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### Study Finds Treating Stroke Patients with Intravenous Magnesium Fails to Improve Outcome

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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 the onset of symptoms does not improve stroke outcomes.

However, the 8-year trial did find that with the help of paramedics in the field, intravenous medications can frequently be administered to stroke victims within that so-called "golden hour," during which they have the best chance to survive and avoid debilitating, long-term neurological damage.

The latter finding is a "game-changer," said Dr. Jeffrey Saver, director of the UCLA Stroke Center and a professor of neurology at the David Geffen School of Medicine at UCLA. Saver served as co-principal investigator on the research, which was presented Feb. 13 at the American Stroke Association's International Stroke Conference.

"Stroke is a true emergency condition. For every minute that goes by without restoration of blood flow, 2 million nerve cells are lost," Saver said. "Since time lost is brain lost, we wanted to develop a method that let us get potentially brainsaving 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 3 clinical trial found that magnesium does not improve stroke-related disability, the search is now on for new drugs and treatments that can be administered in the field to improve longterm outcomes. The infrastructure to treat patients quickly that was created by this study is in place, and that is a major accomplishment, Saver said.

The trial, called Field Administration of Stroke Therapy–Magnesium, or FAST–MAG, involved collaboration among 315 ambulances, 40 emergency medical-service agencies, 60 receiving hospitals and 2,988 paramedics in Los Angeles and Orange counties. Conducted between 2005 and 2013, the study showed that 74 percent of the 1,700 study patients were treated in 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 Geffen School. "The study has really opened up opportunities to treat patients in the prehospital setting in the earliest minutes after symptoms appear."

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 was shown to dilate 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."

For more information, please visit: [www.uclahealth.org](http://www.uclahealth.org)

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