Higher t-tau/Aβ-42 ratio in AD subjects relates to more severe cognitive and neuropsychiatric symptoms.

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Introduction

The cerebrospinal fluid (CSF) biomarkers total-tau (T-tau), hyper-phosforylated tau (P-tau) and the 42-amino-acid isoform of amyloid β (Aβ-42) reflect the core pathological features of Alzheimer's disease (AD): neuronal loss, intracellular neurofibrillary tangles and extracellular senile plaques [1].

The present study aims to evaluate whether changes in CSF AD biomarkers relate to different neuropsychological and neuro-behavioral patterns in an AD population.

Subjects

*We enrolled **26 AD subjects**, 16 women and 10 men, with mean age of 69 years (ds 5.21) and mini mental state examination (MMSE) score of 23.70 (ds = 3.70).*

*All patients underwent a **lumbar puncture** with CSF analysis for AD biomarkers: Aβ-42 (392.4 pg/mL, ds = 96.9 pg/mL), T-tau (748.4 pg/mL, ds = 582.0 pg/mL), P-tau (101.8 pg/mL, ds = 78.9 pg/mL). Since all AD patients showed the typical CSF AD profile characterized by lower CSF Aβ-42 and higher CSF t-tau and p-tau levels, we specifically considered **T-tau/Aβ-42 ratio**, which reflects a higher extent of neuro-axonal degeneration and plaque pathology.*

*Therefore, T-tau/Aβ-42 ratio was correlated to an extensive **neuropsychological battery** and a neuro-behavioral assessment by means of the **neuropsychiatric inventory (NPI)** [2].*

Results

The statistical analysis showed a significant correlation between T-tau/Aβ-42 ratio and lower global cognitive performances (MMSE: $p<0.05$, $r=-0.37$)[Fig. 1], worse performances in tasks exploring episodic memory (Free Recall at the Rey Auditory Verbal Learning Test - RAVLT: $p<0.05$, $r= -0.38$; Free recall at the Rey-Osterrieth complex figure test - ROCF: $p<0.05$, $r= -0.46$) [Fig. 2, 3], semantic memory (Categorical Verbal Fluency: $p<0.05$, $r=-0.42$), and executive functioning (Total errors at the Wisconsin Card Sorting Test: $p=0.05$, $r= -0.42$).

We also found that T-tau/Aβ-42 ratio relates to a higher total NPI score ($p<0.05$, $r=0.42$)[Fig. 4].

Conclusions

*A **higher T-tau/Aβ-42 ratio**, expression a more severe tau and β-amyloid neurodegeneration, relates to poorer cognitive performances in AD patients.*

*In particular, this ratio specifically correlated with lower scores in **memory and executive tasks** and more severe **behavioral disturbances**.*

*These results suggest that in AD patients a more extensive neurodegeneration is related to cognitive and behavioral disturbances, which could reflect the **dysregulation of temporal and frontal lobes function**.*

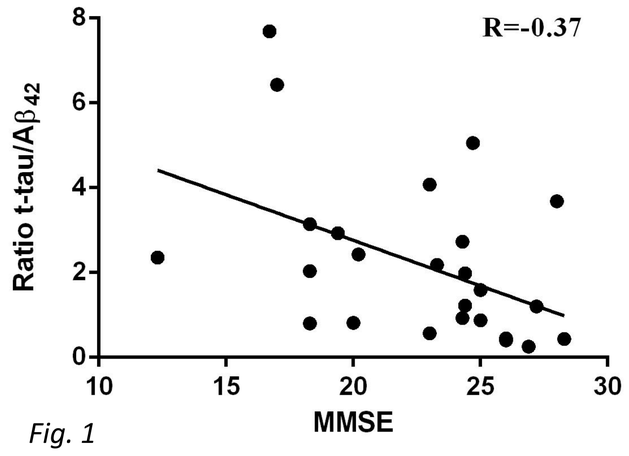

Fig. 1

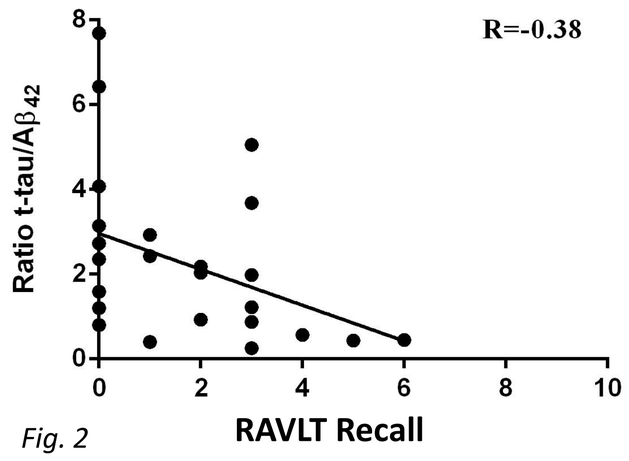

Fig. 2

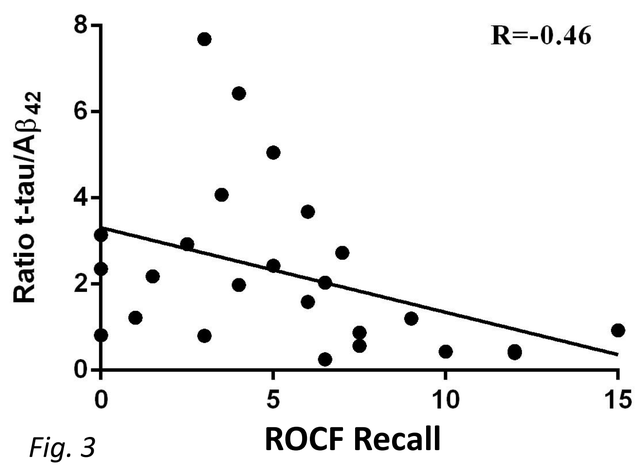

Fig. 3

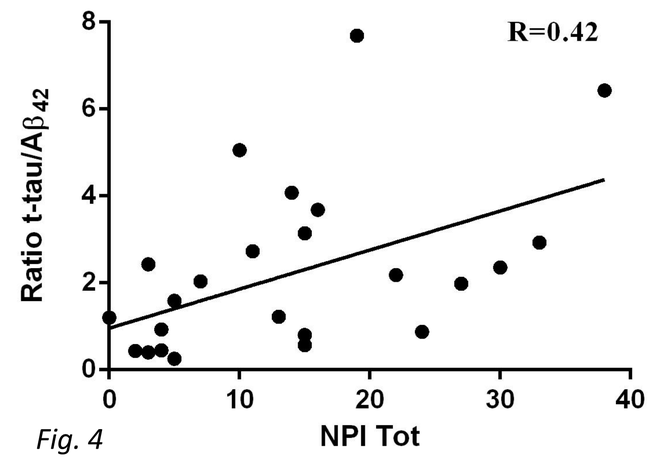

Fig. 4

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