Topographic Distribution of Amyloid-β, Tau, and Atrophy in Patients With Behavioral/Dysexecutive Alzheimer Disease

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Study Question
Do patients with behavioral/dysexecutive Alzheimer disease (AD) have tau pathology localized within the frontal brain regions?

What Is Known and What This Paper Adds
Researchers have defined behavioral/dysexecutive AD based on behavioral and cognitive features, and the existing literature on amyloid-β and tau pathology in this AD subtype consists of only small autopsy studies. This investigation’s results provide evidence for frontal cortical involvement of tau pathology in behavioral/dysexecutive AD.

Methods
For this cross-sectional study, the investigators recruited 15 patients with behavioral/dysexecutive AD (mean age, 65.9 ± 8.8 years), 25 age- and severity-matched patients with amnestic AD (mean age, 65.8 ± 9.1 years), and 131 cognitively unimpaired elderly individuals (mean age, 68.2 ± 11.9 years) at McGill University in Montréal. The participants underwent amyloid PET scans with [18F]-AZD4694, tau PET scans with [18F]-MK6240, and volumetric MRI scans. The investigators used voxelwise multivariate linear regression models to identify patterns of imaging biomarker abnormalities in the behavioral/dysexecutive AD and amnestic AD groups. These biomarker abnormality patterns were the primary outcomes. The investigators used receiver operating characteristic (ROC) analyses to determine whether such abnormality patterns could differentiate the behavioral/dysexecutive AD and amnestic AD groups.

Results and Study Limitations
Voxelwise analyses revealed frontal cortical tau aggregation in the behavioral/dysexecutive AD group, with peaks occurring in the medial prefrontal, anterior cingulate, and frontal insular cortices. These peaks were not apparent in the amnestic AD group, and they were useful for differentiating patients with behavioral/dysexecutive AD from patients with amnestic AD (area under the ROC curve, 0.87). The behavioral/dysexecutive AD and amnestic AD groups did not differ in terms of amyloid PET findings or brain atrophy patterns. The present study’s limitations include the lack of consensus classification guidelines for behavioral/dysexecutive AD, the small sample size, and the relatively young average age of the patients.

Study Funding and Competing Interests
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