Author’s response to reviews

Title: Cardiac Fluid Dynamics meets Deformation Imaging

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Author’s response to reviews:

Reply to Reviewer #1

REVIEWER COMMENT: The title is appealing

The paper is sometimes confusing and insufficiently structured for providing the potential clinical value of the approaches: flow/ strain or both… Reading to paper it is a bit difficult to know what can we clinically expect from the study of the LV flows as compared to LV strain data? The chapter "Sample Clinical Flow Analysis" is a bit surprising in a review paper. A the end, the conclusion is 'Fluid dynamics provide an alternative viewpoint when looking at cardiac mechanics': is it that relevant when the effort is on the implementation of GLS in the daily clinical practice? The figures are more related to a new research paper than to a review paper trying to provide arguments for / against the use of the intra ventricular flow in addition or instead of the myocardial deformation indices….
AUTHORS’ REPLY: We apologize with the reviewer for the confusion we raised in the first version of this manuscript. We have largely extended the “introduction” section to explain at the beginning the intentionally unconventional presentation chosen for this review/opinion paper. In particular, we clarify that literature contains results that are about flow or about tissue deformation, whereas a unitary assessment of both flow and strain is missing. This manuscript introduces the importance of a simultaneous assessment of both flow and tissue; therefore, we found important to introduce preliminary results from exemplary cases to complete the picture.

For the same reason we have also revised the introduction and the title of the section about these sample cases. In the same section, we included more details on the flow force calculation for a better balance between strain and flow assessment.

We have also revised the discussion introducing the sentence suggested by the reviewer about daily clinical practice and underlining in the discussion and conclusion that flow quantification is still a field of research, promising but not immediately available for clinical practice.

We thank the reviewer for the constructive comment. Changes are highlighted (in red) in the revised manuscript.

Reply to Reviewer #2

REVIEWER COMMENT: This study aimed to summarize recent advances in cardiac flow evaluation and its relationship with cardiac wall mechanism analysis.

Despite this manuscript addressed an interesting problem, it suffers some limitations (as reported in subsequent "Major Compulsory Revisions" section) and it should be considered for publication in "Cardiovascular Ultrasound" only after that major revisions will be correctly answered.

AUTHORS’ REPLY: We thank the reviewer for the interest and for the constructive comments. The answers to the specific points are reported below. Changes are highlighted (in red) in the revised manuscript.
REVIEWER COMMENT: Major Compulsory Revisions:

1) More is needed in terms of clarity in the paper's structure. In particular I would suggest to adopt a more specific aim for the paper (i.e. is this a review of the literature or an original paper?). As a consequence two options in my opinion are available A) The "Lines of research in literature" might be shortened and points considered crucial by the authors might be ported into the discussion section. B) The "Lines of research in literature" session might be extended and become a review paper it self.

2) Sample Clinical Flow Analysis: Please report data regarding the reproducibility of the provided echocardiographic measurements.

AUTHORS’ REPLY: We apologize with the reviewer for the lack of clarity and potential confusion in the first version of this paper. Indeed, the two parts (Literature Review and Exemplary Cases) were to be considered as integrated for providing a more complete picture of the topic. In particular, we clarify that literature contains results that are about flow or about tissue deformation, whereas a unitary assessment of both flow and strain is missing. This manuscript introduces the importance of a simultaneous assessment of both flow and tissue; therefore, we found important to introduce preliminary results from exemplary cases to complete the picture.

We have largely extended the “introduction” to explain from the beginning the intentionally unconventional presentation chosen for this review/opinion paper. For the same reason we have also revised the section introducing the sample cases and some other related sentences along the text.

REVIEWER COMMENT: Discretionary revisions:

1) Sample Clinical Flow Analysis, Page 8: I would suggest to remove the sentence "that details are omitted for brevity". Moreover, in my opinion a brief not detailed description for the method used to show flow forces might be appropriate.
AUTHORS’ REPLY: We included more details on the flow force calculation as suggested by the reviewer. We omitted the entire mathematical details (that are complex and long) and limited to the basic formula and concepts describing how forces can be estimated by speckle tracking. We agree that this improves this part of the manuscript ensuring a better balance between strain and flow forces evaluations.