

Role of fragmented QRS complex in the prediction of the extent of myocardial damage following acute coronary syndrome (ACS)

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Background: Coronary heart disease (CHD) is one of the major and leading causes of death worldwide. Fragmented QRS (f-QRS) is a pattern of QRS complex in 12 leads surface ECG which has a great diagnostic and prognostic role in cardiac diseases including coronary heart disease.

Objective: to investigate the role of using f-QRS in acute coronary syndrome (ACS) as a non-invasive and easily accessible tool for the prediction of myocardial damage.

Methods & Results: Retrospective study of 84 patients with ACS were divided into 46 patients with f-QRS (fragmented group) and 38 patients without f-QRS (non-fragmented group) excluding prior history of major ischemic events (MI, PCI & CABG), permanent AF or ischemic and non-ischemic cardiomyopathy. General demographic characteristics, major risk factors of CHD, Killip class, updated GRACE risk score of ACS, cardiac biomarkers, wall motion score index (WMSI), left ventricle ejection fraction (LVEF), diastolic dysfunction (DD), mitral regurgitation (MR), Gensini score and in-hospital death showed no significant differences between both groups. Only LVEDD was significantly higher in fragmented group than non-fragmented group ($P=0.033$). The optimum cut off value for f-QRS leads was >3 leads for predicting in-hospital death with 83.3% sensitivity and 72.5% specificity. In the fragmented group, patients were divided into 2 subgroups according to the numbers of f-QRS

leads; Subgroup (A1) including patients with >3 f-QRS leads & subgroup (A2) including patients ≤ 3 f-QRS leads. Subgroup (A1) showed significant difference than subgroup (A2); a lower SBP (111.33 ± 25.03 vs. 139 ± 38.89 , $P=0.016$), a higher HR (93.81 ± 19.13 vs. 80.77 ± 14.91 , $P=0.014$), a higher updated GRACE risk score (6.81 ± 12 vs. 3.22 ± 6.95 , $P=0.048$), a lower LVEF (48.08 ± 13.07 vs. 56.14 ± 10.92 , $P=0.049$), a higher WMSI (1.55 ± 0.33 vs. 1.27 ± 0.27 , $P=0.007$), a higher Gensini score (86.12 ± 47.2 vs. 55.08 ± 35.97 , $P=0.030$) and a higher incidence of in-hospital death ($5/16$ vs. $1/30$, $P=0.015$). The different locations of f-QRS had different impacts on SBP, HR, Killip (IV), LVEF, WMSI, updated GRACE score, Gensini score and in hospital death. Anterior f-QRS showed significant differences than non-anterior f-QRS; with a lower SBP ($P=0.006$), a higher HR ($P=0.040$), a higher incidence of Killip (IV) ($P=0.030$), a lower LVEF ($P=0.039$), a higher WMSI ($P=0.004$), a higher updated GRACE risk score ($P=0.033$), a higher Gensini score ($P=0.016$) and a higher incidence of in-hospital mortality ($P=0.004$).

Conclusion: Fragmented QRS on 12 leads surface ECG is not an uncommon phenomenon among the patients with acute coronary syndrome (ACS). The location and the number of f-QRS can be used as a non-invasive and easily accessible tool to predict the extent of myocardial damage.

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