Dementia diagnosis

- Utility, Costs and Cost-Utility of Amyloid-PET in the Diagnostic Process of Memory Clinic Patients: A Trial-Based Economic Evaluation From AMYPAD-DPMS
- Temporal Trends in the Association Between Female Sex and Ischemic Stroke Among Patients With Atrial Fibrillation
- From suspicion of cognitive decline to dementia diagnosis: a systematic review of healthcare professionals' considerations and attitudes
- Formal and informal care use before, during, and after detection of cognitive impairment and dementia: A population-based matched study
- Associations of semaglutide with Alzheimer's disease-related dementias in patients with type 2 diabetes: A real-world target trial emulation study
- Personalized Treatment Selection for Multivariate Ordinal Scale Outcomes and Multiple Treatments
- AI and Machine Learning for Detection and Management of Delirium in Care Home Residents
- Lived experience perspectives about gaps and barriers in services for those living with, and those providing care, for people with young-onset dementia in Australia: Findings from the Joint Solutions Project

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Delirium vs.dementia (critical distinction). Delirium AKA acute confusional state. Distinct from dementia, however, patients with dementia are at increased risk of developing delirium [1) 2)].

A primary disorder of attention that subsequently affects all other aspects of cognition [3)]. Often represents life-threatening illness, e.g. hypoxia, sepsis, uremic encephalopathy, electrolyte abnormality, drug intoxication, MI. 50% of patients die within 2 yrs of this diagnosis.

Unlike dementia, delirium has an acute onset, motor signs (tremor, myoclonus, asterixis), slurred speech, altered consciousness (hyperalert/agitated or lethargic, or fluctuations), hallucinations may be florid. EEG shows pronounced diffuse slowing.

Magnetic Resonance Imaging for Dementia Diagnosis

Role of MRI in Dementia

MRI is a cornerstone imaging technique in the **diagnosis, classification, and management** of dementia. It provides high-resolution structural and functional images of the brain, enabling early detection of pathological changes.

Clinical Objectives of MRI in Dementia

- **Exclude reversible causes:**
  - Tumors

    - Subdural hematomas
    - Normal pressure hydrocephalus (NPH)
    - Vascular lesions
- **Identify specific patterns of atrophy** to differentiate types of dementia
- **Evaluate vascular contributions** such as:
    - White matter hyperintensities (WMH)
    - Lacunes
    - Cortical microinfarcts
    - Strategic infarcts (e.g., thalamus, hippocampus)
- **Provide baseline imaging** to track progression and support management decisions

Characteristic MRI Findings by Dementia Type

Dementia Type	MRI Features
Alzheimer's Disease	Medial temporal lobe atrophy, especially hippocampus; parietal atrophy
Frontotemporal Dementia	Frontal and/or anterior temporal lobe atrophy; often asymmetric
Vascular Dementia	Confluent WMH, lacunes, cortical/subcortical infarcts
Lewy Body Dementia	Mild cortical atrophy; less pronounced medial temporal atrophy
Normal Pressure Hydrocephalus	Ventriculomegaly (Evans index > 0.3), DESH pattern

Advanced MRI Techniques (Optional)

- **Volumetric MRI** – quantification of hippocampal or lobar volumes
- **Diffusion Tensor Imaging (DTI)** – assessment of white matter integrity
- **Perfusion MRI** – evaluation of regional cerebral blood flow
- **MR Spectroscopy** – metabolic profile (↓ NAA in neurodegeneration)
- **fMRI** – resting-state connectivity; used mostly in research

Clinical Recommendations

- Routine brain MRI is recommended in **patients with cognitive decline**
- Use standard sequences: **T1, T2, FLAIR, DWI**
- Use contrast if inflammatory, infectious, or neoplastic disease is suspected
- MRI findings must be interpreted **in clinical context**: cognitive testing, labs, patient history

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Rosa-Grilo et al. deliver a paper [4] that raises more concerns than confidence regarding its clinical implications, methodological rigor, and interpretive integrity.

1. Misleading Premise of "Non-Inferiority" The study claims "non-inferior reliability" for ultra-fast MRI in dementia diagnosis compared to standard MRI, yet this is not a non-inferiority trial in the strict methodological sense. There is no a priori definition of non-inferiority margins, no power calculation, and no statistical framework consistent with actual non-inferiority testing. The claim is speculative and loosely justified with post-hoc ratios and confidence intervals rather than robust clinical endpoints.

 2. Lack of Diagnostic Ground Truth The study compares inter- and intra-rater agreement but fails to validate diagnostic conclusions against a gold standard (e.g., autopsy, biomarkers, or longitudinal clinical outcomes). Hence, all “agreement” metrics are tautological—consistency without ground truth is not accuracy. This is especially egregious given the paper’s strong conclusions about therapy eligibility.

 3. Overreliance on Visual Rating Scales The authors rely heavily on subjective visual rating scales (e.g., medial temporal atrophy, Fazekas) without accounting for their inherent limitations in early-stage or atypical dementias. Objective, quantitative volumetric or morphometric data is ignored, despite being more sensitive to early neurodegeneration—exactly the kind of precision needed for determining treatment eligibility.

 4. Overgeneralization of “Real-World” Relevance Labeling the study as “real-world” is a stretch. All scans were performed in a controlled setting by academic neuroradiologists. There is no evidence the findings are generalizable to community hospitals, technologist variability, or radiologists with less subspecialty training. This undermines the paper’s claim that ultra-fast MRI could broadly “improve access and patient equity.”

 5. Ethical and Clinical Implications Downplayed Suggesting that ultra-fast MRI is sufficient for eligibility assessment for disease-modifying therapies (i.e., anti-amyloid monoclonal antibodies) is reckless without demonstrating sensitivity to microhemorrhages, superficial siderosis, or subtle ischemic changes—all critical safety markers. The omission of susceptibility-weighted imaging (SWI) or advanced T2* sequences in a dementia workup is deeply questionable.

 6. Conflicts of Interest and Technological Bias The involvement of developers of MRI acceleration technologies (wave-CAIPI) and commercial imaging platforms is not fully unpacked. Several authors have known industry ties or stake in promoting ultra-fast imaging. Yet no discussion of potential conflicts of interest appears in the abstract or methodology. This undermines the neutrality of the “non-inferiority” conclusion.

 Final Verdict This paper markets a seductive technological shortcut at the expense of clinical rigor and diagnostic safety. Its flawed study design, absence of a diagnostic gold standard, and unjustified claims about therapeutic eligibility make it a prime example of how technological enthusiasm can dangerously outpace clinical evidence.

Fast imaging is a technical feat—but this paper fails to prove it is a diagnostic one.

Cerebrospinal fluid biomarker for dementia

Cerebrospinal fluid biomarker for dementia

Brain biopsy for dementia

Clinical criteria are usually sufficient for the diagnosis of most dementias. Biopsy should be reserved for cases of a chronic progressive cerebral disorder with an unusual clinical course where all other possible diagnostic methods have been exhausted and have failed to provide adequate diagnostic certainty [5)].

A biopsy may disclose CJD, low-grade astrocytoma, and AD among others. The high incidence of CJD among patients selected for biopsy under these criteria necessitates appropriate precautions; see Creutzfeldt-Jakob disease.

In a report of 50 brain biopsies performed to assess the progressive neurodegenerative disease of unclear etiology, [6] the diagnostic yield was only 20% (6%were only suggestive of a diagnosis, 66% were abnormal but nonspecific, 8% were normal). The yield was highest in those with focal MRI abnormalities. Among the 10 patients with diagnostic biopsies, the biopsy result led to a meaningful therapeutic intervention in only 4.

1)
Lipowski ZJ. Delerium (Acute Confusional States). JAMA. 1987; 258:1789–1792
2)
Pompei P, Foreman M, Rudberg MA, et al. Delerium in Hospitalized Older Persons: Outcomes and Predictors. J Am Geriatr Soc. 1994; 42:809–815
3)
Petersen RC. Acute Confusional State: Don't Mistake it for Dementia. Postgrad Med. 1992; 92:141–148
4)
Rosa-Grilo M, Chughtai HR, Thomas DL, Alexander DC, Beament M, Belder CRS, Jäger HR, Lim EA, Magill N, Mallon D, Nicholas JM, Nicholas O, Urban F, Parker GJM, Barkhof F, Mummery CJ, Fox NC. Ultra-fast MRI for dementia diagnosis and treatment eligibility: A prospective study. Alzheimers Dement. 2025 Jun;21(6):e70341. doi: 10.1002/alz.70341. PMID: 40501106.
5)
Hulette CM, Earl NL, Crain BJ. Evaluation of Cerebral Biopsies for the Diagnosis of Dementia. Arch Neurol. 1992; 49:28–31
6)
Javedan SP, Tamargo RJ. Diagnostic Yield of Brain Biopsy in Neurodegenerative Disorders. Neurosurgery. 1997; 41:823–830