Reviewer’s report

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

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Reviewer: Kye Hun Kim

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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 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 patient 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.

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.

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.

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

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.

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?

Minor Comments:

1. Revise the special symbols and their descriptions in legend of 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.

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