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NEWS

RSNA Press Release

MRI May Help Determine Time of Stroke Onset

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At A Glance

- MRI may be used to estimate stroke duration in patients when onset time is unknown.
- By accurately determining the onset time of a stroke, more patients could be eligible for life-saving treatment.
- Stroke is the third leading cause of death in the U.S. and affects nearly 800,000 Americans each year.

OAK BROOK, Ill. — Magnetic resonance imaging (MRI) of the brain could expand the number of stroke patients eligible for a potentially life-saving treatment, according to a new study, published online and in the December issue of the journal *Radiology*.

Some patients who suffer an acute ischemic stroke — in which a blood clot or other obstruction blocks blood flow in the brain — can be treated with a drug called tissue plasminogen activator, or tPA, that dissolves the clot and restores blood flow. However, the clot-busting drug can only be administered within four and a half hours of the onset of a stroke; when given beyond that window of time, the drug can cause bleeding in the brain.

According to the American Stroke Association, stroke is the third leading cause of death in the United States behind diseases of the heart and cancer. Approximately 795,000 Americans suffer a new or recurrent stroke each year.

"As many as a quarter of all stroke patients cannot be given tPA because they wake up with stroke symptoms or are unable to tell their doctor when their stroke began," said lead researcher Catherine Oppenheim, M.D., Ph.D., professor of radiology at Université Paris Descartes in France.

In the study, Dr. Oppenheim and her team of researchers reviewed data from consecutive patients with acute ischemic stroke treated at Sainte-Anne Hospital in Paris between May 2006 and October 2008. The time of stroke onset was well defined in all patients and each underwent MRI within 12 hours.

The 130 patients in the study included 77 men and 53 women (mean age 64.7). Of those, 63 patients underwent MRI within three hours of stroke onset and 67 were imaged between three and 12 hours after stroke onset.

The radiologists analyzed different types of MRI data on the patients, including fluid-attenuated inversion recovery (FLAIR), diffusion-weighted imaging (DWI) and

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apparent diffusion coefficient (ADC) ratios.

Using the MRI data alone, the radiologists were able to predict with greater than 90 percent accuracy which patients had experienced stroke symptoms for longer than three hours.

"When the time of stroke onset is unknown, MRI could help identify patients who are highly likely to be within the three-hour time window when tPA is proven effective and approved for use," Dr. Oppenheim said.

According to Dr. Oppenheim, using MRI to determine the duration of a stroke would change the way stroke is managed in the emergency setting.

"With the use of MRI, all stroke patients could be managed urgently, not just those patients with a known onset of symptoms," she said.

Dr. Oppenheim said clinical trials are the next step necessary to validate the use of MRI as a surrogate marker of stroke duration.

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"MR Imaging Predicts Time from Symptom Onset in Acute Stroke Patients: Implications for Patients with Unknown Onset Time." Collaborating with Dr. Oppenheim were Mina Petkova, M.D., Sebastian Rodrigo, M.D., Ph.D., Catherine Lamy, M.D., Georges Oppenheim, Ph.D., Emmanuel Touzé, M.D., Ph.D., Jean-Louis Mas, M.D., and Jean-François Méder, M.D., Ph.D.

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