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ATTENUATION OF LONG-RANGE TEMPORAL CORRELATIONS IN NEURONAL OSCILLATIONS IN PATIENTS WITH SCHIZOPHRENIA

V.V. Nikulin¹, E.G. Jönsson², G. Curio¹, T. Brismar²

¹Neurophysics Group, Department of Neurology, Charité - Universitätsmedizin, Berlin, Germany, ²Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden

Introduction: Although schizophrenia was previously associated with affected spatial neuronal synchronization, surprisingly little is known about the temporal dynamics of neuronal oscillations in schizophrenia. However, since coordination of neuronal process in time represents an essential aspect of practically all cognitive processes, it might be strongly affected in schizophrenia patients.

Objectives: To test the hypothesis of abnormal temporal neuronal dynamics in patients with schizophrenia.

Aims: We aimed at quantification and comparisons of long-range temporal correlations (LRTCs) in patients and normal subjects.

Methods: We measured 21 patients with schizophrenia (n=18) or schizoaffective disorder (n=3) and 28 age and gender matched controls. Ongoing neuronal oscillations were recorded with multi-channel EEG at rest condition. EEG was analyzed with spectral analysis and with the detrended fluctuation analysis allowing quantification of LRTCs.

Results: The amplitude of neuronal oscillations in alpha and beta frequency ranges did not differ between the patients and controls. However, LRTCs were strongly attenuated in schizophrenia patients: in centro-parietal areas and fronto-central areas for alpha and beta oscillations, respectively. In addition we observed a negative correlation between the strength of the negative symptoms and LRTCs.

Conclusions: Small values of LRTCs and their correlation with the negative symptoms in schizophrenia patients demonstrate that the temporal dynamics of neuronal oscillations are essential for normal brain functioning. Attenuated LRTCs might indicate a more intermittent neuronal dynamics possibly allowing for more random associations between neuronal activations, which in turn might relate to the occurrence of positive symptoms in schizophrenia.