

The Usefulness of Brain Imaging Studies in the Diagnosis and Management of Alzheimer's Disease

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There are a variety of ways to image the brain and some of these imaging studies or x-rays may or may not be useful in the evaluation of someone with a dementing illness. In general, Alzheimer's disease is still a diagnosis of exclusion. In other words, one may need to rule out other causes such as a stroke or tumor by performing a brain scan during the initial work-up. A brain scan can assist with ruling out these other conditions, but it cannot diagnosis Alzheimer's disease. Indications for a brain scan may include signs or symptoms of stroke, a history of a fall and/or head injury, use of a strong blood thinner such as warfarin/coumadin, a sudden onset or acute change in mental status, a sudden or rapid decline in cognition, urinary incontinence and gait problems early on in the course of the disease, fever, headache, or perhaps double vision. Many family members question whether a repeat brain scan should be ordered in the course of the disease once a specific diagnosis such as Alzheimer's disease is made. This is usually not necessary if the disease is following a usual course and trajectory. A repeat scan that may or may not show further atrophy will not either confirm or rule out a specific type of dementia.

When ordering a brain scan, a plain CT Scan of the brain can be done to rule out a bleed or a condition where there is too much fluid on the brain called hydrocephalus. This type of scan is usually done in urgent situations when a patient is in the emergency room setting, or if they have a pacemaker and are unable to have an MRI scan of the brain. The MRI Scan of the brain does show more detailed images, detect more small vessel vascular disease (e.g. small strokes) and allow a better assessment of atrophy as a cause for ventricular (fluid filled spaces) enlargement. It is usually the preferred scan to be ordered during the initial work-up. For those of you that have had an MRI scan, it is often performed in very tight quarters. Some of our patients become anxious and need medication to relax prior to the scan.

There are also open MRI scans that can be ordered. Although the image quality is not quite as good as the closed MRI scans, they are often sufficient to assist with ruling out structural lesions.

A newer imaging study uses a radio labeled agent called Pittsburgh Compound B or PIB that is injected during a Positron Emission Tomography (PET) scan. PIB binds to amyloid in the brain and the Alzheimer's Disease Research Center at Washington University St. Louis has led the way in utilizing and studying this special technique in participants with dementia. We believe the abnormal protein amyloid plays a major role in the pathology of Alzheimer's disease. We now can quantitate the amount of amyloid binding in the brain by this method and be fairly confident of diagnosing individuals that have amyloid pathology in the brain that have Alzheimer's disease and even preclinical or asymptomatic Alzheimer's disease. Although this is still a research method, the radiologic field is moving toward making this a standard in diagnosis and using amyloid imaging as a potential biomarker for treatment that focuses on anti-amyloid drugs. A major limitation to PIB is that the compound has to be made in a cyclotron and has to be used immediately, since it is not very stable. However, newer compounds have been created that are more stable and will likely take the place of PIB as more data on their efficacy is collected.