Associations Between Alzheimer's Disease and Corticobasal Syndrome

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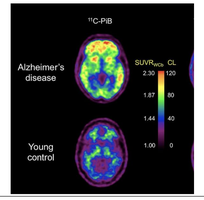
INTRODUCTION

Teaching Objectives:

- To review the clinical overlap in Alzheimer's Disease (AD) and Corticobasal Syndrome (CBS)
- To evaluate the efficacy of PET/CT and CSF findings in differentiating between the two diagnoses
- To compare findings from the literature to a relevant case study from a tertiary institution

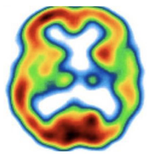
Alzheimer's Disease

- The most common neurodegenerative disease in the world
- Characterized by significant atrophy in the medial temporal lobe leading to memory impairment
- Typical biomarkers include decreased levels of Aβ42 and elevated P-tau 181 in CSF samples
- Radiotracer [11C] PiB has been useful in the diagnoses of AD with higher uptake in areas known to be targeted in the disease such as the frontal, temporal, and parietal cortices



Corticobasal Syndrome

- Characterized by pathological neuronal and glial lesions containing abnormally hyperphosphorylated microtubule associated tau proteins.
- Primarily affects the parietal and frontal lobes of the brain resulting in progressive, asymmetric motor deficits
- Most agreed upon clinical findings include: akinetic rigid syndrome, myoclonus, cortical sensory loss, alien limb phenomenon, limb apraxia, and dystonia.
- Pathologically, CBD can be divided into three subtypes based on the distribution and severity of the lesions: typical CBD, 'basal ganglia predominant CBD' and 'PSP-like CBD'



METHODS

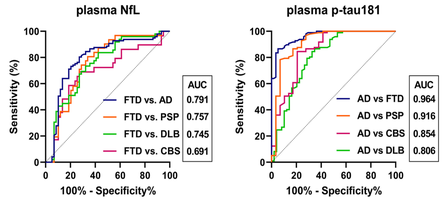
- Using MEDLINE, PubMed, and Google Scholar, a literature review was conducted to determine diagnostic methods to differentiate CBS and AD between 2015 and 2025.
- Key words used in the search included "Alzheimer's disease" and "corticobasal syndrome."
- Commentaries, editorials, and unpublished works were excluded.
- A case from a tertiary academic center was also reviewed to compare with findings from current literature.

RESULTS

CSF Fluid Markers:

- Decreased Aβ42, elevated p-tau, and elevated total tau are thought to be AD-specific patterns
- No CBS specific patterns have been identified
- P-tau and Aβ42 can be used to reliably differentiate CBS and Progressive Nuclear Palsy
- A diagnosis of CBS can be made by ruling out AD with non-AD specific patterns

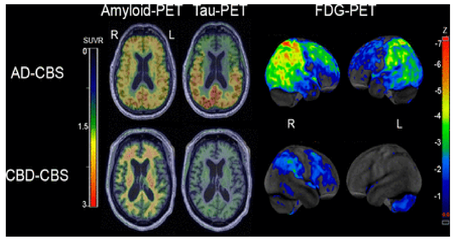
- Baiardi S. et al
- N= 316
- P-tau 181 levels are significantly increased in AD compared to other neurodegenerative disorders, including CBS ($p<0.001$ for all comparisons)
- Found the specificity and sensitivity of p-tau levels in CSF when distinguishing AD from other diseases to be 91.8 and 90.5, respectively
- The diagnostic accuracy of neurofibrillary tangles (Nfl) and p-tau 181 are shown below.



PET/CT Imaging:

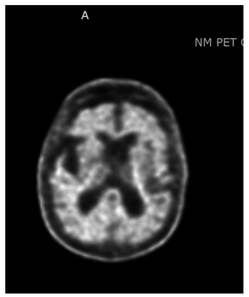
- Amyloid PET is useful in confirming AD via radiotracers targeted to amyloid proteins
- FDG-PET shows areas of hypometabolism
- In CBS, FDG-PET shows hypometabolism in the motor cortex as compared to the occipital lobe in AD

- Koga S. et al
- Figure shows amyloid PET with [11C]PiB, tau PET with [18F]Flortaucipir, and glucose PET with [18F]fluoro-2-deoxyglucose in patients with AD-CBS and CBD-CBS
- Amyloid PET in AD-CBS patients shows diffuse uptake in grey matter and tau PET reveals focal uptake in temporo-parieto-occipital lobes
- CBD-CBS images show no increased amyloid PET uptake in cortical grey matter and no tau–PET uptake



Case Study: Patient Diagnosed with AD-CBS

- Presented with cognitive decline and progressive gait instability
- Diagnosed it with CBS and early signs of AD
- Diagnosis confirmed with CSF analysis, which indicated increased Aβ42 levels and mildly elevated P-tau 181 levels
- F18 Florbetapir PET/CT trans axial image shows amyloid deposition with loss of gray and white matter difference as seen here
- Both patient's CSF profile and imaging findings are highly consistent with AD, justifying further evaluation for anti-amyloid therapy



CONCLUSION

Key Take Away Points:

- Clinically, CBS and AD are too alike to make definitive diagnoses without the guidance of additional labs and advanced imaging
- CSF fluid markers are an effective guide for determining what advanced imaging is most efficacious for patients and efficient for providers
- PET/CT imaging was found to be a reliable way to differentiate between similar neurodegenerative disorders such as CBS and AD

CSF Fluid Findings

- CSF biomarkers, particularly elevated p-tau181 and decreased Aβ42, are highly effective in identifying underlying pathology and differentiating it from non-AD causes of CBS.

PET/CT Imaging

- PET/CT imaging with amyloid specific tracers, like florbetapir, provide visual confirmation of amyloid deposition in the brain.
- This helps to distinguish AD from CBS and other neurodegenerative disorders that lack amyloid pathology.

Comparison of Presented Case to Literature Findings

- The case aligns with the literature in the use of CSF markers and PET/CT imaging modalities to confirm AD diagnosis over CBS and in directing the provider to the best treatment plan

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