005 HYPERCONNECTIVITY IN JME—A NETWORK ANALYSIS

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Graph theory is a technique for studying whole brain connectivity and may detect subtle differences between populations without major brain structural anomalies. We used it to identify differences in structural connectivity in patients with juvenile myoclonic epilepsy (JME) and matched controls.

We performed diffusion tensor imaging (DTI) in 35 JME patients and 35 controls. White matter tracts were reconstructed using deterministic fiber tractography. The automated anatomical labeling atlas (AAL) was used to identify regions of interest. Two regions were considered to be connected if a fiber bundle was present with endpoints in each. We used network-based statistics to identify subnetworks showing significant between-group differences in connectivity.

We identified one significant subnetwork ($p<0.05$ FWE corrected) (encompassing precuneus, parietal, primary motor and subcortical regions) in which all connections exhibited increased values in patients compared with controls.

Hyperconnectivity has previously been reported in JME. A network of hyperconnectivity involving precuneus and subcortical regions–key structures in spike-wave generation–along with primary motor areas, may contribute to myoclonic jerks, and parietal cortex to absence seizures. This abnormal network may also contribute to the cognitive dysfunction seen in JME. We believe this is the first report of DTI-graph theory in JME patients.