Original Investigation | Neurology

Plasma Biomarkers: A Revolution in Alzheimer's Detection A Literature Review

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Key Points

Question:
Can plasma biomarkers accurately detect and monitor Alzheimer's disease (AD) and predict its progression from mild cognitive impairment (MCI)?

Findings:
Plasma p-tau217 and p-tau181 showed high accuracy (AUC > 0.90) and specificity for diagnosing AD. Plasma NfL levels predicted disease progression over four years. Low plasma Aβ42/40 ratio increased the risk of AD progression by 70%.
Plasma biomarkers demonstrated diagnostic accuracy similar to CSF markers.

Meaning:
Plasma biomarkers, particularly p-tau217 and NfL, are promising tools for early AD detection and progression monitoring.
Their non-invasive nature and high accuracy make them viable alternatives to traditional methods like CSF analysis and PET scans.

Abstract

Importance:
Alzheimer's disease (AD) accounts for 60–80% of dementia cases, with mild cognitive impairment (MCI) representing an early stage. Plasma biomarkers, such as Aβ42/Aβ40, p-tau, and neurofilament light (NfL), offer less invasive and cost-effective diagnostic options compared to cerebrospinal fluid (CSF) analysis or PET scans.

Objective:
To evaluate plasma biomarkers for their diagnostic accuracy and association with MCI and AD progression.

Evidence Review
Eight studies were reviewed, examining the correlation between plasma biomarkers and AD progression. Plasma biomarker data were compared with CSF and imaging findings to assess their diagnostic reliability.

Findings
Plasma p-tau217 and p-tau181 had high diagnostic accuracy (AUC > 0.90) and correlated with amyloid and tau pathology. Plasma NfL levels predicted disease progression over four years (p=0.0177, p=0.0001). A low plasma Aβ42/40 ratio indicated a 70% higher risk of progression to AD within two years (p=0.028). Plasma-based biomarkers, like Aβ42 and tau, showed diagnostic accuracy comparable to CSF markers.

Conclusions and Relevance:
Plasma biomarkers demonstrate strong potential for early detection, monitoring, and diagnosis of AD. Their comparable accuracy to traditional methods supports their integration into clinical practice for a less invasive and cost-effective approach.

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