Author’s response to reviews

Title: Evaluation of microstructural changes in spinal cord of patients with degenerative cervical myelopathy by diffusion kurtosis imaging and investigate the correlation with JOA score

Authors:
ZhuoHang Liu (13894707172@163.com)
BingYang Bian (1241928390@qq.com)
Gang Wang (wanggangletter@126.com)
Cheukying Tian (Cheuk.Tang@mssm.edu)
ZhenShan Lv (lzsspine@jlu.edu.cn)
ZhiQing Shao (390622965@qq.com)
Dan Li (13604430730@126.com)

Version: 1 Date: 10 Mar 2020

Author’s response to reviews:

March 8th, 2020

Re: BMC Neurology Decision on Manuscript ID : NURL-D-19-01299

Dear editor and reviewers,

We would like to thank you email dated 2020/02/16, and the review of our manuscript entitled “Evaluation of microstructural changes in spinal cord of patients with degenerative cervical myelopathy patients by diffusion kurtosis imaging and investigate the correlation with JOA score”. We have addressed all the issues raised by reviewers and substantially revised the manuscript. A point-by-point response to each of the reviewers is attached separately.

Again, we thank the reviewers for their very constructive and insightful comments. The manuscript is much improved by their suggestions. I hope that you will find this revised manuscript suitable for publication in BMC neurology.

Yours sincerely

Reviewer #1:
Question: Please include all comments for the authors in this box rather than uploading your report as an attachment. Please only upload as attachments annotated versions of manuscripts, graphs, supporting materials or other aspects of your report which cannot be included in a text format. Please overwrite this text when adding your comments to the authors.
Answer: We appreciate the reviewer’s suggestion. We have made changes according to your requirements.

Reviewer #2:
-1. Question: Page 2, line 13: there is redundancy when mentioning "and DKI metrics".
Answer: We appreciate the reviewer’s suggestion. Abstract section, line 11, page 2: DKI metrics were redundancy, so we deleted these words that including fractional anisotropy (FA) values, mean diffusivity (MD), and mean kurtosis (MK) values.

-2. Question: Page 2 line 56: there is no description of the acronym "FA" or "MD".
Answer: Background section, line 43, page 2: the acronym of fractional animation and mean diffusivity is FA and MD, respectively.

-3. Question: Page 3 line 18: "gray matter" was mentioned on line 11, therefore the acronym "GM" must be changed position.
Answer: We appreciate the reviewer to point this out. Background section, line 10, page 3: the acronym of gray matter is GM.

-4. Question: Page 4 line 50: Table 1 is not cited in the text. In addition, the description does not correspond to the findings described in Table 2.
Answer: Results section, line 44, page 4: Table 1 is cited in the text and in the annexes. Results section, line 2, page 5: Table 2 described the mean of DKI metrics in the white matter and gray matter in DCM group and control group in the annexes.

-5. Question: Page 4 line 56. In the annexes there is no table 3.
Answer: Results section, line 8, page 5: Table 3 described the mean of the DKI metrics in the area of white matter and gray matter in DCM patients with a different JOA score in the annexes.

-6. Question: Page 5 line 16. Describe findings found in the "previous reports" to enrich the discussion.
Answer: We appreciate the reviewer suggestion. Discussion section, line 24 and 25, page 5: "previous reports" found that reduced FA values and increased MD values in the CSC of patients with DCM in comparison with healthy controls.

-7. Question: Page 5 line 20. Describe findings found in the "previous reports" to enrich the discussion.
Answer: Discussion section, line 40 and 41, page 5: "previous reports" found that only the MK values of GM were statistical significant lower in the DCM patients than in healthy subjects.

Answer: Discussion section, line 31, 35, 44 and 52, page 5; line 1, page 6: we added the statistical values of the mentioned studies.

Reviewer #3:
Question: The paper is nice and well written. However, the discussion is poor and the last paragraph is out of context. Authors should tone down their conclusions: they said that conventional MRi is not enough for treating CSM. I think diffusion modalities should be used for difficult cases were
conventional MRI is not enough. For routine, the radiological exam used for treating CSM is conventional MRI.

Answer: We have

Thanks for your careful review of our manuscript and valuable advice. I also realize that the discussion is poor. All the authors of this paper continue to discuss and read the relevant literature carefully together, giving a more detailed introduction to the discussion section. Author refers to the experimental results of other papers and compared the results with our findings. I agree with your viewpoint that conventional MRI is not enough for treating CSM and diffusion modalities should be used for difficult cases. So, we have added a short paragraph in the discussion: there is a poor correlation between the MR findings and clinical symptoms, such as irreversible physical disability, likely due to the presence of microscopic injuries including demyelination, inflammation and axonal loss in the so-called normal-appearing GM and WM, not detectable by routine MR imaging. In our study, T2-weighted imaging showed no abnormal signal intensity in the CSC of DCM patients, but the patient had clinical signs and symptoms that indicated degenerative cervical myelopathy. Therefore, observations of the micro-pathological changes in the CSC, such as axon loss and demyelination, are of great value in determining the treatment plans and evaluating prognosis, especially difficult cases. DKI parameters (FA, MD and MK values) accurately reflect the real situation of water molecule diffusion and provide additional and complementary information on the normal and pathological structural changes compared to routine MR in DCM patients.