Author’s response to reviews

Title: Novel foetal echocardiographic image processing software (5D Heart) improves the display of key diagnostic elements in foetal echocardiography

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Author’s response to reviews:

Dear Editor Francisco Contijoch,

Thank you for your letter and for your comments concerning our manuscript entitled “A novel fetal echocardiographic image processing software (5D Heart) improves display of key diagnostic elements in fetal echocardiography” (BMIM-D-19-00251). Those constructive comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our research. We have studied all comments carefully and have revised our manuscript. Thank you very much for your comments and suggestions. And we hope that the corrections will meet with approval. Revised portion are marked in red in the paper. The main corrections in the paper and the responds to your comments are as follows:

With response to comment: Please elaborate on what determined whether a diagnostic plane was generated or not as it appears to be a result

In this study, we score all elements in one section, for example LVOT. The image quality of all diagnostic element in LVOT was scored according the image quality criteria: clearly, 3 points; adequately, 2 points; unidentifiable, 1 point. Average scores of all elements in LVOT was calculated. When the average score was more than or equal to 2 point was LVOT section considered successfully obtained. So when average scores of all diagnostic elements in each diagnostic section were more than or equal to 2 points, we deemed the section was successfully obtained in 5D Heart analysis. We have made correction according to your comments and the revised portion was in red color (Method section-Elements and grading
With response to comment: Unclear what this 88% refers to. Only 88.2% of the 262 volume datasets could be annotated? Or only 88.2% resulted in diagnostic sections after annotation?

We are sorry for our negligence. Because a total of 262 volume datasets were obtained in 209 normal foetuses, and 231 volume diagnostic sections were successfully obtained with the 5D Heart technique. So 88.2% of the 262 volume datasets could be annotated (Results section, Line 159-160, P4).

With response to comment: This section implies that views are not necessarily generated. If certain criteria were used to judge whether a view was successfully generated, it needs to be explicitly defined.

The criteria was the same with comment 1. When average scores of all diagnostic elements in each diagnostic section were more than or equal to 2 points, we deemed the section was successfully obtained in 5D Heart analysis (Method section-Elements and grading section, Line 138-141, P3; Results section, Line 185-187, P5; Discussion section, Line 227-228, P5;).

With response to comment: Inter or intra-observer variability is not correctly assessed via a t-test. Kappa statistics are the more common convention. https://pubmed.ncbi.nlm.nih.gov/15883903-understanding-interobserver-agreement-the-kappa-statistic/ and comment: As mentioned above, Kappa statistics should be used to describe agreement and the time between evaluations should be described.

We are very touched by your precious advises and thank you for you careful reading. We have made correction according to your comments. Inter- and intra-observer viability were analyzed by kappa statistics. Intra-observer agreement was accessed by Observer A scored the element in two different times and the time interval was one month (Abstract section, Line 34-36, P1; Data analysis section, Line 148-151, P4; Result section, Line 183-187 and Line 191-194, P5; Discussion section, Line 304-306, P7).

With response to comment: The "good reproducibility" is not a result but a discussion point. Thank you for your comments. We have deleted this sentence.

With response to comment: This criteria needs to be clarified in the methods and results section. Thanks for your suggestion. We have clarified the criteria in the methods and results section (Method section-Elements and grading section, Line 138-141, P3; Results section, Line 185-187, P5).

With response to comment: This sentence should be re-written.

Thanks for your valuable advice and we have re-written it in the revised manuscript (Method section, Line 94-95, P3).

With response to comment: The following sections need to be updated given the suggested changes to inter and intra observer agreement.

Thank you very much for your constructive comment. We have re-written all the following sections and the revised part was in red color (Discussion section, Line 304-306, P7). With response to comment: This study also does not include any abnormalities. Therefore, the ability of this method to be used generally is unknown.
Considering your suggestion, we have add this sentence in this part and the sentence was in red color (Discussion section, Line 317-318, P7).

Special thanks to you for your good comments. We feel the manuscript has been substantially improved, and hope that it is suitable for publication in The Journal of BMC Medical Imaging. Thank you for your assistance in handling the manuscript.

With best wishes !
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