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Associations between [F-18]AV1451 tau PET and CSF measures of tau pathology in a clinical sample

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Abstract

ObjectiveTo assess the relationships between fluid and imaging biomarkers of tau pathology and compare their diagnostic utility in a clinically heterogeneous sample.MethodsFifty-three patients (28 with clinical Alzheimer disease [AD] and 25 with non-AD clinical neurodegenerative diagnoses) underwent -amyloid (A) and tau ([F-18]AV1451) PET and lumbar puncture. CSF biomarkers (A(42), total tau [t-tau], and phosphorylated tau [p-tau]) were measured by multianalyte immunoassay (AlzBio3). Receiver operator characteristic analyses were performed to compare discrimination of A-positive AD from non-AD conditions across biomarkers. Correlations between CSF biomarkers and PET standardized uptake value ratios (SUVR) were assessed using skipped Pearson correlation coefficients. Voxelwise analyses were run to assess regional CSF-PET associations.Results[F-18]AV1451-PET cortical SUVR and p-tau showed excellent discrimination between A-positive AD and non-AD conditions (area under the curve 0.92-0.94; 0.83 for other CSF measures), and reached 83% classification agreement. In the full sample, cortical [F-18]AV1451 was associated with all CSF biomarkers, most strongly with p-tau ($r = 0.75$ vs 0.57 for t-tau and -0.49 for A(42)). When restricted to A-positive patients with AD, [F-18]AV1451 SUVR correlated modestly with p-tau and t-tau (both $r = 0.46$) but not A(42) ($r = 0.02$). On voxelwise analysis, [F-18]AV1451 correlated with CSF p-tau in temporoparietal cortices and with t-tau in medial prefrontal regions. Within AD, Mini-Mental State Examination scores were associated with [F-18]AV1451-PET, but not CSF biomarkers.Conclusion[F-18]AV1451-PET and CSF p-tau had comparable value for differential diagnosis. Correlations were robust in a heterogeneous clinical group but attenuated (although significant) in AD, suggesting that fluid and imaging biomarkers capture different aspects of tau pathology.Classification of evidenceThis study provides Class III evidence that, in a clinical sample of patients with a variety of suspected neurodegenerative diseases, both CSF p-tau and [F-18]AV1451 distinguish AD from non-AD conditions.

Keywords

KeyWords Plus: MILD COGNITIVE IMPAIRMENT; ALZHEIMERS-DISEASE; CEREBROSPINAL-FLUID; DIAGNOSTIC GUIDELINES; NATIONAL INSTITUTE; BIOMARKERS; CRITERIA; DEMENTIA; RECOMMENDATIONS RECOGNITION

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