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Effect of enhanced cholinergic challenge on brain atrophy in Alzheimer's disease

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Cerebral atrophy is a common feature of neurodegenerative disorders. In Alzheimer's disease (AD) a loss of gyri and sulci in the temporal lobe and parietal lobe, and parts of the frontal cortex and cingulate gyrus has been reported.

In 56 patients, participating to the trial ASCOMALVA [Effect of association between a cholinesterase inhibitor (ChE-I) and choline alphoscerate on cognitive deficits in AD associated with cerebrovascular injury] and reaching the third year of observation, brain MRI were analyzed by voxel morphometry techniques. The purpose was to assess if a combined therapy using a cholinergic precursor (choline alphoscerate) and a cholinesterase inhibitor (donepezil) may have an effect on slowing the volume loss typical of AD brain.

After three years of treatment, in patients treated with donepezil plus the cholinergic precursor choline alphoscerate, the volume loss of the gray matter (with the concomitant increase of the volume of the ventriculi and space of the cerebrospinal fluid) was countered compared to the reference group, treated with donepezil only. The areas, in which brain atrophy was more limited, were the frontal and temporal lobes, hippocampus, amygdala and basal ganglia. Morphological data were also confirmed by neuropsycological assessment done along the course of the trial.

These findings have shown that cholinergic precursor loading strategy with choline alphoscerate associated to cholinesterase inhibition with donepezil counters to some extent the atrophy occurring in some brain areas of AD patients. The observation of a parallel improvement of cognitive and functional tests in patients treated with choline alphoscerate plus donepezil versus donepezil alone suggests that morphological changes observed may have functional relevance.

Key words

Alzheimer's disease, Cerebral atrophy, choline alphoscerate, association, cerebrovascular injury, choline alphoscerate, donepezil.

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