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Brain Imaging Technique May Help Diagnose Movement Disorders

A new study published in the journal Movement Disorders suggests a promising brain-imaging technique has the potential to improve diagnoses for the millions of people with movement disorders such as Parkinson's disease.

The three-year study looked at 72 patients, each with a clinically defined movement disorder diagnosis. Using a technique called diffusion tensor imaging, the researchers successfully separated the patients into disorder groups with a high degree of accuracy.

"The purpose of this study is to identify markers in the brain that differentiate movement disorders which have clinical symptoms that overlap, making [the disorders] difficult to distinguish," said David Vaillancourt, associate professor in the department of applied physiology and kinesiology and the study's principal investigator.

"No other imaging, cerebrospinal fluid or blood marker has been this successful at differentiating these disorders," he said. "The results are very promising."

Movement disorders such as Parkinson's disease, essential tremor, multiple system atrophy and progressive supranuclear palsy exhibit similar symptoms in the early stages, which can make it challenging to assign a specific diagnosis. Often, the original diagnosis changes as the disease progresses, Vaillancourt said.

Diffusion tensor imaging, known as DTI, is a non-invasive method that examines the diffusion of water molecules within the brain and can identify key areas that have been affected as a result of damage to gray matter and white matter in the brain. Vaillancourt and his team measured areas of the basal ganglia and cerebellum in individuals, and used a statistical approach to predict group classification. By asking different questions within the data and comparing different groups to one another, they were able to show distinct separation among disorders.

"Our goal was to use these measures to accurately predict the original disease classification," Vaillancourt said. "The idea being that if a new patient came in with an unknown diagnosis, you might be able to apply this algorithm to that individual.

He compared the process to a cholesterol test.

"If you have high cholesterol, it raises your chances of developing heart disease in the future," he said. "There are tests like those that give a probability or likelihood scenario of a particular disease group. We're going a step further and trying to utilize information to predict the classification of specific tremor and Parkinsonian diseases."

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