Neuropsychiatric Disease and Treatment

Dovepress

open access to scientific and medical research

Open Access Full Text Article

LETTER

Serum BDNF and P300 Latency: Potential Markers of Mild Cognitive Impairment in Depressed Patients [Letter]

Mengwei Jiang

Department of Anesthesiology, Zhejiang Provincial People's Hospital, Hangzhou, Zhejiang, 310014, People's Republic of China

Correspondence: Mengwei Jiang, Department of Anesthesiology, Zhejiang Provincial People's Hospital, Hangzhou, Zhejiang, 310014, People's Republic of China, Tel +8618767188937, Email Sasuke941@163.com

Dear editor

Xue et al's article on predicting mild cognitive impairment (MCI) in depressed patients through serum biomarkers and P300 latency is commendable.[1] Their discovery of the predictive capabilities of BDNF and FGF22 levels, alongside P300 latency, addresses the often overshadowed cognitive symptoms in depression. Depression, characterized by persistent low mood and impaired function, frequently overlaps with MCI, where cognitive decline exceeds normal aging but does not impair daily activities. This transitional phase is often unrecognized, complicating treatment and prognosis.

Both depression and mild cognitive impairment (MCI) are prevalent globally. However, MCI, a bridge between normal aging and dementia, is often unnoticed due to potential stabilization or recovery. Additionally, depression and cognitive decline can mutually worsen, complicating recognition and treatment.[2] Early detection of cognitive impairment, as highlighted in Xue et al's study, holds promise in mitigating depression progression, underscoring the study's significance.

This study, which generated Receiver Operating Characteristic (ROC) curves by testing blood indices in depressed patients and employing logistic regression modeling, is underpinned by a robust experimental validation protocol. The findings, which indicate that serum levels of BDNF and FGF22, along with P300 latency, offer a more effective method for predicting the onset of mild cognitive impairment (MCI) in these patients, are further bolstered by this validation. The inclusion of additional patient data enhances the confidence in these results, providing a solid foundation for future research in this area.

Brain-derived neurotrophic factor (BDNF) plays a critical role in promoting neuronal growth, development, and differentiation and in maintaining neuronal survival. It exerts short—and long-term structural and functional effects on both excitatory and inhibitory synapses by modulating synaptic transmission. BDNF activates several signaling pathways, including PI3K, MAPK, and PLC-γ, through the TrkB receptor. This activation results in the modulation of synaptic complexity and plasticity, which are crucial for hippocampus-dependent learning and memory processes.[3] Moreover, the downregulation of BDNF expression can lead to defective synaptic plasticity in the hippocampus, which is a significant factor contributing to depression. Therefore, BDNF holds promise as a predictor for assessing the onset of mild cognitive impairment in depressed patients.

This study utilized the ERP technique, which records scalp voltage changes via EEG during neural activities, revealing cognitive processes. The P300 component emerges during attention tasks detecting task-related stimuli. Studies show varied P300 findings in Mild Cognitive Impairment (MCI): some indicate longer latencies and lower amplitudes in MCI patients, while others find no significant difference versus healthy controls.[4,5] These differences may stem from task design and MCI patient heterogeneity. Yet, P300 latency shows promise as an MCI detection tool. Researchers could feasibly use P300 latency to predict MCI in depressed patients.

Received: 2 July 2024
Accepted: 9 July 2024
Published: 10 July 2024

Overall, testing serum BDNF levels or P300 latency can predict MCI in depressed patients, reducing depression progression. Early MCI detection can prevent cognitive decline, enhancing depression treatment outcomes. Routine testing of these biomarkers is recommended to improve long-term depression treatment strategies.

Disclosure

The author reports no conflicts of interest in this communication.

References

1. Xue Z, Zhu X, Wu W, Zhu Y, Xu Y, Yu M. Synapse-related serum and p300 biomarkers predict the occurrence of mild cognitive impairment in depression. *Neuropsychiatr Dis Treat*. 2024;20:493–503. doi:10.2147/NDT.S448312
2. Yin J, John A, Cadar D. Bidirectional associations of depressive symptoms and cognitive function over time. *JAMA Network Open*. 2024;7(6):e2416305. doi:10.1001/jamanetworkopen.2024.16305
3. Lin PY, Kavalali ET, Monteggia LM. Genetic dissection of presynaptic and postsynaptic BDNF-TrkB signaling in synaptic efficacy of CA3-CA1 synapses. *Cell Rep*. 2018;24(6):1550–1561. doi:10.1016/j.celrep.2018.07.020
4. Medvidovic S, Titlic M, Maras-Simunic M. P300 evoked potential in patients with mild cognitive impairment. *Acta Inform Med*. 2013;21(2):89–92. doi:10.5455/aim.2013.21.89-92
5. Paitel ER, Samii MR, Nielson KA. A systematic review of cognitive event-related potentials in mild cognitive impairment and Alzheimer's disease. *Behav Brain Res*. 2021;396:112904. doi:10.1016/j.bbr.2020.112904

https://doi.org/10.2147/NDT.S484938