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Head trauma, TBI important causes of memory loss beyond Alzheimer's disease

Meysami S, et al. *J Alzheimers Dis.* 2019;doi:10.3233/JAD-190708.

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Cyrus Raji

Clinicians may be able to distinguish between memory loss caused by traumatic brain injury, or TBI, vs. Alzheimer's disease by using tailored MRI scans, according to study results published in *Journal of Alzheimer's Disease*.

“Using MRI scans to measure the size of different brain structures among individuals with memory loss who also had a history of head trauma, we found that the areas of the brain that shrank were completely different than those we would expect from Alzheimer's disease,” **Cyrus A. Raji, MD, PhD**, assistant professor of radiology at Washington University in St. Louis, told Healio Psychiatry. “This tells us that just because a patient has memory loss doesn't mean physicians should assume that this resulted from Alzheimer's disease since we have tools available that can measure brain structure and other potential causes that can be very common and debilitating, including TBIs.”

According to Raji and colleagues, quantitative volumetric MR brain imaging is typically used to assess Alzheimer's disease and cognitive disorders, but it may also serve as a tool to assess the chronic, delayed effects of TBI, they wrote. They hypothesized that patients with cognitive complaints and a history of TBI at some point in the past would exhibit a distinct neuroimaging profile that differed from age-related changes, including from patterns seen in common dementias.

The researchers retrospectively evaluated MRI scans from 40 patients who were referred for cognitive complaints and had a history of a TBI according to hospital records. They screened participants for history of known dementia or other disorders that may influence cognition, primary brain malignancy or large

territorial ischemic infarcts. All participants were then given an MRI that included a 3D volumetric sequence and analyzed with a volumetric program called Neuroreader. Lastly, the researchers compared participants' scans to a normative database to determine the extent of atrophy.

Raji and colleagues reported that TBI caused the most damage to the ventral diencephalon, which is associated with learning and emotions. The least amount of atrophy occurred in the hippocampus, which is associated with memory and emotions and is the region of the brain most impacted by Alzheimer's. The researchers noted that individuals with TBI history exhibit regional brain atrophy correlated with cognitive function, whereas Alzheimer's disease atrophy in these patients appeared less likely given the relative sparing of the hippocampi.

"If physicians are seeing patients with memory problems and want to get a quantitative means of evaluation, Neuroreader can supplement the standard MRI with additional information," Raji said. – *by Joe Gramigna*

Disclosures: Raji reports working as a scientific advisor for Brainreader, the developer of Neuroreader. Please see the study for all other authors' relevant financial disclosures.



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