Study finds severely altered mental state in one-third of COVID-19 patients with another third having mild confusion

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Nearly a third of hospitalized COVID-19 patients experienced some type of altered mental function, ranging from confusion to delirium to unresponsiveness, in the largest study to date of neurological symptoms among coronavirus patients in an American hospital system.

And patients with altered mental function had significantly worse medical outcomes, according to the study, published Monday in Annals of Clinical and Translational Neurology. The study looked at the records of the first 509 coronavirus patients hospitalized, from March 5 to April 6, at 10 hospitals in the Northwestern Medicine health system in the Chicago area.

These patients stayed three times as long in the hospital as patients without altered mental function.

After they were discharged, only 32% of the patients with altered mental function were able to handle routine daily activities like cooking and paying bills, said Dr. Igor Koralnik, senior author of the study and chief of neuro-infectious disease and global neurology at Northwestern Medicine. In contrast, 89% of patients without altered mental function were able to manage such activities without assistance.

Patients with altered mental function — the medical term is encephalopathy — were also nearly seven times as likely to die as those who did not have that type of problem.
“Encephalopathy is a generic term meaning something’s wrong with the brain,” Koralnik said. The description can include problems with attention and concentration, loss of short-term memory, disorientation, stupor and “profound unresponsiveness,” or a comalike level of consciousness.

“Encephalopathy was associated with the worst clinical outcomes in terms of ability to take care of their own affairs after leaving the hospital, and we also see it’s associated with higher mortality, independent of severity of their respiratory disease,” he said.

The researchers did not identify a cause for the encephalopathy, which can occur with other diseases, especially in older patients, and can be triggered by several different factors including inflammation and effects on blood circulation, said Koralnik, who also oversees the Neuro COVID-19 Clinic at Northwestern Memorial Hospital. There is very little evidence so far that the virus directly attacks brain cells, and most experts say neurological effects are probably triggered by inflammatory and immune system responses that often affect other organs, as well as the brain.

“This paper indicates, importantly, that in-hospital encephalopathy may be a predictor for poorer outcomes,” said Dr. Serena Spudich, chief of neurological infections and global neurology at Yale School of Medicine, who was not involved in the study. That finding would also suggest that patients with altered mental function in the hospital “might benefit from closer post-discharge monitoring or rehabilitation,” she added.

In the study, the 162 patients with encephalopathy were more likely to be older and male. They were also more likely to have underlying medical conditions, including a history of any neurological disorder, cancer, cerebrovascular disease, chronic kidney disease, diabetes, high cholesterol, heart failure, hypertension or smoking.

Some experts said that President Donald Trump, who was hospitalized with COVID at Walter Reed National Military Medical Center beginning Friday, is of the age and gender of the patients in the study who were more likely to develop altered mental function and therefore could be at higher risk for such symptoms. He also has a history of high cholesterol, one of the preexisting conditions that appear to increase risk. But the president’s doctors have given no indication that he has had any neurological symptoms; the White House had released videos of him talking to the public about how well he was doing. Trump returned to the White House on Monday evening.
Koralnik urged caution in drawing inferences from the study to Trump’s condition. “I think we should be careful trying to ascribe a risk to an individual, based on this retrospective study,” he said. “We need to know more about that individual’s health records, which are not public.”

Altered mental function was not the only neurological complication the Northwestern study found. Overall, 82% of the hospitalized patients had neurological symptoms at some point in the course of the disease from symptom onset through hospitalization, the study found. That is a higher rate than what has been reported in studies from China and Spain, but the researchers say that may be because of genetic factors or that the Northwestern hospitals may have had more time to identify neurological issues because they were not as overwhelmed with patients as the other hospitals.

“This is an important study, since the neurological complications of the infection seem to be frequent and in many cases long-lasting, but yet have not received much attention,” said Dr. Avindra Nath, chief of the section on infections of the nervous system at the National Institute of Neurological Disorders and Stroke, who was not involved in the study.

Among the neurological symptoms, muscle pain occurred in about 45% of patients and headaches in about 38%. About 30% had dizziness. Smaller percentages had disorders of taste or smell.

Younger patients were more likely to develop neurological symptoms overall, except for encephalopathy, which was more common in older people, the study said. The researchers speculated that the younger people might have been more likely to seek hospital care for symptoms like muscle pain, headache or disease, or that doctors paid more attention to those symptoms in younger people because they were less worried about their risk of respiratory failure.

About a quarter of the patients had severe enough respiratory problems to require ventilators, while the rest were considered moderately ill and were treated either in intensive care or in a COVID ward.

The study found that Black and Latino patients were not more likely than other groups to develop neurological symptoms. It found that patients at Northwestern Memorial Hospital, an academic medical center in Chicago that is the health system’s flagship hospital, were younger, more often Black
residents and had more preexisting medical conditions than patients in the suburban hospitals in the network.

The patients at Northwestern Memorial were more likely to have overall neurological symptoms but were not more likely to have encephalopathy. They also had lower mortality rates and were functioning better when they were discharged, even though patients at the non-academic suburban hospitals weren’t more likely to be sick enough to need ventilators. That suggests patients may have received more specialized care or better resources at the academic hospital, the study said.

“IT is also interesting but concerning that they found differences in the outcome of patients between the various hospitals, which they attribute to differences in the quality of care provided,” Nath said. “This means that the hospitalized patients require a high level of care, which is not readily available in most places.”