Reviewer’s report

Title: Computer-aided evaluation of inflammatory changes over time on MRI of the spine in patients with suspected axial spondyloarthritis: a feasibility study

Version: 0 Date: 04 Jun 2017

Reviewer: Jamie MacKay

Reviewer's report:

OVERALL

This is a well written manuscript and the method described has potential utility in both the clinical and research setting.

I have only a few (mostly minor) comments:

ABSTRACT:

I would suggest removing the brackets around 'suspected' from the title and throughout.

This is also a feasibility study rather than a pilot study - I suggest that you update this in your title and background.

In the results section, to put the differences into context, it would be useful to give the reader some idea of what the scale is like. For example, the fact that the differences between observers range from -1 to 1 is impressive if the total score is out of 100, less so than if the score is out of 5.

See also comments regarding statistical analysis below.

INTRODUCTION:

Very good, no comments.

METHODS:

MRI sequences - ideally provide a fuller description of the sequence parameters including: matrix, field-of-view, number of averages, slice gap, inversion time (for STIR) and acquisition duration.
Color-encoded fusion of time points - "No intensity standardisation was applied to original images...". Have you looked at the effect that such standardising would have on your analyses? Intuitively this would seem to be important as differences in a number of MR factors (e.g. transmit/receive gains) mean that the signal of an inflammatory lesion may be fairly different between two scans despite there being no true difference.

Evaluation of inflammatory changes - presumably you mean "oedema" rather than "enhancement" as you have not administered contrast agent.

Statistical analysis - the descriptive statistics provided are helpful, but it would be useful to have some sort of statistical summary of agreement between the two methods. As this is a discrete scoring system a weighted kappa would seem appropriate.

RESULTS

The fact that 5/30 patients had to be excluded due to failure of the registration process should be mentioned as a limitation of the technique in your discussion. While acceptable in a feasibility study setting, this would definitely limit the use of the method in either the clinical or research settings.

Table 1 - In the second part of the table there are variables such as "total mean score of 2 readers at follow-up, median (range)". This is a little confusing. Do you mean median or mean here?

Table 1 - from the looks of this table most of your included patients had very low levels of inflammation. You should be more explicit about mentioning this in your results and in your discussion as a limitation of the study.

Inter-method differences section - it would be interesting to see some example images of where there had been disagreement between the two methods.

DISCUSSION

Other than the points outlined above, no other comments.

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:

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