Author's response to reviews

Title: Value of segmental myocardial strain by 2-Dimensional Strain Echocardiography for assessment of scar area induced in a rat model of myocardial infarction

Authors:

    Shu-sheng LIAO (lshsh303@sina.com)
    Qin-yun RUAN (qyruan@126.com)

Version: 3 Date: 21 March 2012

Author's response to reviews: see over
Dear Editors,

We have addressed the concerns in the following aspects according to the reviewers’ reports. Please review the revised version in your conveniences.

To the comments of Doctor Sicari R,

1. “In the abstract section, results should be reported in a more conventional way, giving numbers.”
   ------We have given more detailed numbers in the abstract.

2. “The ROC is probably not the best statistical tool to identify fibrosis. Since there is no control group and the detection of myocardial fibrosis is confirmed by histology a correlation analysis would be better suited to this aim.”
   ------Yes, the ROC may not be the best statistical tool for our aim. So, the Pearson’s correlation was used in this study to describe the relationship between strain/strain rate and infarct size confirmed by histology (as the figure 2 showed in the manuscript). And we found that there was a significantly negative correlations between them (r=-0.61~-0.80).

3. “In data analysis, one of the major problem for the application of 2D strain is that the longitudinal function is globally affected. This is a major limitation of such technologies when applied to humans.”
   ------We have discussed the issue in our new manuscript that longitudinal function is globally affected, which is a limitation of 2D strain when applied to humans.

4. “These technologies are under scrutiny due to the lack of standardized method of measurements, different software by different vendors. Please address and cite the ASE/EAE joint document on myocardial mechanics.”
   ------Yes, the technology of STE needs further investigation. And there are many kinds of software which could be available, such as ‘VVI’(Siemens), ‘QLab’(Philips), and ‘EchoPAC’(GE). But, for small animal, we only have probe of 10S in VIVID7 dimension’08 (GE Medical) and the software of EchoPAC at hand in our Lab, so we could not investigate by different software.
   We appreciate Doctor Sicari for her information of the ASE/EAE joint document on myocardial mechanics. We have read the document and cited in our manuscript. This document is so important to us, because we use these techniques in our clinical work or study constantly.

5. “The potential clinical implications of the present results should be discussed.”
   ------These have been discussed in the new version manuscript. And rats are widely used as an animal model for investigating cardiovascular diseases, the main aim of this study was to assess sensitivity of parameters derived from 2DSE to detect infarct-induced left ventricular fibrosis in this model.
6. “The figures should be redrawn and not presented as slides.”
------We have redrawn the figures in the revised version.

To the comments of Doctor Donal E,
1. “17 rats were explored after ligation of the LAD. Echocardiography was performed at baseline and after 4 weeks. everything went fine for every animals after the LAD ligation and all were perfectly alive at 4 weeks?”
------Actually, 25 rats were used at first, but 8 rats died for bleeding and arrhythmia during surgery, or severe heart failure by following-up, so only 17 rats were available for the whole study at last. Which was showed in the new version manuscript.

2. “The authors are not the first to explored that field in human and in rats too. Look at Am J Physiol 2010; 298: H 1679 for instance.”
------Yes, our study is not the first one to explore this field in rats. But we focus on the usefulness of 2DSE in the assessment of fibrosis in a rat model of MI. We appreciate Doctor Donal by providing the link of the document, we have read and cited the document in our manuscript. And we have been interested in the field of ischemia-reperfusion injury.

3. “We, now, know quite well that radial strain is not robust enough for clinical practice; can the authors discuss the feasibility and the clinical impact of their results”
------Yes, the radial strain is not robust enough for clinical practice. We have addressed this issue and discussed the clinical implications, 2DSE might act as a noninvasive assessing tool for the serial monitoring the functional efficiency of therapeutic interventions after MI. To humans or bigger animals, because the apical views are apt to be acquired, combined assessment of both long- and short-axis function using 2DSE is available.

4. “Of course, we also need a inter and intra observer vairaibility analysis.”
------Actually, we had done inter and intra observer variability analysis in our study, and have added the results in the new version.

5. “radial strain = thickening = M-mode so can the authors compare their SR results with the one they got with the M-mode analysis?”
------When we measured the thickening of 6 segments by using the anatomic M-mode Echocardiography (AME), we found that the image resolution in the interrogated direction was insufficient for measuring, especially for the inferoseptum and anterolateral segment (as the figure showed below). And we did not focus on the comparison of the methodology in this study. So, we did not compare SR with the thickening (measured by AME) in the study finally.
Best wishes,

Shusheng Liao, Qinyun Ruan
From China