

Fragmented QRS (fQRS) in Acute Coronary Syndrome: Is It a More Potential Marker Than Predicted?

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Fragmented QRS (fQRS) complexes are electrocardiographic (ECG) findings which reflect impaired ventricular depolarization due to heterogeneous electrical activation of ischemic and or injured myocardium. Therefore, it had been associated with many cardiovascular diseases both ischemic and non-ischemic origin.¹ To date, fQRS is considered a novel and convenient marker of myocardial scar or fibrosis. Thus, it has gained more interest to investigate the potential use of fQRS in cardiac disease, especially in acute coronary syndrome (ACS).^{2,3}

The ECG remains the most widely used diagnostic tool for guiding treatment strategies for cardiac diseases. Acute coronary syndrome (ACS) is a fatal acute event of myocardial ischemia and diagnosed based on clinical manifestation, ECG findings, and cardiac enzyme level. Acute coronary syndrome (ACS) is associated with a high mortality rate. That is why risk stratification of ACS is very important to guide proper treatment and towards better outcome. High risk ACS patients indicate for more intensive and aggressive treatment for favourable prognosis. ACS is categorized as unstable angina, Non ST Elevation Myocardial Infarction (NSTEMI) and ST Elevation Myocardial Infarction (STEMI) as manifestation of acute total or subtotal coronary occlusion. ST segment elevation and depression is well-recognized to establish the diagnosis of ACS. ECG analysis had identified other ECG findings in ACS patients called fragmented QRS (fQRS) complexes and previous studies had correlated it with the severity of coronary

lesions and extent in ACS.^{4,5} The presence of fQRS in the ECG of patients with ACS had been investigated and gained more interest recently. Study by Sharma et al⁶ showed fQRS was found in 91.4% ACS patients with culprit lesion with high specificity of 96.7% in the lateral leads. Rahman et al⁷ found correlation of fQRS and severity of coronary obstruction in NSTEMI patients. Fragmented QRS was found more frequent in elderly, male, diabetic smokers and dyslipidemia. A higher frequency of fQRS was also found in patients with multi vessel disease, high troponin level and high syntax score.

Fragmented QRS had been investigated more for prognostic purposes in ACS. One of the original study in this journal by Dinakrisma et al investigate the role of fQRS as a predictor of major adverse cardiac event (MACE) within 30 day in ACS. Three hundred and fifty three patients were included in the study and showed MACE were significantly higher in fQRS group vs non-fQRS group (15.8% vs 5.8%). Bivariate analysis showed higher probability of 30 days MACE in fQRS group (RR 2.72, 95% CI 1.30-5.7; p=0.008). It showed that persistent fQRS was an independent predictor of 30 days MACE cardiac death and re-infarction. Study by Ma et al in 227 STEMI patients showed fQRS as independent predictor of imperfect ST segment resolutions after primary percutaneous coronary intervention (PCI).⁸ The fQRS was useful in identifying patients with severe coronary lesions, left ventricular dysfunction and larger area of ischemic injury.^{9,10} Another study by Chew

et al in 693 myocardial infarct (MI) patients revealed the presence of fQRS was associated with subsequent lack of favourable left ventricle remodelling.¹¹ The number of ECG leads with fQRS was also independently associated with cardiac re-hospitalization for heart failure in patients with prior MI.¹² It pronounced more clearly that the presence of fQRS on ECG is beneficial to identify high risk patients and poor prognosis in ACS patients.

The fQRS is a simple, widely available and inexpensive marker in ACS. In the era of universal health coverage with limited financial support, a cost-effective diagnostic tool and prognostic marker will be highly needed. More studies on fQRS will make it more widely-known and used especially if it had been established as the pathognomonic ECG findings. Further studies will be needed to confirm the use of fQRS in ACS populations. The presence in fQRS in ECG may have more valuable interpretations than we expected and predicted before.

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