Reviewer’s report

Title: Multi-parametric effect in predicting tumor histological grade by using Susceptibility Weighted Magnetic Resonance Imaging in tongue squamous cell carcinoma

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Reviewer: Max Witjes

Reviewer's report:

This paper describes the pre operative use of MRI, in particular, SWI to predict the tumor histological grade in oral squamous cell carcinoma by means of comparing intratumoral susceptibility signal intensities to histology.

The paper is well written and the design seems of a phase 1 trial. The data show that significant difference of ITSS scores between low- and high-grade tumor was observed with an area under ROC curve of 0.84, when a multi-parametric model using combination of ITSSs and tumor thickness was used.

The paper lacks a clear outline of what ITSS are, a statement like: "ITSS are defined as fine linear or dot-like structures with low signal intensity that are not discernable on conventional MR images but are seen within the tumor on magnitude images of SWI" ; should be mentioned in the paper.

The clinical impact of these data are difficult to assess at this point since currently tumor grading in high or low grade oral cancer is not influencing treatment strategies. Histopathological items such as lymph-vascular invasion, invasive front and perineural growth are of much more influence on treatment strategies. Do the authors think that these histological parameters can be identified on MRI ? Do the authors foresee that this might be possible using radionomics type of analysis ?

Would there be a gain if this study had been performed on a 3T MRI ?

The authors find a 0.84 correlation, do they think this means that this is sufficient for accurate tumor grading?

In the M&M section the suggestion is raised that patients have been operated without taking a biopsy of the lesion (biopsy was an exclusion item). I assume that a biopsy was taken after MRI to confirm the clinical suspicion of SCC? The authors should explain the diagnostic strategy.
In table I the characteristics of the cohort are given. Although the authors do not find a difference in tumor volume between high and low grade tumors, the volumes vary greatly. This I find concerning, since a volume of 0.5cm³ is quite small and 50cm³ is quite big. All were low grade tumors. This difference is not seen in the high grade group. Were data of the volume of low/high grade within the groups normally distributed? Can these very small and large volumes be included? are they outliers?

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

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