Fifth PMT meeting on the EADC-ADNI Harmonization of Protocols for Hippocampal Segmentation

FIRST TC:
Wednesday, January 4, 2012

Participants:

Giovanni B. Frisoni	(GBF)	– IRCCS S. Giovanni di Dio - Fatebenefratelli, BS, Italy
Marina Boccardi	(MB)	– IRCCS S. Giovanni di Dio - Fatebenefratelli, BS, Italy
Clifford R. Jack	(CJ)	– Mayo Clinic, Rochester, MN, USA
Simon Duchesne	(SD)	– Laval University, Québec City, Canada
Lennart Thurfjell	(LT)	– GE
Louis Collins	(LC)	- McGill University**,** Montreal, Quebec, Canada

MB presents outline, where we are in the flow-chart, and the updated GANTT.

Master tracers:
started benchmark segmentation

Naïve tracers:
Lack of one tracer lead to ask the group of Nancy Andreasen (psychiatry field). We are waiting for an answer.

Learning platform: SD adjusted things said in last TC and will provide a more complete demo of platform use and functioning for February, before the availability of benchmark images
SD asks for a short "training" phase also for the "naïve" tracers of the project, so that we can be sure that the qualification will be carried out on entirely new images. This can be done on a few more subjects (n=3-5) segmented for this avail.

LC describes the fault of having measured volumes and reliability on AC-PC oriented images, and export panel decisions and protocol on images oriented along the hippocampal axes.
CJ underlines that the advantage of hippo axes is also that all hippocampi of all subjects have a different orientation towards AC-PC, while orientation on hippo axes makes hippocampi orientation much more invariant.
Nonetheless the group agrees on the fact that this is a weak point of the study, and that methodological care should be taken, even if this was quite an inevitable problem.
Solution: the master tracers might retrace 10 whole hippocampi (no division into segmentation units). If there are no differences among AC-PC and hippo axes, then we may switch to AC-PC which is the more liable to automation.
If hippo axes give higher reliability and shorter segmentation time, this may also be a better option, but this will be evaluated when we will have the results.
The group asks these subjects to be balanced by age, gender diagnosis..; GBF replies that our selection is bases on Scheltens scale severity, in order to have all degrees of hippo atrophy represented. Group agrees for balancing based on Scheltens.

So:

5 master tracers will segment 10 subjects each (1.5T), on both AC-PC and hippo axes orientation. Images differently oriented will be provided random in a single sample. Both right and left hippos will be segmented.
LC can provide an automatic algorithm for orienting along hippo axis. "why not orienting based on the only left hippo?": this was a possible option, but was ruled out by panelists since then there would be a bias if one wants to compare right vs left hippos.

Anyway, LC can orient based on the mean angle, and, in case, is also available to give this script for free use.

Half of the slides can not be commented for running out of time, a second TC will be planned to complete the discussion.

SECOND TC:
Wednesday, January 11, 2012

Participants:

Giovanni B. Frisoni	(GBF)	– IRCCS S. Giovanni di Dio - Fatebenefratelli, BS, Italy
Marina Boccardi	(MB)	– IRCCS S. Giovanni di Dio - Fatebenefratelli, BS, Italy
Martina Bocchetta	(MBocch)	– IRCCS S. Giovanni di Dio - Fatebenefratelli, BS, Italy
Clifford R. Jack	(CJ)	– Mayo Clinic, Rochester, MN, USA
Gunnar Krueger	(GK)	– Siemens

(Simon Duchesne (SD) – Laval University, Québec City, Canada connected late, at the end of the call. He's been updated about the TC content, and he provided further info about possible pathology samples)

Regarding the check of tracing on 1.5T oriented images (10 subjects each, on both AC-PC and hippo axes orientation) discussed during the TC of January 4th, the whole group agreed that it will be limited to only 2 master tracers rather than 5. These 2 tracers must be familiar, and thus not biased, with both types of orientation. One tracer will be MBocch.
The results will be fed to the Delphi panel to ask again their opinion about orientation.

GK suggested that in the future the entire acquisition procedures might be standardized (and fully automated), thus also scan acquisition might be registered and oriented to a standard template.

Validation versus pathology: one tracer will segment a sample of subjects with pathologically verified diagnoses twice, first following his/her local protocol and then, after the Qualification, following the Harmonized Protocol.
Originally, the designated sample was the one from DeLeon's institute (Bobinski et al., 2000), but we need to get in contact with him to check whether or not he is still interested in taking part to the project. CJ has a Mayo dataset with pathologically confirmed diagnosis (controls and AD), but not post-mortem hippocampal measurement. These data can only be used internally in Mayo, but this is not a problem (two tracers come from Mayo: Gregory Preboske and Chadwick Ward).

GBF suggested to use both samples: he will get in contact with DeLeon and CJ will put together the cohort and check the methodology used on it for the pathological confirmation.

SD suggested to pathologically validate the protocol also versus other neurological diseases: epilepsy and mesial temporal sclerosis.

Publication issues will be discussed during the next TC.

The next TC is scheduled for February 1, 2012 from 4 pm to 5 pm CET.