Range of diagnostic spinal fluid tests needed to differentiate concurrent brain diseases

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Teasing out the exact type or types of dementia someone suffers from is no easy task; neurodegenerative brain diseases share common pathology and often co-occur. Researchers from the Perelman School of Medicine at the University of Pennsylvania are continuing efforts to differentiate diseases, such as Alzheimer's disease (AD) from frontotemporal lobar degeneration (FTLD), as FTLD is often clinically difficult to distinguish from atypical presentations of AD.

In a series of studies being presented at the American Academy of Neurology's 64th Annual Meeting in New Orleans, Penn researchers demonstrated that, while tests created for AD are effectively diagnosing the condition when it's clear cut, additional tests are needed to address the many cases with mixed pathology.

"With the emergence of disease-modifying treatments for AD and other neurodegenerative diseases, it will be of utmost importance to accurately identify the underlying neuropathology in patients," said senior author John Q. Trojanowski, MD, PhD, professor of Pathology and Laboratory Medicine and co-director of the Center for Neurodegenerative Disease Research at Penn.

In one study, the Penn team compared results of a test looking at levels of tau and amyloid beta (Aβ) in the spinal fluid, using two different types of analytical platforms. They determined that values from the two platforms could effectively be transformed into equivalent units, and these values accurately distinguished AD from FTLD. A cutoff of 0.34

for the t-tau:Aβ1-42 ratio had 90 - 100 percent sensitivity and 91-96.7 percent specificity to differentiate FTLD cases, respectively.

In another study, the team looked at patient cases with more than one underlying neurodegenerative disease and compared the accuracy of the biomarkers using clinical and neuropathological diagnosis. They determined that cerebral spinal fluid (CSF) Aβ and tau assays provided a valid diagnosis of AD but, in mixed pathology cases where Alzheimer's was present along with other diseases (confirmed by autopsy), the testing strategies classified the diagnosis as AD alone.

"We need to develop better CSF diagnostic panels for the early diagnosis of neurodegenerative dementias, including those due to mixed neurodegenerative disease pathologies that commonly co-occur with Alzheimer's," said senior author Murray Grossman, MD, professor of Neurology and director of the Penn FTLD Center.

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