Reviewer’s report

Title: Left ventricular systolic function changes in hypertrophic cardiomyopathy patients detected by the strain of different myocardium layers and longitudinal rotation

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Reviewer: F Schnell

Reviewer’s report:

I have read with interest the present study by Jun Huang et al. The topic is of interest and they used novel technics that might be promising in the evaluation of left ventricular function in hypertrophic cardiomyopathy (HCM).

Indeed, the authors compared the left ventricular (LV) function of 36 HCM patients to 36 controls with the use of two novel technics: multilayer LV longitudinal strain and longitudinal rotation.

The main conclusions of the authors are that (i) in HCM patients, the decrease in LV peak systolic longitudinal strain affects the hypertrophied and non-hypertrophied myocardium; (ii) there is a clockwise longitudinal rotation in the LV of HCM patients; (iii) LV longitudinal strain is altered in its 3 layers; (iv) and diastolic interventricular septum thickness correlates with the peak longitudinal systolic strain of the different layers.

In overall, the paper it is written in suboptimal English language, with many grammatical mistakes. The paper might benefit from general editing.

Major comments:

A decrease in longitudinal function in HCM patients has already be proven. The authors should explain in the introduction why they chose to study multilayer strain and longitudinal rotation.

In the discussion, the authors should explain how their findings might be clinically relevant. In other words, what does the study of multilayer strain or longitudinal rotation adds to the study of the global longitudinal strain for the clinician?

I also have some concerns with the conclusions.

The authors state that the longitudinal strain in altered in the hypertrophied LV myocardium and in the non-hypertrophied myocardium. Which results support this statement? The fact that longitudinal strain is altered in the septum (which is hypertrophied) and in the posterior wall (which is not hypertrophied) as compared to healthy controls?
But, at the same time the authors demonstrate that there is a correlation between the diastolic interventricular septal thickness and peak longitudinal systolic strain. I would suggest that the authors perform a correlation between the regional strain and the corresponding wall thickness (and not solely the septal wall thickness).

Minor comments

- In the introduction, the authors state that "the interventricular septum is always involved (in HCM)" (p3): I do not agree with this statement, in type IV of Maron's classification (published in the Am J Cardiol in 1981) the septum is not involved (i.e. apical HCM)

- What is the rational to include only patients with a ratio of interventricular septum-to-LV posterior wall thickness >1.3 and to exclude patients why a LV obstruction. This might be relevant, but this has to be explained to the reader.

- "Written informed consent was obtained from the each couple enrolled in the study (p4)"; "Consents of all the patients were accepted" (p5). I would suggest not repeat this information twice.

- In the results, the authors state that "the longitudinal rotation degrees in normal subjects was <3°, around the zero baseline for a small angle movement. In HCM patients, the clockwise longitudinal rotation was found in the heart (Table 4, Figure 3)".

I agree that it seems that there is a difference between HCM and controls, but there is no statistical comparison to confirm this statement. Indeed, statistical comparison were only done between the peak segmental longitudinal rotational degrees but not for the global longitudinal rotation.

- In the discussion, the authors state that "hypertrophy of the LV in HCM patient likely leads to an increase in the after-load of the heart".

I am afraid that I do not understand this statement. Afterload might be increased by a LV obstruction in HCM patients, but these patients were excluded from the study.

The authors also state "that neural and humoral regulation mechanisms may underlie the orientation of the longitudinal rotation". That is purely speculative, the authors should support their assumption with at least some references.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.
Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No

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