Reviewer’s report

Title: Layer-specific speckle tracking analysis of left ventricular systolic function and synchrony in maintenance hemodialysis patients

Version: 0 Date: 02 Oct 2019

Reviewer: Ezeldeen Abuelkasem

Reviewer's report:

Thank you very much for the opportunity to Manuscript Number BCAR-D-19-00738, titled "Layer-specific speckle tracking analysis of left ventricular systolic function and synchrony in maintenance hemodialysis patients". The authors report the utility of layer-specific strain (LST) analysis by two-dimensional speckle tracking echocardiography in predicting early changes in left ventricular (LV) systolic function (assessed by global longitudinal strain [GLS] and global circumferential strain [GCS]) and synchrony (assessed by time-to-peak [TTP] longitudinal strain and peak strain dispersion [PTD]) in maintenance hemodialysis patients (MHD) using a group of healthy volunteers as control group. Their results showed that despite not surprisingly, comparable LVEF between the two groups, MHD had altered longitudinal and circumferential strain at different myocardial layers, higher TTP of the 17 LV segments and higher PSD compared to the control group. Using ROC, they also found that the subendocardial LS strain was the best index to predict/evaluate changes in LV systolic function.

Major strength(s)
1. The novelty of the application i.e. utilizing layer-specific strain analysis to study changes in myocardial function in this specific patient population.
2. The manuscript is nicely written and drafted

Major Weaknesses:
1. The authors did not indicate the temporal relation of their strain measurements to intermittent hemodialysis (iHD) sessions i.e. were echocardiographic measurements/images used for strain analysis taken right before/after iHD sessions or in between sessions (usually three times/week). The volume status as well as other hemodynamic parameters (systemic vascular resistance, left ventricular wall stress especially in the co-existence of coronary artery disease) would all significantly affect strain measurements. Therefore, I would recommend authors to report when measurements were taken in relation to iHD sessions, total volume removed by iHD (pre/post iHD weights) and whether this was consistent for all study participants.
2. Under methods, section "participants selection". The authors stated the inclusion and exclusion criteria for the MHD group. However, they did not report the incidence of coronary artery disease (CAD) in their cohort. I am certain that authors know and would agree that patients with end-stage renal disease have accelerated atherosclerosis and are at high risk of developing CAD. The presence of CAD would certainly affect the LST as have been reported in several studies including Kim et al (Kim SA, Park SM, Kim MN, Shim WJ. Assessment of left ventricular function by layer-specific strain and its relationship to structural remodeling in patients with hypertension. Canadian Journal of Cardiology. 2016 Feb 1;32(2):211-6.). Therefore, I recommend reporting the incidence of CAD in the MHD group and based on that readjusting results, discussion and limitations sections.

Minor issues:
1. Under the results section "Comparison of traditional ECG parameters between control and MHD
groups", I believe that authors meant traditional echocardiographic and not "ECG" parameters as they appropriately labeled them in table #2.

**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.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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