

Identifying Patients with Limbic-Predominant Age-Related TDP-43 Encephalopathy Within the Alzheimer’s Disease Continuum Using an Amygdala Subfield-Based Machine Learning Model



Fangxue Zheng ¹, Guoping Peng ¹

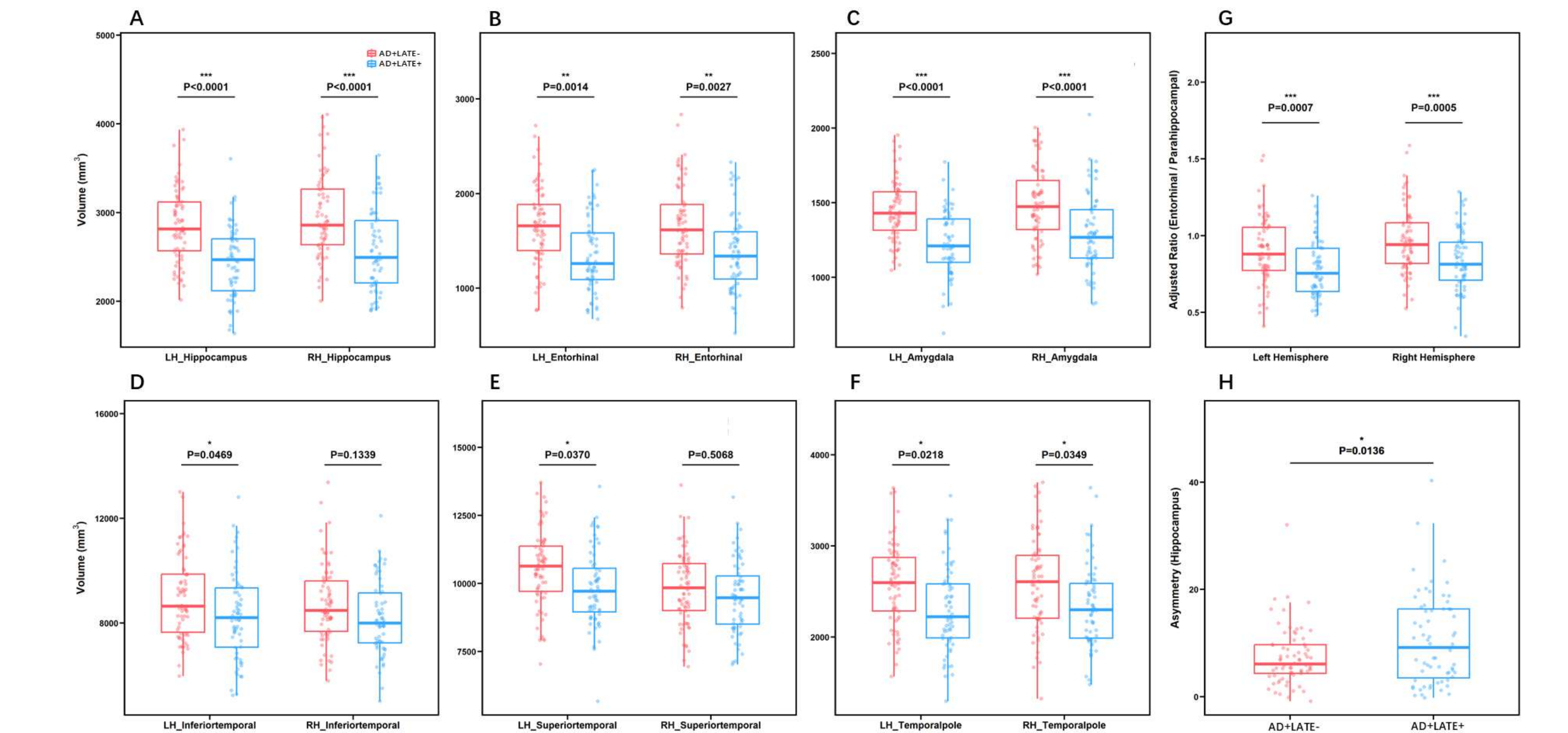
¹ Department of Neurology, The First Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou, China.

INTRODUCTION

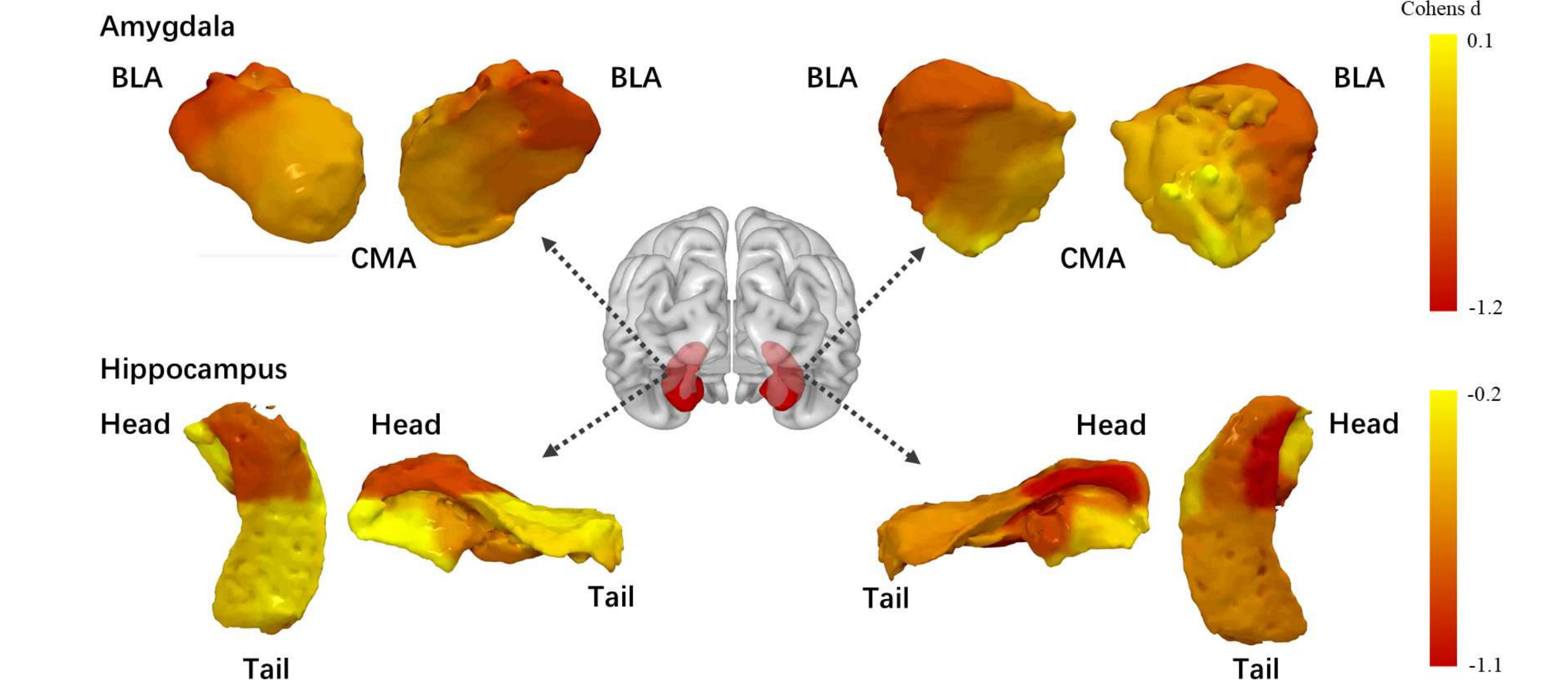
Alzheimer’s disease (AD) and limbic-predominant age-related TDP-43 encephalopathy (LATE) often co-occur, but diagnosis of LATE currently relies exclusively on postmortem neuropathological examination. This study aims to explore the distinct atrophy patterns of hippocampal and amygdala subfields in AD-LATE comorbidity, and to construct a machine learning (ML) model utilizing these features, with the goal of accurately identifying LATE-NC in AD continuum.

RESULTS

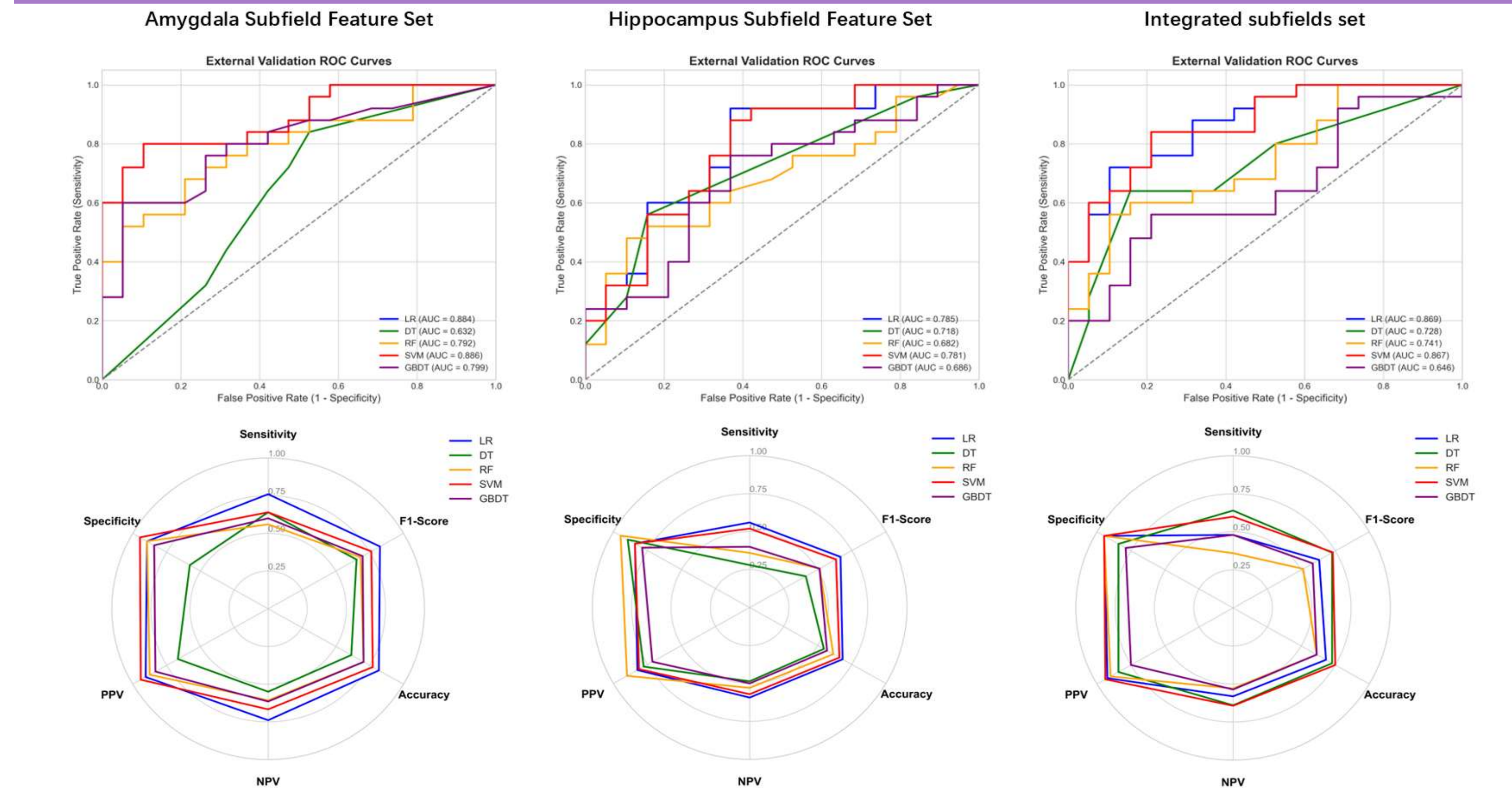
1. Comparison of Global Brain Volumetric Profiles: AD+LATE- versus AD+LATE+



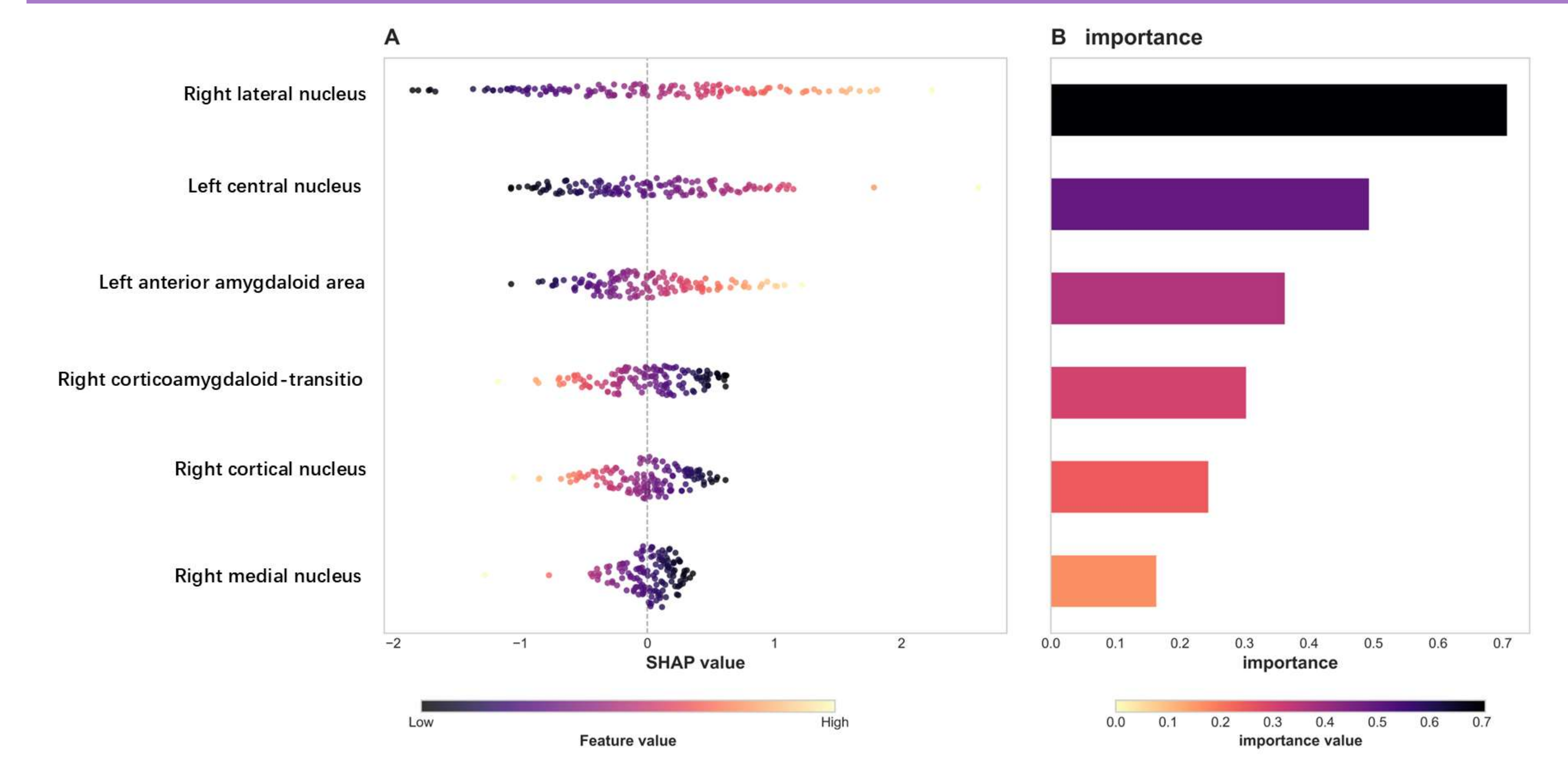
2. 3D Mapping of Amygdala and Hippocampal subfield Atrophy Effect Sizes (AD+LATE- versus AD+LATE+)



3. Optimal SVM Classification Performance Based on Amygdala Substructures



4. SHAP Analysis of Feature Contributions in Amygdala Subfield-Based SVM



CONCLUSIONS

This study investigated the specific atrophy patterns of amygdala and hippocampal subfields in patients with AD-LATE co-pathology. Leveraging these findings, ML models were developed to effectively detect the presence of LATE co-pathology in AD patients. The support vector machine (SVM) model based exclusively on amygdala subfield features achieved the highest discriminative performance. This approach holds promise as a non-invasive and efficient auxiliary diagnostic tool for identifying LATE-NC within the AD continuum.