AMYPAD Deliverable 2.4

Image database and SUVR quantification methods implemented

Publishable Summary

The aim of this document, as stated in the AMYPAD Description of Action (DoA), is to describe the procedures implemented to deploy the online AMYPAD image database as well as the centralized solution for performing the basic SUVR quantification of the images as per deliverable D2.4. The AMYPAD project encompasses two studies: 1) the Diagnostic and Patient Management Study (DPMS) aims at assessing the impact of β-amyloid PET imaging on the clinical management of individuals in the spectrum from subjective cognitive decline (SCD) towards mild cognitive impairment (MCI) and in dementia of unclear etiology; and 2) the Prognostic Natural History Study (PNHS) that will be conducted to contribute to the European Prevention of Alzheimer's Dementia (EPAD) Longitudinal Cohort Study (LCS) to improve Alzheimer's Disease modelling by introducing β-amyloid PET as additional imaging biomarker. Composite amyloid load measurements using simplified methods (either SUVR or Centiloid) will be used to meet the primary outcome in the PNHS and secondary outcomes in the DPMS. Therefore, accurate and precise quantification of the amyloid PET images is crucial to the success of the project.

This goal is challenging due to several factors associated to AMYPAD. Firstly, two different amyloid PET tracers will be used in AMYPAD so that analytical methods have to ensure complete comparability of the quantitative outcomes regardless of the used tracer. Secondly, AMYPAD is a multicentre study that will require to set up methods to push the images to a centralized repository and, participating sites developing advanced quantification methods, will also need to retrieve the images and all associated information in an efficient manner. Thirdly, the DPMS and PNHS studies will rely on different sets of data. In the PNHS, the MRIs acquired in the LCS will be used for the PET analysis to maximize the accuracy and precision of the quantitative outcomes.

On the other hand, in the DPMS, no MRI data will be acquired ex professo, and therefore, a PET-only analytical pipeline will have to be implemented. Finally, the advanced dynamic acquisition protocol developed for the PNHS will require setting up special quantification methods working on dynamic PET data. The procedures and methods described in this document should be regarded as definitive as for the imaging network and the simplified amyloid PET quantification in the PNHS (both SUVR and Centiloid). The current development status of the advanced dynamic quantification in the PNHS as well as the PET-only pipeline for the DPMS are also presented. These analytical methods will be consolidated in the near future, certainly before the first patient in for either protocols.

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