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**Subclinical Left Ventricular Dysfunction in Patients with Obstructive Sleep Apnea**

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Dear Editor,

We read with great interest the article ‘Association of fragmented QRS with subclinical left ventricular dysfunction in patients with obstructive sleep apnea’ by Adar et al. [1]. They aimed to investigate whether or not fragmented QRS is associated with subclinical left ventricular (LV) dysfunction in patients with obstructive sleep apnea (OSA). They found that fragmented QRS on electrocardiography was an independent predictor of subclinical LV dysfunction in patients with OSA. This finding could be a guide for further studies regarding echocardiographic and electrocardiographic evaluation of subclinical LV dysfunction in patients with OSA.

OSA is the most common sleep disorder that is characterized by intermittent, complete, and partial airway collapse, resulting in episodes of apnea and hypopnea [2]. OSA has been increasingly recognized as a factor that increases risk for cardiovascular disease, cardiac arrhythmia and stroke. Multiple studies have demonstrated that fragmented QRS complexes are associated with increased morbidity, mortality and recurrent cardiovascular events [3, 4].

The authors defined subclinical LV dysfunction as the presence of a tissue Doppler-derived Tei index of  $\geq 0.5$  in the absence of impaired LVEF ( $< 50\%$ ) as assessed by transthoracic echocardiography in the current study. The myocardial performance index, also known as the Tei index, is a global estimate of both systolic and

diastolic function of the left and right ventricle. Many studies have showed that LV diastolic dysfunction usually occurs before apparent LV systolic dysfunction. Therefore, it serves as an early and more easily quantifiable marker of subclinical LV dysfunction.

Diastolic dysfunction assessed by transthoracic echocardiography is common in OSA and should be routinely evaluated [5]. In controlled hypertensives, mild-moderate OSA may be associated with early diastolic dysfunction, independently from age, gender and mean blood pressure [6]. The study by Adar et al. [1] did not evaluate LV diastolic function. For this reason, it would be better if they also evaluated left ventricular diastolic function parameters including mitral inflow velocities (E, A and E/A ratio), deceleration time of early E velocity (DT), tissue Doppler lateral and septal velocities [systolic wave (S'), early (E') and late (A') diastolic wave], and isovolumetric relaxation time.

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## Reply

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We would like to thank Demirkol et al. for their interest and comments on our recent study [1]. They raised one important point that we would like to discuss. We agree that left ventricular (LV) diastolic dysfunction could occur before development of the systolic dysfunction. Thus, evaluation of diastolic functions might have additional benefits. We did not evaluate LV diastolic functions for three reasons. Echocardiographic evaluation of diastolic dysfunction is relatively complex and time consuming; it requires measurement of several parameters and implementation of multiple algorithms since no single technique or echocardiographic parameter on its own justifies the diagnosis of diastolic dysfunction [2], and numerous factors may limit the accuracy of echocardiographic indices of diastolic dysfunction [2]. Accordingly, evaluation of the diastolic functions was not our primary methodological approach to assess LV functions. As Demirkol et al. correctly recognized, the Tei index allows evaluation of both systolic and diastolic ventricular performance [3]. Moreover, it is a reproducible parameter and not effected by blood pressure, heart rate, ventricular morphology, valvular insufficiencies or ventricular loading conditions [3]. Thus, for the purpose of our study we preferred to use the Tei index for the evaluation of global LV functions.

### Disclosure Statement

The authors report no conflicts of interest.

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