

Autonomic functions in patients with mild-moderate Alzheimer's disease

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Background: Patients with neurodegenerative disorders such as Lewy body dementia, Parkinson's disease or multi system atrophy may have autonomic disturbances as part of their disease. Brain areas involved in central autonomic control are known to be affected in Alzheimer's disease, and autonomic dysfunction has been described in mutation positive patients with familial forms of AD (S.G. Lindquist et al. Journal of Neurological Sciences 268 (2008) 124-130). However studies investigating autonomic function have yielded mixed results. We therefore wished to examine autonomic function in patients with mild-moderate AD as compared to healthy elderly controls. **Methods:** 33 patients with mild-moderate Alzheimer's disease (MMSE 16-26) and 32 age- and gender-matched healthy elderly controls underwent standardized autonomic testing. Subjects initially rested for a minimum of 10 minutes. Subsequently, the heart rate response to controlled deep breathing (6 breaths per minute), which is a test of cardiac parasympathetic function, was performed. Furthermore the subjects underwent a tilt-table-test (70, 8 minutes). The digital pressure curve and ECG were recorded for off-line analysis of systolic and diastolic blood pressures and beat-to-beat heart rate variability to deep breathing.

Results: There was a trend towards the patients having a lower response to deep breathing compared to the healthy controls (median (25-75% interquartile range) patient: 3.4 (2.4-8.1), controls: 5.8 (3.4-8.7), $p=0.059$). When applying age-adjusted reference values 13 patients and 6 controls ($p=0.093$) were below normal range values. For the tilt-table test there was no difference between groups in heart rate or blood pressure response before 3 or at 8 minutes. Likewise, only 3 patients and 3 controls had heart rate/blood pressure responses which were outside the cut-off values for orthostatic hypotension. The results were consistent with lack of orthostatic symptoms during the tilt-table test.

Conclusions: Our results could indicate a potential parasympathetic autonomic dysfunction in AD, although further studies are needed in order to control for possible cardiac disease. We did not find any evidence for orthostatic hypotension in our group of patients with mild-moderate Alzheimer's disease