Reviewer’s report

Title: A semi-automated measuring system of brain diffusion and perfusion magnetic resonance imaging abnormalities in patients with multiple sclerosis based on the integration of coregistration and tissue segmentation procedures

Version: 0 Date: 09 Sep 2015

Reviewer: Anna Sedda

Reviewer's report:

In this study the Authors describe a new semi-automated method to apply in multiple sclerosis patients in which different software components for MRI analysis are integrated to obtain measurements of DWI and PWI disturbances.

The idea behind the study is clearly of clinical significance, as such a new method would provide better diagnostic and prognostic opportunities for patients.

However, the manuscript as it is now is more a detailed description of the suite than a study on the reliability of the instrument as it lacks a control procedure and no information are provided on the patients (and the numerousness of the sample) on which the suite has been tested.

See detailed comments below.

Detailed comments

INTRODUCTION

Page 3 Line 12 to 22

This sentence contains the main aim of the study, but it is encapsulated in a big paragraph. It would be better to provide a clear explanation, separated from other information, on why it is important to clarify "the actual significance of DWI and PWI abnormalities in MS" and what does this mean for research and clinical practice.

Apart from the epidemiological studies, it would be much more worth to highlight clinical relevance and its impact on general health policies.

Secondly, the rest of the paragraph suffers from some confusion - everything is correct but should be organized better to lead the reader.

Page 3 Line 44 and below: why the chosen approach should be the one indicated by the Authors? It would be helpful if the Authors clearly explain the benefits over other kinds of approach.
Page 6 LINE 26: "independent form scanner" this appears to be a big deal, obtaining images that do not suffer from changing the equipment - it is of noteworthy relevance even for research. Could the Authors be more detailed on this? Because I have the impression that this sentence might be misleading.

METHODS

Here and there in the manuscript the Authors state that they evaluated the suite on patients (selected from a population) but there are no information concerning this sample - at some point they state "single patient / 5 patients" but there are no other details. It would be really important however to know the clinical features of patients that have been selected to test this suite, as different features could led to differences in brain abnormalities (ie. More severe patients easier to identify). Further, the number of patients on which the suite has been tested is also relevant as variability could affect the entire process starting from the part in which the lesions are mapped into ROIs.

CONCLUSIONS

One would have expected a study in which the suite is used by different experimenters/clinicians on the same patients and the results are compared to find out whether there are differences related to the individual using the suite - they Authors themselves state that they aim at reducing errors due to operators.

As this part of analysis is missing and there are no control studies / inter-rater studies or other types of statistical procedure to verify reliability etc. it is not possible to know whether this suite is really reliable. I appreciate the Authors use well known modules but as they themselves state this is a semi-automated procedure, so such controls are needed.

Minor points:
- "Ms lesions and other brain areas" - but MS lesions are not a brain area. This sentence should be clarified.
- The machine used seems quite powerful - did the Authors check if with a different equipment the suite still works? Otherwise it should be clearly stated.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No
Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

No

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

Quality of written English
Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests
I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal.