Association of Apolipoprotein E ε4 with Tau and Amyloid-β PET in a Memory Clinic Cohort

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AIM
The aim of this study was to assess tau and amyloid deposition depending on subject genotype in a memory clinic cohort.

BACKGROUND

- Alzheimer’s disease (AD) is characterised by the deposition of amyloid-β (A) plaques and neurofibrillary tau tangles (T)¹
- Positron Emission Tomography (PET) allows for the in vivo characterisation of AD pathology through different radiotracers
  - These images can be used to identify subject with (A+, T+) or without (A-, T-) the presence of AD pathology
- The apolipoprotein E ε4 (ApoE4) gene is the strongest genetic risk factor for AD²
- Previous studies³ have found a link between ApoE4 genotype and amyloid positivity as well as tau deposits in the Medial Temporal Lobe (MTL)
  - The influence of genotype on tau and amyloid considered together has not been assessed

METHODS

Subjects
- 89 subjects from the Geneva Memory Clinic underwent amyloid and tau PET imaging and ApoE4 genotyping.
- Subjects were classified as ApoE2 carriers, ApoE3 homozygotes, and ApoE4 carriers
- Amyloid uptake converted to centiloid scale
- Tau uptake converted to Standardised Uptake Value Ratios (SUVR), cerebellum as the reference tissue

Statistics
- Correlation and linear regression between amyloid and global tau SUVR
- ANOVA (Tukey corrections) to assess differences between MTL tau or amyloid PET uptake by genotype
- ANOVA (with Tukey corrections) to assess differences between Lateral Temporal Lobe (LTL), Superior Temporal Gyrus (STG), or Primary Visual Cortex (PVC) tau uptake by genotype

RESULTS

- Correlation between MTL tau SUVR and centiloid were only significant for ApoE4 carriers
- MTL tau SUVR and centiloid were significantly higher in ApoE4 carriers when compared to ApoE2 and ApoE3 subjects
- LTL and STG reproduced the same results as MTL. PVC tau uptake was not significantly different between genotypes

CONCLUSION

- ApoE4 carriers present significantly higher amyloid and tau uptake in comparison to non-carriers
- The correlation between amyloid and tau load is significant only in ApoE4 carriers
- Increase in tau deposition is not limited to the MTL, but extends to the entire Temporal Lobe

References: