Author's response to reviews

Title: Valid and efficient manual estimates of intracranial volume from magnetic resonance images

Authors:

Niklas Klasson (niklas.klasson@neuro.gu.se)
Erik Olsson (erik.olsson@neuro.gu.se)
Mats Rudemo (rudemo@chalmers.se)
Carl Eckerström (carl.eckerstrom@neuro.gu.se)
Helge Malmgren (helge.malmgren@filosofi.gu.se)
Anders Wallin (anders.wallin@neuro.gu.se)

Version: 3
Date: 28 May 2014

Author's response to reviews: see over
Dear Editorial board,

I am pleased to submit a full paper entitled “Valid and efficient manual estimates of intracranial volume from magnetic resonance images” for consideration for publication in BMC Medical Imaging.

In the submitted manuscript a method for estimation of intracranial volume from magnetic resonance images, using linearly spaced intracranial areas, is evaluated. Originally Eritaia et al. evaluated this approach in the study “An optimized method for estimating intracranial volume from magnetic resonance images” that was published in the year 2000 (PMID: 11108637). While the method still is commonly used, the study by Eritaia et al. has never before been replicated. The submitted manuscript also extends the evaluation by Eritaia et al. to include the use of coronal and transversal intracranial areas as well as sagittal ones. Further, an improvement to the method is suggested enabling a more work-efficient and valid use of it.

Automatic estimates of intracranial volume are widely used but the original validation is often limited or lacking. The intracranial estimate is computed by everything from linear registrations (FreeSurfer) and brain extractions (BET) to sums of brain volumes and total cerebrospinal fluid (SPM). Depending on the measures used, different kinds of biases are introduced, e.g. estimates affected by brain atrophy or cranial thickness. Therefore, manual estimates are still important, both when rigorous estimates are needed and to evaluate the automatic methods. With a fast manual alternative, as evaluated in the submitted manuscript, the estimation time can be reduced while still maintaining estimate validity not yet achievable with automatic methods.

This manuscript has not been published and is not under consideration for publication elsewhere.

Thank you for your consideration!

Best regards,

Niklas Klasson
In the resubmitted version following changes have been done:

Changes in section “Participants”:

At line 95 the sentence a was changed to b
   a) “Thirty-eight patients and 32 controls with 1.5 T MRI scans were included from the Gothenburg MCI (mild cognitive impairment) study.”
   b) “The present study is a substudy of the Gothenburg MCI (mild cognitive impairment) study from which 38 patients and 32 controls with 1.5 T MRI scans were included.”

At line 96 the sentence a was changed to b
   a) “The patients, who were remitted to the memory clinic in Mölndal with subjective or objective cognitive impairment, did not fulfill any of the exclusion criteria and agreed to participate in the study.”
   b) “The patients, who were remitted to the memory clinic in Mölndal with subjective or objective cognitive impairment, were first included in the Gothenburg MCI study if they did not fulfill any of the exclusion criteria.”

At line 104 following sentence was added
   “To participate in the Gothenburg MCI study both patients and controls had to give their written informed consent.”

At line 109 the sentence a was changed to b
   a) “Eight of the 70 participants were excluded because parts of the intracranial vault had not been covered in the MRIs.”
   b) “Eight of the 70 participants in the present substudy were excluded because parts of the intracranial vault had not been covered in the MRI scans.”

Changes in section “MRI Acquisition”:

At line 118 the sentence a was changed to b
   a) “Coronal, T1-weighted, 3D IR/GR (inversion recovery/gradient echo) MRIs, obtained from a 1.5 T Siemens Symphony scanner, were used for the ICV measurements.”
   b) “Coronal, T1-weighted, 3D IR/GR (inversion recovery/gradient echo) MRI scans, obtained from a 1.5 T Siemens Symphony scanner, were used for the ICV measurements.”

Previous changes:

Changes in section “Competing interests”:

At line 349 following sentence was added
   “The authors declare that they have no competing interest.”