Reviewer's report

Title: Pre-contrast T1 and cartilage thickness as confounding factors in dGEMRIC when evaluating human cartilage adaptation to physical activity

Version: 0 Date: 05 Oct 2018

Reviewer: Atsuya Watanabe

Reviewer's report:

Summary

The authors examined the influence of pre-contrast T1 and cartilage thickness when assessing knee joint cartilage quality with dGEMRIC. They found that cartilage pre-contrast T1 and thickness may be sources of error in dGEMRIC that should be considered when analyzing bulk values.

General comment

This study is interesting, and the text is mostly concise and clearly written.

Specific comments

Introduction

OK.

Materials and methods

Page 4, line 85

Please clarify the definition of "healthy" subject.

Page 4, line 98 - page 5, line108

Was the selection of TIs (50, 100, 200, 400, 800 and 1600 ms) suitable to measure the pre-contrast T1 value?

It is important to perform the post-contrast T1 measurement on the same slice position as that acquired for the pre-contrast T1 measurement. Did you select the exactly same slice? If yes,
please provide the method how you chose the post-contrast slice corresponding to the pre-contrast slice previously acquired.

The local concentration of Gd-DTPA2 in the tissue is determined by using the following equation:

\[ \text{Gd-DTPA2} = \frac{1}{r} \left( \frac{1}{R1_{\text{post}}} - \frac{1}{R1_{\text{pre}}} \right) \]

where \( r \) is the relaxivity of Gd-DTPA2 in the tissue and \( R1 \) equals 1 divided by the longitudinal relaxation time.

It might be interesting to evaluate the local concentration of Gd-DTPA2 in cartilage using this equation.

(Radiology. 2006 Apr;239(1):201-8.)

A double dose of Gd-DTPA2- (0.2 mmol/kg of Gd-DTPA2-) has been used in many studies of dGEMRIC.

Do you think the concentration of Gd-DTPA2- could affect the results?

Page 5, line 110 - 120

The segmentation of the thin cartilage can be difficult. Please provide the rationale or methodology for this cartilage segmentation. Was the segmentation performed by a single investigator?

Results

OK.

Discussion

OK.

Tables, & Figures

OK.

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 recommend additional statistical review

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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