**Effects of Aerobic Exercise on progression of Hippocampal Volume and cognition in amnestic Mild Cognitive Impairment due to AD.**

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**Introduction:** Increasing evidence demonstrates that physical exercise is an important modifiable factor not only for cardiovascular fitness, but also for brain health and dementia prevention. However, it is not clear how supervised physical exercise can affect cognition and biomarkers in patients with amnestic mild cognitive impairment (aMCI) due to Alzheimer's disease (AD). In this study, we aimed to evaluate six months of supervised aerobic training on hippocampus volume in aMCI subjects with CSF positive AD biomarkers (low Aβ1-42 and/or low Aβ1-42/p-tau).

**Materials and Methods:** 19 aMCI (mean age of 70,6 ± 7,6 years old) subjects were diagnosed using the core criteria of the NIA/AA for MCI and presented positive CSF AD biomarkers**.** All patients underwent neurocognitive tests, which included Mini Mental State Examination (MMSE) and Rey Auditory-Verbal Learning Test, and a structural MRI at 3.0T. Hippocampal volume was analyzed using *FreeSurfer* software (https://surfer.nmr.mgh.harvard.edu/). A graded maximal exercise test on a motor-driven treadmill assessed aerobic fitness (measured by VO2maximun). Participants were divided into Aerobic group (AG, 9 patients with supervised exercise 3 times per week for 6 months) and control group (CG, 10 patients with non-supervised exercise). The groups were controlled for age, sex, and education.

**Results:** General Linear Model for repetitive measures showed a significant improvement in aerobic fitness, indicating that while AG improved VO2maximun, CG decreased (p<0.009). CG presented a significant decrease in the MMSE, Right hippocampus volume and a tendency in left hippocampus volume (p<0.033, p<0.05, p<0.082, respectively), while these variables did not change in the AG over time.

**Discussion:** The present results show that physical exercise may play an important role on changes in synaptic interconnections, axonal integrity and capillary bed growth, which could be explained with changes in growth factors such as Brain-derivated neutrofic factor¹. Some studies with healthy cognitive elderly have shown an improvement in cognitive functions and increase in brain volume²,³. Even though our studied presented patients with high-risk to develop AD, they benefited from aerobic exercise.

**Conclusion:** Six months of supervised aerobic exercise seems to be effective, not only for improving aerobic fitness, but also in maintaining global cognitive functions and hippocampus volume in aMCI subjects due to AD.

**References:**

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