Reviewer’s report

Title: Cervical Spine Osteoradionecrosis or Bone Metastasis after Radiotherapy for Nasopharyngeal Carcinoma? The MRI-Based Radiomics for Characterization

Version: 0 Date: 31 May 2020

Reviewer's report:

This is an exploratory, retrospective, clinical study demonstrating the potential of MRI-image based radiomics to differentiate ORN from metastasis non-invasively. Differentiation of the two conditions is a very challenging but clinically significant problem, as they have similar hyperintensity on CE-T1WI but need distinct treatments. This work showed a promising preliminary results that may encourage more clinical studies in the future. The manuscript was well written, with sufficient discussions related to previous works in the literature. This study will be beneficial to readers interested in MRI radiomics and/or cervical spine ORN. However, there are some concerns (major and minor) from this reviewer which deserves to be further addressed before acceptance for publication.

Major issues:

1. MRI image quality (e.g., artifacts from fat signal, morphological distortion, SNR, and spatial resolution, as appearing in Figs. 3 and 4) varies from patient to patient, and from site to site. How does it affect the extraction of radiomics features and the outcomes of radiomics prediction? Please comment.

2. The deep learning approaches in artificial intelligence (AI) were developed to eliminate the burden of feature extraction for machine learning. Why did not you use the deep learning approach for the differentiation between ORN and metastasis? Please explain.

Minor issues:

3. Page 5, the end of Background section. It would be beneficial to readers, if the authors provide a scientific basis (not just rationale) for the proposed idea of using radiomics to differentiate ORN from metastasis. Or what is the underline pathological connection between radiomics features and ORN/metastasis?

4. Page 8, lines 23-48. Radiomics feature selection is subjective and laborious. Why did not you employ a deep learning network which does not require feature selection and thus is robust to human errors?

5. Page 10, lines 22-40, Patient characteristics. This paragraph repeats what already described in Methods/Patients on page 6.
6. Page 11, lines 7-13. Radiomics features were extracted from CE-T1WI images. Is it implicitly assumed that CE-T1WI has the potential to differentiate ORN from metastasis but not yet captured by human eyes?

7. Page 11, lines 28-38. The radiomics score equation should be written in a new line as a mathematics "equation", rather than text content.

8. Page 22, lines 34-35. "Fig. 3 Images in a 52-year-old man …" should be "Fig. 3. Images of a 52-year-old man …". The same for Fig. 4.

9. Page 23, Fig. 4. "d At MRI follow-up …" should be "D. At MRI follow-up …".

10. Supplementary Materials, Details of MRI acquisition. For ease of reading, it's better to list these acquisition parameters in a table.

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

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

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

Yes

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 am able to assess the statistics

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

Acceptable
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