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Object recognition deficit in early and adult onset schizophrenia: A study of event related potential (ERP) and source analysis.

Promotionsfach: Psychiatrie

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Perceptual closure is the ability of the brain to recognize a complete object based on fragmentary information. Visual perceptual closure deficit has been a fairly consistent finding in schizophrenia. It is hypothesized that: 1) Early visual information processing is disturbed in schizophrenic patients. This fact should manifest in prolonged latencies and/or reduced amplitudes of main P100 component. 2) Visual pathways are affected in schizophrenic patients regardless the disease onset and from very early processing on (ca. 80 ms).

To evaluate visual information processing deficit in schizophrenia, Event-related potentials (ERPs) were recorded in response to successively less fragmented line drawings of common objects. Two groups of schizophrenic patients (n=19 EOS and n=21 AOS) and age-matched healthy controls participated in the present study.

To localize cerebral generators underlying perceptual closure, a method of source analysis, BESA was applied to the data from high-density ERP recording. Source localization proceeds by a search within the head model for a location where the sources can explain a maximal amount of variance. To model perceptual closure activity, each segment of the epoch that encompassed with an ERP deflection was successively fitted with pairs of symmetric sources. Patterns of between-group differences for predefined ERP components were determined using permutation test and bootstrap methods.

ERP recordings resulted in significant reduction of P100 and N_{cl} amplitudes in EOS versus young controls and in AOS versus adult controls. Reduction of P100 amplitude was relatively equal between AOS and EOS, which emphasizes impaired sensory level processing in both groups of schizophrenia regardless of the disease onset. There were no significant differences in N180 and P230 amplitudes between EOS and young controls and between AOS and adult controls. Reduced N180 and N_{cl} amplitudes in both controls (EOC vs. AOC) and patients (EOS vs. AOS) indicated an age-dependent effect (increasing amplitudes with age). Between control

subjects and patients (adult controls/ AOS) and (young controls/EOS) the N180 amplitude did not differ significantly, that means, no effect of diagnosis could be detected. Both groups of patient showed reduced amplitude of the N_{CL}. Highly significant main effects were found between controls and patients for both young and adult subjects.

P230 amplitude increases with age in control groups (AOC have significantly greater amplitudes than EOC) indicating an age-dependent physiological development. However P230 amplitude is comparable between patients (EOS/ AOS) and between patients and controls. In patients, no significant age-dependent increase of P230 amplitude could be found.

It is shown that the visual pathways impairments in schizophrenic patients significantly increase a vulnerability to the disease and may represent an endophenotype for schizophrenia. The early course of the illness is indicated by maturation periods of prefrontal cortex.