Results: Patients had a significant reduction in GMV in left fusiform gyrus (Hedge's g = 1.98, T= 6.7), and increased GMV in the right precuneus (Hedge's g = 1.63, T= 5.5) and lingual cortex (Hedge's g = 1.19, T= 4.0). We did not find any other areas of significant GMV change. Of these 3 circumscribed GMV changes, reduced fusiform GMV was found among FEP patients with lower processing speed (ß=0.45, p=0.04), higher severity of delusions (ß=-0.43, p=0.049) and unusual thought content (ß=-0.59, p=0.01). Increased precuneus GMV was found among FEP patients with higher severity of delusions (ß=0.62, p=0.008) and unusual thought content (ß=0.50, p=0.03). Right lingual changes were not related to the severity of delusions or processing speed scores.
Discussion: Our findings suggest that (1) GMV deficits are minimal in drug-naïve FEP subjects, with large effect-size changes concentrated around face processing (fusiform) region (2) GMV increases co-occur with GMV reduction especially in those with most severe delusions and cognitive deficits indicating a role for compensatory plasticity. Subtle early brain structural changes appear to predict symptom burden and cognitive deficits at the time of first clinical presentation with psychosis. Focusing on treatments that manipulate the structure of fusiform cortex could potentially reduce the severity of some of the early symptoms in FEP.

T166. SPATIAL INCOHERENCE OF LARGE-SCALE CORTICAL NETWORKS RELATES TO FORMAL THOUGHT DISORDER IN SCHIZOPHRENIA: A 7T MRI-BASED THICKNESS STUDY

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Background: The thickness of cerebral cortex varies across individuals as well as across different regions within an individual. Shared trophic or plastic influences such as repeated task-related recruitment of extant brain regions results in morphological covariance within large-scale brain networks. Pathological processes disrupting functional co-activation can result in higher than expected degree of variability within large-scale networks in an individual level, resulting in spatial incoherence. We studied spatial incoherence of cortical thickness in 17 cortical networks identified on the basis of well-known patterns of intrinsic connectivity, to identify the spatially incoherent networks and relate them to differences in severity of thought disorder among patients with schizophrenia.
Methods: Ultra-high field 7T anatomical MRI scans (MPRAGE) were obtained from 20 subjects in a clinically stable, medicated early stage of schizophrenia, and 19 sex, parental socioeconomic-status and age matched healthy controls. Cortical thickness was estimated using Freesurfer v5.0, across 17 networks based on the parcellation scheme of Yeo et al. We computed within-network coefficient of variation in thickness (CVT) across vertices that constitute each network. Higher CVT of a network in a subject indicates higher spatial incoherence within the network for that individual. Independent 2-tailed t-tests were used to compare CVT of 17 networks between the 2 groups with FDR-corrected p=0.05 considered as statistically significant. We related CVT of affected networks to the scores of positive and negative Formal Thought Disorder measured using Thought and Language Index in patients.
Results: Salience Network (aka Ventral Attention Network as per Yeo atlas), Default Mode Network and Central Executive Network (aka dorsal Attention Network in Yeo atlas) showed most significant reduction in MRI-derived cortical thickness (networks #8, #12, #15 as well as #16 of Yeo atlas). Only the Salience and Executive Networks (network #8 and #12) showed higher coefficient of variation in patients compared to controls, indicating either a failure of coordinated maturation or co-ordinated function. Higher spatial incoherence of Salience Network related to reduced mean thickness of Central Executive Network in patients with schizophrenia; this relationship was not seen in healthy controls (Fisher's z test, p=0.02). Both higher coefficient of variation in Salience Network and lower mean thickness in Central Executive Network predicted the severity of positive but not negative thought disorder scores.
Discussion: Our results indicate that (1) large-scale cortical networks involved in information processing (Salience and Executive Networks) show spatial incoherence in schizophrenia (2) the degree of spatial incoherence relates to the severity of disorganisation of thoughts and language in patients. Spatial incoherence may be the result of a dysmaturational or functional dysplastic effect reflecting inefficient cortical recruitment in schizophrenia. Within-subject morphological variability carries useful information that can potentially explain the elusive neural basis of complex symptoms such as formal thought disorder.

T167. ABERRANT MYELINATION OF THE CINGULUM BUNDLE IN PATIENTS WITH SCHIZOPHRENIA: A 7T MTI/DTI STUDY

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Background: The structural integrity of the anterior cingulum has been repeatedly observed to be abnormal in patients with schizophrenia. Reduced glutathione levels, indicating oxidative stress, is associated with reduced structural integrity of cingulum bundle in patients with schizophrenia. Variations in neuregulin-1, a well-established candidate marker for schizophrenia, results in oligodendrocyte dysfunction and defective myelination, and is shown to affect the structural integrity of the anterior cingulum in patients with schizophrenia. While the evidence to date has been obtained using diffusion tensor imaging, abnormal tract-specific changes in myelin content can be more directly inferred by combining multiple modalities of WM imaging such as diffusion tensor (DTI) and magnetization transfer imaging (MTI) in parallel.
Methods: We used ultra-high resolution (7 Tesla) MTI in 17 patients with schizophrenia and 20 controls, to evaluate the macromolecular (predominantly myelin) content of the brain. Immediately after the 7T scanning, we also obtained a 3T diffusion tensor image (DTI) and undertook probabilistic tractography using FSL software (AutoPtx, ProbTrackX) to delineate anterior cingulum bilaterally. Unpaired t tests were used for group comparisons along with estimates of Cohen's d or Hedge's g for effect sizes.
Results: Patients had a significant reduction in magnetization transfer ratio (MTR) in right (Cohen's d=0.91, p=0.007) but not left (d=0.03, p=0.92) cingulum bundle. There was also a trend level reduction in fractional anisotropy of right (d=0.60, p=0.07) but not left (d=0.47, p=0.17) cingulum bundle. We did not find any significant relationship between the 3 major symptom dimensions of schizophrenia (Reality Distortion, Disorganization, Psychomotor Poverty) and Cingulum MTR. Patients with Schneiderian delusions (n=5) showed a significantly reduced MTR of left cingulum compared to patients (n=12) with no Schneiderian delusions (Hedges' g=1.36, p=0.02).
Discussion: Our findings suggest that MTR changes in anterior cingulum, resulting from either dysmyelination or neuroinflammation, is present in clinically stable patients with schizophrenia despite their medicated status. We lacked sufficient power to detect association between MTR changes of cingulum and symptom dimensions. Nevertheless, our results suggest that MTR changes are of higher magnitude than changes in fractional anisotropy, indicating the sensitivity of measuring myelination as a biological marker of white matter aberrations in schizophrenia.

T168. STRUCTURAL COVARIANCE AND CORTICAL REORGANIZATION IN SCHIZOPHRENIA: AN MRI-BASED MORPHOMETRIC STUDY

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