LETTERS TO THE EDITOR

Can the Number of Leads with fQRS Be Used as an Additional Tool to Detect Significant Coronary Artery Disease?

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Dear editor,

We read with a great interest the manuscript by Tusun et al.¹ titled "Fragmented QRS Is Associated with Improved Predictive Value of Exercise Treadmill Testing in Patients with Intermediate Pretest Likelihood of Significant Coronary Artery Disease" published on July 14, 2015 in your journal. The authors demonstrated that the frequency of fragmented QRS (fQRS) was significantly higher in patients with significant coronary artery disease (CAD) compared to nonsignificant CAD, and the presence of fQRS was significantly associated with increased risk of significant CAD in multiple logistic regression analysis. They proposed that the presence of fQRS in patients with positive exercise treadmill testing may support clinicians during the decision-making process with regard to the referral for a coronary angiography. We would like to add some comments and contributions to this article.

Fragmented QRS is traditionally defined as an additional R wave (R'), notching of the R wave, notching of the downstroke 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.² However, authors have recently focused on the number of fQRS derivations pattern and the number of the studies on this issue has been gradually increasing. Bekler et al.³ demonstrated that the number of fQRS leads on 12-lead ECG on admission was found to be associated with the severity and complexity of CAD in the patients with acute coronary syndrome (ACS). In

our previous study, we showed that as the number of fQRS derivation increased, the number of vessels with critical stenosis also increased significantly in patients with ACS.⁴ Torigoe et al.⁵ reported that the number of leads with fQRS was an independent predictor of cardiac death or hospitalization for heart failure in the patients with prior myocardial infarction. Finally, Ozcan et al.⁶ found that the number of leads with fQRS was an independent predictor of appropriate implantable cardioverter defibrillator (ICD) shocks in patients with left ventricular systolic heart failure who underwent ICD implantation for primary prophylaxis.

In this study, comparing the mean numbers of fQRS derivations of significant CAD and nonsignificant CAD groups may provide additional benefit. However, the authors did not mention such an analysis in their study. If there is a significant difference between the significant CAD and nonsignificant CAD groups in terms of the number of leads with fQRS, this result will provide additional contribution to the study. In addition, we suggest that determining a cutoff value by ROC analysis for the number of leads with fQRS to detect significant CAD may increase the importance of the study.

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RESPONSE OF THE AUTHOR

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

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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.

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