Discrepant FDG-PET and Neuropathological Findings in Patients Scanned to Distinguish Frontotemporal Dementia from Alzheimer’s Disease Dementia

Norman L Foster1, Richard D King1, Angela Y Wang1, Edward Zamrini1, Anthony Yachnis2, Steven Chin1
1University of Utah, Salt Lake City, UT, USA; 2University of Florida, Gainesville, FL, USA

OBJECTIVES
To identify the causes of discrepant FDG-PET and neuropathology results in clinic patients scanned to distinguish frontotemporal dementia (FTD) from Alzheimer’s disease dementia (AD).

BACKGROUND
• FTD and AD often are difficult to distinguish clinically
• Insurers reimburse FDG-PET when uncertainty remains after an otherwise complete evaluation whether dementia is due to AD or FTD
• In highly selected research subjects with autopsy confirmation of diagnosis, predominant frontotemporal hypometabolism has a 97% specificity and positive likelihood ratio of 36.5 for FTD

RESULTS
• FDG-PET and neuropathological findings agreed in 19 (79%) of subjects.
• AD was confirmed in all 6 with an AD-like scan
• 1 subject with FTD-like scan had both AD and FTD neuropathology
• FTD was not confirmed in 5/18 (28%) with FTD-like scans
• Discrepant cases were older

METHODS
Subjects:
• 24 patients (13 men, 11 women, mean age 67+12 yrs) received clinical FDG-PET for suspected FTD and subsequently had a brain autopsy (mean scan to autopsy 2.9 ± 1.4 yrs)

FDG-PET scans:
• FDG-PET scans were performed on GE Advance or GE Discovery ST using ADNI acquisition protocol
• Images were analyzed with Neurostat 3D SSP (1). Peak metabolic glucose uptake values, normalized to pons, and statistical Z-scores, compared to an elderly normal population, were projected stereotactically onto surface maps

FDG-PET classification:
• Scans were classified as either AD-like or FTD-like based on visual inspection of Neurostat SSP metabolic and statistical maps
• Two experienced raters independently reviewed and then came to consensus using our previously published criteria (2)

Neuropathological assessment:
• Silver stain, alpha-synuclein, ubiquitin, H+E, tau antibody, antibodies to Aβ protein

CONCLUSIONS
• FDG-PET is helpful when there is diagnostic uncertainty about FTD
• Specificity of FDG-PET for FTD is less in clinical patients than in research subjects and when only those with suspected FTD are scanned
• Scan classification errors usually occur with mixed pathology and are more likely in older patients

REFERENCES

ACKNOWLEDGEMENTS
Supported in part by the the Alzheimer’s Disease Neuroimaging Initiative (NIH grant U01AG026510); the University of Utah Center for Alzheimer’s Care, Imaging and Research; and NIH grants R01EB007688 and K23AG03835.