

Correlation of synthetic MRI with amyloid PET in cases of amyloid positive (Alzheimer disease - AD) and amyloid negative (Fronto-temporal dementia- FTD) dementia

SHIKHA AWASTHI, SANDHYA MANGALORE, PT SIVAKUMAR
AFFILIATIONS National Institute of Mental Health and Neurosciences, Bengaluru, India

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INTRODUCTION

Amyloid PET is the most crucial imaging tool for diagnosis of AD which is considered amyloid positive whereas FTD is amyloid negative on amyloid PET. Hence, this study aimed to explore & find non-invasive MR imaging-based biomarkers for categorization of dementias into amyloid positive and amyloid negative dementias.

MATERIALS AND METHODS

This prospective case-control study included 30 dementia patients referred for amyloid PET between March 2024 and December 2025, who underwent synthetic MRI at the time of PET acquisition. Fifteen healthy controls underwent brain synthetic MRI and relaxometry-derived parameters were analysed across 22 predefined bilateral and midline brain regions.

RESULTS

The study included 18 amyloid-positive AD patients, 12 amyloid-negative FTD patients, and 15 healthy controls, with mean ACE scores progressively lower in AD and FTD compared with controls. Synthetic MRI relaxometry showed significant group differences, including lower right temporal T2 values in FTD versus controls and lower left parietal T1 values in AD versus controls.

CONCLUSIONS

Region wise quantitative relaxometry values can identify distinct tissue property patterns in amyloid PET defined dementia groups. Using synthetic MRI derived measurements in pre-specified brain areas we observed a clear separation between amyloid positive, amyloid negative & HC groups.

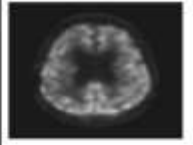
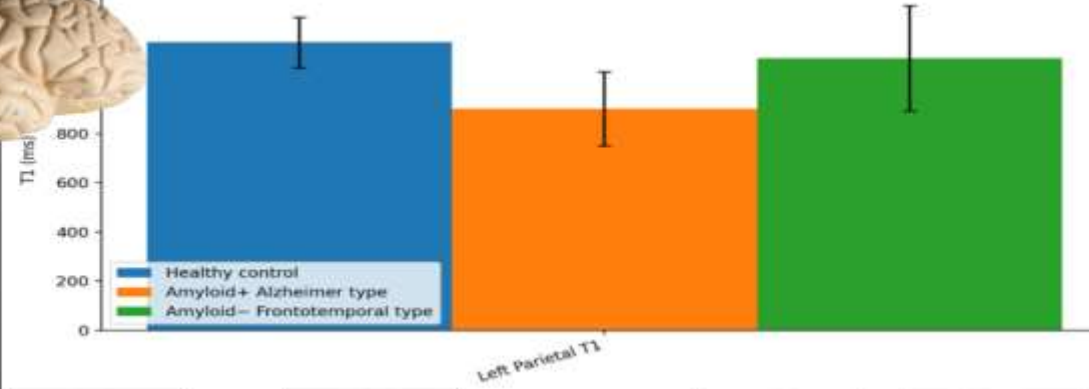
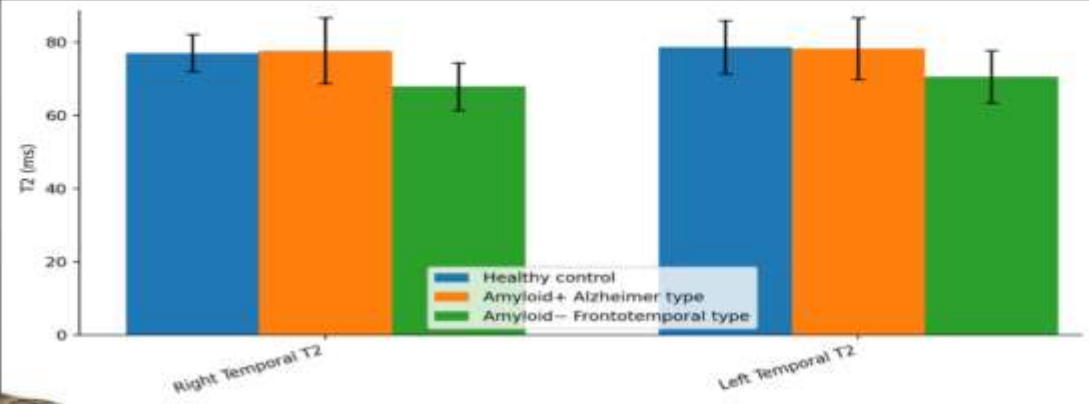
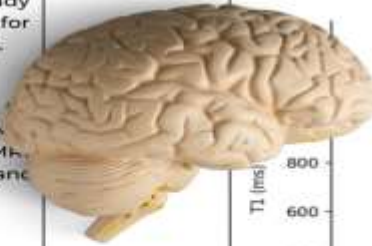
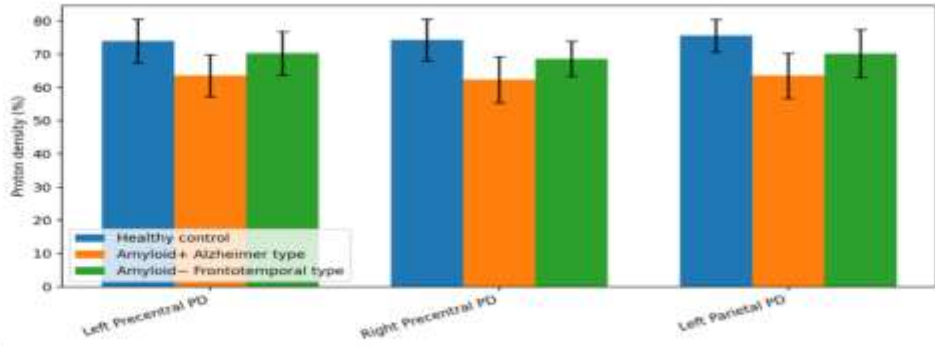


Fig 1 - Amyloid PET image at the level of lateral ventricles reveals normal grey-white discrimination.

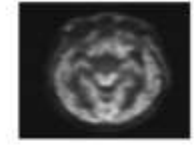


Fig 2 - Amyloid PET image at the level of temporal lobes reveals normal grey-white discrimination.

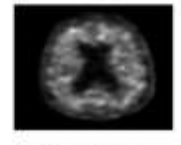


Fig 3 - Amyloid PET image at the level of lateral ventricles reveals severe loss of grey-white discrimination.

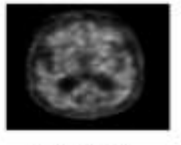


Fig 4 - Amyloid PET image at the level of temporal lobes reveals severe loss of grey-white discrimination.

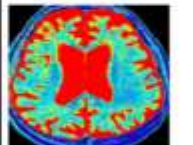


Fig 5 - T1 Map from synthetic MRI

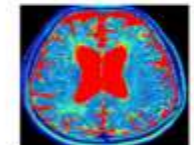


Fig 6 - T2 Map from synthetic MRI



Fig 7 - T1 Map from synthetic MRI



Fig 8 - T2 Map from synthetic MRI