Author’s response to reviews

Title: Myocardial tissue characterisation using echocardiographic deformation imaging

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Reviewer comments

“Interesting and clinically relevant review. However, I believe that the scope of pathologies discussed in this article is too limited. Addressing myocardial tissue characterisation with the use of echocardiographic deformation imaging cannot be regarded as complete without discussing typical findings observed in STE in patients with infiltrative and storage disease such as amyloidosis, Fabry disease, glycogen storage diseases and hemochromatosis.”

Response to reviewer

We would like to take this opportunity to thank the reviewer for their kind comment. We agree with the reviewer that other cardiomyopathies are important to discuss. Although we would have preferred to include additional articles in the review, unfortunately, there is a remarkable dearth of studies investigating this area. The majority of studies rely on correlation between echocardiography and other imaging modalities, in particular cardiac MRI, to investigate deformation measures in different conditions. We believe that while this is understandable due to a lack of cardiac tissue, there is a risk that comparing an indirect method of tissue characterisation with another indirect method may allow potentially significant errors to occur. For example, in a seminal article examining deformation in Fabry cardiomyopathy (Krämer et al European Heart Journal (2013) 34, 1587–1596), STE deformation was compared with cardiac MRI, with the aim to “evaluate speckle tracking as a method for non-invasive determination of myocardial fibrosis”. However, areas of involvement in Fabry cardiomyopathy have other histological features, such as extensive myocyte vacuolisation, rather than just fibrosis alone. As such, this review aims to take a focused look at studies with histological correlation, and ideally with quantitative or semi-quantitative assessment of the histology. We have added clarification at
the end of the Introduction to highlight that we are not focusing on studies with correlation purely with other imaging modalities (page 4, lines 32-33). A review focused on typical findings during the clinical use of strain has been referenced in the text (reference 4, Collier et al).

However, to allow for a more comprehensive overview of this area, we have made a number of additions to the manuscript. We have added a paragraph at the end of the section on “Global STE deformation for tissue characterisation” (page 6, lines 73-81) covering cardiomyopathies with lower levels of evidence. A similar paragraph focused on segmental deformation is included on page 9, lines 141-151.

Finally, we have made an additional entry to the limitations to highlight the fact that changes in deformation are likely to be non-specific when viewed across conditions (page 13, lines 239-243).

We trust that this response provides reassurance to the reviewer, and that you will consider the manuscript for publication in your journal.