

Media Contact: Aline McKenzie

214-648-3404

aline.mckenzie@utsouthwestern.edu

Diagnosing non-Alzheimer's dementia with PET scans has high error rate, UT Southwestern researchers find

DALLAS – Dec. 8, 2010 – Interpreting a type of brain scan called positron emission tomography (PET) is reliable for diagnosing Alzheimer's disease, but is prone to error when diagnosing another common form of degenerative dementia, researchers at UT Southwestern Medical Center have found.

"Doctors seem to have an Alzheimer's-centric approach to PET scans," said Dr. Kyle Womack, assistant professor of neurology and neurotherapeutics and psychiatry at UT Southwestern and lead author of the study, which appears online and in a future issue of *Archives of Neurology*. "If they see the classic changes associated with Alzheimer's, they stop.

"Unfortunately, PET scans are used primarily when other examinations can't tell dementias apart, so it's vital that they're effective. Our results show that if clinicians pay more attention to certain areas of the brain when reading these scans, their interpretations improve."

The study tested physicians' ability to distinguish between Alzheimer's disease and frontotemporal lobar degeneration (FTLD), the third most common cause of degenerative dementia, using a three-dimensional imaging technique called FDG-PET scanning.

In a PET scan, patients are given a solution of sugar tagged with a radioactive tracer. When the sugar reaches the brain, it congregates in metabolically active areas that "light up" on scans. In degenerative dementias, various areas of the brain suffer nerve death and show less activity.

The study involved 31 patients with Alzheimer's disease and 14 patients with FTLD. The patients had undergone PET scans before their deaths; after their deaths, their diagnoses were confirmed by autopsy.

The PET scans were examined by 12 "raters," 10 neurologists and two psychiatrists. None were informed of any details of the patients' cases.

The raters were all correct in interpreting 87 percent of the Alzheimer's scans but were correct for only 50 percent of the FTLD scans. In one case of FTLD, 11 of the 12 raters missed the diagnosis.

The clinical symptoms of people with FTLD often lead physicians to misdiagnose the condition as Alzheimer's or a psychiatric disorder such as late-onset bipolar disorder, Dr. Womack said. Medicaid and Medicare recently approved PET scans as a way to distinguish FTLD from Alzheimer's, so reliable interpretation is critical, he said.

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“Clinicians will have to be careful to take the entire pattern of the brain scan into account,” Dr. Womack said.

Other UT Southwestern researchers involved in the study were Dr. Ramón Díaz-Arrastia, professor of neurology and neurotherapeutics, and Dr. Anne Lipton, former assistant professor of neurology and neurotherapeutics and psychiatry, now at Presbyterian Hospital of Dallas.

Researchers from the University of Pittsburgh; University of Pennsylvania; Department of Veterans Affairs Medical Center in Ann Arbor; the University of Michigan; the Mayo Clinic; the University of California, Davis; UC Berkeley; UC Irvine; the University of Washington; Seattle Children’s Hospital and Regional Medical Center; the University of Utah; Duke University; Indiana University, Indianapolis; and Washington University, St. Louis, also took part in the investigation.

The study was funded by the National Institutes of Health and the Center for Alzheimer’s Care, Imaging and Research at the University of Utah.

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