Reviewer's report

Title: Radiofrequency Ablation of Liver Lesions: Quantitative Assessment of Treatment Completeness through CT Image Processing.

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Reviewer: Gerlig Widmann

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Comments to authors
This is a very innovative and promising method for (semi-automated) quantification of treatment success if RFA of liver tumours. 5 metastases and 5 HCCs smaller than 20cm³ were treated with a single RFA electrode. The paper showed that the US-guided single electrode RFA was not sufficient in most cases and recurrence has to be expected. The importance of an ablative margin of 1 cm cannot be overemphasized and multi-electrode position or multi-needle approaches are required for optimal RFA treatment of even small lesions. It would be of greatest interest to retrospectively evaluate RFA cases with the presented method and to look how accurate the method could predict recurrence.

Major Compulsory Revisions

Material and Methods:
Which phase (all or only one specific) of CT-imaging was used for the registration, segmentation and evaluation? This is of particular interest for HCC which has a characteristic enhancement pattern.

In the HCC cases arterial occlusion was performed. Was there a difference between mets and HCC? In fact, we do not perform this technique but rather use multi-electrode approaches.

How fast were the registration procedure and the semi-automatic segmentation algorithm?

The problem of fictitious deformations that alter the true overlap of an RFA lesion may not be totally solved. RFA of larger lesions may produce significant deformations of the original shape. What was the mean percentage of liver deformation between two data-sets?

Numerical indices for the RFA evaluation:
In addition to the presented extremely valuable indices, an automated calculation of the largest axial diameter and difference of the HU-units (before and after RFA) would be an interesting additional information, in order to provide the surrogates for the modified RECIST criteria.
Level of interest: An article of outstanding merit and interest in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
'I declare that I have no competing interests'