LETTER TO THE EDITOR

When Should fQRS Be Evaluated as a Noninvasive Prognostic Marker in Patients Undergoing Primary PCI with STEMI?

Mehmet Gul, M.D., Nevzat Uslu, M.D., Hulusi Satılmışoglu, M.D.,
and Sinem Ozbay Ozyılmaz, M.D.

From the Cardiology Department, Mehmet Akif Ersoy Cardiovascular and Thoracic Surgery Center, Training and Research Hospital, Istanbul, Turkey

Ann Noninvasive Electrocardiol 2015;20(2):200–201

Dear Editor,

Fragmentation of QRS (fQRS) complex is an easily evaluated noninvasive electrocardiographic parameter. fQRS on 12-lead electrocardiography was defined by the presence of single or multiple notches in the R or S wave, without a typical bundle branch block, in >2 contiguous leads in 1 of the major coronary artery territories. The presence of fQRS on electrocardiogram (ECG) is associated with myocardial scarring, ischemia, and fibrosis and originates from the deterioration in the process of signal transduction and ventricular depolarization.¹

It has been proved that the presence of fQRS, on admission has been linked to poor outcomes in ST-segment elevation myocardial infarction (STEMI) patients undergoing primary percutaneous coronary intervention (PCI).^{2–4} In addition to this information, the study that recently published we evaluated the group which included 542 patients with STEMI undergoing primary PCI and reported that wall motion score index (WMSI) as another indicator of left ventricular systolic function found to be significantly higher in on-admission fQRS (+) patients. Also, we demonstrated that the presence of fQRS on admission ECG was related with higher in-hospital adverse events and long-term cardiovascular mortality in patients with STEMI undergoing

primary PCI. In our study, cardiac enzymes (Troponin T, peak CK-MB) were significantly higher in fQRS (+) group compared to the fQRS (–) group. Patients with fQRS (+) had lower ejection fraction (EF) and higher WMSI which could be related to the size of myocardial infarction in STEMI.⁵

We have little information about the time appearance of fQRS in patients with acute myocardial infarction (MI). In a few patients during a previous study, Das et al. observed that fQRS appears with in approximately 24 to 48 hours of the onset of symptoms and persists there after as a sign for MI scarring.⁶ Also Das et al. evaluated the fQRS with serial ECG of patients with acute coronary syndromes follow-up up to 48 hours. Seventy-four percent of patients developed fQRS within 24 hours of presentation.⁷ Ozcan et al. showed new-onset or persistence of fQRS at 48 hours after primary PCI has been found as significantly associated with myocardial blush grade of <3, peak CK-MB level.⁴ Additionally, the number of leads with fQRS was negatively correlated with left ventricular ejection fraction which might be associated with inadequate myocardial reperfusion and increased myocardial injury. Lordis et al. demonstrated persistent fQRS on a 12-lead ECG is a marker of decreased survival after acute MI, whereas transient fQRS correlates

Address for correspondence: Mehmet Gul, M.D., Istanbul Mehmet Akif Ersoy Hastanesi, Istasyon Mah, Turgut Ozal Bulvarı No:11, Kucukcekmece, Istanbul 34303, Turkey. Fax: + 90-212-471-94 94; E-mail: drmg23@gmail.com

© 2014 Wiley Periodicals, Inc.
DOI:10.1111/anec.12239

with recurrent MI.⁸ Canpolat et al. suggested, fQRS in some of the patients ECG on admission may disappear because of the successful myocardial reperfusion and in this group in-hospital and long-term prognosis might be better than persistent fQRS.⁹ Furthermore, some of the STEMI patients without fQRS on admission might develop fQRS after primary PCI which might increase the risk of in-hospital and long-term event rate.

fQRS formation in ECG is a dynamic process. In the majority of studies, on admission or 24 and 48 hours ECGs were evaluated, fQRS formed in this period in the most of patients. However, in studies it has been shown that clinical value of temporal trends of fQRS (either persistent/newly developed or absence/resolution).⁴ In addition to these studies, Canpolat et al. had put forward a new idea that temporal trend might be better than instant occurrence of fQRS.⁹ This topic is new and up to date. There are not finalized suggestions yet. The more important information can be obtained by comparing the study groups between temporal trends and instant occurrence fQRS.

REFERENCES

1. Pietrasik G, Zareba W. QRS fragmentation: Diagnostic and prognostic significance. *Cardiol J* 2012;19(2):114–121
2. Akgul O, Uyarel H, Pusuroglu H, et al. Predictive value of a fragmented QRS complex in patients undergoing primary angioplasty for ST elevation myocardial infarction. *Ann Noninvasive Electrocardiol* 2014, doi:10.1111/anec.12179. [Epub ahead of print]
3. Stavileci B, Cimci M, Ikitimur B, et al. Significance and usefulness of narrow fragmented QRS complex on 12-lead electrocardiogram in acute ST-segment elevation myocardial infarction for prediction of early mortality and morbidity. *Ann Noninvasive Electrocardiol* 2014;19:338–344.
4. Ozcan F, Turak O, Canpolat U, et al. Myocardial tissue perfusion predicts the evolution of fragmented QRS in patients with ST-segment elevation myocardial infarction undergoing primary percutaneous coronary intervention. *Ann Noninvasive Electrocardiol* 2014;19:454–461.
5. Uslu N, Gul M, Cakmak HA, et al. The assessment of relationship between fragmented QRS complex and left ventricular wall motion score index in patients with ST elevation myocardial infarction who underwent primary percutaneous coronary intervention. *Ann Noninvasive Electrocardiol* 2014 Jul 17 [Epub ahead of print].
6. 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.
7. Das MK, Michael MA, Suradi H, et al. Usefulness of fragmented QRS on a 12-Lead electrocardiogram in acute coronary syndrome for predicting mortality. *Am J Cardiol* 2009;104:1631–1637.
8. Lorgis L, Jourda F, Hachet O, et al. Prognostic value of fragmented QRS on a 12-lead ECG in patients with acute myocardial infarction. *Heart Lung* 2013;42: 326–331.
9. Canpolat U, Aras D, Topaloglu S, et al. Temporal trend might be better than instant occurrence of fQRS As a noninvasive prognostic marker in STEMI patients undergoing primary PCI. *Ann Noninvasive Electrocardiol* 2014. In press.