Jun 3rd 2022,

Jin-Lei Wang,

Company Editor-in-Chief, Editorial Office

World Journal of Clinical Cases

Dear Dr. Wang,

Re: **Clinical Utility of Left Atrial Strain in Predicting Atrial Fibrillation Recurrence After Catheter Ablation: An Up-to-date Review**

Thank you for considering our paper and encouraging a revision. After reviewing both reviewers' comments, we have improved the content in accordance with the reviewers' comments and have revised our manuscript accordingly. We confirm that all of the authors have approved the changes to the revised manuscript. We would be grateful if the revised manuscript could be further considered for publication in the *World Journal of Clinical Cases*, and we look forward to hearing from you soon.

Yours sincerely,

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Ping Yang, MD, Ph.D.,

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Response to Reviewer 1

This review showed that left atrial strain in STE is related to atrial remodeling and atrial function, so it is a good parameter in predicting the recurrence of AF after CA. Further studies are needed to add strength to the early prediction value of atrial strain in AF recurrences. This review is very comprehensive and easy to understand. In table 2, it is well described about studies related to atrial strain, so it seems that we will get the information we want to know right away. The figures are very good because they have strong visual impacts. But they are difficult to understand. Therefore, it would be good to provide more detailed explanations of the figures and include them below the figures.

1. ***Comments:*** The figures are very good because they have strong visual impacts. But they are difficult to understand. Therefore, it would be good to provide more detailed explanations of the figures and include them below the figures.

Res: Thank you for your positive feedback and the valuable comment. We agree with the point and add detailed explanations below the figures to make it more readable.
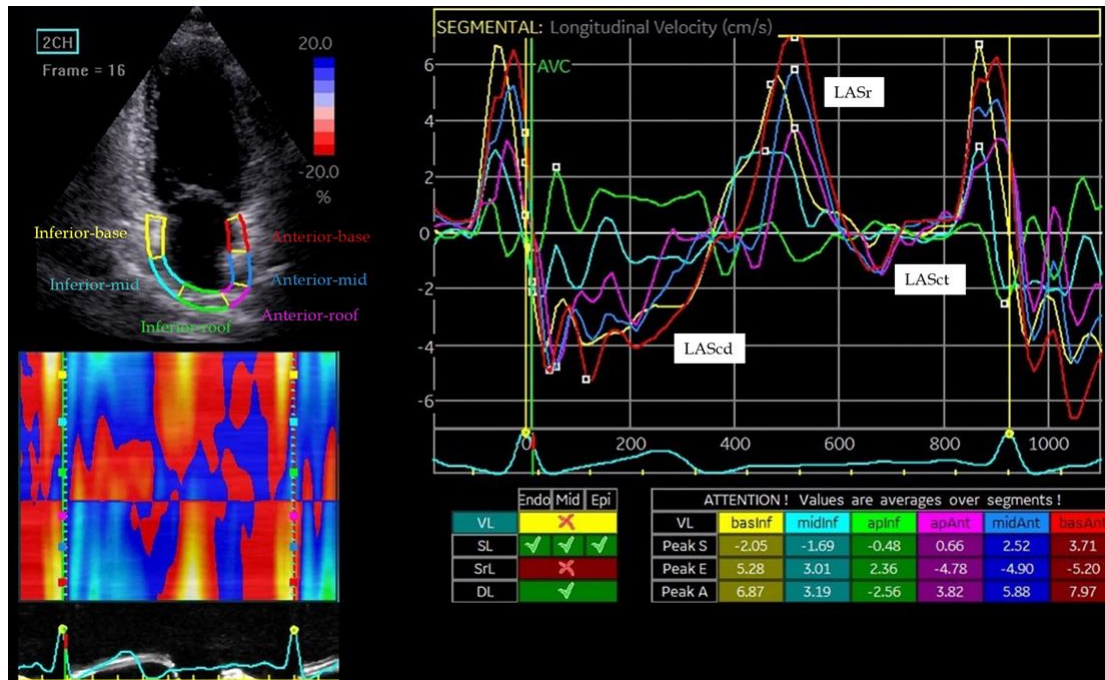
Figure 1 Atrial strain image by 2D-STE in a healthy volunteer.

As shown on the left, LA is divided into 6 segments distinguished by color and corresponded to the strain curve in the same color from the apical four-chamber view. Each segment of LA diastole and contract successively and regularly over time with a similar trend are shown on the right. The positive peaks in the sinus rhythm strain curve reflect the reserve function of the LA, marked as LASr (white label). While the first and second negative peaks stand for the conduit phase (marked as LAScd in the white label) and contract phase (marked as LASct in the white label) respectively.

LASr: left atrial reservoir strain, LASct: left atrial contractile strain, LAScd: left atrial conduit strain. (Figure legend Section, Page 32, line 8-19)

Figure 2 Atrial strain image by 3D-STE in a healthy volunteer.

3D-STE reconstructs the 3D structure of LA without the left atrial appendage, through continuous monitoring of 4 cardiac cycles, plots the time-volume curve of LA avoiding the error caused by geometric hypothesis calculation, and calculates the parameters as the list in the upper right corner. It is difficult to meet the continuous and stable cardiac cycle in AF patients. (Figure legend Section, Page 33, line 2-8)
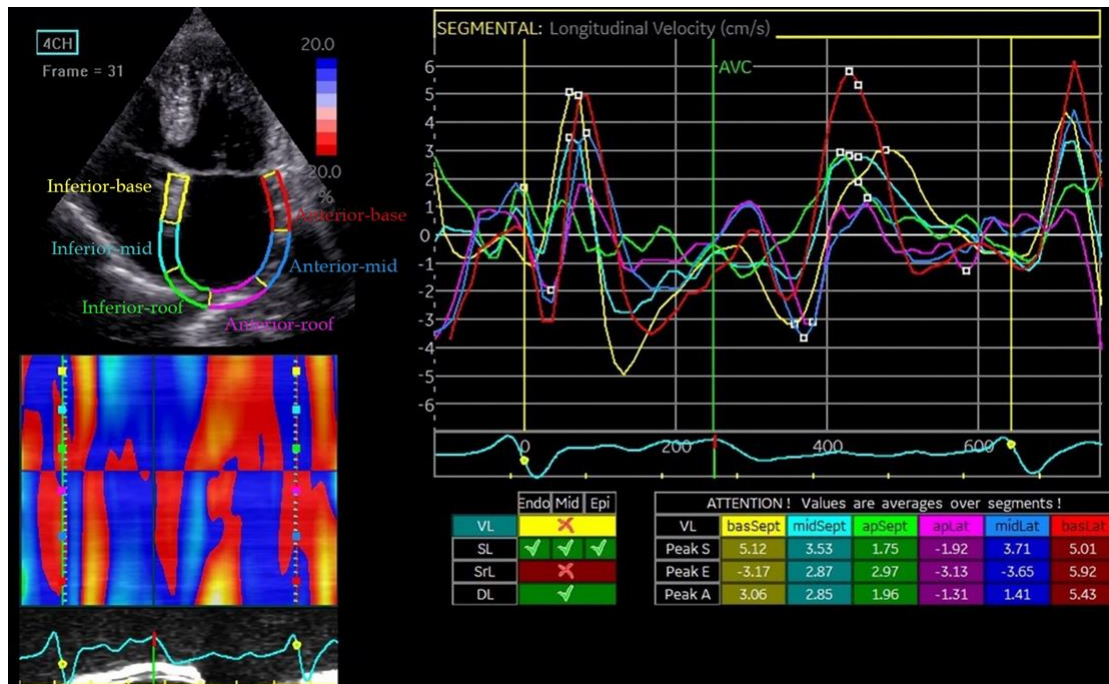
Figure 3 Atrial strain image by 2D-STE in a patient with AF.

Similarly, as shown on the left, LA is divided into 6 segments distinguished by color and corresponded to the strain curve in the same color from the apical four-chamber view. Each segment of LA diastole and contract successively over time are shown on the right. The strain curves in patients with AF are more disorganized than those in healthy volunteers (Figure 1). The different stages of atrial function cannot be clearly distinguished over the cardiac cycle in AF patients.

AF: atrial fibrillation. (Figure legend Section, Page 34, line 2-11)

Thank you for all your valuable comments!

Response to Reviewer 2

  Yu et al. presented a review on the utility of LA strain in predicting AF recurrence after ablation. The paper is of interest. Speckle-tracking echo has been applied for assessing LA function. Table 2 is exhaustive. After minor language improvements, the paper can be resubmitted for publication.

  Res: Thanks for your positive feedback and the encourage for a revision.

1. ***Comments:*** It has been proven to be superior to LA size as AF predictor after AF ablation (Saraiva et al., J Am Soc Echocardiography 2010; Hammerstingl et al., JCE 2012; Montserrat et al., Heart Rhythm 2015).

Res: Thank you for the valuable comment. We agree with the point and add the following content to describe the prediction role of LA strain in AF ablation.

  "Recently, LA strain has been proven to be superior to LA size as a predictor for AF recurrence after CA. An increased LA strain, representing the decline in the deformability of LA, is related to a higher AF recurrence rate. Moreover, Sílvia et al. indicate LA strain is reliable in predicting the success of the CA procedure in AF, especially for the second CA. "==(Page 8, lines 11-16)==

2. ***Comments:*** I would include the paper on JACC Cardiovascular Imaging 2019;12(6):1093-1101 "Left Atrial Strain Performance and its Application in Clinical Practice" to give to the readers an overview on LA strain and its clinical application.

Res: Thank you for your valuable comment. We agree with the point and add the following content to present LA strain and its clinical application.

  "In 2019, Kawa Haji. et al. detailed described and illustrated a practical eight steps in measuring LA strain with TTE and strain software, and stressed

the comprehensive clinical applications of LA strain in heart failure and AF."

3. *Comments:* I would also add a paragraph on AI and echo data to predict AF recurrence after ablation (Hwang YT, et al., A novel approach for predicting AF recurrence after ablation using convolutional neural networks by assessing LA curved M-mode speckle-tracking images. Front Cardiovascular Med 2021).

Res: Thank you for your valuable comment. We agree with the point and add the following content to introduce that artificial intelligence algorithms were combined with STE, and applied in assessing outcome status after AF ablation.

"Of note, Hwang YT et al. reported that applying artificial intelligence algorithms to the STE radial strain of the LA can assess outcome status after AF ablation more accurately and sensitively. They developed a deep convolutional neural networks (CNN) model based on curved M-mode STE images, which may be a novel approach to evaluate the LA dysfunction. CNN may accurately classify the curved M-mode images of global strain in patients and provide detailed spatiotemporal information about the deformation sufficiently."

Thank you for all your valuable comments!