Reviewer’s report

Title: Comparison of the Prognostic Values of Three Calculation Methods for Echocardiographic Relative Wall Thickness in Acute Decompensated Heart Failure: A Retrospective Study

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Reviewer: Marcelo Haertel Miglioranza

Reviewer's report:

The echocardiographic relative wall thickness is essential in the clinical arena. It is mainly useful for categorization of an increase in LV mass as either concentric (RWT > 0.42) or eccentric (RWT ≠ 0.42) hypertrophy, and for identification of concentric remodeling (normal LV mass with increased RWT). The relative wall thickness could be assessed using both septal and posterior wall thickness, or just one of these walls thickness. It is interesting to note that the actual Chamber Quantification Guidelines recommend calculating the relative wall thickness using the formula: 2 (posterior wall thickness)/(LV internal diameter at end-diastole). However, there is no cited reference embasing this recommendation to use only the posterior wall thickness on the formula. Reviewing the literature, we can find papers demonstrating the clinical impact of the relative wall thickness despite the used methodology. But none paper performed a comparison among the different formulas. In the present manuscript, the author aimed to fill this scientific gap. They performed a direct comparison among the three different methods for calculating the echocardiographic relative wall thickness concerning the prognostic value. It is a single-center retrospective cohort of 426 consecutive patients admitted due to acute decompensated heart failure in an emergency department between June/2014 to April/2016. From the 426 enrolled patients, just 385 were eligible for the analysis. The primary outcome was all-cause of death, but in some analysis, the authors use hospital admission or mortality as a and 90-day outcome. The paper is interesting and well written. However, there are some points to be reviewed:

Major concerns:- Please review all manuscript using the STARD recommendations check-list (http://www.equator-network.org/reporting-guidelines/stard/) and include as Figure 1 an enrolment flow-chart. - I would suggest to better describe in the methodology section, which was the primary and secondary outcomes. There are results presented in a 90-day follow-up, which I guess also considered admission and not just death. Also, it is essential to explain how the follow-up was assessed and cite how many patients were lost during the follow-up period. The Kaplan-Meier graphs display a longer than 600 days follow-up. How long were the average follow-up and the interquartile interval?- Why the authors used the mean value of the relative wall thickness as a cut-off to divide the respective method groups? Why not use the cut-off provided on the Chamber Quantification Guidelines or the cut-off derived from the respective ROC curve (c-statistic)? I guess it could change the results. - The authors tested the reliability of the measurement of PWth and IVSth in an offline way. However, there is no description in the methodology section if these echo studies were storage or not. Please review it. - Please, review the study objective (page 1, line 18): To compare the clinical significance of RWTPW, RWTIVS+PW, and RWTIVS, we examined and compare the prognostic values of the RWTs were examined and compared in patients with ADHF. It is not clear.- I would suggest to review all text language. - A result data should be
described only once in the manuscript. So, if a result data is presented in a table, please avoid to describe it again in a figure or in the main text. Please review all the paper.

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