Diagnostic utility of [18F] florbetaben PET and its concordance with amyloid-β1-42 in cerebrospinal fluid in patients with dementia

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Background and Objective

Brain amyloid deposition is considered one of the main hallmarks of Alzheimer's Disease (AD). Nowadays, two approaches are available for assessing AD pathology "in vivo": Aβ1-42 cerebrospinal fluid (CSF) levels, and, more recently, amyloid load visualized by Amyloid beta Positron Emission Tomography imaging (Amy-PET) probes. Studies evaluating concordance between these two methods have provided conflicting results. Under specific conditions, Amy-PET may be of great clinical utility, especially in conflicting diagnosis. This study aimed to determine concordance between CSF and PET in detecting amyloid pathology. Moreover, we wanted to explore the impact of Amy-PET scan information on diagnostic confidence and clinical diagnosis.

Subjects & Methods

We included 24 patients (age 67.33 ±9.75; 12 males, 12 females), 12 suspected for AD pathology and 12 suspected for not-AD pathology.
All patients underwent CSF analysis including Aβ1-42 dosage and Amy-PET with [18 F] Florbetaben.
CSF biomarker was considered abnormal based on Aβ1-42 < 600 pg/ml.
A semiquantitative visual scan assesment were used to quantifiy amyloid deposition in the brain. Brain Amyloid Plaque Load (BAPL) was rated as negative (BAPL 1 absence of amyloid) or positive (BAPL 2 and 3 presence of amyloid).

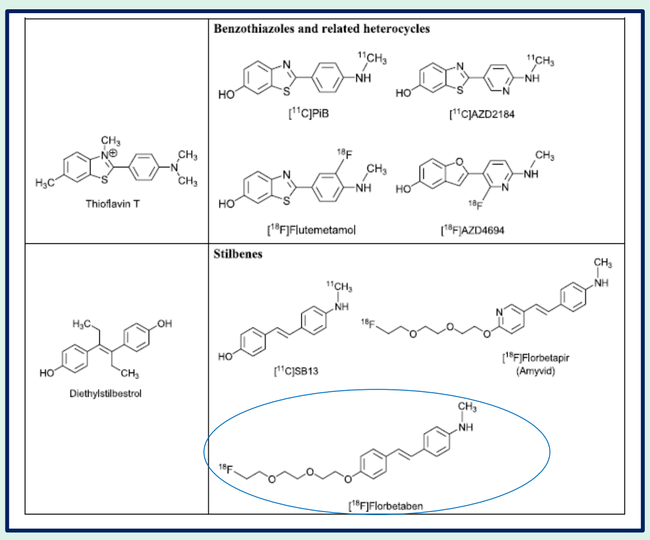

FIGURE 1. PET imaging probes

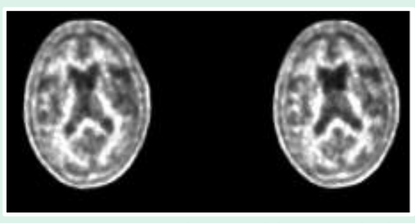

FIGURE 2. BAPL 1: absence of brain amyloid plaques

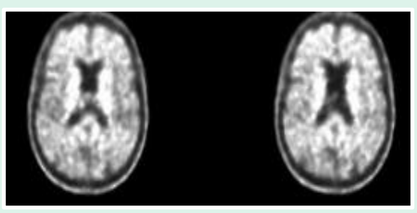

FIGURE 3. BAPL 3: high load of brain amyloid plaques

Results

Concordance between Amy-PET and CSF was 83%.
In 2 out of 4 discordant cases, Amy-PET was positive and CSF Aβ1-42 levels were close to the cut-off. In 3 out of 4 discordant cases, Amy-PET was in accord with diagnostic suspicion. In the remaining case with positive Amy-PET and Aβ1.42 high levels in the CSF, the patient had a concomitant mild normal pressure hydrocephalus.
Considering Amy-PET results, clinical diagnosis were changed in 2 out of 24 patients and diagnostic confidence increased in 19 out of 24.

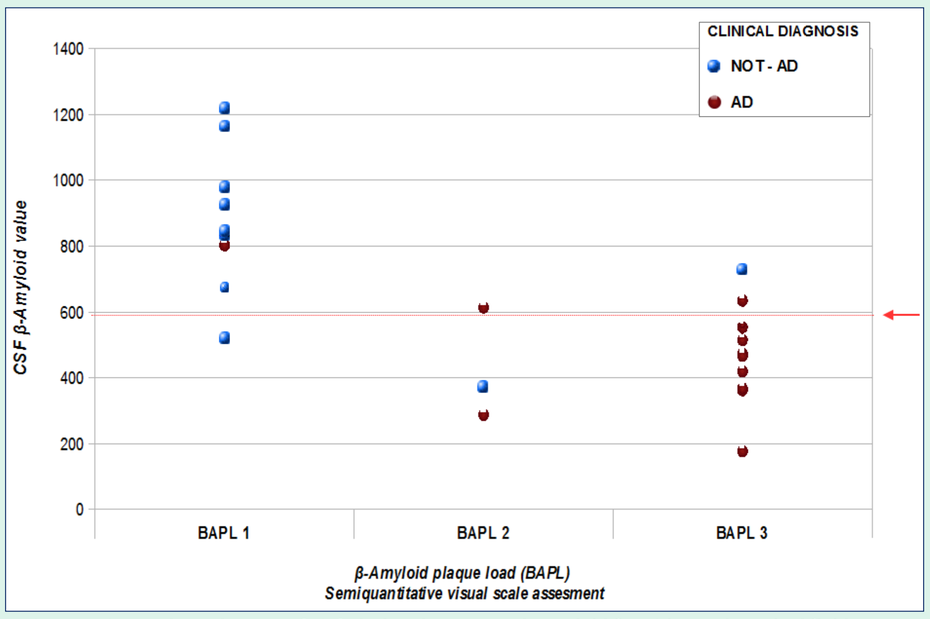

FIGURE 4. Concordance between [18F] Florbetaben PET and Amyloid β1-42 in cerebrospinal fluid

Conclusions

Our preliminary results shown a good concordance between CSF biomarker and Amy-PET in detecting brain amyloid load.
In discordant cases, clinical diagnosis were more often in agreement with Amy-PET results.
In suspected AD, Amy-PET could provide more evidences of AD pathology, especially when CSF levels are just above cut-off.
In our experience, after a proper diagnostic work-up, Amy-PET significantly modifies clinical diagnosis only in few cases, but it can improve diagnostic accuracy and confidence.

References

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