Measurement of Epicardial Fat Thickness by Echocardiography Presents Challenges

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To the Editor,

It was with great interest that we read the paper by Kaplan et al.[1] entitled ''Evaluation of Electrocardiographic T-peak to T-end Interval in Subjects with Increased Epicardial Fat Tissue Thickness'' published on *Arquivos Brasileiros de Cardiologia* in December 2015. They aimed to investigate the relationship between epicardial adipose tissue (EFT) and ventricular repolarization. They demonstrated some ventricular repolarization abnormalities on electrocardiography in patients with higher EFT thickness. We would like to thank Kaplan et al.[1] for their great effort in this study, and share some of our thoughts.

Echocardiographic measurement of EFT is a commonly used imaging modality because it presents advantageous characteristics such as easiness, reproductibility, low-cost, availability and lack of radiation. However, it presents technical difficulties which may have an effect on the interpretation of study results.[2] First, two-dimensional echocardiography gives us a linear measurement of EFT. Since EFT is a three-dimentional structure, two-dimensional echocardiography can only partially measure the thickness of EFT and can not give us precise volume of EFT. Second, obtaining clear acoustic windows with echocardiography is not easy in obese individuals. Also, the poor intraobserver and interobserver variability compared to cardiac magnetic resonance imaging or computerized tomography is still an issue. Moreover, an inattentive sonographer can measure the pericardial effusion or pericardial adipose tissue thickness instead of EFT.[2] Finally, EFT can change with supine or lateral positioning during echocardiography.[3] In the study by Kaplan et al.,[1] the measurement of EFT was performed perpendicularly on the free wall of the right ventricle at the end diastole in the parasternal long-axis view in three cardiac cycles. We believe the measurement can be performed in the parasternal short-axis view, as well as parasternal long-axis view, and the mean value of the measurements may be calculated subsequently. Thus, one can maximize the percentage of accurate measurement for EFT.[2,3] In addition, the measurements performed at the end-systole and end-diastole at the same time could have made this study more valuable for future researchers.[4]

Today, magnetic resonance imaging is the gold standard for visceral adipose tissue assessment and computerized tomography can measure the EFT and volume more accurately than echocardiography.[5] It would have been very helpful to perform magnetic resonance imaging for the evaluation of EFT in terms of defining the exact role of EFT thickness in ventricular repolarization abnormalities which has prognostic importance.

Keywords

Pericardium; Adipose Tissue; Electrocardiography; Arrhythmias, Cardiac; Echocardiography; Reference Values; Magnetic Resonance Imaging / trends.

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Letter to the Editor

References

1. Kaplan O, Kurtoglu E, Nar G, Yasar E, Gozubuyuk G, Dogan C, et al. Evaluation of electrocardiographic T-peak to T-end ınterval in subjects with ıncreased epicardial fat tissue thickness. Arq Bras Cardiol. 2015;105(6):566-72.
2. Mita N, Kuroda M, Saito S, Miyoshi S. Effect of lateral body position on transesophageal echocardiography images and the association with patient characteristics: a prospective observational study. Ann Card Anaesth. 2015;18(3):299-305.
3. Eroğlu S. How do we measure epicardial adipose tissue thickness by transthoracic echocardiography? Anatol J Cardiol. 2015;15(5):416-9.
4. Iacobellis G, Ribaudo MC, Assael F, Vecci E, Tiberti C, Zappaterreno A, et al. Echocardiographic epicardial adipose tissue is related to anthropometric and clinical parameters of metabolic syndrome: a new indicator of cardiovascular risk. J Clin Endocrinol Metab. 2003;88(11):5163-8.
5. Wong CX, Ganesan AN, Selvanayagam JB. Epicardial fat and atrial fibrillation: current evidence, potential mechanisms, clinical implications, and future directions. Eur Heart J. 2016 Mar 1. [Epub ahead of print].

Reply

We thank the authors for their interest in our article. Firstly, we agree, in part, with the authors' assertion that the two-dimensional echocardiography can only partially measure the thickness of epicardial fat tissue (EFT) and cannot give us the precise volume of EFT. However, three-dimensinal echocardiographic evaluation of EFT is time-consuming and is not a cost-effective method. Therefore, we used a simple, ready to use, and reproducible method as described by Iacobellis et al.[1] In addition, in our study, long and short axis measurements were calculated, but clear and reliable acoustic windows were observed in the long axis views. When we compared long and short axis views in our study, we found that EFT measurements were similiar. Therefore, we used long axis views. These findings are in line with the findings by a previous study, which found that both short and long axis measurements were similiar.[2,3] Secondly, the authors state that obtaining clear acoustic windows with echocardiography is not easy in obese individuals. Every clinician knows that obese individuals are not good candidates for two or three-dimensional echocardiographic evaluations. However, our patients were overweight and not obese, since the mean BMI in our study was 28 kg/m^2. Any participant who did not present a clear acoustic window was excluded from the study participation as cited in Methods section. Thirdly, the authors say that the poor intraobserver and interobserver variability compared to cardiac magnetic resonance imaging (MRI) or computerized tomography (CT) is still an issue. We did not utilize MRI or CT in our study, and intra and inter-observer variablity may be an issue with an study. Finally, the authors state that an inattentive sonographer can measure the pericardial effusion instead of EFT, and EFT can change with supine or lateral positioning during echocardiography. The sonographer in our study was a cardiologist who had expertised in echocardiography. Also, stardard EFT evaluation for echocardiography is parasternal axis in left lateral decubitis position; and for CT or MRI, it is supine position. Therefore, it does not matter that EFT can change with supine or lateral positioning as long as a standardized method is used for any measurement by any method.

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References

1. Iacobellis G, Ribaudo MC, Assael F, Vecci E, Tiberti C, Zappaterreno A, et al. Echocardiographic epicardial adipose tissue is related to anthropometric and clinical parameters of metabolic syndrome: a new indicator of cardiovascular risk. J Clin Endocrinol Metab. 2003;88(11):5163-8.
2. Eroğlu S, Sade LE, Yıldırır A, Demir O, Müderrisoğlu H. Association of epicardial adipose tissue thickness by echocardiography and hypertension. Turk Kardiyol Dern Ars. 2013;41(2):115-22.
3. Eroglu S, Sade LE, Yildirir A, Bal U, Ozbicer S, Ozgul AS, et al. Epicardial adipose tissue thickness by echocardiography is a marker for the presence and severity of coronary artery disease. Nutr Metab Cardiovasc Dis. 2009;19(3):211-7.