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NEWS

RSNA Press Release

Post-Stroke Depression Linked to Functional Brain Impairment

Released: June 5, 2012

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At A Glance

- Using functional MRI (fMRI), researchers found a strong association between impairments in the default-mode network of the brain and severity of post-stroke depression.
- The findings suggest that functional brain impairment may be more critical than structural lesions in assessing post-stroke mood disorders.
- One-third of patients surviving a stroke experience post-stroke depression.

OAK BROOK, Ill. — Researchers studying stroke patients have found a strong association between impairments in a network of the brain involved in emotional regulation and the severity of post-stroke depression. Results of the study are published online in the journal *Radiology*.

"A third of patients surviving a stroke experience post-stroke depression (PSD)," said lead researcher Igor Sibon, M.D., Ph.D., professor of neurology at the University of Bordeaux in Bordeaux, France. "However, studies have failed to identify a link between lesions in the brain caused by ischemia during a stroke and subsequent depression."

Instead of looking for dysfunction in a specific area of the brain following a stroke, Dr. Sibon's study was designed to assess a group of brain structures organized in a functional network called the default-mode network (DMN). Modifications of connectivity in the DMN, which is associated with internally generated thought processes, has been observed in depressive patients.

"The default-mode network is activated when the brain is at rest," Dr. Sibon said. "When the brain is not actively involved in a task, this area of the brain is engaged in internal thoughts involving self-related memory retrieval and processing."

In the study, 24 patients between the ages of 18 and 80 underwent resting-state functional magnetic resonance imaging (fMRI) 10 days after having mild to moderate ischemic stroke. An fMRI imaging study measures metabolic changes in specific areas of the brain. Although many fMRI exams are designed to measure brain changes while a patient performs a specific task, during a resting-state fMRI exam, patients lie motionless.

The patients, which included 19 men and five women, were also clinically evaluated 10 days and three months post-stroke to determine the presence and severity of depression and

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anxiety symptoms. At three months post-stroke, patients were evaluated for depression using the DSM-IV diagnostic classification system.

Using the DSM-IV criteria, 10 patients had minor to moderate depression, and 14 patients had no depression. Results of the fMRI exams revealed an association between modifications of connectivity in the DMN 10 days after stroke and the severity of depression three months post-stroke.

"We found a strong association between early resting-state network modifications and the risk of post-stroke mood disorders," Dr. Sibon said. "These results support the theory that functional brain impairment following a stroke may be more critical than structural lesions."

According to Dr. Sibon, the widespread chemical changes that result from a stroke may lead to the modification of connectivity in brain networks such as the DMN. He said results of his study may contribute to the clinical management of stroke patients by providing an opportunity to investigate the effects of a variety of treatments on patients whose fMRI results immediately post-stroke indicate impaired connectivity in the DMN.

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"Subacute Default Mode Network Dysfunction in the Prediction of Post-Stroke Depression Severity." Collaborating with Dr. Sibon were Saioa Lagadec, Ph.D. student, Bixente Dilharreguy, Ph.D., Pauline Renou, M.D., Olivier Fleury, M.D., and Michèle Allard, M.D., Ph.D.

Radiology is edited by Herbert Y. Kressel, M.D., Harvard Medical School, Boston, Mass., and owned and published by the Radiological Society of North America, Inc. (*http://radiology.rsna.org/*)

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