

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

AAN, Honolulu, Wednesday, April 13, 2011

Participants:

Giovanni Frisoni, Marina Boccardi – IRCCS S. Giovanni di Dio - Fatebenefratelli, BS, Italy

Charles deCarli - UC Davis, CA, USA
Tom den Heijer - Rotterdam Scan Study, The Netherlands
Liana Apostolova - UCLA, CA
Lenore Launer - Honolulu Asia Aging Study
Joyce Suh - Synarc
Chahin Pachai - Bioclinica
Lisa Silbert - Oregon Health & Science University School of Medicine
Craig Watson - Detroit, MI
Dirk Wouters; John Lawson - Innogenetics
Marlis Frey, Glenn Stebbins – Rush University, Chicago IL
Tamanna Bembenek
Meredith McNeil, Heather Snyder, Maria Carrillo - Alzheimer's Association, Chicago, IL

Remote participants:

Martina Bocchetta - IRCCS S.Giovanni di Dio – Fatebenefratelli, BS, Italy
Simon Duchesne - Laval University, Québec City, Canada
Nicolas Robitaille - Laval University, Québec City, Canada
Cristina Bagnoli - IRCCS S.Giovanni di Dio – Fatebenefratelli, BS, Italy
Enrica Cavedo - IRCCS S.Giovanni di Dio – Fatebenefratelli, BS, Italy
Gregory Preboske - Mayo Clinic, Rochester, MN, USA
Josephine Barnes - UCL Neuroscience, Dementia Research Centre, Inst Neurology, London, UK
Lei Wang - Wash U, Northwestern U, Chicago, ILL, USA
Sandra Pietrantonio - Department of Psychiatry, McGill University, Montreal, Quebec, Canada
Leyla DeToledo-Morrell - Rush UMC, Chicago, ILL, USA
Travis Stoub - Rush UMC, Chicago, ILL, USA
Ronald Killiany - Center for Biomedical Imaging, Boston University, Boston, Massachusetts
Nikolai Malykhin - Department of Biomedical Engineering, Univ Alberta, Edmonton, AB, Canada
Timothy Brown - Johns Hopkins University
Haroon Burhanullah - Johns Hopkins University
George Bartzokis - UCLA, CA
Maija Pihlajamäki - University and University Hospital, Kuopio, Finland
Yawu Liu - University and University Hospital, Kuopio, Finland
Andy Simmons - (NEUROMED), London, UK
Patricia Cole - Imagepace
Gennan Chen -
Louie Perkins -
Lena Sherbakov -
Wouter Henneman -

Dr Frisoni describes the rationale, participants, and preliminary steps of the project, including the latest quantitative data on segmentation units obtained on a larger sample of 31 controls, 23 MCI

and 23 AD patients. Dr Boccardi shows the structure (flow-chart and gantt) of the funded project, and provides logistic information about Validation Phase 1, Master Tracing, and Delphi Panel. She shows and explains all issues that will be asked to the Delphi participants. The presentation ends with the list of publications (2 full papers and 6 congress presentations). The presented slides are available at www.hippocampal-protocol.net.

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Questions/comments from the audience:

Q=question

A=answer

C=comment

VALIDATION PHASE

Q (C DeCarli): Underlines the importance of the preliminary phase, and asks whether the tracings of the segmentation units can be made available to all.

A (M Boccardi): Exact info about segmentation units can be accessible to Master Tracers and Delphi participants, but not to all, at least until the Validation Phase 1 is not concluded. This is to prevent that the knowledge deriving from this work would interfere with the tracing based on local protocols.

Q: Are all Naïve Tracers trained to trace based on the Harmonized Protocol/segmentation units?

A: Not now. First we ask them to trace a sample of 20 images following your local protocol, and when they will finish the tracings (and when the harmonized protocol will be defined), they will qualify learning and tracing according to the Harmonized Protocol.

Q: What kind of software/procedure may we use for the pre-processing of the images? Is it the same for both local and harmonized protocol?

A (M Boccardi): If your local protocol requires to orient the images along the AC-PC, you could download the images already oriented by us, without any further changes. If your local protocol requires another type of orientation (for instance along the hippocampal axis) you can download the native images, and follow the same procedure that you usually use in your laboratory for orienting them. For the Qualification Phase and for the tracing according to the Harmonized Protocol, we will provide oriented images ready to be traced, you will not have to modify them.

DELPHI QUESTIONNAIRE

C (M Boccardi): We remind you that only one person for each centre could participate to the Delphi Panel. If two experts would like to answer to the Delphi Questionnaire, they could share the same laboratory-account and complete together the Questionnaire.

C (C DeCarli): If the meaning of the data about Alveus/Fimbria is counter-intuitive, why don't you change the question?

A (M Boccardi): Right, the question should be changed in order to express more clearly the meaning of the data (i.e., that the lower reliability in tracing the alveus and fimbria does not relate to their inclusion in a harmonized protocol but, rather, to their exclusion).

C (C DeCarli): He suggests to add a question regarding the orientation of the slice for the tracing: along the hippocampal axis, or the AC-PC or other.

A (M Boccardi): This also will be done.

C (D Wouters): He underlines that in the Questionnaire there are only choices and opinion, not justification for each answer. He suggest to ask the participant to add the explanation or a justification for his/her choices as a mandatory step.

BUDGET

C (C DeCarli): He underlines that segmenting the hippocampus consists in a lot of work and he says that the budget is not adequate, at least if one works as a master tracer.

A (GB Frisoni): Master tracers receive something more than naive tracers. Budgets are proportional to the work that has to be carried out.

TRACERS SELECTION

Q (J Suhi): How did you select a person for being Master or Naïve Tracer?

A (M Boccardi): Master Tracers are internationally recognized experts (Josephine Barnes, Liana Apostolova and Gregory Preboske), because of their experience in tracing hundreds of hippocampi. Martina Bocchetta and Rossana Ganzola are experts in all the details about the project and the definition of the Segmentation Units and how to trace them. Naïve tracers are experts in tracing the hippocampus, as their accuracy is over 0.80.

C (J Suhi): She claims that, especially for clinical trials, there's a need to allow a standard and periodical qualification for segmenting the hippocampus.

A (M Boccardi): Another objective of the project is the creation of an on-line system that allows everyone to qualify his/her tracing and to learn how to trace the Harmonized Hippocampus. It will also give feedback about the correctness of the tracing.

AUTOMATIC ALGORITHM

Q (J Suhi): How difficult is for an automatic algorithm to be close to the Protocol?

A: We are now defining the landmarks for the Harmonized Protocol. In the next future this will be an issue for the developers of the automatic algorithms.

C (J Suhi): The output of the automatic algorithms may not be so accurate as what the experts decided for the landmarks, and maybe a method including both automatic and human contribution may be opportune.

C: He suggests to make available the definitions of the landmarks and of the Segmentation Units for this purpose, and also masks and models.

A (M Boccardi): The protocol for the Segmentation Units with all the definitions of the landmarks is already available for the Delphi Questionnaire. We will ask Simon Duchesne and Nicolas Robitaille to create masks and models.

Q: What about the comparison between Freesurfer and the Hippocampal Protocol?

A (GB Frisoni): This is not one of the points of our project, but it can be done, of course.

Q: And what about making available “Harmonized Protocol masks” for the templates?

A (GB Frisoni): It can also be done. We could make available “Harmonized Protocol masks” and adapt them for the most used templates (SPM, Freesurfer for instance).