

## Relations of Progression in Cognitive Decline with Initial EEG Resting-State Functional Network in Mild Cognitive Impairment

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**Abstract :** This study aimed at investigating whether the functional brain networks constructed using the initial EEG (obtained when patients first visited hospital) can be correlated with the progression of cognitive decline calculated as the changes of mini-mental state examination (MMSE) scores between the latest and initial examinations. We integrated the time-frequency cross mutual information (TFCMI) method to estimate the EEG functional connectivity between cortical regions, and the network analysis based on graph theory to investigate the organization of functional networks in aMCI. Our finding suggested that higher integrated functional network with sufficient connection strengths, dense connection between local regions, and high network efficiency in processing information at the initial stage may result in a better prognosis of the subsequent cognitive functions for aMCI. In conclusion, the functional connectivity can be a useful biomarker to assist in prediction of cognitive declines in aMCI.

**Keywords :** cognitive decline, functional connectivity, MCI, MMSE

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