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Changes in amygdalar integrity in frontotemporal dementia subtypes

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State of the art
The amygdala is a small subcortical brain structure located in the medial temporal lobe. It is composed of multiple nuclei that play a critical role in regulating various emotional and cognitive processes. While amygdalar atrophy has been previously reported in frontotemporal dementia (FTD), the trajectories of progression are not well characterised. The aim of this study was to determine the structural changes of the amygdala in FTD subtypes as disease progresses.

Methods
Patients clinically diagnosed with behavioural variant FTD (bvFTD) (n=20), semantic dementia (SD) (n=20), primary nonfluent aphasia (PNFA) (n=20), Alzheimer's disease (AD) (n=20), and 20 matched healthy controls (HC) completed whole brain structural MRI annually across multiple time points. FastSurfer (a deep learning-based neuroimaging pipeline) and FreeSurfer segmentation pipeline was used to process the T1-weighted images and analyse amygdala nuclei volumes. Linear mixed effects models were applied to identify changes in amygdala volume over time.
Results
At baseline, bvFTD, SD and AD patients displayed significant amygdalar atrophy compared with HC ($p<0.05$). Atrophy was most severe and asymmetrical (Left > Right) in the SD group ($p<0.001$). Longitudinally, all patient groups showed more pronounced amygdalar atrophy rates compared with HC ($p<0.05$). Further, rates of change differed among patient groups and syndrome specific profiles were observed in different amygdalar subnuclei.
Conclusion
These novel findings provide important insights into longitudinal amygdala atrophy profiles at both overall and subnuclei levels across FTD subtypes. Further analyses are planned to examine the alterations in connectivity between the amygdala and other brain regions.

Conflicts of interest

The authors report no potential conflict of interest.