Utility of amyloid neuroimaging in clinical practice

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Objective: Our goal is to determine the utility of 11C-PiB-PET (11C-Pittsburgh compound B-positron emission tomography) in clinical setting classifying patients based on clinical probability of Alzheimer's Disease (AD).

Background: The 11C-PiB-PET is a tracer that specifically detects amyloid deposition in specific areas of the brain during lifetime. Even though it's a minimally invasive study, costs remain high and its usefulness in clinical practice in the spectrum of degenerative diseases has not been stipulated.

Methods: Observational cross-sectional study

Population: 89 patients underwent 11C-PiB-PET in our center. Patients were assigned into categories of high or low pretest probability according to clinical suspicion of amyloid burden. High probability group included: AD, amnestic mild cognitive impairment (MCI), multiple-domain MCI, posterior cortical atrophy, amyloid angiopathy and mixed dementia. Low probability group included: normal controls, non-amnestic MCI, primary progressive aphasia non-logopenic (PPA) and frontotemporal dementia (FTD).

Results: 24.6% of patients with high pretest probability had 11C-PiB-PET negative (AD 9.1%, amnestic MCI 35%, multiple-domain MCI 43%), and 31.25% in the low-probability had a positive PET (normal controls 8.3%, non-amnestic MCI 40%, FTD 25%, PPA 80%). Categories with more discrepancies were: MCI and PPA. AD patients had high clinical and molecular consistency. Atypical AD features was highly consistent with positive 11C-PiB-PET as well.

Discussion: Despite discrepancies between clinical and molecular diagnosis in both high and low probability groups, the implications of 11C-PiB-PET for diagnosis were different for each syndromic category. 11C-PiB-PET contributed significantly to the diagnosis in cases of suspected early-onset AD (both prodromal and clinical stages) and in cases of atypical presentation where differential diagnosis included AD (APP, behavioral variant DFT and ACP). The presence of amyloid in the rest of the categories mentioned, does not establish cause or coexisting pathology. Therefore, 11C-PiB-PET is of additional value in diagnostic work-up mainly in certain specific clinical categories.

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