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Alterations of Brain Structure Linked to Myoclonic Epilepsy

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Recent neuroimaging studies suggest that frontal lobe and thalamus are the key structures involved in generation of myoclonic seizures. However, data indicating clear structural alterations of other grey matter (GM) regions in this seizure type is limited. Thus, our purpose was to characterize the cortical and subcortical volumes in patients with myoclonic seizures. We quantified brain structural measures (cortical and subcortical GM volumes) extracted from 3T magnetic resonance images (MRI) across 40 patients (mean age \pm standard deviation: 25 ± 7 years; 14 males) with myoclonic seizures and 40 healthy subjects (23 ± 5 years; 14 males). A statistically significant difference in cortical volumes between patients and healthy subjects was found in the following clusters: left superior parietal, postcentral and fusiform; right middle temporal and bilateral precentral, superior frontal and precuneus areas (all $p < 0.05$). Analysis of subcortical volumes revealed significantly smaller volumes of bilateral thalamus and caudate in patients compared to healthy. These findings support the hypothesis of aberrant cortico-thalamic networks in patients with myoclonic seizures and extend these to basal ganglia.