Reviewer’s report

Title: Speckle tracking echocardiography-determined measures of global and regional left ventricular function correlate with functional capacity in patients with and without preserved ejection fraction

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Reviewer: Gianni Pedrizzetti

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This study focussed on the information that Speckle Tracking Echocardiography, STE, (Strain Imaging), can provide in patients with heart failure and preserved EF (HFPEF). The actual functional status of patients, taken as reference, is the DASI index (questionnaire developed a Duke). Authors found that DASI correlates with longitudinal strain while it does not with classical measures like EF and E/e’. In particular, highest correlation is found in the inferolateral segments.

Therefore results are interesting and important; the explanation, based on intraventricular vortex formation, is also intriguing and original, although still speculative. In summary, the manuscript is good but several points require additional care.

MAJOR POINTS:

1. Regional STE-derived measures suffer high variability and moderate reproducibility. To ensure confidence on regional results a careful inter-observed variability, or even repetition by a 2nd observed, is mandatory.

2. There are several studies about STE in HFPEF that do not report significant differences in peak strain. The differences leading to significant success in this study must be better clarified. If this is just due to usage of DASI some more confidence that this index is appropriate must be provided. Otherwise the strength of this study with respect to existing ones must be underlined.

3. Data in support of the speculative discussion about vortex formation must be provided; either by a vortex formation index or at least with preliminary observations in a few exemplary patients.

4. The fact that “correlation remain significant after correlation with age” must be well clarified. When is correlation considered significant? How does it change when adjusted with age? How is correlation with age? Etc. A statistical support could be useful.

MINOR POINT:

5. Specify if strain is at endocardium, epicardium of average in the myocardium.

RECOMMENDATION
6. There is one point, common to most STE studies, that is difficult to understand and that will have to be addressed in this type of studies. To compute the (radial) strain authors need to track endocardium and epicardium. In particular the endocardial borders at end-sys and end-dia are needed (at least for global longitudinal strain), the same two borders that are required for computing EF.

Why are border traced manually for EF and the same border got automatically for Strain? Cannot we rely on the automated border for EF as well? I think that this mixing of two methods for evaluating the same borders introduces a lot of variability or even bias in the results. By a methodological point of view, it would be very useful to include a (second) EF evaluated with the automatically-computed endocardial borders.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests