Application of PET/CT to Dementia

**Why Use PET/CT?**

PET/CT is the most accurate test for differentiating between Alzheimer’s disease (AD), fronto-temporal dementia, multiple-infarct-dementia and normal aging in early stage patients. This is because PET/CT can detect reductions in neuronal activity well before the cognitive reserve is exhausted and well before this reduction is reflected by changes in anatomy.

By using PET/CT early, patients with AD can be put on cholinesterase inhibitors early, which can significantly reduce the rate of progression; while patients with other forms of dementia can be moved on to more appropriate therapies.

When PET/CT was added to the workup of patients with possible AD, sensitivity went from 84% to 94% while sensitivity went from 52% to 75% with and overall improvement in accuracy from 69% to 85% (Silverman, DH., 2001).

In patients satisfying the criteria below, PET/CT is reimbursed by Medicare.

**When to Use PET/CT?**

Use FDG-PET/CT for patients that:

- Have a formally documented cognitive decline of at least 6 months.
- Have had a comprehensive clinical evaluation including: 1) medical history from the patient and a well-acquainted informant, 2) physical and mental status examination aided by cognitive scales or neuropsychological testing, 3) laboratory tests (B12, thyroid hormone).
- Meet diagnostic criteria for both Alzheimer’s disease and fronto-temporal dementia.
- Have had structural imaging such as magnetic resonance imaging (MRI) or computed tomography (CT).
- The specific neurodegenerative disease or other cause for the clinical symptoms remains uncertain.
- Have not had a single photon emission computed tomography (SPECT) or FDG-PET scan of the brain for this indication within the past year.

**PET Images**

Bilateral hypometabolism in the temporal parietal regions is indicative of early AD. Both of these brains would look normal on CT or MRI.