Author’s response to reviews

Title: Assessment of right atrium dysfunction in patients with obstructive sleep apnea syndrome using velocity vector imaging

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Author’s response to reviews:

Dear Editors and Reviewers:

Thank you for your letter and for the reviewers’ comments concerning our manuscript entitled “Assessment of right atrium dysfunction in patients with obstructive sleep apnea syndrome using velocity vector imaging” (ID: CARU-D-18-00027). Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied comments carefully and have made correction which we hope meet with approval. Revised portion are marked in red in the paper. The main corrections in the paper and the responds to the reviewer’s comments are as flowing:

Responds to the reviewer’s comments:

Reviewer 1

1. All the values of continuous variable should be described as "mean±SD". But the authors used "t" from the beginning of the abstract. What does "t" mean? Then they wrote that they described that numeric values as "mean±standard deviation" (page 7, line 43). All the forms of continuous variables in the manuscript should be corrected.

Response: We used ANVOA for the continuous variables between normal control and OSAS patients. And then we used chi-square test to compare the differences between continuous variables of groups. So we used "t" represent the similarity of two groups.
2. Authors used ANVOA for the continuous variables between normal control and OSAS patients. They also divided OSAS into three groups, "mild", "moderate" and "severe". To compare the differences between continuous variables derived from more than two groups, just like 4 groups in this article. They should have used post-hoc analysis also. So it should be more clearly described which statistical methods were used. The descriptions of variables and statistical methods are considered inadequate for the publication. These things should be checked before the submission although the subjects are interesting.

Response: As Reviewer said that we used ANVOA for the continuous variables between normal control and OSAS patients. And we used chi-square test to compare the differences between continuous variables of groups. (marked in red, line189-192)

3. Authors used right atrial volume for the analysis for the right atrial function too. They also used maximal, minimal and pre-contraction volumes which are used for the left atrial function. Then they described it has reservoir, conduit and contractile function just like left atrium. For that description, there should be a reference.

Response: As Reviewer suggested that we added a reference in the article. (marked in red, reference 7)


4. Right atrial length and volumes already showed the differences between the normal control and OSAS group. What is the benefit of VVI analysis in right atrial function? To check that further analysis should be performed such as AUC.

Response: Our study showed that RA-GLS and RA-SRe were directly correlated with AHI, suggesting that RA-GLS and RA-SRe were independent predictors of disease severity in patients with OSAS. VVI can accurately detect myocardial dysfunction of RA in patients with OSAS, which is expected to be a worthy technique for early clinical therapy in patients with OSAS. Our study is a sequence study. We will perform more analysis such as AUC in further study.

5. The examples of VVI curve in normal control and OSAS (such as Fig 1. a. normal control and Fig 1. b. severe OSAS) will help the readers for the understanding.

Response: Because there are too many figures in our study, we only retain the original parameters and typical figures for data analysis, but not the original figures of other patients. We are very sorry about that. We will keep all original data in further study.

Minor comments.
1. Check the abbreviations. A lot of abbreviations are used differently in the manuscript.

Response: We have made correction according to the Reviewer’s comments. (marked in red, line 22-25)

2. Check the symbols. Symbols used in table 2 and 3 are different from those in table 1.

Response: We have made correction according to the Reviewer’s comments. (marked in red, in table 2 and 3)

3. Check the spaces between the words, sentences and values.

Response: We have made correction according to the Reviewer’s comments.

Reviewer 2

Review for Manuscript: CARU-D-18-00027 Title: Assessment of right atrium dysfunction in patients with obstructive sleep apnea syndrome using velocity vector imaging

Thank you for providing me the opportunity to review the paper entitled "Assessment of right atrium dysfunction in patients with obstructive sleep apnea syndrome using velocity vector imaging".

General comments: In this manuscript, the authors aimed to assess the right atrium (RA) dysfunction in patients with obstructive sleep apnea syndrome (OSAS) using velocity vector imaging (VVI) among a total of 101 patients (71 patients in the study group and 30 patients in the control group). The authors concluded that RA function assessed by VVI was impaired in patients with OSAS in regards to its severity. Although this study has interesting contents regarding the geometric changes of RA in patients with OSAS, several issues should be clarified before considering publication at Cardiovascular Ultrasound. First of all, the contents of abstract are too complicated to understand the main finding of this study. Because RA functional parameters including VVI parameters were not different between control group and mild OSAS group (considering table 2 and 3), the descriptions within the abstract should be corrected like that RA functional parameters are significantly impaired in OSAS more than moderate degree or in advanced stage of OSAS.

Response: Thank you for your comments for our study. We have simplified the abstract section and corrected the descriptions in table 2 and 3 according to your comments. (marked in red, line 37-42, line 49-50)

Major comments:

1. Authors have mentioned that the RV dysfunction may increase RV end-diastolic pressure, right atrial pressure (RAP), leading to RA dilatation and eventually right heart failure in the introduction section. And authors introduced studies confirmed that the RA enlargement is an independent predictor of mortality and prognosis in patients with PH. However, in this article, information other than RA function were not fully presented such as RV cavity size, RV systolic
function, and even LA and LV cavity size and systolic function as well as LV filling pressure, which could make differences to RA function. Authors should additionally describe basic echocardiographic findings regarding LV, LA and RV function and chamber size.

Response: Our study is a sequence study including RV function. And there have been many studies on LV and LA function in OSAS patients. After discussion by our authors, to avoid too complicated, the data of LV, LA and RV are not added in our study, but added concerned references. (marked in red, reference 16)

2. Although the RA VVI parameters of the OSAS group showed a significant difference compared to the control group, but this does not represent the "RA dysfunction". It would be better to be corrected properly in the text.

Response: We have made correction according to the Reviewer’s comments. (marked in red, line33-34,112-114,322-323)

3. What is the clinical implication of this study? Please describe it in the discussion section.

Response: We have added description it in the discussion section according to the Reviewer’s comments. (marked in red, line328-330)

4. There is no specific comment on the acquisition and analysis of PAPs in this article. I believe it would be assessed by echocardiography, but it was not described elsewhere. Authors should additionally describe above information in the methods section.

Response: PAPs was determined by the following methods : PAPs = PTR + PRA

PTR: tricuspid regurgitation pressure. PRA : RA pressure

We have added description it in the methods section according to the Reviewer’s comments. (marked in red, line 168-169)

5. It is much confusing because authors mainly described two-group comparison in the result section, but ANOVA was mentioned in the method section, and there was nothing described about the statistics in the table 1, 2 and 3. Please unify the statistical methods and present P-values in the text and tables with detailed descriptions on the statistical method used. - In the result section, did PAPs show significant difference between moderate and severe group?

Response: We used ANVOA for the continuous variables between normal control and OSAS patients. And then we used chi-square test to compare the differences between continuous variables of groups. So we described t and P-values between continuous variables of groups.
PAPs show no significant difference between moderate and severe group.

Minor Comments: 1. Revise the special symbols and their descriptions in legend of table 2 and table 3.

Response: We have made correction according to the Reviewer’s comments. (marked in red, in table 2 and table 3)

2. There are 31 patients in the control group described on abstract but there are 30 patients described in the manuscript. I believe it would be typographic error. Please check it and make it correct.

Response: We have made correction according to the Reviewer's comments. (marked in red, line37-38)