Interhemisphreric connectivity in schizophrenic patients :
Mutual information analysis of the EEG

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Abstract

Objective: The aim of present study is to investigate the interhemispheric connectivity between different cortical areas and to characterize the dynamical property of the cortical areas of schizophrenic patients from multi-channel EEG. To characterize the global feature of the likelihood of two time series, we calculated the mutual information between a segment of the EEG at one electrode and segments of the EEG at the other electrode with the same length but different delays. In addition, to investigate the cortico-cortical mutual similarity between the schizophrenic patients and the normal subjects, we established a difference map by subtracting the averaged A-CMIs over all normal subjects from the averaged A-CMIs over all schizophrenic patients.
Methods: We recorded the EEG from 16 electrodes in 10 schizophrenic patients and 10 age-matched normal controls. We estimated the slope of the AMI to measure the complexity of the EEG signal from one electrode and the A-CMI for mutual similarity between two cortical areas.
Results: In T5, C3, and O1 electrodes, the schizophrenic patients had lower complexity than normal controls. Interhemispheric A-CMI values between T5-T6, C3-C4, P3-P4, and O1-O2 were higher in schizophrenics. Moreover, from the difference map, schizophrenic patients group had higher intra- and/or interhemispheric connectivity than

normal control group.

Conclusions: These results are consistent with previous findings that suggest left hemispheric hypoactivity and interhemispheric overconnectivity in schizophrenics. Through the difference map of A-CMI, we can get the global feature of cortico-cortical coupling between different cortical areas in the human brain.

Keywords : cortico-cortical coupling; EEG; mutual information; schizophrenia; mutual similarity