Section Editors
David C. Spencer, MD
Steven Karceski, MD

Suicide after stroke

Steven Karceski, MD

WHAT IS THIS STUDY ABOUT? In their article "Poststroke suicide attempts and completed suicides: A socioeconomic and nationwide perspective,"[1] Dr. Eriksson and colleagues focused on suicide after a serious brain injury (stroke). The authors work at Umea University in Sweden and the study was supported by the Swedish Council for Health and the Swedish Research Council. The study followed more than 220,000 people for 12 years after their stroke. Within this group, the authors counted the number of people who were admitted to a hospital for a suicide attempt and the number of people who died due to suicide. They found that younger less-educated men who had a more severe stroke had the highest risk of suicide following stroke. This is an important finding because by identifying groups at risk, steps can be taken to prevent this serious stroke-related problem.

WHY WAS THE STUDY DONE? There is an increased rate of depression and suicide in many neurologic conditions, including epilepsy,[2,3] Alzheimer disease,[4] multiple sclerosis,[2] and stroke.[5] Although stroke tends to occur most often in people older than 65,[5] strokes also occur in younger adults. The reasons why people commit suicide are complex. One thought is that younger people with stroke are much more likely to attempt or commit suicide than older adults.[1] However, many other factors may contribute, including a person's cultural and religious upbringing. Socioeconomic factors, income, and education may also play a role. Although it is probably impossible for a single study to look at every factor, Dr. Eriksson and colleagues studied how some of these factors might help to identify people at risk for suicide after stroke.

HOW WAS THE STUDY DONE? In Sweden, there is a national register called Riksstroke. This was established in 1994 to "monitor, support, and improve the quality of stroke care in Sweden."[6] In 1998, all Swedish hospitals who admitted or treated people with acute stroke were participants in Riksstroke. As of 2012, 72 Swedish hospitals were active participants in Riksstroke. One estimate is that 94% of people who have a stroke in Sweden are entered into Riksstroke.

Riksstroke keeps track of people from the time they enter the registry until their death. It records important prestroke background information such as a person's education, marital status, income, living conditions, and other medical illnesses.[6] Riksstroke records the kind of stroke a person had and the kinds of treatment used. At 3 and 12 months after stroke, Riksstroke records a person's living conditions, independence, and mood.

Dr. Eriksson and colleagues used this national registry to study a large group of people who had had a stroke. Using the registry, the authors were able to identify people who reported "feeling depressed" 3 months after the stroke occurred. They identified people who were admitted to a hospital for self-harm or suicide attempts. Finally, they were able to determine the cause of death as suicide using the Swedish Cause of Death Register.

WHAT DID THE STUDY SHOW? Dr. Eriksson and colleagues studied a group of patients followed in Riksstroke from 2001 to 2012. They identified 220,336 people who had a stroke. Of these, 985 people attempted suicide one or more times. Eight hundred fifty-two had one attempt, 90 had 2 attempts, and 43 had 3 attempts, for a total of 1,217 suicide attempts. There were 260 fatal suicides. Two hundred thirty-three of these occurred on the first attempt.

One of the strongest observations was that those who reported depression 3 months after stroke were much more likely to attempt or commit suicide than those who did not report depression. Young people were much more likely to attempt suicide than older adults. The youngest patients, ages 18–54, had a 6-times-greater risk compared to the oldest (those over 85). The authors estimated that the "breaking point" occurred at age 75. Those older than 75 were unlikely to attempt or commit suicide. Men were more likely to attempt suicide than women. People who lived alone were much more likely to commit suicide than those who had spouses or lived with someone else. People with lower income or those who had fewer years of education were also more likely to attempt or commit suicide. Of the 1,217 attempts, 889 (73%) were by self-poisoning, 16.4% were by hanging, 5.6% were by gunshot wounds, and 3.6% were by a sharp object.

The authors made several important observations. First, a person's level of independence did *not* correlate with an increased rate of suicide. They defined independence as an ability to dress, perform toileting, or walk independently. When comparing the group of people who had attempted or completed suicide with the group who had not, there was no difference in level of independence.

The study also showed that timing was important. The risk of a suicide attempt was highest in the first year after the stroke. There was a lower risk in the second year after stroke. Following this, the rate is comparable to people who have not had a stroke, as in the general population.

WHAT ARE THE STRENGTHS AND WEAKNESSES OF THE STUDY? There are many strengths to this study. First, the authors were able to study a large number of people. Furthermore, the information was gathered by a national registry. The registry provided information on an estimated 94% of people who had a stroke in Sweden. In other words, the study is very powerful and provides a complete and very accurate picture of how people are doing after a stroke.

One possible weakness is that the study occurred in Sweden. There are many factors that lead to suicide or suicide attempts, some of which are cultural or religious. There may be reasons that are unique to Scandinavia that the study could not account for. It is known that suicide rates vary among different countries.[1] Why these differences occur is unclear.

In this study, patients self-reported their mood. They answered questions like "Are you depressed?" They were given several possible responses: never, almost never, sometimes, often, constantly, or do not know. Those who reported "often" or "constantly" were considered depressed. There was no independent assessment of mood. The patients did not necessarily see a psychiatrist. In other words, it is possible that the rates of depression were not correct. If an independent assessment had been done, a more precise measure of mood may have been possible.

Patients also self-reported their medical illnesses. Other medical illnesses could have influenced the rates of depression and suicide attempts. It is possible that a medical illness increased the risk of suicide. However, establishing a link between medical illness and suicide is not possible because of the way that the information was collected.

WHAT DID THE AUTHORS DETERMINE? There is an increased rate of attempted suicide and suicide after stroke. Many factors contribute to this. In this study, if the patient reported depression 3 months after the stroke, there was a much higher chance that he or she would attempt or commit suicide. Younger male patients were much more likely to attempt or commit suicide. Finally, those who had fewer years of education, those with lower income, and those who lived alone were more likely to attempt suicide after stroke.

REFERENCES

1. Eriksson M, Glader E-L, Norrving B, Asplund K. Poststroke suicide attempts and completed suicides: a socioeconomic and nationwide perspective. Neurology 2015;84:1732–1738.
2. Dickstein LP, Viguera AC, Nowacki AS, et al. Thoughts of death and self-harm in patients with epilepsy or multiple sclerosis in a tertiary care center. Psychosomatics 2015;56:44–51.
3. Meyer N, Voysey M, Holmes J, Casey D, Hawton K. Self-harm in people with epilepsy: a retrospective cohort study. Epilepsia 2014;55:1355–1365.
4. Small GW. Differential diagnoses and assessment of depression in elderly patients. J Clin Psychiatry 2009;70:e47.
5. Pompili M, Venturini P, Lamis DA, et al. Suicide in stroke survivors: epidemiology and prevention. Drugs Aging 2015;32:21–29.
6. The Swedish Stroke Register. Available at: www.riksstroke.org. Accessed February 20, 2015.

Section Editors
David C. Spencer, MD
Steven Karceski, MD

About stroke

Adapted from: Leonard AD, Brey RL. Blood pressure control and stroke: An ounce of prevention is worth a pound of cure. Neurology 2002;59: E1–E2.

WHAT IS A STROKE? A stroke, or brain attack, is caused by the sudden loss of blood flow to the brain or bleeding inside the head (see below for more details). A stroke causes brain cells to die. This damage can cause paralysis, speech problems, loss of feeling, memory and reasoning problems, coma, and possibly death. Fortunately, there are effective ways to prevent stroke. If you have a stroke, seeking immediate medical attention can help reduce your chances of death and disability.

WHAT ARE THE WARNING SIGNS OF STROKE? The "Give Me 5" uses easy-to-remember words to help identify the 5 signs of stroke:

- Walk—is their balance off?
- Talk—is their speech slurred or face droopy?
- Reach—is one side weak or numb?
- See—is their vision all or partly lost?
- Feel—is their headache severe?

HOW COMMON IS STROKE? Every year, about 780,000 people in the United States have a stroke and about 160,000 die. Stroke is the nation's number 3 killer after heart disease and cancer. Stroke is the number one cause of adult disability.

Stroke is an emergency. Call 911 immediately if you or someone you know experiences any of the above warning signs. Jot down the time the symptoms started. Sometimes these warning signs last for only a few minutes and then stop. But even if that happens or if you feel better, call 911 for help.

RISK FACTORS FOR STROKE THAT CAN BE TREATED OR CHANGED

- High blood pressure
- Atrial fibrillation (an irregular heart beat)
- Diabetes
- Cigarette smoking
- Hyperlipidemia (high fat level in the blood)
- Alcohol abuse
- Obesity
- Sickle cell disease

WHAT CAUSES A STROKE? There are 2 types of stroke or brain attack. Ischemic stroke is caused by an interruption of blood flow to the brain. Hemorrhagic stroke is caused by bleeding inside the brain.

About 85% of all strokes are ischemic. Ischemic stroke can be caused by narrowing of the large arteries to the brain, also known as atherosclerosis. If a clot forms in the neck vessels, pieces can break off and block a brain blood vessel. Clots may also form in the heart and travel by blood flow to the brain vessels, where they become lodged.

Hemorrhagic stroke is caused by the bursting of a blood vessel in the brain. It accounts for about 15% of strokes. Subarachnoid hemorrhage occurs when there are weak spots on brain arteries (aneurysms) that burst and cover the brain with blood. Blood vessels in the brain can also burst if they are weakened by high blood pressure, diabetes, and aging.

WHAT ARE THE TREATMENTS FOR STROKE? Immediate medical care is critical for the person who is having a stroke or brain attack. New treatments work only if given within a few hours after the onset of a stroke. For example, a clot-busting drug must be given within 3 hours of stroke onset.

HOW IS STROKE PREVENTED? Some risk factors—age, sex, race, and a history of stroke in the family—cannot be changed. However, many others can be controlled. Most controllable risk factors relate to the health of the heart and blood vessels. The following can help prevent stroke:

- Having regular medical checkups
- Controlling high blood pressure
- Not smoking; stopping if you do
- Treating heart disease, especially an irregular heart beat called atrial fibrillation
- Improving diet: avoid excess fat, salt, and alcohol
- Exercising
- Controlling diabetes
- Seeking immediate medical attention for warning signs of stroke

FOR MORE INFORMATION

Neurology Now®
http://journals.lww.com/neurologynow/Pages/ResourceCentral.aspx

American Stroke Association
http://www.strokeassociation.org

Brain Aneurysm Foundation
http://www.bafound.org

The Brain Attack Coalition
http://www.brainattackcoalition.org

Suicide after stroke

Steven Karceski

Neurology 2015;84;e130-e133
DOI 10.1212/WNL.0000000000001578