Specific amygdala subnuclei volumes are associated with AD-tau and help distinguishing between AD and non-AD dementia

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Background

- Neuropathological studies suggest early deposition of AD pathology in amygdala [1-3]
- Cross-sectional differences are observed in amygdala volume between cognitively unimpaired individuals and prodromal AD [4]
- Cross-sectional differences in tau PET signal are observed in the MTL (including amygdala) in prodromal AD [5]

Methods

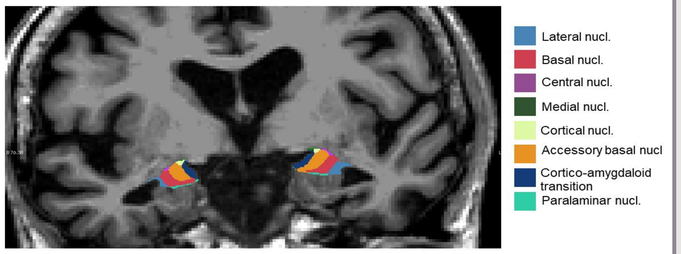
139 Participants : 28 amyloid-negative cognitively normal older adults (Amy- CN) 17 Amy+ CN; 52 Prodromal AD, 22 AD Dementia, 20 Non-AD patients

MRI : 3DT1 MRI – Amygdala subnuclei segmentation (FreeSurfer 7).

PET : 18F-MK6240 Tau-PET.

Amyloid status : Flutametamol-PET, cerebrospinal, or plasmatic Simoa Assays

Neuropsychological assessment



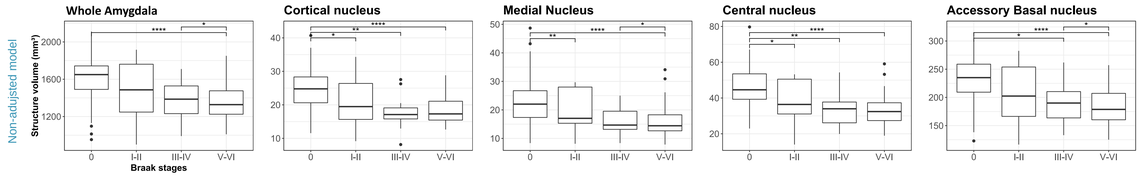
Conclusion

- Amygdala atrophy is not uniform in AD
- The atrophy of the **medial amygdala subnucleus** appears most sensitive to early tauopathy (Braak I-II)
- **Basal accessory nucleus** atrophy appears most specific for AD versus non-AD patients
- **Basal accessory nucleus** better correlates with tau in temporal neocortex than whole amygdala volume

Results

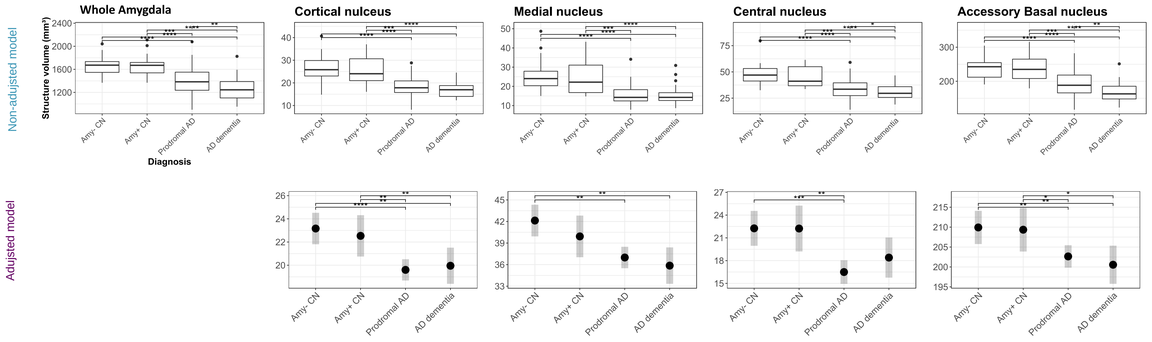
Pval <0.05* ; <0.01** ; <0.001*** ; <0.0001****

Amygdala subnuclei volume differences against Braak stages (non adjusted for whole amygdala volume)



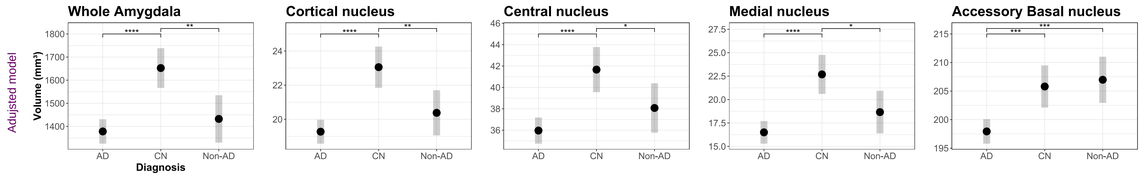
✓ Cortical, medial and central nuclei have atrophy from Braak stage I-II (vs stage 0). The whole amygdala and accessory basal nucleus have atrophy from Braak stage III-IV

Amygdala subnuclei volume differences against diagnosis before and after adjustement for whole amygdala



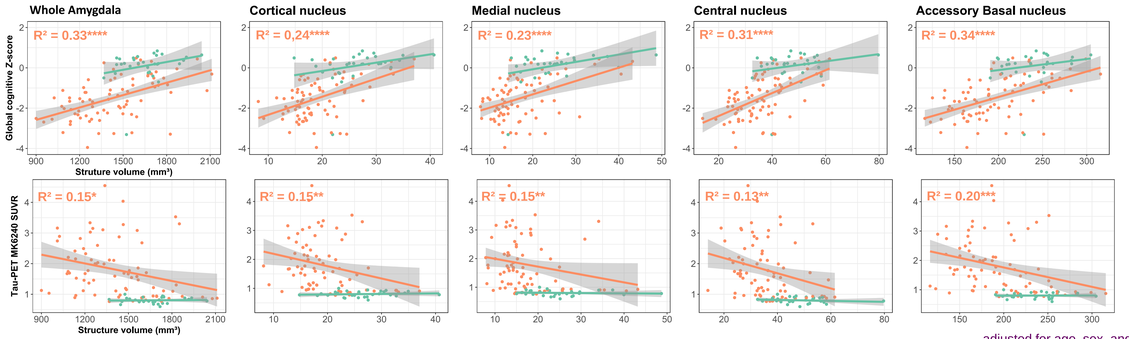
✓ Amygdala atrophy in AD is not uniform: cortical, medial, central, and accessory basal nuclei are atrophic in prodromal AD, even after adjusting for whole amygdala.
✓ No differences between Amy- CN and Amy+ CN

Amygdala subnuclei volume differences adjusted for amygdala volume regarding diagnosis



✓ Whole amygdala atrophy is not AD specific, as it is also observed in non-AD patients Cortical, central, and medial nuclei are also atrophic in non-AD patients
✓ The volume of the accessory basal nucleus is more reduced in AD than the whole amygdala, whereas this subfield is not specifically atrophic in non-AD patients

Correlation between amygdala subnuclei volumes, tau burden, and cognition in Amy+ and Amy- CN subjects



adjusted for age, sex, and ICV

✓ The volume of the accessory basal nucleus better correlates with tau pathology in the temporal lobe than whole amygdala volume
✓ Cognitive scores are similarly associated similarly with all amygdala subnuclei volumes.
✓ Correlations for both tau and cognition are driven by Amy+ impaired participants. No correlation observed in Amy- CN

References

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