Reviewer’s report

Title: Development of a Disease-Specific Graded Prognostic Assessment index for the management of Sarcoma patients with Brain Metastases (Sarcoma-GPA).

Version: 0 Date: 13 Aug 2019

Reviewer: Patrick Lin

Reviewer's report:

The study comprises a statistical review of patients with brain metastases from sarcomas to derive a sarcoma-specific prognostic index to direct treatment decisions. This is a very specialized problem as few patients with sarcoma develop brain metastases, and the authors are to be commended for acquiring a substantial cohort of patients to study.

1. The main finding is that two histologies that make up H4 (alveolar soft parts sarcoma and solitary fibrous tumor) have better prognosis in terms of longer median survival. It is well-known however that these two types of sarcomas tend to be quite indolent. All patients eventually died.

2. The groupings of the histologies H1 to H3 seem very closely grouped in terms of survival. Kaplan-Meier curves suggest median survival is much less than 12 months for all three (the pdf picture is not so clear). While there may be a statistical difference, how this might translate to different therapeutic interventions is not clear.

3. It appears that the definition of histologies H1 to H4 were made from a statistical grouping as opposed to a biological grouping. Each group contains a large number of different sarcomas which are not intuitively related. For many histologies, there are very few cases to justify the statistical placement.

4. The paper is difficult to read and follow. For example, in the Methods section, under Patient Cohort, there is no simple description of what the total n is for the study cohort. The authors reference previous work, which is not always the best way to convey to the reader what was done.
5. The other interesting finding in this work is that extra-cranial metastasis does not help predict survival for sarcoma patients with brain metastasis. The authors point out that the overwhelming large majority of patients with sarcoma brain metastases have metastases elsewhere. It would be interesting to know what the cause of death is for patients with brain metastases. How many die from brain metastases as opposed to lung metastases? Are there any histologies for which patients are more or less likely to die from brain metastases?

**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.

Unable to assess

**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?**
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I am able to assess the statistics

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