Epicardial adipose tissue (EAT) is ectopic visceral fat surrounding the heart that is located close to the coronary arteries. Excessive EAT has been reported to be associated with known cardiovascular risk factors\(^1\). Moreover, several investigators have shown that quantity of EAT can be a marker for the presence and severity of coronary artery disease (CAD)\(^3\) - \(^6\). Computed tomography and Magnetic resonance imaging provide volumetric measurement of EAT, whereas echocardiography determines only the thickness of regional EAT. However, close relationship between echocardiographic thickness of EAT and volume of EAT determined by other modalities has been reported\(^4\), \(^7\).

A good biomarker on the management of cardiovascular diseases satisfies the following requirements: 1) reflects degree of atherosclerosis, 2) predicts cardiovascular events, 3) improves by intervention, and 4) produces better clinical outcome on the improvement of the index. Furthermore, it is preferable that the measurement of the biomarker is non-invasive, easy, low cost, accurate, reproducible, and standardized. In these viewpoints, echocardiographic EAT thickness is a candidate. Many investigators have published substantial number of papers concerning the clinical significance of EAT in the last decade, however, evidence for this index is still not enough for using this parameter in the daily clinical practice.

In this issue of the journal, Gurses and his colleagues measured EAT thickness using transthoracic 2-dimensional (D)-guided M-mode echocardiography and reported that the thickness was greater in the Vitamin D-deficient patients (premenopausal women) than in the control group. The difference between EAT thickness in the patients and in the controls was approximately 0.7 mm. As they used a commercially available ultrasound diagnostic machine for echocardiography using a sector probe with 2 to 3 MHz central frequency, the wavelength was approximately 0.5 to 0.7 mm. Thus, the accuracy of their measurement was undesirable. Several methods for the measurement of EAT thickness have been reported. Majority of investigators have measured it by 2-D echocardiography using parasternal long-axis view. Excellent interobserver and intraobserver agreement for epicardial fat thickness measurement has been reported. Intraclass correlation coefficients have ranged from 0.90 to 0.98 and from 0.93 to 0.98, respectively, indicating good reproducibility and reliability. M-mode measurement is superior to 2-D measurement in terms of serial resolution; however, it enables the measurement of thickness only in the beam direction. Moreover, the thickness can be changed easily when one moves the M-mode line a little, because the ultrasound beam is fixed and the fat tissue moves in a cardiac cycle. However, echocardiographic EAT thickness is still useful because it is inexpensive, reproducible, repeatable, and a direct measure of visceral fat without X-ray exposure, as they noticed in this manuscript.

Gurses and his colleagues also observed its response to replacement therapy; however, no beneficial effect was obtained in the short-term period. Whether the volume of EAT can be reduced with interventions and whether this will reduce the risk of events remains to be demonstrated. Regression of EAT has been observed in subjects who underwent weight loss\(^9\), exercise\(^10\), atorvastatin administration\(^11\), and ezetimibe therapy\(^12\). Echocardiography is preferable for the repeated measurements of EAT thickness, if the accuracy and reproducibility are established. Whether quantification of EAT really has the diagnostic properties to serve as an indicator of cardiovascular risk, should be analyzed in large, randomized, and multi-ethnic populations.
Disclosures

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