Reviewer’s report

Title: Measuring liver fat fraction with complex-based chemical shift MRI: the effect of simplified sampling protocols on accuracy

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Reviewer: Hiroyuki Akai

Reviewer's report:

Thank you for letting me review the present article titled "Measuring liver fat fraction with complex-based chemical shift MRI: the effect of simplified sampling protocols on accuracy."

In the present study, the authors evaluated the accuracy of simplified ROI protocols for liver %FF measurements using whole-liver ROI as a reference standard.

They showed that significant differences were observed between rt-ROI and fh-ROI, as well as between rt-ROI and lt-ROI, with a tendency of rt-ROI showing lower value. They also showed that the mean coefficient of variance increased when more slices were sampled.

So they concluded that "Single slice elliptical-ROI measurements vary by less than 3% fat fraction compared to freehand whole-liver ROI but the standard deviation increases with increasing number of samples indicating that multiple slices are needed to measure heterogeneity."

The study itself is performed in a straightforward manner, and the results are satisfactory. However, before it is accepted for publication, the authors should address the following comments.

Major points

1. Background section It is unclear what is new about this present study compared to previous papers (especially papers that are examining the ROI method as reference 20).

Is it just the used technique (IDEAL IQ) is new? Please clarify the novelty of the present study clearly in the Background section.

2. It is written as "The purpose of this study is to assess the accuracy of %FF measurements when using simplified ROI sampling protocols, using freehand drawn ROIs that sample the whole liver as a reference standard." in the Background section.
Indeed, the fh-ROI method was considered as the reference standard whole through the M&M and Results sections.

However, in the Discussion section, most of the latter part is composed by the consideration of fh-ROI method, and finally, conclusion section is entirely composed by the result of fh-ROI method!!

This is not a proper way to write a scientific paper, and also makes the value of the present study insignificant.

3. page 8 line 6-16 In page 8 line 6-10, the authors showed that the distribution of mean %FF in the present study was not normally distributed.

However, in the assessment of inter-observer reliability, the authors are using the intra-class correlation coefficient, which is a technique that can be used on the assumption that data are normally distributed.

Please use proper statistics.

Minor points.

M&M

1. page 6 line 12-15 Please clarify the unit for each MRI acquisition parameter.

2. page 6 line 12-15 Here the authors wrote that "Fourteen axial slices were taken through ...", although they wrote in the result section that "A number of significant pairwise differences were present between the 17 and 19 slice datasets."

So, exactly how many slices of data did you actually acquired?

3. page 6 line 21-22 The authors wrote that they "generate a freehand whole liver ROI (fh-ROI) drawn around the margins of the entire liver excluding fat at the porta hepatis and falciform ligament."

However, if we see Figure 1, the fh-ROI is clearly avoiding the caudate lobe. Which is true?
Results

1. page 8 line 18-20 The method of post hoc test should be written in the M&M section, and not in the Results section.

Discussion

1. page 11 line 3-4 "... found to be at most 2.79%." This fact is one of the results of the present study, so please describe this result (also mean or median difference and range) in the Results section.

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.

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?
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

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