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Abstract

Dysfunction of the cerebellum in schizophrenia is established as the concept of 'cognitive dysmetria,' which suggests impairments in sensorimotor and mental coordination resulting in perceptual disturbance, disorganized thoughts and speech, and cognitive dysfunction. It has become evident that cerebellar dysfunction is already present in individuals at ultra-high risk (UHR) for psychosis. We investigated functional connectivity of cortico-cerebellar circuits focusing on the default mode network (DMN) during rest in UHR individuals to figure out neurofunctional correlates of disease-related vulnerability.

Thirty-three UHR individuals (including 8 converters during follow-up) and 56 healthy controls underwent fMRI scanning during rest at baseline. Seed-based functional connectivity analysis was performed using two cerebellar seeds in bilateral crus I, previously known to be associated with the DMN. We conducted a statistical comparison of cortico-cerebellar functional connectivity in the DMN between three groups; converters, non-converters, and healthy controls.

Converters showed significantly decreased connectivity in several frontal regions as compared with both non-converters and healthy controls. The ventromedial prefrontal cortex (vmPFC) was particularly decreased in converters. Non-converters and healthy controls showed no significant difference in functional connectivity.

This result suggests that aberrant cortico-cerebellar connectivity in the DMN is evident prior to the development of psychotic symptoms in UHR individuals who later become overt psychosis. The cerebellum, as an internal-model control system, may play an important role in developing psychosis and give some clues to identify 'true' UHR individuals for psychosis.

This study was supported by a grant of the Korea Health Technology R&D Project through the Korea Health Industry Development Institute (KHIDI), funded by the Ministry of Health & Welfare, Republic of Korea (grant number: HI14C2242 for ASK and HI14C1234 for PHJ).

PM457

Decreased left CA2/CA3 subfield of hippocampal volume in schizophrenia is associated with tumor necrosis factor-α

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Abstract

While the hypothesis of neuroinflammation is becoming the main stream of schizophrenia research, the aim of this study was to examine the relationship of decreased hippocampal volumes and cytokines in schizophrenic patients. Thirty-one schizophrenic patients and 31 age- and sex-match healthy controls (HCs) were recruited. All participants examined with 1.5T high-resolution magnetic resonance imaging. Image was analyzed by FreeSurf that delineated the subfields of hippocampus. Cytokines included the pro-inflammatory cytokine tumor necrosis factor-α(TNF-α) and the anti-inflammatory cytokine interleukin-10 (IL-10), which was measured using an enzyme-linked immunosorbent assay. The Kendall τ_b non-parametric correlation was used for correlation statistic. Subfields that was decreased in schizophrenic patients compared with HCs included left cornus ammonis 2 and 3 (left CA2/3), right presubculum, right CA1, right CA2/3, right CA4/DG. The IL-10 was significantly higher in schizophrenic patients compared to HCs, whereas TNF-α was not significantly different between groups. When correlated the decreased hippocampal subfields with cytokines, only TNF-α levels was significantly correlated with the volume of left CA2/3. (Kendall's τ_b=0.277, p=0.033). Meanwhile, the ratio of TNF-α to IL-10 was significantly correlated with the volume of left CA2/3 in schizophrenic patients (Kendall's τ_b=0.316, p=0.021). Our results are, thus, consistent with previus findings and suggest that the CA2/3 subfield of hippocampus plays an important role in pathophysiology of schizophrenia and is vulnerable to TNF-α.

Keywords: hippocampus, schizophrenia, tumor necrosis factor-α

PM458

Altered Frontal and Temporal Microstructure in Patients with First-Episode Psychosis: Diffusion Kurtosis Study

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Abstract

The reports of microstructural disruption in schizophrenia gray matter from post-mortem studies showed various abnormalities such as reduced somal size, dendritic arborization and length. However, it has been difficult to infer to the timing, pattern and location of the microstructural changes due to the limitations of the post-mortem method. To clarify this gap in knowledge and to extend it to in vivo, microstructural complexity of cortex in subjects diagnosed with first episode psychosis (FEP) was compared to healthy controls with diffusion kurtosis imaging (DKI) technique.

A total of 37 FEP and 36 matched healthy controls underwent DKI and T1-weighted magnetic resonance imaging (MRI) to examine the microstructural complexity in cortex. Mean kurtoses in cortical gray matter regions of interests (ROI) were compared between groups. We also investigated the relationship between the microstructural complexity and symptom severity.

Mean kurtosis that represents microstructural complexity, was significantly reduced bilaterally in frontal and temporal cortex and right occipital cortex in FEP compared to healthy controls. Our result not only highlight the location and pattern of microstructural changes in schizophrenia using MRI, it specifically points out that the microstructural anomaly already exists and detectable in FEP.

Keywords: *psychosis, MRI, diffusion, kurtosis imaging, gray matter*