White Matter Differences in the Inferior Longitudinal Fasciculus Between First Episode and Chronic Schizophrenia Patients

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BACKGROUND

Recent studies provide evidence of disruption in white matter integrity of the inferior longitudinal fasciculus (ILF) in patients diagnosed with schizophrenia (Kubicki, 2007). However, it is not clear whether the ILF is stable or changes over the course of the illness. The objective of this study is to compare ILF diffusion measures from young, first-episode patients diagnosed with schizophrenia (FESZ) with both older patients diagnosed with chronic schizophrenia (CSZ) and age-matched controls (NC).

METHODS

Diffusion-weighted images (DWI) were acquired on a 3T MRI scanner from 18 FESZ, 18 CSZ, and 20 NC matched for age, parental socioeconomic status (PSES), and handedness; for a total of 76 subjects. Subjects received diffusion imaging on a GE 3T MRI scanner at a resolution of 1.7mm x 1.7mm x 1.7mm (51 diffusion directions, b=900, TR 17000 ms, TE 78 ms, FOV 24 cm, 144x144 matrix). Two regions of interest (ROI) were manually traced over the anterior portion of the temporal lobe and the corresponding hemisphere in the slice following the first appearance of the posterior portion of the corpus callosum. Each ROI was seeded using streamline (deterministic) tractography. Tracts were then filtered to include only ipsilateral tracts passing through both ROI’s. Average fractional anisotropy (FA) was calculated for the resulting ILF in each hemisphere.

RESULTS

We found a significantly lower mean FA in CSZ compared to FESZ patients in the left ILF (FA: t(34)=-2.433, p=0.021). In addition, this trend was seen the the right ILF though it did not reach the level of statistical significance (FA; t(34)=-1.977, p=0.058). This held true though the FESZ patient group showed greater symptom severity compared to the CSZ group though this was not statistically significant (BPRS: t(33)=-1.824, p=0.080). When compared to controls the CSZ we observed a trend of lower FA values though it did not reach statistical significance (Left FA: t(36)=-1.941, p=0.061 and Right FA: t(36)=-1.890, p=0.068). There was no significant difference in FA or trace when comparing FESZ and their controls. This was also true when comparing the two control groups.

CONCLUSION

These results suggest a difference in FA in the ILF between the first episode and chronic states that is not due to normal aging, since the young and older controls exhibit no differences. These findings may reflect the influence of treatment and/or a progression of the disease.