

# CT Profile Flags Stroke Patients Who May Have More Time

Nancy A. Melville | February 18, 2016

LOS ANGELES — Stroke patients identified with computed tomography (CT) perfusion as having a distinctive neurologic profile show potential benefits from endovascular interventions well beyond the conventional 6-hour window, new research suggests.

"What we're trying to say is when a patient comes in with stroke and it looks severe and it's past 6 hours from symptom onset, we shouldn't stop there," coauthor Jenny Tsai, MD, a neuroimaging and vascular neurology fellow at Stanford University's Stanford Stroke Center in California, told *Medscape Medical News*.

"We want to give these patients a chance of being identified as a potential candidate that may still have a chance of doing well if we intervene, and the use of CT perfusion imaging can serve that purpose."

The research was presented this week at the American Stroke Association's International Stroke Conference (ICS) 2016.

In stroke neurology, the mantra is "time is brain," and patients who aren't treated within the 6-hour window of symptom onset are considered to have significantly poorer outcomes, the authors note. However, recent research has indicated that as many as 30% of patients have a unique brain physiology, or a "target mismatch" profile, that could extend their window for responding well to endovascular intervention.

"The target mismatch profile is essentially people with a lot of salvageable tissue at risk but as small an area of dead brain as possible," Dr Tsai explained. "So you could call it a 'stroke of luck' that their anatomy of blood vessels allows them to tolerate the insult of the stroke a little better and be able to possibly go on many hours beyond the 6-hour window."

"These patients could have the most to gain after 6 hours, but we have to be able to identify them."

The previous [DEFUSE 2 prospective clinical trial](#), also conducted at Stanford, showed the capability of identifying such patients with MRI perfusion. However, whereas that modality can take 45 minutes to an hour, CT perfusion is much quicker — involving use of a contrast agent with the standard CT imaging that most stroke patients already receive and adding only about 5 to 10 minutes to the procedure, Dr Tsai said.

To better evaluate outcomes of stroke patients with target mismatch, defined specifically as the ratio of Tmax greater than 6s lesion to core volume of greater than 1.8, Dr Tsai and her colleagues analyzed data from the 2-year CT Perfusion to predict Response to Recanalization in Ischemic Stroke Project (CRISP), conducted at six US medical centers and involving patients aged 18 years and older.

They identified 102 patients with ischemic stroke who underwent baseline CT perfusion, had the target mismatch profile, and achieved endovascular reperfusion up to 18 hours after the onset of stroke symptoms.

They found that while 71.4% of the patients treated within 6 hours of onset had good functional outcomes, defined as a modified Rankin Scale score of 0 to 2 at day 90, indicating little to no disability, as many as 61.7% of those treated between 6 and 18 hours after onset also had good outcomes.

Multivariate analysis showed no significant association between the onset-to-perfusion time and good outcomes ( $P = .32$ ), whereas patient age (every 5 years;  $P = .02$ ), baseline National Institutes of Health Stroke Scale score ( $P < .001$ ), and Alberta Stroke Program Early CT score ( $P = .005$ ) were factors in outcome.

The adjusted relative risk per hour of delay was 0.994 (95% confidence interval [CI], 0.97 - 1.02). Overall, the median time from onset to perfusion was 6.6 hours.

Dr Tsai noted that with most data only showing therapy to be beneficial after six hours, most stroke centers do not perform perfusion imaging beyond the 6-hour window.

"We know that 20% to 30% of patients still can potentially have good outcomes with intervention beyond 6 hours, and we have a tool now to identify them, so we need to find a way to make CT perfusion imaging accessible to as many patients as possible."

In commenting on the study, Bruce Ovbiagele, MD, professor and chief of neurology at the Medical University of South Carolina in Charleston, said the findings shed important light on stroke intervention outcomes.

"What this study is saying is that all may not be lost once you get beyond 6 hours," he said in a statement, "[particularly] if you're the type of patient for whom this imaging is done and you seem to be a candidate because you have some brain cells that might still be potentially revived."

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