

New Guideline Offers Advice for First Unprovoked Seizure

Treatment with an AED immediately after a first seizure may reduce the risk of a second seizure in some adults.

WASHINGTON, DC—A new guideline found that administering an antiepileptic drug (AED) immediately after a first seizure reduces the risk of another seizure within two years. Announced at the 67th Annual Meeting of the American Academy of Neurology and published in the April 21 issue of *Neurology*, the evidence-based guideline was developed jointly by the American Academy of Neurology and the American Epilepsy Society.

"Determining whether to treat a patient after a first seizure is a complex process, but this guideline sup-

An analysis indicates that the risk of a second seizure is greatest in people with a significant abnormality on brain imaging and in those who have nocturnal seizures.

ports the use of medication in some cases and could influence standard practice for many physicians," said lead author Allan Krumholz, MD, Professor of Neurology at the University of Maryland School of Medicine in Baltimore. "A single seizure could be a sign of epilepsy. Even one seizure is traumatic and can affect many aspects of an individual's life, from driving a car to employment options. This guideline clarifies a person's risk for another seizure and when to consider medication."

One in 10 people worldwide have a first seizure in their lifetime. Annually, about 150,000 adults in the United States have an unprovoked seizure. In addition, one in 26 Americans will develop epilepsy. According to the International League Against Epilepsy, epilepsy is defined as one or more seizures with a high likelihood of recurrence, not due to another immediately triggering cause, such as low blood sugar.

The guideline authors reviewed nearly 50 studies on first seizure that addressed the probability that an adult with an unprovoked first seizure would have recurrent seizures, in addition to information about short- and long-term health risks and medication side effects.

The authors found strong evidence that for adults who have had a first seizure, the risk of another seizure is greatest within the first two years. The risk ranges from about a one-in-five chance (21%) to nearly a one-in-two chance (45%). They also found strong evidence that the risk of another seizure is greatest in those with a previous brain injury such as a stroke, brain tumor, or head trauma and in those with an EEG test result that shows signs of epilepsy. Their analysis revealed moderate evidence that the risk is greatest in people with a significant abnormality on brain imaging and in those who have nocturnal seizures.

According to the guideline, there is moderate evidence to suggest that immediate treatment with an AED lowers the risk of another seizure by 35% within the first two years. "About half of patients who have a first seizure will never have another seizure; but for the other half, immediate drug therapy may help," Dr. Krumholz said. He stressed that the guideline should be used by physicians to help inform patients of their individual risk of a second seizure and involve them in the decision-making process.

The guideline cites moderate evidence suggesting that while treatment was shown to provide a short-term benefit, over the longer term (more than three years), treating a first seizure immediately rather than waiting for another seizure to occur is unlikely to increase or decrease the likelihood of remaining seizure free.

The guideline notes that 7% to 31% of patients who take an AED will experience a drug side effect; however, these are usually mild and can be reversed when a patient is switched to another AED or the dose is lowered.

"This guideline does not give a simple, black-and-white recommendation [about] whether an adult should immediately be started on an epilepsy drug," said coauthor Jacques-

line French, MD, a Professor of Neurology and Director of Translational Research at New York University's Langone Comprehensive Epilepsy Center in New York City. "What is most important is that the decision whether to immediately treat a first seizure requires meaningful conversation between patient and doctor so that the patient's individual circumstances, balance of risks and benefits, and personal preferences are understood and accounted for."

The guideline was endorsed by the American Neurological Association and the World Federation of Neurology. **NR**

Suggested Reading

Krumholz A, Wiebe S, Gronseth GS, et al. Evidence-based guideline: management of an unprovoked first seizure in adults. *Neurology*. 2015;84:1705-1713.

Do Cosmic Rays Cause Cognitive Problems?

Exposure to space radiation may put astronauts at risk for cognitive problems, according to a study in mice. In advance of the first manned spaceflight to Mars, scientists are unclear about what happens when the brain is exposed to charged particles spewed by galactic cosmic rays that penetrate spacecraft. Charles Limoli, PhD, Professor of Radiation Oncology at the University of California, Irvine, and colleagues accelerated the same types of charged particles found in galactic cosmic rays and briefly placed mice that had been genetically altered to have glowing, fluorescent neurons in the path of a single beam of this type of high-energy radiation.

Six weeks later, the researchers observed distinct changes in the brains of exposed animals. In particular, the mice had decreased numbers of dendritic synapses, branched structures protruding from neurons that carry electrochemical signals. Charged particles hit dendritic branches like a bullet and caused them to break off. The loss of these dendritic branches is linked to cognitive decline in Alzheimer's disease and other diseases.

To study the animals' cognition, the researchers put the mice through a series of experiments known to be reliable indicators of learning and memory. They put the mice in a box containing toys and then changed either the location of the toys or the types of objects in the box. Radiation-exposed animals lacked curiosity and were less active in new situations and became more easily confused. If the neuronal changes shown to occur in mice occur in astronauts, their response to unexpected situations, along with their ability to spatially reason and recall information, may be impaired, according to the authors.

Parihar et al. *Sci. Adv.* 2015;1:e1400256