

Study seeks to improve stroke outcomes by optimizing blood glucose control

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About 40 percent of ischemic stroke patients arrive at the hospital with high blood glucose levels that can worsen their brain damage, say physicians working to stop the additional loss.

Insulin, a hormone that enables cells to use glucose as energy, can help, but questions remain about the optimal way to give it, said Dr. Askiel Bruno, [stroke](#) specialist at the Medical College of Georgia at Georgia Health Sciences University. He's a Clinical Principal Investigator on a National Institute of Neurological Disorders and Stroke-funded study that should determine whether intravenous delivery or the usual shot of insulin works best. Other Clinical Principal Investigators for the trial enrolling 1,400 participants nationally are Dr. Christiana E. Hall, University of Texas Southwestern Medical Center, and Dr. Karen C. Johnston, University of Virginia School of Medicine.

A quick finger prick to check blood glucose levels is part of the early evaluation of all [stroke patients](#) in the emergency room, whether or not they are diabetic, Bruno said. It's important not only because of the association with increased damage but because the symptoms of low glucose can mimic [stroke symptoms](#).

"When blood glucose is high the damage is worse so lowering that glucose right away, should result in less damage and better outcomes for patients," he said.

Exactly why blood [glucose levels](#) rise dramatically with a stroke is not

completely understood, but it's known that stroke triggers the release of [stress hormones](#) that interfere with insulin's ability to coax glucose into cells, Bruno said. A leading theory is that [free radicals](#) produced by stroke also pile on the damage.

"The body just does not respond to insulin as it should and stress hormones interfere with the response," Bruno said. In a more chronic situation, an elevated [blood glucose](#) also is a major risk factor for stroke, he noted.

When acute [high blood glucose](#) levels are detected in stroke patients – 150 milligrams per deciliter or greater versus a healthy 100 or less – most typically get a shot of insulin. When those levels are particularly difficult to control, patients may get an intravenous dose instead, which requires closer monitoring but seem to work faster and better at getting and keeping levels safe.

The SHINE Trial directly compares stroke outcome using the two approaches to determine the most efficacious, Bruno said. Study participants will receive insulin for up to three days – when the brain's circulation should be more stable – then resume standard care. At three months, stroke recovery will be objectively assessed.

"How are you doing? That is the key question. We may find intravenous works better for some patients than others," said Bruno who led a small pilot study at Indiana University School of Medicine that showed that within four hours, intravenous insulin reduced stroke patients' [blood glucose levels](#) 31 percent more than shots.

Stroke is the third leading cause of death in the United States, affecting nearly 800,000 Americans annually, according to the Centers for Disease Control and Prevention. About 85 percent of strokes are ischemic, which means portions of the brain aren't getting enough oxygen. The remainder

result from brain bleeding. The clotbuster tPA is currently the only Food and Drug Administration-approved drug therapy for [ischemic stroke](#) and only about 5 percent of patients receive the drug which must be given within four-and-one-half hours after the onset of symptoms.

Provided by Georgia Health Sciences University

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