

Research Article

Incidence and Predictive Factors of Heart Rhythm Disorders in Acute Coronary Syndrome with ST Segment Elevation

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Received: 07 March, 2023**Accepted: 11 April, 2024****Published: 17 April 2024****Abstract:**

Background: Heart rhythm disorders in acute coronary syndrome with ST segment elevation are common and may induce hemodynamic instability and sudden death.

Their predictive factors have been the subject of several international studies, as well as their related mortality but their epidemiological data are lacking in Algeria.

Aims: The main objective of our study is the determination of the frequency of heart rhythm disorders in acute coronary syndrome with ST segment elevation; we included conduction disorders, ventricular and supra ventricular arrhythmias; the secondary objective was the analysis of their predictive factors, and related mortality.

Methods and materials: In this prospective study, conducted in the cardiology department of Hussein Dey hospital (Algiers-Algeria), 467 patients with acute coronary syndrome with elevated ST segment (87 women and 380 men) were enrolled between 28 February 2014 and 16 July 2015. The average age is 60 ± 13 years; at admission, a Holter recorder was attached for continuous ECG monitoring during 48 hours.

Kruskal's ANNOVA or H tests were used for comparison of quantitative variables, χ^2 test or Fisher's exact test, were used for qualitative variables, all tests were performed with 1st species risk of 5%.

Results: The frequency of Heart rhythm disorders is 48.6 % (227 patients), CI 95%: [44.1%-53.1%], multivariate analysis identified the following independent predictors: high ST segment elevation above or equal 6 mm, excessive reciprocal ST segment depression above or equal 2 mm, low diastolic blood pressure less than 60 mm Hg, and cardiac troponin elevation above or equal 5 ng/ml.

The risk of mortality expressed by Hazard Ratio (HR) is 71, CI95%: [1.1-3572], $p = 0.032$; low diastolic blood pressure and Blood creatinine above or equal 17 mg/l are the two predictive factors of mortality, identified in our study.

Conclusion: Heart rhythm disorders are frequent in acute coronary syndrome with elevated ST segment, their predictive factors according to our study are: high ST segment elevation, excessive reciprocal ST segment depression, low diastolic blood pressure, and cardiac troponin elevation.

Their occurrence increases the risk of in-hospital mortality, and the predictors of this latter are hemodynamic instability and high creatinine level.

Keywords: Acute Coronary Syndrome, Heart Rhythm Disorders, ST segment elevation, reciprocal ST segment depression, cardiac troponin.

Introduction

Heart rhythm disorders in acute coronary syndrome with ST segment elevation are common and may induce hemodynamic instability and sudden death.

Several mechanisms are involved in the genesis of rhythm disorders like ischemia, necrosis and reperfusion, also electrolyte disturbances, and autonomic disorders.

According to several studies, their incidence varies between 15 and 31 % [1-7], it depends on several factors namely the type of rhythm disorder included in the study and the management of acute coronary syndrome.

Their predictive factors have been the subject of several international studies, but their epidemiological data are lacking in Algeria.

The main objective of our study is to determine the frequency of heart rhythm disorders in acute coronary syndrome with ST

segment elevation, during the first 48 hours of hospitalization, we included conduction disorders, ventricular and supra ventricular arrhythmias; while the secondary objective is the analysis of their predictive factors and related mortality.

Methods and materials

We prospectively studied a group of 467 consecutive patients (380 men and 87 women; mean age 60 ± 13 years) who presented acute coronary syndrome with ST segment elevation and admitted in cardiology department of Hussein-Dey hospital (Algiers, Algeria), between 28th February 2014 and 16th August 2015.

At emergency department admission, an ECG Holter recorder was attached for continuous ECG monitoring during 48 hours, the 17-leads surface ECG recorded at admission and repeated during hospitalization, Doppler Echocardiography, coronary angiography, and biological assessment were performed in the

majority of patients.

The most important rhythm and conduction disorders were identified, we included in the Heart rhythm disorders group, patients with one or several disorders such as: supraventricular arrhythmias, ventricular arrhythmias, conduction disorders. (Table 1)

Serious Heart rhythm disorders	Patients	% patients
Atrial fibrillation	28	6 %
Atrial flutter	2	0.4 %
Ventricular fibrillation	27	5.8 %
Sustained ventricular tachycardia	17	3.6 %
Ventricular flutter	1	0.2 %
Non-sustained ventricular tachycardia	132	28.3 %
Complete and high grade sino atrial block	12	2.6 %
High grade atrio ventricular block	1	0.2 %
Complete atrio ventricular block	19	4 %
Complete left bundle branch block	8	1.7 %
Complete right bundle branch block	51	10.9 %

Several disorders may exist in the same patient; the group of patients with heart rhythm disorders is compared to the opposite group without those rhythm disorders.

Statistical analysis

Data are presented as mean ± SD, median, or frequency (percentage) where appropriate. Continuous variables were compared using the ANNOVA test, or H Kruskal Wallis test. χ² tests and Fisher’s exact test were performed to distinguish differences between categorical variables. Statistical

significance was defined as p < 0.05. In this first step, we used EPI-info version 6.0. A multivariate Binary regression was performed to determine the predictor factors of arrhythmias, and Cox regression was performed to identify the predictor factors of mortality.

The magnitude of the relationship between rhythm disorders and their predictive factors is estimated by the Cramer V coefficient, a coefficient lower than 0.2 is in favor of a weak link, between 0.2 and 0.5: moderate link, greater than 0.5: strong link.

The statistical analysis was performed using SPSS Statistics (release 17).

Results

Incidence: The characteristics of the 467 patients included in our study are shown in Table 2; two hundred and twenty seven patients had presented serious rhythm disorder at admission or during hospitalization (Figure 1), so its frequency in this present study is 48.6 % (51 patients), CI 95% [44.1%-53.1%].

This group of patients included thirty-six women and one hundred and ninety-one men. The mean age was 60.10 ± 12 years; the extreme age was 28 and 91 years.

Cardiovascular risk factors, clinical characteristics, medical history, treatment and evolution are shown in Table 2.

The Surface ECG had shown, extensive anterior ACS in 88 patients, circumferential in 15 patients, anterior in 18 patients, antero-septal in 4 patients, antero-septo-apical in 4 patients, inferior in 38 patients, infero-basal in 56 patients, right ventricular in 27 patients.

The mean heart rate at admission was 82 ± 23 beats/min, the mean PR interval was 143 ± 30 msec, the mean duration of the QRS complex was 80.38 ± 25.4 msec, the mean amplitude of the ST segment elevation was 4.7 ± 2.9 mm, ST segment elevation ≥ 5 mm in 31 patients, the mean amplitude of the ST segment depression was 1.4 ± 1.3 mm, the mean amplitude of the T wave was 7.2± 4 mm and the mean corrected QT was 422.5 ± 45 msec.

Twenty-four patients had persistence of the segment ST elevation during hospitalization.

	Patients with Heart rhythm disorders (227)	Patients without Heart Rhythm disorders (240)	P-value	
Mean age	60.106	60.250	0.901	NS
Females	36	51	0.168	NS
Early consultation (within 6 hours)	177/225	166/237	0.044	S
Hypertension	103/227	106/240	0.865	NS
Diabetes type 1	9/227	5/240	0.357	NS
Diabetes type 2	70/227	72/240	0.923	NS
Diabetes	79/227	77/240	0.600	NS
Current smoking	121/227	114/240	0.245	NS
Hyperlipidemia	33/226	34/238	0.971	NS
GRACE score ≥ 155	86/226	81/240	0.488	NS

Cardiogenic shock	18/227	0/240	0.000	S
Left ventricular heart failure	37/227	26/240	0.111	NS
Right ventricular heart failure	11/227	4/240	0.000	S
Persistence of chest pain	24/227	18/416	0.000	S
Persistence of chest pain after thrombolysis	22/205	4/201	0.000	S
Mean SBP	126.943	133.646	0.072	NS
Mean DBP	74.833	80.021	0.001	S
DBP ≤ 60 mmHg	52/227	30/240	0.004	S
Hospital mortality (first 48 hours)	17/227	0/240	0.032	S
Previous myocardial infraction	11/227	10/240	0.896	NS
Electrocardiogram				
Right ventricular ACS	27/227	15/240	0.048	S
Extensive Anterior ACS	88/227	80/240	0.260	NS
Circumferential ACS	15/227	9/240	0.234	NS
Anterior ACS	18/227	26/240	0.360	NS
Inferior ACS	38/227	46/240	0.574	NS
Infero basal ACS	56/227	56/240	0.818	NS
Heart Rate at admission	82.361	82.933	0.912	NS
Mean QRS duration	80.383	68.917	0.000	S
QRS duration ≥ 100 msec	55/227	9/240	0.000	S
Mean ST segment elevation	4.718	3.617	0.000	S
ST segment elevation ≥ 6mm	54/227	33/240	0.007	S
Mean ST segment depression	1.396	1.146	0.037	S
ST segment depression ≥ 2 mm	71/227	44/240	0.001	S
Average QTc	422.531	413.170	0.020	S
QTc interval ≥ 416 msec	115/227	95/240	0.020	S
Persistence of ST segment elevation	23/226	7/239	0.002	S
Persistence of ST segment elevation after thrombolysis	21/204	6/200	0.006	S
Other associated arrhythmias				
Bursts of PAC	82/209	76/239	0.122	NS
Bursts of PVC	139/209	66/239	0.000	S
Accelerated idioventricular rhythm	49/209	28/239	0.001	S
Polymorphic PVC	37/209	14/239	0.000	S
R on T phenomenon	16/209	2/239	0.000	S
Medication before ACS				
Beta blockers	17/226	19/240	0.988	NS
ARB	33/226	34/240	0.998	NS

ACE-inhibitor	12/226	23/240	0.115	NS
Lipid-lowering drugs	14/226	19/240	0.586	NS
Antiplatelet agents	22/226	18/240	0.486	NS
Treatment at admission				
Thrombolysis	205/227	201/240	0.049	S
Primary or rescue percutaneous coronary intervention	8/161	6/168	0.722	NS
Beta blockers	78/227	108/240	0.024	S
ACE-inhibitor	109/227	152/240	0.001	S
Sympathomimetic	15/226	0/240	0.000	S
Atropine	18/227	4/240	0.002	S
Amiodarone	41/227	3/240	0.000	S
External electric shock	32/227	0/240	0.000	S
Temporary pacing	7/227	0/240	0.006	S
Echocardiography				
Ejection fraction of left ventricle < 40 %	32/208	31/239	0.551	NS
Mean left atrium surface	16.915	16.524	0.288	NS
Mean right atrium surface	11.595	10.992	0.070	NS
Mean Diastolic diameter of left ventricle	54.721	53.619	0.166	NS
Mean Diastolic diameter of right ventricle	25.085	24.474	0.091	NS
Akinetic segment	138/208	133/239	0.026	S
Thrombus	7/206	5/236	0.544	NS
Coronary angiography				
Severe coronary artery lesions	51/161	51/168	0.889	NS
Left main coronary artery severe lesion	7/161	5/168	0.711	NS
Left anterior descending artery lesion	101/161	108/168	0.858	NS
Left circumflex coronary artery lesion	58/161	60/168	0.988	NS
Right coronary artery lesion	63/161	76/168	0.335	NS
Two-vessel coronary artery disease	62/161	66/168	0.975	NS
Multi-vessel coronary artery disease	25/161	36/168	0.216	NS
TIMI flow grade 0	31/161	34/168	0.931	NS
Biology				
Average blood urea g/l	0.392	0.358	0.011	S
Blood urea ≥ 0.330 g/l	119/225	102/240	0.031	S
Average blood creatinine mg/l	12.596	11.151	0.002	S
Blood creatinine ≥ 17 mg/l	22/213	11/239	0.031	S
High-Sensitivity Troponin ≥ 5 ng/ml	90/192	69/226	0.000	S
ACS: Acute Coronary Syndrome, ACE inhibitors: Angiotensin-Converting Enzyme inhibitors ARB: Angiotensin Receptor-Blocker, DBP Diastolic Blood Pressure, PAC: Premature Auricular Complexes, PVC: Premature Ventricular Complexes, QTc: Corrected QT interval, SBP: Systolic Blood Pressure.				

Treatment at admission and during hospitalization: Metalyse (Tenecteplase) as fibrinolytics treatment were administered in 205 patients (90.3 %),

Aspirin, Clopidogrel and Anticoagulants were administered in 227 patients (100 %), beta blockers in 78 patients (34.36 %), ACE inhibitors in 109 patients (48.01 %), sympathomimetic agents in 15 patients (6.6 %), diuretics in 26 patients (11.45 %), external electric shock in 32 patients (14.09 %), Amiodarone in 41 patients (18.06 %), Magnesium and Potassium supplementation at admission in 131 patients (57.7 %), Insulin in 73 patients (32.15 %), Atropine in 18 patients (7.9 %), temporary pacing in 7 patients (3.08 %).

Thrombolysis failure: the persistence of chest pain and ST segment elevation after thrombolysis was observed in 22 patients and persistence of ST segment elevation in 21 patients.

Doppler echocardiography was performed in 208 patients, the left ventricular fraction less than 40 % was found in 32 patients (15.38%), left ventricular hypertrophy in 59 patients (28.92 %), the mean area of the left atrium: $16.91 \pm 3.96 \text{ cm}^2$, the mean area of the right atrium: $11.6 \pm 2.94 \text{ cm}^2$, the mean diastolic diameter of the left ventricle: $54.72 \pm 6.76 \text{ mm}$, the mean diastolic diameter of the right ventricle was $25.08 \pm 3.58 \text{ mm}$, the systolic pulmonary blood pressure: $27.49 \pm 7.27 \text{ mm Hg}$, wall akinesia in 138 patients (66.34%), apical thrombus in 7 patients (3.39 %) and significant mitral insufficiency in 18 patients (8.78%).

Holter ECG was performed in 209 patients; this exam had participated in the recording of heart rhythm disorders (Figure 1), also showed their character (transient or persistent), and detected associated arrhythmias not included in the heart rhythm disorders group. (Figure 2) (Figure 3)

Bursts of premature atrial complex were detected in 82 patients (39.23 %), bursts of premature ventricular complex in 139 patients (66.5 %), Accelerated idioventricular rhythm in 49 patients (23.44 %), polymorphic premature ventricular complex in 37 patients (17.7 %), R on T phenomenon in 16 patients (7.6 %).

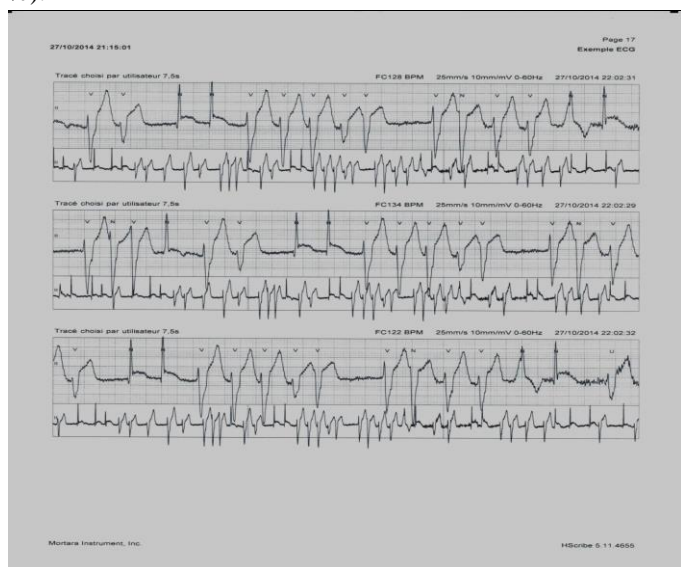


Figure 1: Holter ECG showed non-sustained polymorphic ventricular tachycardia and atrial fibrillation in patient with acute coronary syndrome with ST segment elevation

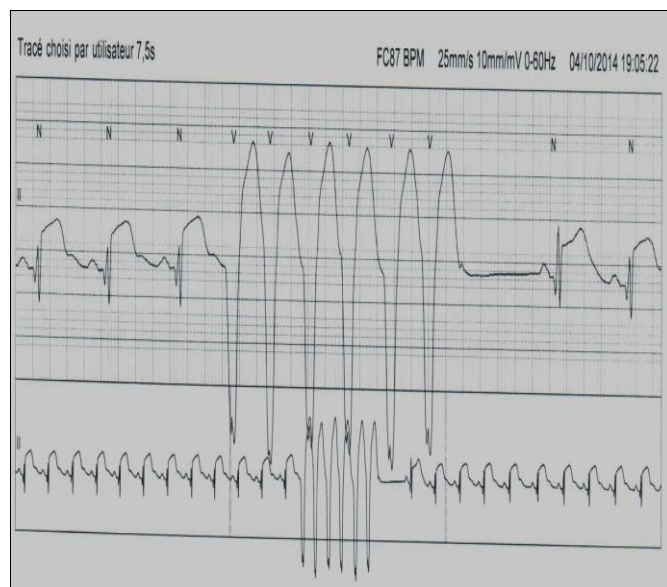


Figure 2: Holter ECG showed non-sustained ventricular tachycardia in patient with acute coronary syndrome with ST segment elevation

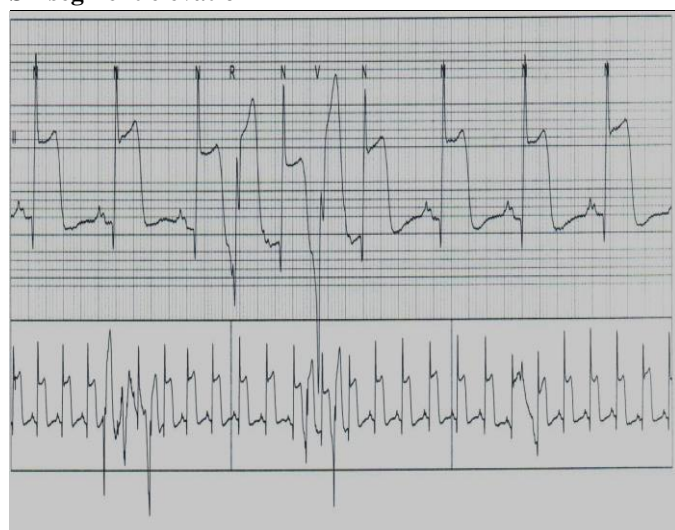


Figure 3: Holter ECG showed interpolated premature ventricular complex with R on T phenomenon in patient with acute coronary syndrome with ST segment elevation

Evolution and complications: persistence of chest pain in 23 patients, ventricular septal perforation in one patient, ischemic stroke in 2 patients, apical aneurysm in one patient, hypotension with vasovagal response in 4 patients.

Coronary angiography was performed in 161 patients (70.9 %), severe coronary artery lesions were found in 51 patients (31.67 %), severe stenosis of the left main coronary artery in 7 patients (4.34 %), left anterior descending artery in 101 patients (62.7 %), circumflex artery in 58 patients (36 %), right coronary artery in 63 patients (39 %), two-vessel coronary artery lesions in 62 patients (38.5 %), Multi-vessel coronary artery lesions in 25 patients (15.5 %), TIMI flow grade 0 in 31 patients (19.25 %).

Mortality: seventeen patients died during the first 48 hours of their hospitalization; one patient died 30 min after admission, 2 patients in the first hour, 5 patients before the 6th hour, 2 patients before the 12th hour, 2 patients between the 12th and the 24th

hour, and 5 patients between 24th and 48th hour.

Biology: the average blood glucose: 1.6 ± 0.88 g/l, average serum potassium 4 ± 0.6 mmol/l, average blood urea: 0.39 ± 0.24 g/l, blood creatinine: 12.59 ± 7.56 mg/l; High-Sensitivity Troponin (hs-Trop) above or equal 5 ng/ml in 90 patients (46.87 %).

Predictive factors

According to the univariate study, several variables had a statistically significant association with the occurrence of heart rhythm disorders: Early consultation (within 6 hours), cardiogenic shock, right ventricular heart failure, persistence of chest pain, persistence of chest pain after thrombolysis, diastolic blood pressure ≤ 60 mm Hg, QRS duration ≥ 100 msec, ST segment elevation above or equal 6mm, persistence of ST segment elevation, ST segment depression ≥ 2 mm, QTc interval ≥ 416 msec, presence of akinetic segment, right acute coronary syndrome, Bursts of premature ventricular complex, accelerated idioventricular rhythm, polymorphic premature ventricular complex, R on T phenomenon, administration of Fibrinolytic agents, less frequent administration of beta blockers, blood urea above or equal 0.330 g/l, blood creatinine above or equal 17 mg/l, High-Sensitivity Troponin above or equal 5 ng/ml. (Table 3)

Variables	RR	CI 95%	P
Early consultation (≤ 6 hour)	1.28	1-1.63	0.04
Cardiogenic shock	2.15	1.95-2.37	0.00002
Right ventricular heart failure	2.11	1.92-2.33	0.001
Persistence of chest pain	1.85	1.55-2.22	0.0001
Diastolic blood pressure ≤ 60 mm Hg	1.40	1.15-1.70	0.004
QRS duration ≥ 100 msec	2.01	1.73-2.34	10^{-8}
ST segment elevation ≥ 6 mm	1.36	1.12-1.66	0.007
Persistence of ST segment elevation	1.64	1.32-2.05	0.002
Reciprocal ST segment depression ≥ 2 mm	1.39	1.16-1.68	0.001
QTc interval ≥ 416 msec	1.26	1.04-1.51	0.02
Akinetic segment	1.28	1.03-1.59	0.02
Right acute coronary syndrome	1.37	1.07-1.75	0.04
Bursts of premature ventricular complex	2.35	1.89-2.93	10^{-8}
Accelerated idioventricular rhythm	1.48	1.20-1.81	0.001

Polymorphic premature ventricular complex	1.67	1.37-2.05	0.0001
R on T phenomenon	1.98	1.63-2.40	0.0006
Administration of Fibrinolytic agents	1.38	0.97-1.95	0.04
Administration of beta blockers	0.80	0.66-0.98	0.02
Blood urea ≥ 0.330 g/l	1.24	1.03-1.50	0.03
Blood creatinine ≥ 17 mg/l	1.46	1.12-1.90	0.03
High-Sensitivity Troponin ≥ 5 ng/ml	1.44	1.17-1.76	0.0008
Persistence of chest pain after thrombolysis	1.76	1.45-2.13	0.0006
Persistence of ST segment elevation after thrombolysis	1.60	1.28-2.01	0.006

But after the multivariate analysis using binary logistic regression, four predictive factors were identified: ST segment elevation above or equal 6 mm, reciprocal ST segment depression above or equal 2 mm, High-Sensitivity Troponin above or equal 5 ng/ml, Diastolic blood pressure less than or equal 60 mmHg (Table 4) (Figure 4)

Predictive factors	OR	CI 95%	P
ST segment elevation ≥ 6 mm	1.848	1.084-3.150	0.024
Reciprocal ST segment depression ≥ 2 mm	1.685	1.042-2.725	0.033
High-Sensitivity Troponin ≥ 5 ng/ml	1.663	1.089-2.540	0.043
Diastolic blood pressure ≤ 60 mm Hg	2.009	1.295-3.117	0.002

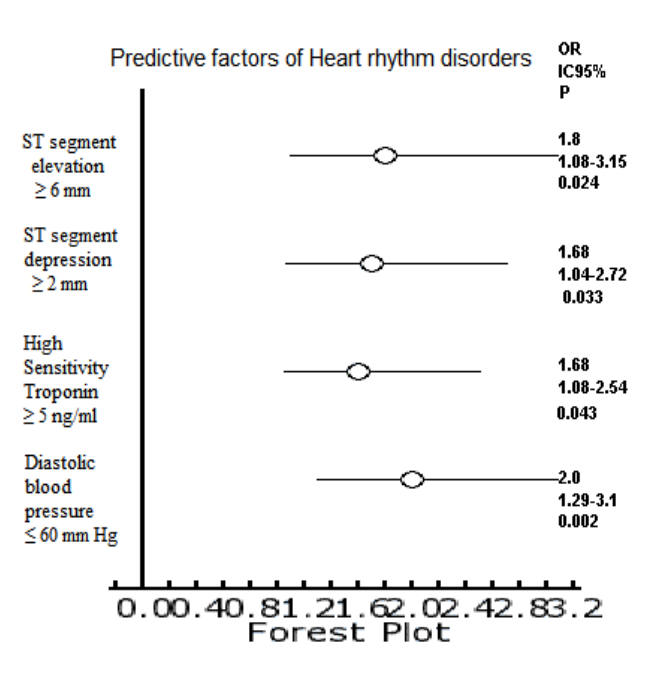


Figure 4: Predictive factors of Heart rhythm disorders in acute coronary syndrome

The magnitude of the relationship between Heart rhythm disorders and their predictive factors is low; the Cramer V coefficient doesn't exceed 0.2 for the four predictive factors. (Table 5)

Predictive factors of Heart rhythm disorders	Cramer V coefficient	P
ST segment elevation \geq 6 mm	0.129	0.005
Reciprocal ST segment depression \geq 2 mm	0.150	0.001
High-Sensitivity Troponin \geq 5 ng/ml	0.137	0.003
Diastolic blood pressure \leq 60 mm Hg	0.168	0.001

Mortality

Hospital mortality (first 48 hours), in the Heart rhythm disorders group is 7.5 % while it is 0 % in the group without Heart rhythm disorders (HR at 71, CI 95% [1.1-3572], p = 0.032. (Figure 5)

Cox regression was used for univariate and multivariate studies of mortality predictors. According to the univariate study, some factors have a statistically significant association with the occurrence of mortality in the Heart Rhythm Disorders group. (Table 6)

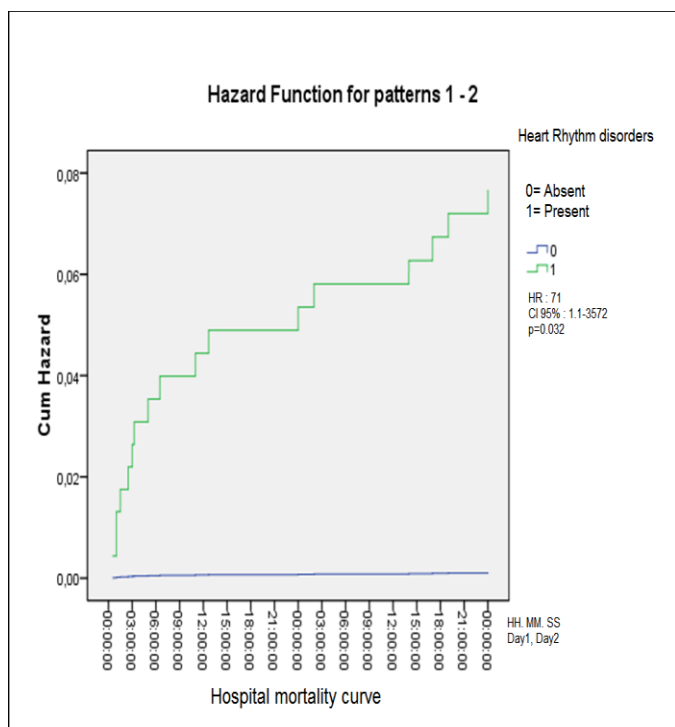


Figure 5: Hospital mortality curve (48h) in Heart rhythm disorders group versus group without Heart rhythm disorders

Factors	OR	CI 95%	P
Female gender	5.1	1.9-13.2	0.001
Age \geq 65 years	8.28	2.3-28.8	0.001

Right heart failure	31.8	12-84	0.000
Left heart failure	4.9	1.8-12.7	0.001
Cardiogenic shock	61.6	21.8-174.3	0.000
Right acute coronary syndrome	4.4	1.6-11.9	0.003
Persistence of ST segment elevation after thrombolysis	28.8	9.9-83	0.000
Persistence of chest pain	17.5	6.6-46.2	0.000
Diastolic blood pressure \leq 60 mm Hg	2.8	1.03-7.59	0.042
Systolic blood pressure \leq 100 mm Hg	7.5	2.8-19.9	0.000
Blood creatinine \geq 17 mg/l	5.8	1.9-17.8	0.000
GRACE Score > 155	7.58	2.1-26.6	0.002

According to multivariate analysis, low diastolic blood pressure and blood creatinine above or equal to 17 mg/l are identified as predictive factor of mortality in Heart Rhythm Disorders group. (Table 7)

Predictive factor of mortality in Heart Rhythm Disorders group	OR	CI95%	P
Low diastolic blood pressure	3.5	1-10.8	0.03
Blood creatinine \geq 17 mg/l	4.3	1.3-13.7	0.01

The magnitude of the relationship between mortality and low diastolic blood pressure is low but for blood creatinine, the magnitude of the relationship is moderate. (Table 8)

Predictive factors of mortality in Heart Rhythm Disorders group	Cramer V Coefficient	P
Low diastolic blood pressure	0.140	0.035
Blood creatinine \geq 17 mg/l	0.236	0.001

Discussion

Heart rhythm disorders in acute coronary syndrome with ST segment elevation, represent the most frequent and serious complications, and may occur early after coronary occlusion. Their mechanisms are complex and multifactorial; several electrophysiological modifications occur just after coronary artery occlusion, and lead to conduction disturbances with several degrees of block in the conduction system, and reentry phenomena, abnormal automaticity, and triggered activity in myocardial tissue.

In acute coronary syndrome, ischemia and reperfusion, cause profound ionic and metabolic changes in intra and extracellular. Ischemia causes alterations of the resting membrane potential and the action potential, these electrophysiological changes, induce arrhythmias by abnormal automaticity or reentry phenomena. [1][2]

Biochemical and metabolic changes in reperfusion depend on the duration of ischemia; the mechanism of reperfusion arrhythmias is mainly the triggered activity. [2]

Myocardial tissue and /or conduction tissue including: sinus

node, atrioventricular node and His Purkinje system may be affected by ischemia and /or reperfusion.

According to several studies conducted before thrombolysis era, the incidence of Heart rhythm disorders varied between 38 % and 76 %. [2]

The incidence of Heart rhythm disorders is 38 % for Rosenbaum and al in 1941, 73 % for Imperial and al in 1960, 95 % for Julian and al in 1964, and 76 % for Stock and al in 1967. [2]

This incidence has declined significantly in the reperfusion era, and varies between 15 and 31 % [3-7].

According to Thai Acute Coronary Syndrome Registry, the incidence of Heart rhythm disorders is 29.1 %, whereas GRACE registry reported 15 % [3-4].

The incidence of Heart rhythm disorders in our study was 48.6 % (227 patients), CI 95%: [44.1%-53.1%], the high incidence in our study was probably related to the use of the ECG Holter and recording of asymptomatic and transient disorders.

Several studies reported predictive factors for supra ventricular and ventricular arrhythmias and also for conduction disturbances.

For supraventricular arrhythmias, several predictors have been reported such as age, female sex, history of atrial fibrillation, high heart rate at admission, left ventricular failure, smoking, high GRACE score, low systolic blood pressure, high blood creatinine [8-10].

Several studies have reported smoking, male sex, low heart rate, low serum potassium levels, high blood creatinine, as predictive factors of ventricular arrhythmias [11-12].

According to many studies, predictors of atrioventricular block are age, diabetes, smoking, heart failure, high troponin level, dyslipidemia and severe coronary lesions [4][13].

According to our study four predictive factors were identified: ST segment elevation ≥ 6 mm, Reciprocal ST segment depression ≥ 2 mm, High-Sensitivity Troponin ≥ 5 ng/ml, Diastolic blood pressure ≤ 60 mm Hg.

High ST segment elevation and reciprocal ST segment depression reflect the importance of electrophysiological changes and tissue damage.

High level of High-Sensitivity Troponin reflects the presence of cells lysis with extensive tissue lesions.

Low diastolic blood pressure is related to hemodynamic instability with cardiogenic shock.

Several international studies have reported risk of mortality related to Heart rhythm disorders,

Before thrombolytic era, Heart rhythm disorders were associated with high risk of mortality, which related to severe ventricular arrhythmias, left ventricular failure, and cardiogenic shock. [2][14]

The mortality rate reported by Imperial et al (1960) is about 45 %; according to Rosenbaum and Levine (1941), the mortality rate related to arrhythmias is 42 %, this rate is about 36 % in patients with atrial fibrillation and 50 % in patients with ventricular arrhythmias.

Julian et al (1964), reported the mortality rate of 60 %, this rate is about 31 % in patients with atrial fibrillation, 67 % in ventricular tachycardia, 90 % in ventricular fibrillation, 34 % in

atrioventricular block, and 62 % in bundle branch block.

According to Stock et al (1967), the mortality rate is 51 %, this rate is 41 % in patients with atrial fibrillation, 56 % in ventricular tachycardia, 50 % in ventricular fibrillation, 68 % in atrioventricular block, and 79 % in bundle branch block.

Currently and after reperfusion era, the mortality rate has significantly decreased; according to Grace Registry the mortality rate is 28.6 % in patients with cardiac arrest, 52 % in patients with ventricular arrhythmias, and 22.7 % in patients with atrioventricular block while it doesn't exceed 1.6 in patients without arrhythmias. [13][15]

According to Thai Acute Coronary Syndrome Registry, the mortality rate is about 50.1 % in patients with cardiac arrest, 48 % in patients with ventricular arrhythmias, and 31 % in patients with atrioventricular block.

According to Swedish registry, the hospital mortality in patients with ventricular arrhythmias is about 16.5 %, this rate is 17.6 % if arrhythmias occur after angioplasty and 11.3 % if arrhythmias occur before angioplasty, while it doesn't exceed 1.5 % in patients without those arrhythmias.[16]

The rate of mortality is also high in patients with new onset atrial fibrillation, according to several studies, the incidence of hospital mortality varied between 8.8 and 14.5%. [8][10][17]

According to another study published in 2000, this incidence of mortality is 25.3 % while it doesn't exceed 16 % in patients without atrial fibrillation. [18]

In our study, the occurrence of Heart rhythm disorders increases the risk of in-hospital mortality (first 48 hours) with HR at 71.

The low diastolic blood pressure and high blood creatinine are the predictive factors of mortality; these two factors reflect the hemodynamic instability in patients with Heart Rhythm disorders.

Conclusion

Heart Rhythm disorders in acute coronary syndrome with ST segment elevation are frequent, their predictive factors according to our study are: high ST segment elevation, high Reciprocal ST segment depression, high hs-Troponin, and low Diastolic blood pressure.

The occurrence of Heart Rhythm disorders increases the risk of in-hospital mortality, related to hemodynamic instability and renal impairment.

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