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Researchers identify conditions most likely to kill encephalitis patients

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People with severe encephalitis—inflammation of the brain—are much more likely to die if they develop severe swelling in the brain, intractable seizures or low blood platelet counts, regardless of the cause of their illness, according to new Johns Hopkins research.

The Johns Hopkins investigators say the findings suggest that if physicians are on the lookout for these potentially reversible conditions and treat them aggressively at the first sign of trouble, patients are more likely to survive.

"The factors most associated with death in these patients are things that we know how to treat," says Arun Venkatesan, M.D., Ph.D., an assistant professor of neurology at the Johns Hopkins University School of Medicine and leader of the study published in the Aug. 27 issue of the journal *Neurology*.

Experts consider encephalitis something of a mystery, and its origins and progress unpredictable. While encephalitis may be caused by a virus, bacteria or autoimmune disease, a precise cause remains unknown in 50 percent of cases. Symptoms range from fever, headache and confusion in some, to seizures, severe weakness or language disability in others. The most complex cases can land patients in intensive care units, on ventilators, for months. Drugs like the antiviral acyclovir are available for herpes encephalitis, which occurs in up to 15 percent of cases, but for most cases, doctors have only steroids and immunosuppressant drugs, which carry serious side effects.

"Encephalitis is really a syndrome with many potential causes, rather than a single disease, making it difficult to study," says Venkatesan, director of the Johns Hopkins Encephalitis Center.

In an effort to better predict outcomes for his patients, Venkatesan and his colleagues reviewed records of all 487 patients with acute encephalitis admitted to The Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center between January 1997 and July 2011. They focused further attention on patients who spent at least 48 hours in the ICU during their hospital stays and who were over the age of 16. Of those 103 patients, 19 died. Patients who had severe swelling in the brain were 18 times more likely to die, while those with continuous seizures were eight times more likely to die. Those with low counts in blood platelets, the cells responsible for clotting, were more than six times more likely to die than those without this condition.

The findings can help physicians know which conditions should be closely monitored and when the most aggressive treatments—some of which can come with serious side effects—should be tried, the researchers say. For example, it may be wise to more frequently image the brains of these patients to check for increased brain swelling and the pressure buildup that accompanies it.

Venkatesan says patients with cerebral edema may do better if intracranial pressure is monitored continuously and treated aggressively. He cautioned that although his research suggests such a course, further studies are needed to determine if it leads to better outcomes for patients.

Similarly, he says research has yet to determine whether aggressively treating seizures and low platelet counts also decrease mortality.

Venkatesan and his colleagues are also developing better guidelines for

diagnosing encephalitis more quickly so as to minimize brain damage. Depending on where in the brain the inflammation is, he says, the illness can mimic other diseases, making diagnosis more difficult.

Another of the study's co-authors, Romergryko G. Geocadin, M.D., an associate professor of neurology who co-directs the encephalitis center and specializes in neurocritical care, says encephalitis patients in the ICU are "the sickest of the sick," and he fears that sometimes doctors give up on the possibility of them getting better.

"This research should give families—and physicians—hope that, despite how bad it is, it may be reversible," he says.

Provided by Johns Hopkins University School of Medicine

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