

Real-world Diagnostic Performance Of Plasma P-tau217 In Memory Clinics:A Multicenter Study From Northwest China

Sunday-1179

Chunyu Li¹, Peijie Liu¹,Simeng Cui¹,Jin Wang¹, Qiumin Qu¹, Ling Gao¹
1Neurology,The First Affiliated Hospital of Xi'an Jiaotong University,Xi'an,Shaanxi,China

Plasma p-tau217 retained robust diagnostic accuracy for Alzheimer’s disease in a real-world memory clinic cohort with heterogeneous comorbidities.Compared with p-tau181 and GFAP, p-tau217 showed the most stable performance when the reference group shifted from healthy controls to diverse non-AD neurological disorders.These findings support plasma p-tau217 as a promising first-line triage biomarker in routine memory clinic practice.

INTRODUCTION

Alzheimer’s disease is the most common cause of dementia and requires accurate early diagnosis, particularly in the era of disease-modifying therapies^[2]. Amyloid PET and cerebrospinal fluid biomarkers provide high diagnostic accuracy but are limited by cost, invasiveness, and accessibility in routine memory clinics. Blood-based biomarkers offer a scalable alternative. Plasma p-tau217 has shown excellent accuracy for Alzheimer’s disease in well-controlled case-control studies, with reported AUCs of approximately 0.94–0.98^[1]. However, real-world memory clinic populations are more complex. Patients frequently have vascular risk factors, metabolic comorbidities, Parkinson’s disease, vascular cognitive impairment, cerebrovascular disease, or other neurological disorders. Whether plasma p-tau217 maintains its diagnostic performance in this heterogeneous clinical setting remains insufficiently defined^[3,4].

METHODS

We conducted a multicenter real-world study across 38 memory clinics in Northwest China. Participants aged 40–85 years were consecutively enrolled and classified into three groups: Alzheimer’s disease: amyloid PET-positive or CSF-confirmed AD Non-AD neurological disorders: including vascular cognitive impairment, Parkinson’s disease, cerebrovascular disease, neuroimmune disorders, and other neurological conditions Cognitively normal controls: individuals with common age-related comorbidities but without cognitive impairment Peripheral blood samples were collected in EDTA tubes. Six plasma biomarkers were measured using chemiluminescence immunoassay: Aβ42, Aβ40, p-tau181, p-tau217, GFAP, NfL. The Aβ42/Aβ40 ratio was calculated for diagnostic evaluation. Diagnostic performance was assessed using receiver operating characteristic curves. AUCs were compared across diagnostic scenarios. In the accepted abstract analysis, cross-scenario AUC differences were evaluated using DeLong’s test.

RESULTS

A total of 1,443 participants were analyzed (AD=109,non-AD=774, controls=560). Compared with controls,p-tau217 showed the best performance for diagnosing AD(AUC 0.908 [95%CI0.884-0.929]), while p-tau181 and GFAP also demonstrated robust power (AUC 0.897 [0.872-0.919]and 0.877 [0.850-0.901]). For differentiating AD from all non-AD disorders,p-tau217 exhibited superior diagnostic performance (AUC 0.865 [0.840-0.887]; sensitivity 85.3%,specificity 77.9%)versus p-tau181 (0.828[0.802-0.853])and GFAP(0.732 [0.701-0.761]). In subgroup analyses, p-tau217 maintained accuracy against VCI (AUC 0.805 [0.753-0.857]; n=156)and PD(AUC 0.863 [0.821-0.906]; n=186). Notably , in cross-diagnostic scenario comparisons, p-tau217 exhibited the most consistent performance with a minimal decline in AUC (DeLong's test p=0.0525), whereas the AUCs of p-tau181 (*p*=0.0086) and GFAP (*p*<0.0001) decreased significantly.Other markers, including the Aβ42/Aβ40 ratio and NfL, showed limited diagnostic utility(Table 1,Figure 1, Figure 2).

Table 1. Diagnostic performance of plasma biomarkers for Alzheimer’s disease in real-world memory clinic setting									
Biomarker	AUC(95%CI)		DeLong P	Youden index J		Sensitivity%		Specificity%	
	AD vs Control	AD vs Non-AD		AD vs Control	AD vs Non-AD	AD vs Control	AD vs Non-AD	AD vs Control	AD vs Non-AD
P-tau217	0.908 (0.884-0.929)	0.865 (0.840-0.887)	0.0525	0.7216	0.6323	87.16	85.32	85	77.91
P-tau181	0.897 (0.872-0.919)	0.828 (0.802-0.853)	0.0086	0.703	0.5766	84.4	84.4	85.89	73.26
GFAP	0.877 (0.850-0.901)	0.732 (0.701-0.761)	<0.0001	0.6453	0.4217	88.99	76.15	75.74	66.02
Aβ42/Aβ40 ratio	0.754 (0.720-0.786)	0.692 (0.661-0.723)	0.0647	0.4137	0.3285	84.4	66.06	56.96	66.8
NfL	0.714 (0.678-0.748)	0.542 (P=0.0764)	<0.0001	0.4124	-	75.23	-	66.01	-
Aβ42	0.697 (0.660-0.731)	0.679 (0.647-0.710)	0.6304	0.3085	0.2709	71.56	69.72	59.29	57.36

*Abbreviations:Youden index J = sensitivity + specificity – 1.

DeLong p compares AUC(AD vs Control) vs AUC(AD vs Non-AD).

For NfL in AD vs Non-AD, AUC was not statistically significant (P=0.0764) and therefore not reported.*

Figure 1. Diagnostic performance of plasma p-tau217 in real-world memory clinic populations.

AD vs Control
AUC:0.908

AD vs Non-AD
AUC:0.865

DeLong p=0.0525