

Clinical Utility of Plasma P-tau 181 and 217 Biomarkers for Alzheimer's Disease Diagnosis in a Hong Kong Cohort

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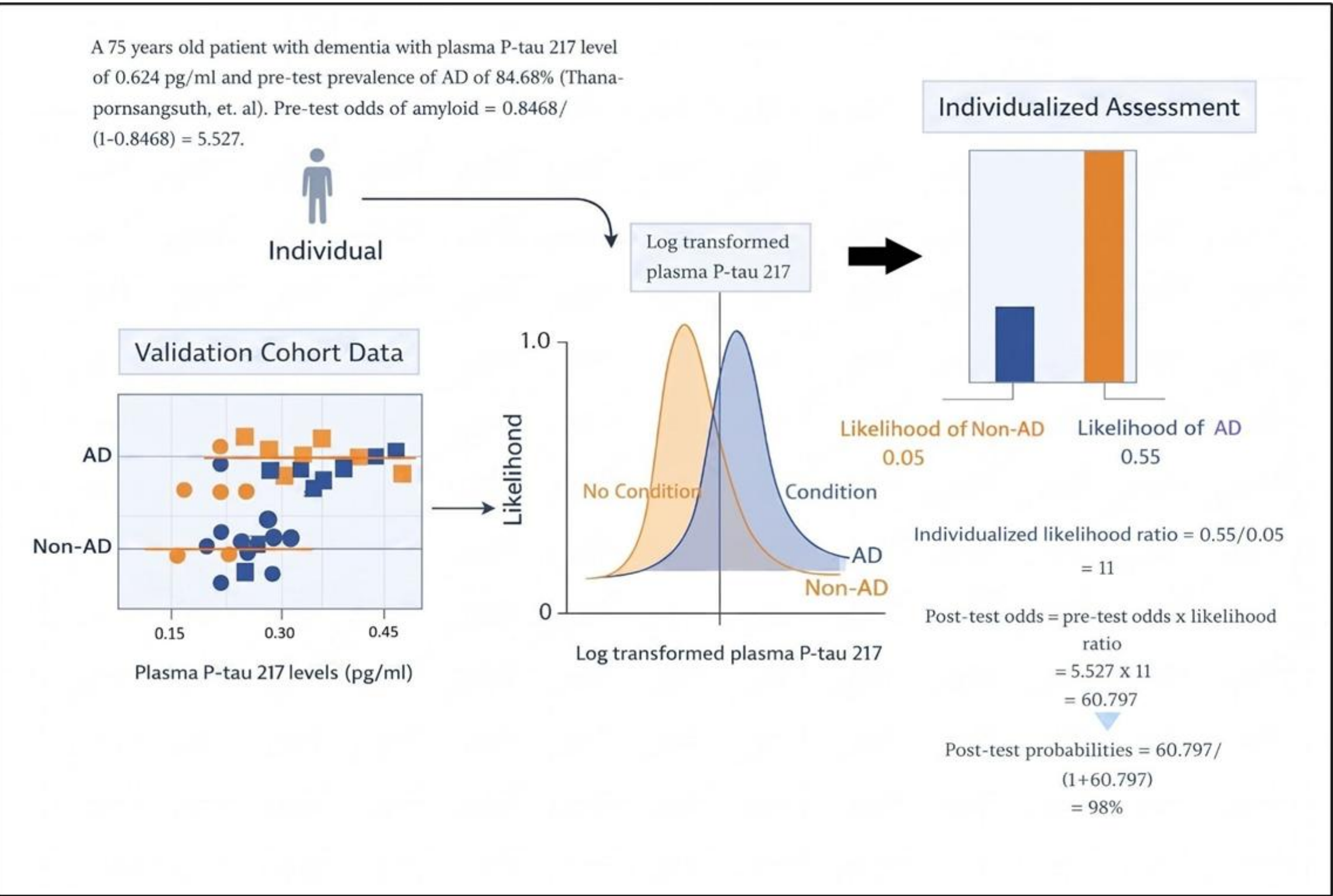
Introduction & Background

- Plasma P-tau 181 and P-tau 217 biomarkers have not been extensively studied in Chinese clinical populations for Alzheimer's disease (AD) diagnosis.
- There is a clinical need for accurate non-invasive biomarkers to diagnose AD in memory clinics due to increasing demand following approval of treatments such as Lecanemab and Donanemab.
- Western population studies report plasma P-tau 181 area under the curve (AUC) between 0.86-0.89 and P-tau 217 with AUC over 0.90, with a three-range strategy recommended for AD detection using reference cutoffs.
- This study aims to evaluate the clinical application of plasma P-tau 181 and 217 in a Hong Kong cohort with cognitive impairment.

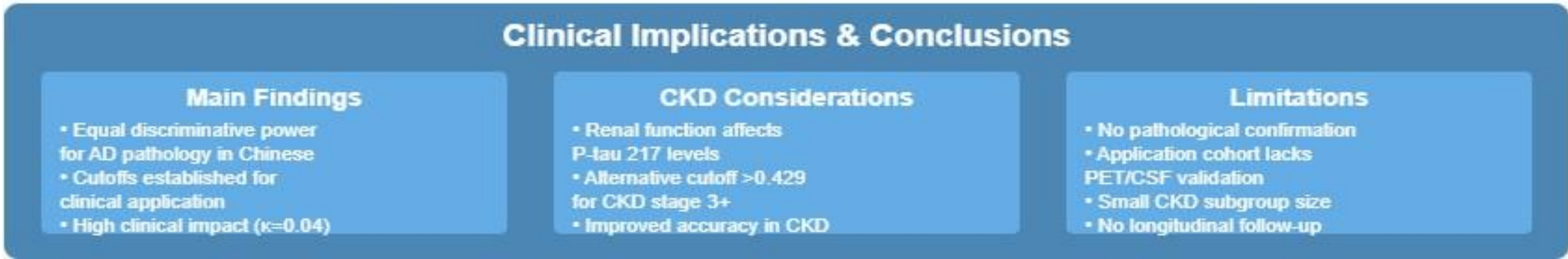
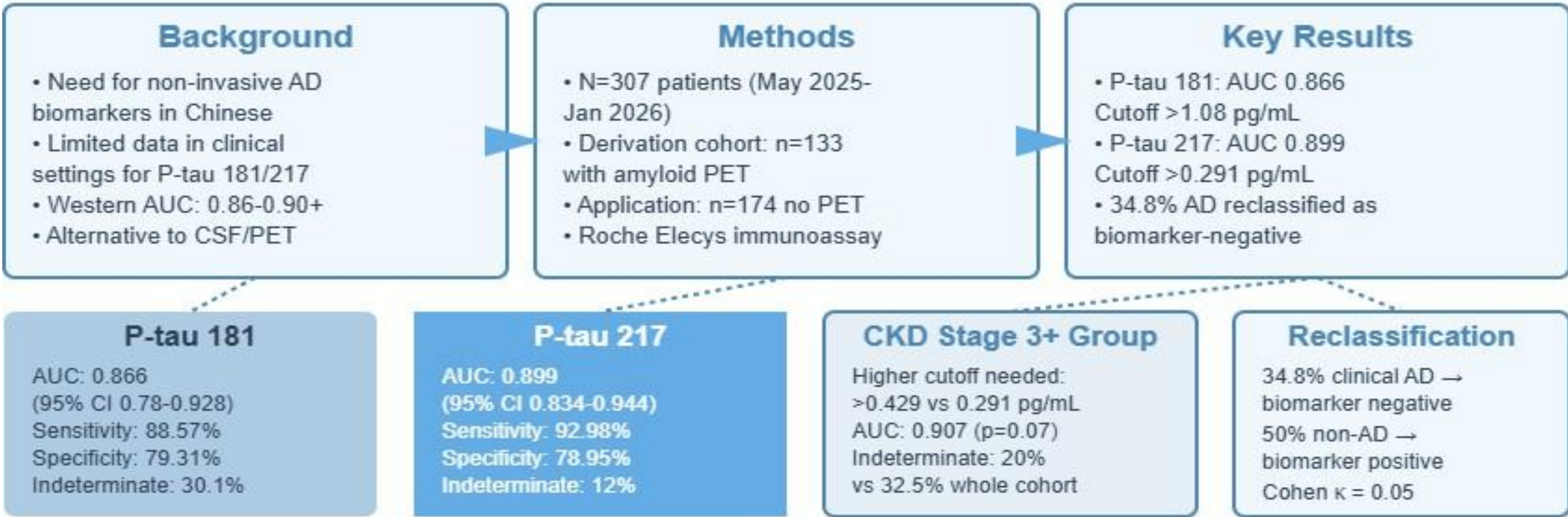
Methods

- 307 patients were consecutively recruited from Queen Mary Hospital Memory and Neurology Clinics between May 2025 and January 2026, with IRB approval UW25-167. A derivation cohort (n=133) had amyloid PET imaging; the application cohort (n=174) did not.
- Plasma P-tau 181 and 217 levels were quantified using the Roche Elecsys immunoassay on the Cobas e801 platform employing a sandwich principle, with blinded technicians and monthly calibration.
- HK-MoCA cognitive assessments were performed and estimated glomerular filtration rate (eGFR) was calculated using the CKD-EPI equation.
- Statistical analyses included ROC curve for AUC calculation (absolute values and post-test probabilities, Youden index for comparison

The flowchart about calculation of post-test probabilities with an example



Plasma Biomarkers for Alzheimer's Disease Hong Kong Cohort Study: P-tau 181 & 217 Clinical Application



Results

Diagnostic Performance of Plasma P-tau 181

- AUC of 0.866 (95% CI: 0.78-0.928). An optimal cutoff >1.08 pg/mL yielded sensitivity 88.57% and specificity 79.31%.
- The defined triple-range cutoff (0.878-1.44 pg/mL) identified 30.1% of patients within an indeterminate range.

Diagnostic Performance of Plasma P-tau 217

- AUC of 0.899 (95% CI: 0.834-0.944). An optimal cutoff >0.291 pg/mL resulted in sensitivity 92.98% and specificity 78.95%.
- A double cutoff range (0.30-0.418 pg/mL) achieved sensitivity 91.2% and specificity 90.79%, with 12% classified as indeterminate.
- In chronic kidney disease (CKD) stage 3+ subgroup, a higher optimal cutoff >0.429 pg/mL was observed compared to the whole cohort (0.291 pg/mL). The post-test probabilities cut-off >90.54%, with a trend of better accuracy (AUC 0.907, p=0.07), and reduced indeterminate cases (19.5% vs 32.5%) compared with the optimal cut-off of >0.429 pg/ml.

Application Cohort Findings

- In the application cohort without PET imaging, 34.8% of clinically diagnosed AD patients were biomarker-negative, and 50% of clinically non-AD were biomarker-positive indicating mixed AD pathology.
- Cohen kappa for agreement between clinical and biomarker classification was 0.05, indicating slight agreement and major discordance.

Table 1: Confusion Matrix (if using the international cut-off)

		Plasma P-tau 217 +	Plasma P-tau 217 -	Indeterminate results
Whole cohort (n=133)	Amyloid PET +	49	3	24 (18%)
	Amyloid PET -	9	50	
≤ 0.222 pg/ml: amyloid negative				
0.223-0.378 pg/ml: indeterminate				
>0.379 pg/ml: amyloid positive				
Same cut-off and exclude the CKD stage 3 or above (n=93)	Amyloid PET +	29	2	13 (14%)
	Amyloid PET -	4	45	

Discussion & Implications

- The study confirms that Roche Elecsys plasma P-tau 181 and P-tau 217 provide equivalent AD diagnostic performance in Chinese patients with cognitive impairment, supporting their use in clinical settings.
- Renal function negatively correlates with plasma P-tau 217, necessitating consideration of CKD in biomarker interpretation and diagnostic cutoffs.
- Limitations include no postmortem confirmation, absence of PET or CSF confirmation in the application cohort, small CKD subgroup sample size, and lack of longitudinal follow-up to assess predictive value.

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