Seventh meeting on the EADC-ADNI Harmonization of Protocols for Hippocampal Segmentation
AAN, San Diego, Tuesday, March 19, 2013

Hosts: Giovanni B. Frisoni (in person), Marina Boccardi (a remoto) – IRCCS S. Giovanni di Dio - Fatebenefratelli, BS, Italy,

Participants:
Maria Carrillo - Alzheimer's Association, Chicago, IL
Lisa Silbert - Oregon Health & Science University School of Medicine
Craig Watson – Detroit, MI, USA
Diane Stephenson – C-PATH
Joyce Suhy - Synarc
Ronald Pierson – Brain Image Analysis
Susan De Santi

List of in person participants may not be exhaustive

Remote participants:
Martina Bocchetta - IRCCS S. Giovanni di Dio – Fatebenefratelli, BS, Italy
Simon Duchesne - Laval University, Québec City, Canada
Adam Christensen - Northwestern University – Chicago, IL
Timothy Brown - Johns Hopkins University, USA
Kristian Steen Frederiksen - Memory Disorders Research Group, Dept. of Neurology, Copenhagen
Yawu Liu - University of Eastern Finland, Kuopio
Oliver Martinez - UC Davis, CA, USA
Jonathan Harlap - Prodema
Feng Luo - BMS
Hui Jing Yu – Bioclinica

Background
GBF illustrates the rationale and background of the study, recalling main steps and results up to the last meeting in Vancouver.

Update
MB illustrates the current phase, consisting in the Validation of the Harmonized protocol (HP). Design consists of segmenting 40 hippocampi by 20 tracers from different laboratories based on local protocols, then train the tracers to segment based on the HP, and resegment the same 40 hippocampi based on HP.
A second phase of the validation consists of segmenting 240 hippocampi (from 15 ADNI subjects, been scanned at different time points and with different machines and magnet field strengths), to evaluate variance due to re-trace, atrophy, scanner etc. this phase is being carried out by 5 tracers.
MB describes the web-platform built and managed by Simon Duchesne and his group, where the segmentations by master tracers are uploaded and used to provide visual and quantitative feedback to the new tracers learning to segment based on the HP. Qualification of tracers for segmenting based on HP has been completed by 10 tracers. Mean Jaccard indices for their performance are between .78 and .85.
Re-segmentation of the 40 hippocampi for Validation phase 1 has been completed by 8 tracers so far (among the 10 who qualified). Inter-rater reliability values among these tracers are higher for the

HP segmentations (Consistency method: >.95; Absolute: >.90) than for local protocol segmentations (Consistency: <.86; Absolute: <.45)

Next Phase
GBF illustrates the next Expansion Project, aiming to enlarge the physiological variability by including a larger number of different subjects (variability from only 15 different subjects is represented in the current Harmonization project). GBF illustrates funders and design for this project.
Publications, publication policy, beta users qualification are also described.

The presented slides are available at http://www.hippocampal-protocol.net/SOPs/results.html.
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Questions/comments from the audience:
Q=question
A=answer
C=comment

Q: did you exclude images with artefacts for the "expansion" project?
A: ADNI images mostly had high quality. Even if artifacts were present, images were not excluded since the hippocampus was visible enough for our aim. Anyway, image problems were observed in a maximum of a couple of images among all of the 135. We may mark images based on quality.

Q: did you consider the fact that the image quality of scans in clinical trials is usually lower than that of ADNI, how may we transfer the method on those images?
A: after the project, algorithms may be run on images of different quality, and there we may see what happen and how it is required to proceed. Anyway this project is not aimed to the use of algorithms per se, rather provides manual segmentations for future use by algorithms. Image quality may anyway be marked and considered in the course of this project to the suggested aim.

Q: how will you carry out the validation on neuropathology?
A: we will use two datasets, that from Mayo clinic and that by Mony de Leon. These datasets have different kind of information and of MR scans (e.g. ante-mortem and post-mortem scnas) .

Q: did you consider cases of unusual anatomy? Shouldn't these cases be specifically addressed for the learning and generalization of algorithms?
A: useful suggestion, this is an issue that will be deserve attention.
(C: Ron Pierson offers his categorization of unusual anatomy for ADNI subjects)

C: in De Leon's lab unusual anatomy and abnormal CSF pools were considered

Q: do you confirm that the labels obtained with the expansion project will be publicly available and will not undergo any embargo
A: yes labels will be available to the public and will not undergo any embargo.