

The Effect of ECT On Brain Grey Matter, Insights From Longitudinal MRI

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Background: Despite the highly beneficial effects of ECT in the elderly, the close relationship between brain structure and LLD and the possible predictive value of structural changes on ECT response in LLD, no study has addressed the effects of ECT on gray matter volume (GMV) in the elderly so far.

Method: In this presentation we review recent studies elucidating neural effects of ECT in non-elderly cohorts and present a longitudinal structural neuroimaging study in a cohort of 28 elderly subjects to compare GMV before and after ECT. Given the different cortical and subcortical areas implicated in LLD and the absence of previous studies revealing specific regions of interest, we applied a whole brain approach (voxel-based morphometry (VMB)) to explore structural changes. We also investigated the correlation between structural changes and changes in mood, cognition and psychomotor function (given their clinical relevance in LLD).

Results: We observed significant right-hemispheric GMV increase in the caudate nucleus, medial temporal lobe (including hippocampus and amygdala), insula and posterior superior temporal cortex. Furthermore, a correlation was found between the increase of GMV in the caudate nucleus region and the change in psychomotor function scores indicating interesting and potentially specific clinical associations. Potential neurobiological mechanisms underlying these GMV increases will be discussed.