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ORIGINAL ARTICLE

Electrocardiography as a predictor of left main or three-vessel disease in patients with non-ST segment elevation acute coronary syndrome

Ashraf Hussien *, Ahmed Battah, Mohamed Ashraf, Tarek Zein El-Deen

Critical Care Medicine, Cairo University, Cairo, Egypt

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KEYWORDS

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Abstract *Introduction:* Acute coronary syndrome remains the leading cause of morbidity and mortality worldwide. It will continue to rise as the prevalence of patients with obesity and diabetes increases. Patients with non-ST segment elevation acute coronary syndrome had a bad prognosis in patients with left main \pm three vessel diseases, so early identification of these patients by electrocardiography if ST segment elevation in lead aVR ≥ 0.5 m and maximal QRS duration of ≥ 90 ms is important for the selection of optimal treatment.

Materials and methods: The study was designed as a multicenter cross-sectional study that was conducted on 150 patients presenting with non-ST segment elevation acute coronary syndromes, 80 patients had non-ST segment elevation myocardial infarction and 70 patients had unstable angina in the period between January 2009 till January 2010. All patients had full history, clinical examination, laboratory investigations including lipid profile, blood glucose, cardiac Troponin T and renal function, also electrocardiography and coronary angiography was done to prove the diagnosis. ECG was analyzed to assess the degree of ST segment elevation in aVR, ST segment depression in other leads and the maximal QRS was analyzed. Coronary angiography was done to all patients with detection of the presence of left main 50% stenosis at least with or without other three significant coronary vessels showing 70% stenosis or more to be included in 67 patients in group I. Group II include 83 patients with normal coronaries or significant stenosis in one or two vessels.

* Corresponding author.

E-mail address: drashraf_husseini@yahoo.com (A. Hussien).



Results: Left main coronary stenosis with or without three significant coronary vessel stenosis occurs in 67 patients (44.7%) in group I vs. 83 patients (55.3%) in group II (i.e. without left main disease or three vessel disease). The mean age of the patients 59 ± 9 years which was not significant in both the groups ($P > 0.05$). The following also were not significant gender, smoking, dyslipidemia, renal impairment, hypertension and positive family history. Diabetes was considered significant in 44 patients (65.7%) in group I in comparison to 34 patients (41%) in group II ($P < 0.003$). Positive Troponin T was also significant in group I in 47 patients (70.1%) vs. 33 patients (39.8%) in group II. ST segment elevation ≥ 0.5 mm in lead AVR is significant in group I in 52 patients (77.6%) vs. 29 patients (34.9%) in group II ($P < 0.001$). ST segment depression ≥ 0.5 mm in leads other than aVR is significant in group I in 56 patients (83.6%) vs. 41 patients (49.4%) in group II ($P < 0.001$). The presence of QRS duration > 90 ms in the admission ECG was significant in group I in 45 patients (67.2%) vs. 16 patients (19.3%) in group II ($P < 0.001$). **Conclusion:** ST-segment elevation in lead aVR ≥ 0.5 mm and QRS duration ≥ 90 ms are good electrocardiographic predictors of left main or three vessel disease in patients with non-ST segment elevation acute coronary syndrome.

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1. Introduction

Acute coronary syndrome remains the leading cause of morbidity and mortality worldwide will continue to rise as the prevalence of patients with obesity and diabetes increases.¹

Patients with NSTEMI-ACS had a worst prognosis in patients with LM/3VD disease, so an early identification of patients with LM/3VD disease is an important factor in the prognosis and selection of the optimal treatment strategy in patients with NSTEMI-ACS.

2. Aim of the work

To demonstrate if ST-segment elevation in lead aVR of ≥ 0.5 mm and maximal QRS duration of ≥ 90 ms, are useful predictors of left main and/or three vessel disease (LM/3VD) in patients presenting with non-ST elevation acute coronary syndrome.

3. Patients and methods

The study was designed as a multicenter cross-sectional study that was conducted on 150 patients presenting with non-ST segment elevation acute coronary syndromes, 80 patients had non-ST segment elevation myocardial infarction and 70 patients had unstable angina in the period between January 2009 till January 2010.

3.1. Inclusion criteria

1. Patients with typical chest pain attributed to cardiac ischemia lasting at least 20 min and involving an unstable pattern of pain, including rest pain, new onset, severe or frequent angina (accelerating angina).
2. Fully assessable ECG on admission.
3. Fully assessable angiographic data during hospitalization.

3.2. Exclusion criteria

1. Conditions precluding the evaluation of QRS duration or ST segment on the ECG [LBBB, RBBB, left ventricular

hypertrophy, ventricular pacing, ventricular pre-excitation, non-ischemic cardiomyopathy, or antiarrhythmic drugs].

2. Transient or persistent ST segment elevation in leads other than AVR.
3. Q-wave acute MI on presentation.
4. Recent [< 6 months] PCI, or previous CABG.

All patients had full history clinical examination, laboratory investigations including lipid profile, blood glucose, cardiac Troponin T and renal function, also electrocardiography and coronary angiography was done to prove the diagnosis. ECG was analyzed to assess the degree of ST segment elevation in aVR, ST segment depression in other leads and the maximal QRS duration was analyzed. Coronary angiography was done to all patients with detection of the presence of left main 50% stenosis at least with or without other significant coronary vessels showing 70% stenosis or more to be included in 67 patients in group I. Group II include 83 patients with normal coronaries or significant stenosis in one or two vessels.

4. Results

4.1. Demographic data

1. Age: It ranged from 29 to 81 years with a mean of 59 ± 9 years.
2. Sex: It includes 115 males (77%) and 35 females (23%).

Table 1 Incidence of risk factors in the study.

Risk factors	No.	%
Hypertension	99	66
Dyslipidemia	71	47
Diabetes mellitus	78	52
Smoking	95	63
Positive family history	26	17.3
Renal impairment	25	16.7

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