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Age-and Gender-Linked Differences in MRI Lateralization Index of Hippocampal Subfields

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Asymmetry of hippocampus is relevant in neurological diseases, however asymmetry of its substructures is poorly investigated in general population, and few is known about the normal-aging variations. For this reason, we explored differences in laterality index (LI) between females and males, and the correlation of LI subfields with age. One-hundred healthy subjects were selected from ADNI, 52 females (72.6 yrs) and 48 males (age 74.2 yrs). The structural baseline T1s were processed with Free Surfer 6.0 and volumes of hippocampi and 12 subfields were extracted. Paired t-test was used for assessing differences in left and right, separately for females and males. The LI was calculated as absolute value of:((Left-Right)/(Left+Right))*100. ANOVA adjusted for age and intracranial volume (ICV) was used for evaluating LI differences between groups. The correlation between age and LIs was investigated by linear regression with ICV as covariate. The statistical threshold was Bonferroni corrected $p < 0.05/13 = 0.0038$. Both females and males had rightward asymmetries (right>left) in WH, CA1, CA3, CA4, GC_ML_DG, molecular layer, tail and HATA, while a leftward asymmetry (left>right) was found only in presubiculum of males. Males had higher asymmetry degree than females in parasubiculum (+30%) and tail (+20%), even if differences did not survive at Bonferroni's. Only males presented association survived at Bonferroni's between age and LI of WH, molecular layer and tail. Our findings showed that males had higher asymmetry magnitude than females, which increases with normal aging and we suggest that age and sex should be considered when evaluating hippocampal subfields laterality, especially when pathologies are studied.

Biography:

Alessia Sarica is currently a Post-doc Research-Fellow at Neuroscience Research Center, Department of Medical and Surgical Sciences, Magna-Graecia University of Catanzaro, Italy. She ownsa PhD in Biomedical and Computer Science Engineering and her research interests are on knowledge discovery from Neuroimaging, pattern-recognition and machine-learning. She has wide expertise in Random Forest and presented a systematic review about it for the prediction of Dementia (Sarica et al., 2017). She was the organizer and Special Guest Editor of a special issue on Journal of Neuroscience Methods:"A Machine learning neuroimaging challenge for automated diagnosis of Mild Cognitive Impairment" (Sarica et al., 2018).

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