Harmonization of Protocols for Manual Hippocampal Volumetry: an EADC-ADNI Project


Methods

We selected 12 most used tracing protocols in the AD literature (Figure 2). One rater carried out complete tracings on two prototypical 1.5T MR scans (0.99x0.99 mm²) (one control and one matched AD, ADNI subjects) on 1.2 mm slices, using each protocol. Individual interactive web conferences with the primary author of each protocol allowed to check or correct the execution of the tracing. We extracted the differences among the author-certified protocols, operationalized them into segmentation units (Figure 1) in order to compute their influence on total hippocampal volume, difference due to AD, and reliability measures in the manual tracing. Then, we traced and re-traced the segmentation units on 20 ADNI subjects (4 for each severity degree at the MTA control and one matched AD, ADNI subjects) on 1.2 mm slices on two prototypical 1.5T MR scans (0.99x0.99 mm²) depending on the adopted segmentation protocol.

Background

Hippocampal atrophy is a key diagnostic marker for early-onset clinical Alzheimer’s disease (AD), but manual tracing on magnetic resonance (MR) images (present gold standard procedure) results in heterogeneous volumetric estimates (2 to 5.3 cm³) depending on the adopted segmentation protocol.

Conclusions

This operationalization, and the quantification of segmentation units features provide quantitative evidence that will assist an international panel of experts in achieving consensus for a harmonized protocol for the manual tracing of the hippocampus.