ROLE OF AMYGDALA IN ODOR IDENTIFICATION FAILURE IN PRODROMAL ALZHEIMER’S DISEASE

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Introduction: Patients with Alzheimer’s disease (AD) have odor identification impairment, which occurs in early stages of the disease. This impairment is caused especially by medial temporal lobe degeneration; however, accurate role of each single structure is still unclear. AD is preceded mainly by amnestic Mild Cognitive Impairment (aMCI).

Aims: Aim of our study was to determine the role of amygdalar atrophy in odor identification deficit in AD and its prodromal stages.

Methods: 11 AD patients, 16 aMCI multi-domain (aMCImd), 7 aMCI single-domain (aMClisd) and 14 control subjects were included in the study. Volume of right amygdala (RA) and left amygdala (LA) was measured using MRI-based automated volumetry software (FreeSurfer). Odor identification was assessed using Motol Hospital Smell Test (MHST). MHST results correlate with UPSIT results ($r=0.68$, $p<0.0005$).

Results: Odor identification was impaired in AD ($p<0.001$) and aMCImd ($p<0.05$) compared to control group. Volume of RA and LA was reduced in AD compared to control group ($p<0.001$). There was a weak correlation between MHST and RA volume ($r=0.364$, $p<0.05$) and a medium-strong correlation between MHST and LA volume ($r=0.501$, $p<0.001$). MHST did not correlate with total brain volume ($p>0.05$).

Conclusions: We have confirmed that odor identification is impaired already in prodromal stages of AD. Our results show that amygdalar atrophy is detectable as late as in advanced stages when using FreeSurfer. Correlations indicate that amygdalar atrophy plays a role in odor identification deficit in AD patients; however, it is not the principal cause.