P-14.029 Functional and anatomical connectivity abnormalities in cognitive division of anterior cingulate cortex in schizophrenia

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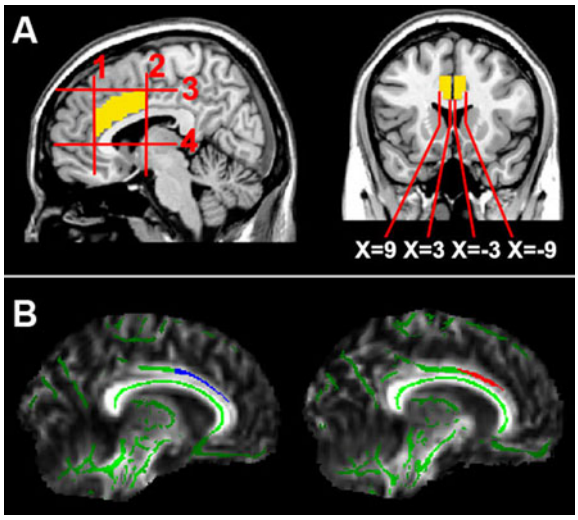

Objective: Current pathophysiological theories of schizophrenia highlight the role of altered brain functional and anatomical connectivity. The cognitive division of anterior cingulate cortex (ACC-cd) is a commonly reported abnormal brain region in schizophrenia for its importance in cognitive control process. The aim of this study was to investigate the functional and anatomical connectivity of ACC-cd and its cognitive and clinical manifestation significance in schizophrenia by using the resting-state functional magnetic resonance imaging (fMRI) and the diffusion tensor imaging (DTI).

Methods: Region-of-interest (ROI)-based resting-state functional connectivity (RSFC) analysis and Tract-Based Spatial Statistics (TBSS) were performed on 33 medicated schizophrenics and 30 well-matched health controls. The connectivity abnormalities in patients were shown by the significant between-group differences for the mean fractional anisotropy (FA) of the bilateral anterior cingulum and the RSFC strength of the bilateral ACC-cd with other parts of the brain (See Figure 1. for the ROIs information). The Pearson Correlation was performed between the imaging measures (RSFC strength and FA) and the Stroop performance and scores of the Positive and Negative Syndrome Scale (PANSS), respectively.

Results: Patients with schizophrenia showed significantly abnormal in the RSFC and its hemispheric asymmetry of the ACC-cd with multiple brain areas, e.g., decreased positive connectivity with the bilateral putamen and caudate, increased negative connectivity with the left posterior cingulate cortex (PCC), increased asymmetry of connectivity strength with the contralateral inferior frontal gyrus (IFG). The FA of the right anterior cingulum was significantly decreased in patients group ($p = 0.014$). The abnormal functional connectivity of the ACC-cd with the left PCC was significantly correlated with Stroop performance ($r = -0.432$) and the severity of the symptoms ($r = -0.396$) in the patients.

Conclusion: Our results suggested that the abnormal connectivity of the ACC-cd might play a role in the cognitive impairment and clinical symptoms in schizophrenia.

Policy of full disclosure: None.

P-14.030 MRI brain scan study of minor physical anomalies to aid the early diagnosis of autism

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Objective: Autism is a neurodevelopmental disorder in children who show social, communication and behavioural problems often persisting into adulthood. MPAs (minor physical anomalies) occur more frequently in neurodevelopmental disorders because MPAs of the eyes and face are known to form during the very same time window as the maturation of the brain ie in the first trimester of fetal life. That ''cranio-facial'' development is synchronized in early life means that a convenient biomarker exists. The advantages of using MRI scan are that it overcomes the following: traditional measurement of MPAs depends on direct observation of the subject which is bias-laden; multi-centre data is facilitated, can assist early diagnosis as a biomarker. The novel objective of the study was to demonstrate that MPAs are present in autism and this might be specifically applied to MPAs of the eye region.

Methods: We recruited children aged 7–14 with autism ($n = 25$), compared with their age and gender matched controls ($n = 46$). All children had MPA measurements conducted, 'blinded' to subject identity, using MRI brain scan. MPAs included inter-orbital distance and inter-optical angle.

Results: Intra-class coefficient ICC was 0.95. The inter-lens/inter-orbital distance showed significant positive correlations with age in controls but not in the patients group. There was smaller inter-optic nerve angle in patieints (mean: 62 degrees) than controls (mean 66 degrees) ($p < 0.18$) and there was a significant negative correlation between the inter-optic angle and age ($r = -0.617$, $p < 0.001$) in the patients.

Conclusion: It is feasible to measure MPAs using MRI scan. Since inter-optic angle reduces from 180 degrees (in utero) to 68 degrees (by age 3 into adulthood) as head size enlarges, then a smaller inter-optic angle in the autism group compared to controls may signify early head size enlargement in neurodevelopment.

Policy of full disclosure: None.

P-14.031 Amplitude of low-frequency oscillations abnormalities in tardive dyskinesia: A resting state fMRI study

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Objective: Tardive dyskinesia (TD) is a serious adverse effect associated with the long-term administration of neuroleptic medicine. Although studies have identified active theories, or hypotheses, regarding the cause of TD, the pathophysiology remains largely unknown. Resting state brain activity in TD may give clues to the pathophysiology of the disorder, but it has never been explored using functional MRI (fMRI). Previous studies have shown that amplitude of low frequency fluctuation (ALFF) may be suggestive of regional spontaneous neuronal activity. The aim of the study was to investigate abnormalities in resting state fMRI based on ALFF in TD patients.

Methods: Resting state fMRI was acquired from 15 schizophrenia patients with TD, 15 age and education matched schizophrenia patients without TD (non-TD) and healthy control. We used ALFF (0.01–0.08 HZ) to examine the amplitude of low-frequency oscillations in TD patients. Patients' mental state was assessed by the Positive and Negative Syndrome Scale for schizophrenia, and dyskinesia by the Abnormal Involuntary Movements Scale.

Results: Compared with healthy control, schizophrenia patients without TD showed decreased ALFF in left lingual gyrus and cerebellum, and none increased ALFF region was found. TD patients showed increased ALFF in left inferior temporal gyrus and caudate nucleus compared with healthy control. Compared with non-TD, TD patients had increase ALFF in bilateral anterior cingutate. These results suggest LFO abnormalities in TD.

Conclusion: This resting-state fMRI study suggests that the changed spontaneous neuronal activity of these regions may be implicated in the underlying pathophysiology in schizophrenia with TD.

Policy of full disclosure: None.