Amyloid PET in multiple sclerosis predicts cognitive decline at 18 months

Jordi A. Matias-Guiu, Vanesa Pytel, Maria Nieves Cabrera-Martín, Ana Cortés-Martínez, Teresa Moreno-Ramos, José Luis Carreras, Jorge Matias-Guiu

1Neurology, 2Nuclear Medicine, Hospital Clinico San Carlos

Objective:
To study the clinical, cognitive and radiological evolution of a cohort of patients with multiple sclerosis (MS), taking into account the demyelination/remyelination status assessed by amyloid positron emission tomography (PET) with 18F-Florbetaben.

Background:
Cognitive impairment is frequent and relevant in MS. Biomarkers predicting future cognitive decline are necessary. PET with amyloid tracers is a promising tool in the in vivo assessment of demyelination/remyelination in MS. Previous studies have shown that amyloid tracers uptake is lower in damage white matter, but the usefulness in monitoring the disease progression is unknown. However, experience in this setting is still limited.

Design/Methods:
29 patients with MS according to Mc Donald’s criteria 2010 were studied with longitudinal structural MRI and a clinical and comprehensive neuropsychological protocol, with a mean interval between assessments of 18±3.31 months. 18F-Florbetaben PET was performed at baseline. PET and MRI were pre-processed using Statistical Parametric Mapping and FSL (SIENA, SIENAX and FIRST). We analyzed 18F-Florbetaben uptake in demyelinating plaques (damage white matter, DWM), normal-appearing white matter (NAWM), and grey matter. Results obtained were correlated with clinical, cognitive and MRI data.

Results:
Patients with cognitive decline during the follow-up showed a lower SUVr in NAWM (1.52±0.14; 1.67±0.13; p-value 0.01) and in DWM (1.23±0.11; 1.37±0.13; p-value 0.01). In baseline MRI, they showed a lower thalamic volume (6968.65±1062.17; 7896.66±958.55; p-value 0.03), and a higher white matter lesion load (15253.76±8726.90; 9175.07±11171.04; p-value 0.02). PET measures were more predictive of cognitive decline than MRI, and were correlated with several neuropsychological tests.

Conclusions: A lower uptake in white matter in amyloid PET is associated to cognitive decline during the follow-up. Our study suggests that 18F-florbetaben may be a useful biomarker in MS in the assessment of myelin status and in the prediction of cognitive outcome.