

Treating stroke with IV magnesium within an hour of symptoms fails to improve outcomes

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In the first study of its kind, a consortium led by UCLA physicians found that giving stroke patients intravenous magnesium within an hour of symptom onset does not improve stroke outcomes, according to research presented today at the American Stroke Association's International Stroke Conference.

However, the eight-year study found that, by working with paramedics in the field, intravenous medications can be given to [stroke patients](#) within the "golden hour," the window in which patients have the best chance to survive and avoid debilitating, long-term neurological damage. That finding is a "game changer," said study co-principal investigator Dr. Jeffrey Saver, director of the UCLA Stroke Center and professor of neurology at the David Geffen School of Medicine at UCLA.

"Stroke is a true emergency condition. For every minute that goes by without restoration of blood flow, two million nerve cells are lost," Saver said. "Since time lost is brain lost, we wanted to develop a method that let us get potentially brain-saving drugs to the patient in the earliest moments of onset of the [stroke](#). If these patients don't get protective drugs until two, three or four hours later, irreversible brain damage has already occurred."

While the Phase III Field Administration of Stroke Therapy – Magnesium (FAST-MAG) clinical trial found that magnesium does not improve stroke-related disability, the search is on now for new drugs and treatments that can be administered in the field to improve long-term

outcomes. The infrastructure to treat patients quickly was created by the study and is in place, Saver said, and that is a major accomplishment.

FAST-MAG involved collaboration between 315 ambulances, 40 emergency medical service agencies, 60 receiving hospitals and 2,988 paramedics. Conducted between 2005 and 2013, the study showed that 74 percent of the 1,700 study patients in Los Angeles and Orange counties were treated within the first hour, with the magnesium administered within a median time of 45 minutes.

"With this study, we were able to reach the threatened brain faster than ever before," said co-principal investigator Dr. Sidney Starkman, co-director of the UCLA Stroke Center and professor of emergency medicine and neurology at the David Geffen School of Medicine at UCLA. "The study has really opened up opportunities to treat patients in the pre-hospital setting in the earliest minutes after symptoms appear."

Starkman said that the study would not have been possible without the approval and confidence of the California and local [emergency medical service](#) agencies and the administrations of the participating hospitals.

Today, the only immediate treatment for strokes caused by blockage of blood vessels is the clot-busting drug tissue plasminogen activator (tPA). But tPA cannot be given until the patients arrive at the hospital and undergo a CT scan to rule out bleeding in the brain.. Giving tPA in an ambulance without a CT scan first is not an option because it could harm patients whose strokes are caused by brain bleeds, Saver said. However, neuroprotective drugs can be administered in the field because they're safe for both blockage and the bleeding strokes.

For the FAST-MAG trial, magnesium was chosen because it dilated blood vessels in the brain in animal studies, increasing blood flow. It also countered the damaging calcium build up that occurs in cells deprived of

oxygen. It was already approved to treat medical conditions in people, and it was known to have a good safety profile.

Saver said FAST-MAG researchers are extremely indebted to the nearly 3,000 paramedics involved in the study, as well as the emergency medicine physicians, neurologists, neurosurgeons and nurses who participated.

"Now we are tasked with finding a different agent or combination of agents that can improve stroke outcomes within that golden hour," Saver said. "We developed a treatment platform that works and can be used around the world to test promising agents. FAST-MAG has opened a new, earlier-than-ever window for treatment that has the potential to significantly improve outcomes for the hundreds of thousands of people each year who suffer a stroke."

The National Institute of Neurological Disorders and Stroke (NINDS) is "extremely grateful to the investigators, emergency medical technicians and patients who participated in this landmark study demonstrating how to test therapies in stroke patients before they arrive at the hospital," said Dr. Walter Koroshetz, deputy director of the NIH NINDS, the sponsor of the FAST-MAG study.

"NINDS has just set up a new national stroke trials network which can incorporate the lessons learned in FAST-MAG, but also increase the likelihood that the treatments we test will improve [patients'](#) lives," he said.

Stroke is the fourth leading cause of death in the United States and is a major cause of adult disability. About 800,000 people in the United States have a stroke each year. One American dies from a stroke every four minutes, on average.

Provided by University of California, Los Angeles

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