtual health, and teleconsultation are now on the forefront of medicine.

### **Dr. Klucznik, do you have any closing remarks?**

**Dr. Klucznik:** I just want to thank all those who are on the front lines providing stroke care. We've never stopped; we are always taking patients. Patients don't need to be afraid. We are in the hospitals, and because we don't always know for sure if someone is COVID-19 positive, we treat them as if they are COVID-19 patients. If you have a stroke, you will not go untreated. ■

1. Schirmer CM, Ringer AJ, Arthur AS, et al. Delayed presentation of acute ischemic strokes during the COVID-19 crisis. *J Neurointerv Surg.* 2020;12:639-642. doi: 10.1136/neurintsurg-2020-016299
2. Fraser JF, Arthur AS, Chen M, et al. Society of NeuroInterventional Surgery recommendations for the care of emergent neurointerventional patients in the setting of COVID-19. 2020;12:539-541. doi: 10.1136/neurintsurg-2020-016098