FDG PET IMAGING IN DEMENTIA (FTD vs AD)

Case Study: Neuropsychological testing

- Evaluates:
  - Intelectual/overall functioning
  - Attention/processing speed
  - Motor skills
  - Visuospatial/construction
  - Comprehension
  - Memory
  - Executive functioning
  - Psychological functioning

- A more extensive battery of tests administered by a neuropsychologist who provides more in-depth and specific results and takes 2-4 hours.
- Given the multiple areas of cognitive deficits and the indication of some functional decline, a diagnosis of early dementia appears supported at this time. The etiology of this dementia, however, is less clear. There are some indicators (e.g., severe impairments in verbal memory that do not improve with cueing, naming difficulties, relatively worse semantic than phonemic fluency) that might suggest Alzheimer’s disease (AD) as the pathological condition. There are also indicators (e.g., relative impairments on executive functioning measures, notable language difficulties, early behavioral presentation) that suggest frontotemporal dementia (FTD) as the possible cause. Additionally, the relatively early onset of the cognitive symptoms is more suggestive of FTD than AD. PET imaging may be useful for this differential diagnosis. It should also be noted that cognitive data suggests some asymmetry in the cognitive deficits, with relatively greater impairments in the language-based skills (i.e., left cerebral hemisphere) than the visuospatial-based skills (e.g., right cerebral hemisphere).

Case Study: 2nd clinical visit – 6 months later

- Reviews previous mental status and compares to current level
- There needs to be evidence that cognitive decline has been present for six months
- The primary encounter diagnosis was Dementia without behavioral disturbance, unspecified dementia type
- Diagnosis of Aphasia syndrome, Obstructive sleep apnea syndrome on CPAP, Cardiac pacemaker, and Essential tremor were also pertinent to this visit.
- Increase in medications: busPIRone (BUSPAR) 5 mg tablet (Depression), cyanocobalamin (VITAMIN B12) 1000 mcg tablet, racicapride (VISCORI) 30 mg tablet (sleep aid), donepezil (ARICEPT) 10 mg Tab, losartan (COZAAR) 50 mg Tab, Memantine HCl ER 28 mg CAPSULE SR 24 HR, and memantine HCl 5 mg tablet.
- MoCA score is 17. This is equivalent to an MMSE score of 23 and represents a 1 point improvement from his previous MoCA score.
- 2nd Assessment: Mild dementia. Evaluation incomplete. This patient has an atypical dementia diagnosis of primary progressive aphasia, a subtype of FTD, unlikely. Early Alzheimer’s disease dementia, and progressive aphasia due to frontal temporal degeneration.

Case Study: FDG PET After 2nd clinical visit

PROCEDURE: The patient was fasted for 6 hours, resulting in a blood glucose of 84 mg/dl. 9.58 mCi of 18F FDG was injected intravenously. 30 minutes later, a PET/CT scan of the brain was performed. Emission data was corrected using the CT acquisition.

INDICATION: To evaluate metabolic changes due to Alzheimer’s disease, frontotemporal dementia, and amyloidosis in a 72-year-old male with memory loss and language impairment who is being evaluated for Alzheimer’s Disease (AD) and other causes of cognitive decline.

IMPRESSSION: PET image is of a patient who has Alzheimer’s disease dementia and is a possible diagnosis due to the metabolic reductions noted in the left lateral temporal, parietal, and precuneus cortex. If the patient’s cognitive difficulties continue to worsen, repeating the FDG-PET/CT scan in approximately 18-24 months may be appropriate.

Case Study: Amyloid PET

PROCEDURE: 4.79 mCi of Vizamyl (flutemetamol F-18 Injection) was injected intravenously 90 minutes later, a PET/CT scan of the brain was performed. Emission data was corrected using the CT acquisition. Reconstructed emission images were interpreted using transaxial, coronal, and sagittal views. Images were interpreted by comparing the radioactivity in cortical gray matter cerebral cortex with activity in the adjacent white matter. Semi-quantitative analysis was performed by Cortex ID software, comparing activity in specific cortical regions to that in the pons.

INDICATION: Beta-amyloid neuritic plaque density assessment in an adult patient with cognitive impairment who is being evaluated for Alzheimer’s Disease (AD) and other causes of cognitive decline.

PET/CT BRAIN VIZAMYL

Case Study: Post imaging visit

This patient has Alzheimer’s disease dementia.

FDG PET imaging of dementia is not an FDA approved indication, but CMS has agreed to reimburse if certain prerequisites are met.