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【Overview presentation】

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Performance of plasma pTau217/Aβ42 ratio and pTau217 to predict Aβ pathology status defined by CSF testing in SPIN cohort

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Overview presentation	**Background and Objectives:** Predicting the Amyloid status in brain by blood-based assays is useful for screening of Alzheimer's disease. Recent studies suggest that plasma phosphorylated tau at threonine 217 (p-Tau217) is currently promising blood biomarker for detecting amyloid pathology. In this study, we aimed to evaluate the performance of plasma p-Tau217 and p-Tau217/ Aβ42 measured by an Automated Immunoassay System HISCL™-5000 / HISCL-800 (Sysmex Corporation, Kobe, Japan) to predict Aβ pathology defined by CSF testing in SPIN (Sant Pau Initiative on Neurodegeneration) cohort. **Methods:** This study included 199 participants: 50 cognitively unimpaired (CU), 49 mild-cognitive impairment (MCI) due to Alzheimer's disease (AD), 49 MCI due to non-AD and 51 AD dementia from the SPIN cohort which were enrolled at Hospital de la Santa Creu i Sant Pau from 2013 to 2022. The Aβ pathology was defined by CSF Aβ42/40 ratio measured by Lumipulse (Fujirebio-Europe). The plasma p-Tau217 and Aβ42 were measured by HISCL-5000. **Results:** Plasma p-Tau217 and the p-Tau217/Aβ42 ratio predicted Aβ pathology as defined by the CSF Aβ42/40 ratio, with AUROC values of 0.947 (95% CI, 0.911–0.982) and 0.954 (95% CI, 0.920–0.987), respectively. The optimal thresholds determined by the Youden Index were 0.176 for p-Tau217 and 0.010 for the p-Tau217/Aβ42 ratio. At the p-Tau217 threshold of 0.176, sensitivity, specificity, PPV, NPV, and overall accuracy were 93.0%, 90.9%, 91.2%, 92.8%, and 92.0%, respectively. At the p-Tau217/Aβ42 ratio threshold of 0.010, the

	corresponding values were 92.0%, 91.9%, 92.0%, 91.9%, and 92.0%. A two-threshold approach to achieve 95% sensitivity and specificity was also evaluated. Thresholds of 0.158 and 0.490 for p-Tau217 achieved a 94.2% accuracy with 16% of intermediate population, while thresholds of 0.007 and 0.024 for the p-tau217/Aβ42 ratio yielded 96.1% accuracy with 17% of intermediate population. These findings indicate that both single-threshold and two-threshold approaches can achieve >90% sensitivity, specificity, and accuracy. **Conclusions:** Plasma p-Tau217 and the p-tau217/Aβ42 ratio achieved high accuracy in predicting Aβ pathology determined by CSF testing.
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