

Peer Review File

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Reviewer A

Periodic cardiac movement may expose the heart to radiation field induced damage during thoracic radiotherapy, leading to radiation-induced heart disease (RIHD). In the manuscript “Analysis of heart displacement during thoracic radiotherapy based on electrocardiograph-gated 4-dimensional magnetic resonance imaging”, authors quantified the dynamic changes and the compensatory extension range of the heart and its substructures by breath-hold and electrocardiogram gated 4-dimensional magnetic resonance imaging (4D-MRI).

Couple questions are required to be answered before it will be accepted.

(1) What were the advantages of 4D-MRI for heart displacement? Please state in the introduction.

Reply: We have modified our text as advised (see Page 4, line 13-17).

(2) It was better to add related reference (DOI: 10.21037/qims-20-1234) about the applications of 4D-MRI.

Reply: According to the reference, 4D flow MRI is a type of phase-contrast (PC) MRI that uses blood flow encoded in 3 directions, which is resolved relative to 3 spatial and temporal dimensions of cardiac circulation. And it seemed different to the breath-hold 4D-MRI technique.

(3) What were the inclusion criteria and exclusion criteria for collected patients? Please state in the methods.

Reply: We have modified our text as advised (see Page 4, line 24-27).

(4) In the research, only 15 patients were recruited. How to deal with the limitations? Please state in the discussion.

Reply: We have modified our text as advised (see Page 11, line 20-21).

(5) What were your good suggestions for treatment for radiation-induced heart disease (RIHD)? Please supplement in the discussion.

Reply: We have modified our text as advised (see Page 10, line 24-28).

(6) In the figure legends, please state clearly the yellow line.

Reply: We have modified our text as advised (see legends of Figure1 and 2).

Reviewer B

First, the abstract needs some revisions. The background did not indicate the knowledge gap on this research focus and what the clinical significance of this focus is. The methods need to describe the clinical characteristics of the 15 patients, how the data were collected, and how the data were analyzed. The conclusion needs comments for the clinical implications of the findings.

Reply: We have modified our text as advised (see Page 1, line 26-28, line 30-34; Page 2, line

5-7, line 20-22).

Second, the introduction of the main text focused on the measurement methods for heart displacement but the authors did not review what has been known on the heart displacement during thoracic radiotherapy and did not analyze the limitations of prior studies. The authors need to clearly describe the potential clinical implications of this research focus.

Reply: We have modified our text as advised (see Page 4, line 2-7, line 13-16).

Third, in the methodology of the main text, please describe the authors' considerations for the selection of the 15 patients and please explain whether such sample could provide a stable answer for the parameters of heart displacement during thoracic radiotherapy. In statistics, please specify the groups to be compared by using Kruskal-Wallis H, the test of the normality of the variables, and ensure $P < 0.05$ is two-sided. A basic question is how to minimize the measurement errors of these parameters, which was not described by the authors.

Reply: We have modified our text as advised (see Page 4, line 24-27; Page 6, line 17-24).