
Background: Behavioural and psychiatric symptoms (BPS) are frequently observed in the clinical course of Alzheimer’s disease (AD). However, previous studies on neuroanatomical underpinnings of BPS in AD have revealed inconsistent results, which might be biased by the image pre-processing steps and the small samples. The current study aimed to assess the relationship between regional grey matter volume (GMV) atrophy and BPS in a large sample of 424 Alzheimer’s Disease Neuroimaging Initiative (ADNI) participants. Methods: Structural MRI images and the scores of neuropsychiatric inventory questionnaire (NPI-Q) of altogether 85 AD, 208 patients with mild cognitive impairment (MCI), and 131 healthy controls (HC) were collected from the ADNI website. In contrast to the previous studies in this field, we used improved image pre-processing strategies, including the new segmentation and DARTEL normalization tools from SPM8. Voxel-based multiple regression analyses were used to characterize the association between GMV atrophy and each NPI-Q symptoms across the whole sample, with age, gender and total intracranial volume as covariates of non-interest. The results were exclusively masked with regions directly related to general cognitive deterioration, as expressed by the correlation with the Mini-Mental-State-Examination (MMSE). A statistic threshold of p<0.05 (cluster level family wise error corrected) was applied. Results: Agitation was associated with GMV loss in the bilateral precuneus, the left frontonal and insula cortices. Depression was related to GMV decreases in the left frontal cortex. Aberrant motor behaviour was associated with GMV atrophy in bilateral medial orbitofrontal cortices, bilateral putamen and the right inferior frontal gyrus. Conclusions: The current study has shown the neuroanatomical underpinnings of specific BPS by using advanced VBM techniques within a large public available database (ADNI). Our results contribute to the poor understanding of the pathology of BPS in AD.

Background: Posterior cortical atrophy is emerging as an important aspect of Alzheimer’s disease (AD). A 4-point visual rating scale for posterior cortical atrophy (PA) on magnetic resonance (MR) images has been recently developed (Koedam, Eur Radiol 2011). We aimed to validate the rating scale through quantitative grey matter (GM) volumetry of the entire posterior region and its anatomical subregions, as well as voxel-based morphometry (VBM). Methods: We included patients with probable...