Journal Pre-proof

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PII: S0019-4832(22)00051-7

DOI: https://doi.org/10.1016/j.ihj.2022.03.007

Reference: IHJ 1991

To appear in: *Indian Heart Journal*

Received Date: 23 February 2022

Accepted Date: 12 March 2022

Please cite this article as: Buffle E, Johner N, Namdar M, Shah D, Changes in LA volume and diameter correlate with mechanisms of recurrence after paroxysmal AF ablation, *Indian Heart Journal*, https://doi.org/10.1016/j.ihj.2022.03.007.

Changes in LA volume and diameter correlate with mechanisms of recurrence after paroxysmal AF ablation

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WORD COUNT: 970

FIGURES: 0 TABLES: 0 REFERENCES: 10

Dear Editor,

We would like to thank Papathanasiou et al. for their comments.

As stated in our manuscript, a smaller left atrial (LA) volume, assessed angiographically, was statistically significantly associated with pulmonary vein (PV) reconnection and a larger LA diameter correlated, also statistically significantly, with the need to apply radio-frequency application in non-PV foci in our patients[1]. Although we did not find statistically significant correlations of either a smaller LA diameter with PV reconnection or of a larger LA angiographic volume with radio-frequency application targeting non-PV foci, we would like to underline that all the corresponding odds ratios were congruent with the confidence intervals of the odds ratio of their modality counterpart where there was indeed a statistical difference. Therefore, we believe that the lack of statistical significance for the correlation of smaller LA diameter with PV reconnection and of larger LA angiographic volumes with non-PV foci ablation could well be a statistical trend. Recently, it has also been shown that patients with larger LA antero-posterior diameter corresponding to more spherical LA geometry, had higher prevalence of persistent AF [2], [3]. In this context, we believe that our analyses – and related findings - of echocardiographic LA diameters and angiographic LA volumes may also provide support for non-uniform dimensional changes as a manifestation of left atrial structural remodelling.

We do agree that the angiographically calculated LA volume as compared to 3D echocardiographic measurement has a tendency to overestimation, however with a statistically significant correlation between these 2 methods as shown in previous data from our own center [4]. Our manuscript focuses on the dynamic changes of LA size and was not intended to validate dimension standards nor change the clinical practice of LA volume assessment. Therefore, assuming a systematic constant bias[4-7], the angiographically calculated LA volume constitutes an additional intra-procedural method intrinsically temporally correlated with invasively obtained electrophysiological data and easily available to give insight into those dynamic changes, while imaging modalities such as echocardiography are standard for LA size assessment during clinical follow–up. Of note, consistent similar overestimation with statistically significant correlation has been observed in multiple studies comparing CT/ MRI measured LA volumes and electro-anatomic mapping calculated volumes with echocardiographic LA volumes[5-7].

Finally, we are also glad to note that Papathanasiou et al concur with our inferences that dynamic changes in LA dimensions are associated with different arrhythmia recurrence mechanisms after catheter ablation. A recent publication from our group similarly demonstrated that progressive post PVI AF inducibility at re-ablation, a marker of extra-PV AF substrate, correlated with increased LA volume.[8] As reinforced by the manuscript cited by Papathanasiou et al [9], dynamically changing LA dimensions after PV isolation seem to both give important insight on the underlying pathophysiology and bear prognostic significance regarding the success of the procedure. Besides echocardiography, late gadolinium enhancement measured with cardiac magnetic resonance is another interesting imaging marker associated with atrial fibrillation [10]. To detect dynamic changes occurring after atrial fibrillation ablation and potentially develop new management algorithms with therapeutic consequences for the patient, these changes should be serially followed with the same image modality ideally incorporating electrophysiologically relevant substrate profiles. Due to its widespread availability and cost-

effectiveness, echocardiography remains the modality of choice for serial measurements. However, future studies should address the utility of serial imaging with other substrate characterising modalities in the management of patients in this clinical setting.

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