From clinical overlap to distinctive signatures in Atypical Parkinsonism: a multilevel analysis of cognitive, neuropsychiatric, and brain FDG-PET features

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BACKGROUND

Atypical parkinsonism (AP) refers to neurodegenerative disorders including multiple system atrophy (MSA), progressive supranuclear palsy (PSP), corticobasal degeneration (CBD), and dementia with Lewy bodies (DLB). While often presenting with parkinsonian motor features, AP is associated with non-motor manifestations, that are difficult to recognize in the early disease stages, when significant overlap among syndromes complicates differential diagnosis (1). This study investigates clinical, cognitive, neuropsychological, neuropsychiatric, and metabolic (FDG-PET) features across AP subtypes, aiming to identify disease-specific signatures to improve diagnostic accuracy and prognostic evaluation.

METHODS

SUBJECTS: 21 AP patients (MSA=4, PSP=3, CBD=5, DLB=9); UPDRS-III, Hoehn & Yahr.

COGNITIVE/NEUROPSYCHOLOGICAL: MMSE, MoCA, full battery; 1-year follow-up.

NEUROPSYCHIATRIC: NPI, scales for mood, apathy, sleep, QoL, NMSS, Zarit.

BRAIN METABOLISM: FDG-PET with validated voxel-based SPM (2).

STATISTICS: multiple regressions to identify diagnostic predictors.

RESULTS

- Groups comparable for age, onset, educational level, disease duration (~2.9 yrs), UPDRS-III
- DLB: significantly worse MoCA (15.25, p=0.015); cognitive decline at 1-year in DLB and CBD.
- DLB: higher burden (delirium, agitation, hallucinations); PSP: poorer quality of life (p=0.031)
- Brain hypometabolism: MSA: cerebellum, basal ganglia; PSP: frontotemporal; CBD: frontoparietal; DLB: parieto-occipital.
- Key distinguishing features: MoCA score, NPI (delirium/hallucinations), hypometabolism in occipital cortices, frontal operculum, cerebellum.

DISCUSSION

Despite similar clinical presentations and disease duration, parkinsonian syndromes can be distinguished through neuropsychological and neuropsychiatric features. In particular, DLB exhibited greater cognitive decline, marked executive and visuospatial impairments (partly shared with CBD), higher neuropsychiatric burden, and faster progression. Distinct brain hypometabolism patterns further support diagnostic differentiation. Multilevel assessment may improve diagnostic accuracy and provide prognostic insights, though confirmation in larger cohorts with extended follow-up is required.

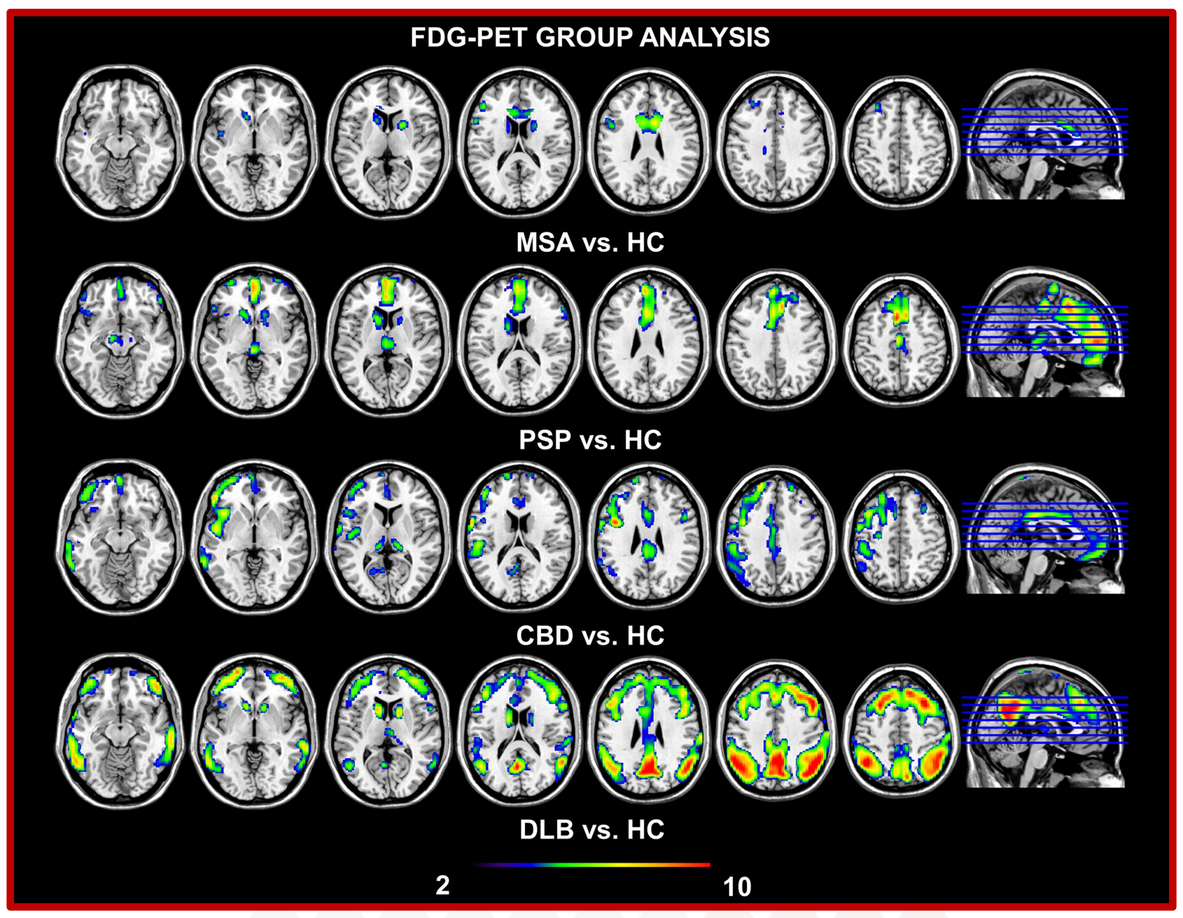

Figure 1: Statistical Parametric Mapping brain hypometabolism map – groups analysis

REFERENCES

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