Peer Review File

Reviewer A

(1) Some key words are of little significance, such as "the late diastolic peak filling rate; The area under the concentration-time curve ", it is suggested that the author replace the keywords that are closer to the research.
Reply: According to your comments, some keywords have been adjusted.
(2) There are too many contents in the introduction, which take up too much space. Many of them are purely conceptual things, which are of little significance. It is suggested that the author summarize and concise the sentence expression.
Reply: According to your opinion, the content of the introduction has been deleted and adjusted.
(3) There are many formulas and equations in the method part, and the meaning of each letter should be accurately explained. It is suggested that the author check and correct them.
Reply: After verification, the meaning of the letters in the equations has been confirmed and corrected.
(4) It is discussed that some cited documents should correspond to the contents, and it is suggested that the author check the research contents of each document to match the research results of this paper.
Reply: After consideration, the references have been reviewed and replaced in this revision.
(5) The statement of the conclusion is not appropriate enough. It is suggested that the author summarize the research content of this article again and put forward more concise arguments.
Reply: Based on your comments, the thesis of this study has been re-summarized according to the research results.
(6) In the last paragraph of the introduction, it is necessary to clarify the research framework of this article and suggest that the author supplement it.
Reply: According to your opinion, the general idea of this research has been supplemented in the last paragraph of the introduction.
(7) Please add an error value to the data in Figure 7.
Reply: Figure 7 has been redrawn based on your comments.

Reviewer B

1. In the introduction, a large paragraph is used to describe the epidemiological characteristics, causes and treatment methods of heart failure, the development of imaging technology and compressed sensing. What is the correlation between these contents?
Reply: After consideration, the content of the introduction has been reorganized, some superfluous content has been deleted, and the expression form has been adjusted.
2. How about the application effect of compressed sensing in MRI in the introduction? Is there any specific research to show that? Or is that what this study suggests? The application of this

technology in the treatment of heart disease can be described in detail, or as a key question to be addressed in this study.

Reply: After consideration, the relevant research progress of compressed sensing and MRI graphics has been added in this revision.

3. In Figure 2, e 'and heart rate (HR) levels of the experimental group were significantly higher than those of the control group (P<0.05). Please mark in the figure that partial coincidence is not complete.

Reply: After consideration, the results of quantitative data can intuitively display the condition of the subjects' cardiac MRI parameters.

4. The image quality of cardiac MRI images in FIG. 4 and FIG. 5 is too low, which has a big difference with the image effect presented by the equipment parameters. Can you change it to a high quality image?

Reply: After consideration, Figure 4 and Figure 5 have been reprocessed to improve the clarity and quality of the image.

5. Do the results of this study differ from those of other studies? Are there similar studies with different results? Please supplement the results of this study by comparing them with other studies in the discussion section.

Reply: After consideration, the results of this study have been compared with those of previous studies.

6. The number of references is small, please add some references.

Reply: According to your comments, some related references have been added.

7. During the discussion, it is necessary to add the research results of previous scholars and compare and analyze them with the research results of this article.

Reply: According to your opinion, some previous research literature has been added in the discussion section, and related discussions have been carried out.

Reviewer C

1. In the summary results, it is best to present more specific experimental data to enhance the readability and reliability of the summary.

Reply: After verification, some quantitative data results have been shown in the abstract.

2. The first and second paragraphs of the introduction should be merged, and some redundant content needs to be deleted to leave the main conceptual statement.

Reply: After consideration, the introduction part has been deleted and merged, and the miscellaneous content has been removed.

3. In the introduction, there is too little description of the advantages and current application of MRI in the diagnosis of heart failure, which needs to be supplemented. And it is necessary to point out its shortcomings, leading to the following compression awareness algorithm, making the article logical.

Reply: After consideration, in the introduction part, the related research status of compressed sensing and MRI formation has been supplemented to clarify the research direction.

4. "Ultrasonic testing" and "MRI testing" require information on the model and manufacturer of the ultrasound diagnostic instrument and magnetic resonance system.

Reply: After consideration, the information of ultrasound instrument and MRI imaging system has been added in this modification.

5. The chapter "Clinical data collection" can be changed to "Observation indicators", and then describe the specific data and clinical indicators that need to be collected during the experiment.

Reply: According to your opinion, the title has been modified.

6. "Statistical methods" does not mention the area under the curve, please add.

Reply: After verification, the calculation content of ROC curve has been explained in the method part.

7. In "Figure 2 Comparison of the clinical data between the 2 groups", the expression of images is very cumbersome, and it is recommended to change it to a table form.

Reply: After consideration, pictures can directly display the differences in clinical data between the two groups of subjects, so pictures are the best form.

8. In "Figure 3 Comparison of the cardiac MRI parameters between the 2 groups", it is recommended to change the expression to a histogram to make it clearer and more intuitive. The letters A and B should be marked in the upper left corner of the image.

Reply: After consideration, Figure 3 has been redrawn.

9. "Figure 4 MRI images of the heart of a 65 year old man" and "Figure 5 MRI of the heart of a 65 year old man" are MRI images of typical cases. I believe that only one image can be retained, and the other image is best replaced with a comparison of the image quality of the MRI images before and after using the algorithm.

Reply: After verification, the comparison of image quality before and after algorithm processing has been shown in the corresponding part of results. Figure 4 mainly showed the lesion images of some patients.

Reviewer D

1) First, the title needs to indicate the clinical research design of this study, i.e., a diagnostic test.

Reply: According to your comments, we have verified and adjusted the title.

2) Second, the abstract needs substantial revisions. The background did not describe the clinical needs for this research focus and what the knowledge gap is on the diagnostic accuracy of MRI-based on compressed sensing. The methods did not describe the inclusion of subjects, the diagnostic parameters from MRI, the diagnosis of HF, and how the diagnostic accuracy was assessed. It is very strange to describe the patients with stroke not HF. The results need to briefly describe the clinical characteristics of the two samples and the 95%CIs of AUC, sensitivity and specificity due to the small sample size of this study.

Reply: After consideration, the research background has been supplemented in the abstract in this revision.

3) Third, the introduction needs to explain why MRI-based on compressed sensing parameters can accurately diagnose HF and what the generalizability of this method is. Again, patients with stroke?

Reply: According to your comments, the corresponding explanation has been added in the introduction.

4) Fourth, in the methodology of the main text, please describe the clinical research design, sample size estimation, and how the diagnosis of HF was made. The authors need to explain why they did not set a group of patients with other medical conditions that were easily to be misdiagnosed with HF, why the sample size of the healthy controls was so small and the potential impact on the diagnostic accuracy assessment. In statistics, why the authors did not combine PFR2 and FV2 together improve the diagnostic accuracy of HF? Please describe the calculation of sensitivity and specificity, and the threshold values of these diagnostic parameters for a good diagnostic test. Please ensure P<0.05 is two-sided. Finally, please consider to cite the below related paper: Xin JF, Zhang LY, Liu XF, Huang LL, Fang QJ, Lin LJ. A retrospective study on the clinical significance of cardiac computed tomography in heart failure patients with preserved ejection fraction. Ann Transl Med 2022;10(24):1319. doi: 10.21037/atm-22-5549.

Reply: After consideration, the main purpose of this study was to explore the diagnostic effect of cardiac MRI imaging based on compressed sensing on patients with heart failure. Therefore, only healthy people who underwent physical examination at the same period were introduced as controls, and the sample size was randomly included. In addition, in this revision, we have also cited the relevant references.

<mark>Reviewer E</mark>

1. Figure 2
a) Please explain E, e', E/e', MIR, HR, and BSA.
Reply: Hello, based on your suggestion, we have explained the meanings of E, E ', E/E', BMI, HR, and BSA.
Changes in the text: Specific content can be found on page 10/lines 301-306.

b) The * here is not complete, please revise.
Reply: Hello, according to your suggestion, we have completed the differential symbol.
Changes in the text: Specific content can be found on page 21/lines 600.

2. Figure 3
Please provide the description of the x-axis.
Reply: Hello, according to your suggestion, we have completed the X-axis of Figure 3.
Changes in the text: Please refer to page 23/613 for specific content.

2. Figure 6

Please provide the description of the y-axis on both sides.

Reply: Hello, according to your suggestion, we have completed the Y-axis in the figure.

Changes in the text: Specific content can be found on page 23/lines 611.

3. Figure 7

a) Please explain OCS and OMP in the legend.

Reply: Hello, based on your suggestion, we have provided a supplementary description of the SENSE algorithm and OMP algorithm.

Changes in the text: Please refer to page 18/380-384 for specific content.

b) Please provide the description of the x-axis.

Reply: Hello, according to your suggestion, we have added a description of the horizontal axis in the image.

Changes in the text: Please refer to page 27/645 for specific content.

4. References/Citations

Please double-check if citations should be added as you mentioned "studies".

> to those in the normal group. The PFR1, PFR1/PFR2, FV1, and FV1/FV of the experimental group were significantly higher than those of the control group. Consistent with the findings of previous studies, the PFR2 and FV2 of the experimental group were significantly lower than those of the control group (P<0.05), which

Reply: Hello, according to your suggestion, we have carefully checked and added the citations in the order mentioned in the main text. And supplemented the missing literature.

Changes in the text: Please refer to page 19/579-584 for specific content.

5. Please indicate the patients' source.

> 157 ##Study objects
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> 159 Patients diagnosed with HF in XXX Hospital from December 1, 2019 to October 15,
> 160 2020 were selected as the experimental group, aged between 36 and 75 years old.
> 161 Meanwhile, 20 patients with normal cardiac function who underwent physical

Response: We have indicated the patients' source.