LETTER TO THE EDITOR

The Importance Presence and the Number of Leads with Fragmented QRS in Coronary Artery Disease

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To the Editor,

We thank Tanriverdi et al.¹ for their interest in our work.²

Coronary artery disease (CAD) is associated with increased morbidity and mortality worldwide despite advances in its diagnosis and treatment, and it remains to be one of the leading causes of health system costs. Recently, a large number of scoring systems and laboratory parameters have been studied for risk stratification in patients with CAD to identify the severity and complexity of CAD.

Fragmented QRS (fQRS) obtained on resting 12-lead surface electrocardiogram (ECG) is an easily accessible, cost-effective, and noninvasive method and may be used to carry out risk stratification of CAD. fQRS is generally agreed to be derived from regional myocardial fibrosis/scar and ischemia, which cause heterogeneous myocardial electrical activation. Das et al. demonstrated that the presence of fQRS, defined as an additional R wave (R'), notching of the R wave, notching of the down stroke or upstroke of the S wave, or the presence of $>1R'$ in ≥ 2 contiguous leads corresponding to a major coronary artery territory on the 12-lead ECG, is associated with myocardial scars on myocardial perfusion imaging in patients with CAD.³ The presence of fQRS has been shown to predict adverse outcomes in many disease including CAD, acute coronary syndrome, prior myocardial infarction (MI) showing resolved Q waves, and ischemic or nonischemic cardiomyopathy.^{4–8} Therewithal, the number of fQRS leads on 12-lead ECG on admission is associated with the severity and complexity of CAD in patients with ACS.^{9,10} Especially, the presence of ≥ 3 leads with fQRS is an independent predictor of cardiac death or hospitalization for heart failure in patients with prior MI.¹⁰ As a noninvasive method, fQRS may promptly and accurately have a role in diagnosis CAD with traditional tests, as well as demonstrates presence and severity of disease, and predicting mortality and morbidity in patients with CAD.

In this context, our study showed that the presence of fQRS on 12-lead surface ECG increased the positive predictive value of positive exercise treadmill testing (ETT) from 53.7% to 85.1%. The presence of fQRS in patients with positive ETT may support clinicians during the decision making process with regard to the referral for a coronary angiography.²

Consequently, detecting fQRS on ECG is easily applied, cheap, and readily available and can help clinicians to diagnosis and treatment of CAD. The presence and the number of leads with fQRS provide an important contribution in clinical practice and require new studies.

REFERENCES

1. Tanriverdi Z, Bingol T, Kaya D. Can the number of leads with fQRS be used as an additional tool to detect significant coronary artery disease? *Ann Noninvasive Electrocardiol* 2015 Oct 30 [Epub ahead of print].
2. Tusun E, İlter A, Besli F, et al. Fragmented QRS is associated with improved predictive value of exercise treadmill testing in patients with intermediate pretest likelihood of significant coronary artery disease. *Ann Noninvasive Electrocardiol* 2015 Jul 14 [Epub ahead of print].
3. Das MK, Khan B, Jacob S, et al. Significance of a fragmented QRS complex versus a Q wave in patients with coronary artery disease. *Circulation* 2006;113:2495–2501.
4. Das MK, Saha C, El Masry H, et al. Fragmented QRS on a 12-lead ECG: A predictor of mortality and cardiac events in patients with coronary artery disease. *Heart Rhythm* 2007;4:1385–1392.
5. Chatterjee S, Changawala N. Fragmented QRS complex: A novel marker of cardiovascular disease. *Clin Cardiol* 2010;33:68–71.
6. Das MK, Maskoun W, Shen C, et al. Fragmented QRS on twelve-lead electrocardiogram predicts arrhythmic events in patients with ischemic and nonischemic cardiomyopathy. *Heart Rhythm* 2010;7:74–80.
7. Canpolat U, Kabakci G, Aytemir K, et al. Fragmented QRS complex predicts the arrhythmic events in patients with arrhythmogenic right ventricular cardiomyopathy/dysplasia. *J Cardiovasc Electrophysiol* 2013;24:1260–1266.

8. Wang J, Tang M, Mao KX, et al. Idiopathic ventricular fibrillation with fragmented QRS complex and J wave in resting electrocardiogram. *J Geriatr Cardiol* 2012;9:143-147.
9. Bekler A, Barutcu A, Tenekecioglu E, et al. The relationship between fragmented QRS complexes and SYNTAX and Gensini scores in patients with acute coronary syndrome. *Kardiol Pol* 2015;73:246-254.
10. Torigoe K, Tamura A, Kawano Y, et al. The number of leads with fragmented QRS is independently associated with cardiac death or hospitalization for heart failure in patients with prior myocardial infarction. *J Cardiol* 2012;59:36-41.