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# Can statins prevent seizures after strokes?

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**WHAT DID THE AUTHORS STUDY?** People who have had strokes are at increased risk of developing seizures and epilepsy. In the article “Statin treatment reduces the risk of poststroke seizures,” Guo and colleagues looked at whether treating patients who had recently had a stroke with a cholesterol-lowering “statin” medication might reduce the risk of developing seizures following the stroke.<sup>1</sup>

**WHY MIGHT THIS STUDY BE IMPORTANT?** Seizures or epilepsy may be caused by many different factors that damage or irritate the brain. Strokes can cause damage to the brain, and having a stroke is a common reason that patients develop seizures and epilepsy, especially immediately following the stroke.<sup>2,3</sup> Not every patient who has a stroke will experience a seizure. However, those who do may need treatment, and the effects of seizures (and the treatments themselves) on a patient’s health and quality of life can be major. It is hard to predict which stroke patients will go on to experience seizures or how severe the seizures might be.

Currently, patients and their doctors make decisions about treating seizures only after they have occurred. We do not have a lot of information about how poststroke seizures might be prevented in the first place. These researchers studied whether a group of medications called “statins” might have a role in preventing seizures following a stroke. Statins are a class of medications that have been used for many years to treat high cholesterol. They are regularly used for stroke prevention and treatment because high lipid levels are associated with a higher risk of stroke. It is also thought that statins may be useful when given immediately following a stroke. Statins may also have beneficial effects in other types of neurologic diseases. Therefore, the authors investigated whether statins given before a stroke or at the time of a stroke might prevent seizures in the future.

**HOW WAS THE STUDY PERFORMED?** The authors studied all patients with a first-ever ischemic stroke who were admitted to the Department of Neurology at Western China Hospital of Sichuan University between January 2010 and August 2013. They studied only patients who were diagnosed with ischemic strokes. An ischemic stroke is caused by a lack of blood flow and oxygen to the brain,

often due to a narrowing of blood vessels in the brain. The researchers collected information about these patients. This information included their diagnosis, the severity of their stroke, any testing they had, and their treatment while in the hospital. They also followed up with these patients (either by phone or in person) for several years after their admission to find out whether they had experienced any seizures. The researchers then determined which of these patients had received statins. In particular, they examined which patients had been treated with statins before their stroke (for at least a month) or immediately after their stroke (within 3 days).

**WHAT WERE THE RESULTS OF THE STUDY?** The authors divided poststroke seizures into 2 groups: acute seizures and late-onset seizures. Acute seizures occurred within the first 7 days of the stroke, and late-onset seizures occurred after 7 days. This difference is important because single acute seizures may not be a long-term health issue. In contrast, patients who go on to have more than one seizure after the acute period are more likely to be diagnosed with epilepsy (recurrent seizures) and require treatment.

The authors found that most acute poststroke seizures happened very early, often in the first day after the stroke. Those patients treated with statins were less likely to have acute poststroke seizures and less likely to develop epilepsy later on.

**WHAT DID THE AUTHORS CONCLUDE?** The authors concluded that patients who are treated with statins may be less likely to have seizures soon after having a first ischemic stroke, especially if they receive the statins within the first 3 days of the stroke. They also found that statin treatment may prevent future development of epilepsy in these patients.

**WHAT ARE SOME OF THE STRENGTHS AND LIMITATIONS OF THIS STUDY?** This study was an observational study. This means that the investigators observed the effects of an exposure (in this case the use of statin medications) on different groups of patients with a similar disease process. They followed these patients over time to see whether they

developed seizures. Studies of this type can provide very useful information, such as the association between acute strokes and seizures over time in different groups of patients.

However, as the authors note, there are limitations to this study design. Few patients had poststroke seizures. The exact type and dose of statin was not consistent among all patients. Even though there was an association between the use of statins and the chance of developing seizures after stroke, this study did not establish a direct link or cause. In other words, we can't be sure that it was the treatment with statins that protected people from seizures. It is possible that some other factor was actually protective. The results from this study should be confirmed by larger studies. A different type of study—a randomized controlled trial—might better prove whether statins truly provide protection against seizures in this setting. Another issue to consider is that the population of patients studied by the authors may differ from

patient populations elsewhere, sometimes making it difficult to apply the results to all patients.

**WHAT ISN'T KNOWN YET?** Although the results of this study are promising, we still don't know with certainty whether statins can help to prevent seizures in patients with stroke. We also don't know why statins might have this effect. However, this study and others like it suggest that further investigating these questions may be beneficial for patients and their doctors.

## REFERENCES

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## Section Editors

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# About stroke and seizures

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**WHAT IS A STROKE AND WHAT ARE THE CAUSES OF STROKES?** A stroke is an injury to the brain that causes brain cells to die. Strokes are usually caused by a lack of blood flow or oxygen to the brain (ischemic stroke) or bleeding in the brain (hemorrhagic stroke). Ischemic strokes are sometimes compared to heart attacks because both happen due to a lack of blood flow, and treating strokes and heart attacks as soon as possible can sometimes lead to better outcomes. The symptoms that patients experience as a result of a stroke depend on where in the brain a stroke occurs and how large it is. Stroke symptoms can include weakness or paralysis, trouble with sensation (feeling), trouble with thinking and memory, and many other problems. If the stroke is severe enough or if it occurs in a critical part of the brain, it can result in very severe disability or death.

Most strokes are ischemic and result from a lack of blood flow or oxygen to the brain. Ischemic stroke can be caused by blockages in the blood vessels (arteries) that supply the brain. Sometimes the blockages develop slowly over time, like atherosclerosis in heart disease. Other times they happen suddenly, such as when a blood clot travels to the brain and lodges in a blood vessel. We can try to prevent strokes by controlling some of the risk factors for blood vessel disease. Many of these factors are the same as those involved with heart disease, such as high blood pressure, high blood sugar (diabetes), high cholesterol, tobacco use, not exercising, and eating poorly. There are some factors that cannot be controlled, such as a family history of stroke and whether you are male or female. Strokes can be caused by many factors, so it is important to see a doctor to understand why a stroke might have happened and to treat it properly. It is also very important to know that a stroke is an

emergency, and rapid treatment can improve outcome. Patients or their families should call 911 immediately with any symptoms of a possible stroke.

**WHAT IS A SEIZURE AND WHAT CAUSES SEIZURES?** A seizure is an event caused by abnormal electrical activity in the brain. A seizure may cause a patient to have a symptom or feeling, such as an unusual smell, sense of fear, or trouble speaking. Sometimes the symptoms can only be felt by the patient. Sometimes they can be seen by other people (for example, when they cause abnormal involuntary movements of the body). Seizures can also affect a person's ability to think or interact with others. Seizures can vary from one person to the next. The types of symptoms caused by a seizure are usually related to where in the brain the seizure is occurring. Epilepsy is a term that simply means that a person has recurrent seizures.

Seizures are caused by many different things. Some of these include hereditary factors (genetics), abnormal brain development, injuries to the brain (including stroke and bleeding in the brain), infections of the brain, cancer, and disorders of the immune system. In many patients, no definite cause of seizures can be found.

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