Key Concepts for Dementia Assessment: Structural Imaging Biomarkers

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Some Basic Terms Discussed

**Diffusion MRI** – measures diffusion of water molecules in biological tissues. Good for identifying acute changes in water due to stroke or edema. An enhancement can be seen minutes after the onset of stroke symptoms.

**FLAIR (Fluid attenuated inversion recovery)** – an inversion-recovery pulse sequence used to suppress signals from fluids. It suppressing cerebrospinal fluid so as to bring out hyperintense areas in the white matter.

**Fractional anisotropy** (FA; pronounced ‘ani SAW tropy’) – is a value between one and zero that describes water restriction. A score of zero means that there is unrestricted diffusion in all directions.

**Hippocampal fissure cysts** – thin and often multiple. Seen best on axial T2 images. Located between the head of the hippocampus and subiculum. They are considered benign.

**Junque Scale of LA** – A visual metric method for quantifying leukoaraiosis (LA). Junque is pronounced “Hun K”.

**Leukoaraiosis** – CT or MRI defined areas of white matter hyperintensities or abnormalities. Best seen on FLAIR (Fluid Attenuated Inversion Recovery; FLAIR).

**Perivascular Spaces** (Virchow-Robin spaces) – most common location of such spaces is along lenticulostriate arteries. Differential diagnoses include an extensive list of diseases such as lacunar infarcts, fungal and parasitic infections, and cystic neoplasms. They are typically fluid-filled spaces that allow basal perforating vessels to penetrate deep into the cerebral parenchyma.

**T1-weighted MRI** – basic standard scan for differentiating water from fat. Water is darker and fat is brighter. Provide good gray/white matter contrast for structural volumetric measurements.

**T2-weighted MRI** – basic standard scan where fat is differentiated from water. Fat is darker and water is lighter (CSF is lighter in T2 scans). Good for showing edema.