

## Research Article

# Complete Right Bundle Branch Block in Acute Coronary Syndrome with ST Segment Elevation: Epidemiological Features

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### Abstract:

**Background:** Complete right bundle branch in acute coronary syndrome with ST segment elevation is common and may predict a poor clinical prognosis.

Its incidence has been the subject of several international studies, as well as, its related mortality, but its epidemiological data is lacking in Algeria.

**Aims:** The main objective of our study is the determination of the frequency of complete right bundle branch block in acute coronary syndrome with ST segment elevation, the secondary objective was the analysis of its 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  $60 \pm 13$  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,  $\chi^2$  test or Fisher's exact test, were used for qualitative variables, all tests were performed with 1<sup>st</sup> species risk of 5%.

**Results:** The frequency of complete right bundle branch block is 10.9 % (51 patients), CI 95%: [8.1%-13.7%], multivariate analysis identified the following independent predictors: anterior acute coronary syndrome, persistence of chest pain after thrombolysis, and diabetes type 2.

The risk of mortality expressed by Hazard Ratio (HR) is 3.4, CI95%: [1.07-11.35],  $p = 0.037$ ; persistence of ST segment elevation after thrombolysis is the only predictive factor of mortality, identified in our study.

**Conclusion:** Complete right bundle branch block is frequent in acute coronary syndrome with elevated ST segment, its predictive factors according to our study are: anterior acute coronary syndrome, persistence of chest pain after thrombolysis, and type 2 diabetes.

Its occurrence increases the risk of in-hospital mortality, and the predictor of this latter is the failure of thrombolysis.

**Keywords:** Anterior Acute Coronary Syndrome, Complete right bundle branch Block, Type 2 Diabetes.

## Introduction

Complete right bundle branch block (RBBB) in acute coronary syndrome with ST segment elevation, represents the most frequent conductive disorder.

It may reflect the importance of myocardial damage; predict hemodynamic instability with poor prognosis.

After acute coronary artery occlusion, ischemia and necrosis are the principal mechanisms of complete RBBB.

The right proximal branch is irrigated by the atrioventricular node artery, which frequently originates from the right coronary artery and also by the septal branch of the left anterior descending artery.

Its incidence and prognostic value have been widely reported in the literature, but its epidemiological data is lacking in Algeria. The main objective of our study is to determine the frequency of complete right bundle branch block in acute coronary syndrome with ST segment elevation, during the first 48 hours of hospitalization, while the secondary objective is the analysis of its predictive factors and the related mortality.

## Methods and materials

We prospectively studied a group of 467 consecutive patients (380 men and 87 women; mean age  $60 \pm 13$  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, the patients with the same type of disorder are grouped together, and the name assigned to each group is that of the disorder that characterizes it; there are overlaps between the groups, so that several disorders may exist in the same patient.

The constitution of each group of the rhythm disorder implies

the constitution of the opposite group without the corresponding disorder, the latter group is used for the comparative study; each group is therefore described and then compared to the corresponding opposite group.

In this sub study, the group of patients with complete right bundle branch block was compared to the rest of patients without complete right bundle branch block

### 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.  $\chi^2$  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 complete RBBB 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).

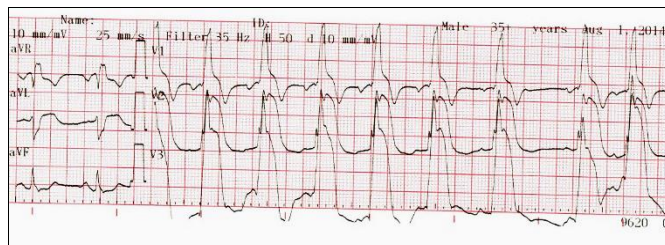
### Results

**Incidence:** The characteristics of the 467 patients included in our study are shown in Table 1; fifty-one patients had presented complete RBBB at admission or during hospitalization, so its frequency in this present study is 10.9 % (51 patients), CI 95% [8.1%-13.7%].

This group of patients included nine women and forty-two men. The mean age was  $61.43 \pm 12$  years; the extreme age was 29 and 85 years.

Forty-two patients had presented complete RBBB at admission, (Figure1) (Figure 2) and nine patients had presented complete RBBB during their hospitalization.

The complete RBBB was persistent in thirty-three patients, and transient in eighteen patients.



**Figure 1: Surface ECG showed complete right bundle branch block in extensive anterior acute coronary syndrome with ST segment elevation**



**Figure 2: Surface ECG showed intermittent complete right bundle branch block, and non-sustained ventricular tachycardia in anterior acute coronary syndrome with ST segment elevation**

Cardiovascular risk factors, clinical characteristics, medical history, treatment and evolution are shown in Table 1.

The Surface ECG had shown, extensive anterior ACS in 29 patients, circumferential in 3 patients, anterior in 6 patients, antero-septal in 1 patient, antero-septo-apical in 1 patient, inferior in 4 patients, infero-basal in 6 patients, right ventricular in 27 patients.

The mean heart rate at admission was  $89.52 \pm 18.73$  beats/min, heart rate  $\geq 80$  beats/min in 34 patients, the mean PR interval was  $144.89 \pm 27.54$  msec, the mean duration of the QRS complex was  $109.80 \pm 23.108$  msec, complex QRS duration  $\geq 100$  msec in 40 patients, the mean amplitude of the ST segment elevation was  $5.21 \pm 2.68$  mm, ST segment elevation  $\geq 5$  mm in 31 patients, the mean amplitude of the ST segment depression was  $1.45 \pm 1.17$  mm, the mean amplitude of the T wave was  $7.11 \pm 3.50$  mm and the mean corrected QT was  $440.84 \pm 51.69$  msec, QTc interval  $\geq 440$  msec in 25 patients.

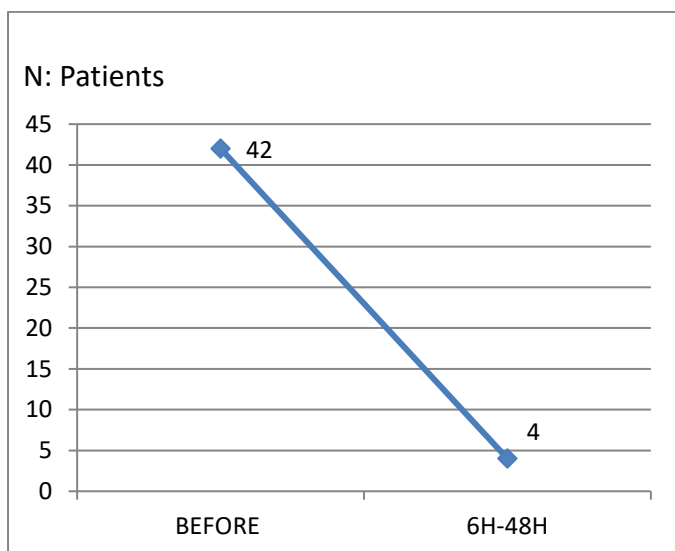
Eight patients had persistence of the segment ST elevation during hospitalization.

Table 1: Characteristics of the study patients.					
	Patients with complete RBBB (n = 51)	Patients without complete RBBB (n = 416)	P-value		
Mean age	61.431	60.026	0.453		NS
Females	9	78	0.999		NS
Early consultation (within 6 hours)	41	302	0.370		NS
Hypertension	23/51	186/416	0.922		NS
Diabetes	<b>24/51</b>	<b>132/416</b>	<b>0.042</b>		<b>S</b>
Diabetes type 2	22/51	120/416	0.053		NS
Current smoking	23/51	212/416	0.520		NS
hyperlipidemia	7/51	60/413	0.954		NS
GRACE score $\geq 155$	21	145	0.579		NS
Cardiogenic shock	3/51	15/416	0.312		NS
Left ventricular heart failure	11/51	52/416	0.115		NS
Right ventricular heart failure	1/51	10/416	0.657		NS
Persistence of chest pain	<b>10/51</b>	<b>18/416</b>	<b>0.000</b>		<b>S</b>

Persistence of chest pain after thrombolysis	<b>10/46</b>	<b>16/360</b>	<b>0.000</b>	<b>S</b>
Mean SBP	133.431	130.014	0.451	NS
Mean DBP	78.137	77.421	0.768	NS
Hospital mortality (first 48 hours)	4/51	13/416	0.102	NS
Previous myocardial infraction	4/51	17/416	0.186	NS
<b>Electrocardiogram</b>				
Right ventricular ACS	3/51	39/416	0.300	NS
Extensive Anterior ACS	<b>29/51</b>	<b>139/416</b>	<b>0.001</b>	<b>S</b>
Circumferential ACS	3/51	21/416	0.499	NS
Anterior ACS	6/51	38/416	0.344	NS
Inferior ACS	4/51	80/416	0.071	NS
Infero basal ACS	<b>6/51</b>	<b>106/416</b>	<b>0.046</b>	<b>S</b>
Heart Rate at admission	<b>89.529</b>	<b>81.813</b>	<b>0.013</b>	<b>S</b>
Heart rate $\geq$ 80 beats /min	<b>34/51</b>	<b>209/416</b>	<b>0.038</b>	<b>S</b>
Mean QRS duration	<b>109.804</b>	<b>70.161</b>	<b>0.000</b>	<b>S</b>
QRS duration $\geq$ 100 msec	<b>40/51</b>	<b>24/416</b>	<b>0.000</b>	<b>S</b>
Mean ST segment elevation	<b>5.216</b>	<b>4.022</b>	<b>0.001</b>	<b>S</b>
Average QTc	<b>440.848</b>	<b>414.884</b>	<b>0.000</b>	<b>S</b>
QTc interval $\geq$ 440 msec	<b>25/51</b>	<b>106/416</b>	<b>0.000</b>	<b>S</b>
Persistence of ST segment elevation	<b>8/51</b>	<b>22/416</b>	<b>0.010</b>	<b>S</b>
Persistence of ST segment elevation after thrombolysis	<b>8/46</b>	<b>27/398</b>	<b>0.006</b>	<b>S</b>
<b>Other associated arrhythmias</b>				
Bursts of PAC	20/47	138/401	0.345	NS
Bursts of PVC	<b>13/47</b>	<b>192/401</b>	<b>0.013</b>	<b>S</b>
<b>Medication before ACS</b>				
Beta blockers	5/51	31/415	0.356	NS
ARB	11/51	56/415	0.180	NS
ACE-inhibitor	3/51	32/415	0.451	NS
Lipid-lowering drugs	4/51	29/415	0.498	NS
Antiplatelet agents	6/51	34/415	0.263	NS
<b>Treatment at admission</b>				
Thrombolysis	46	360	0.609	NS
Primary or rescue percutaneous coronary intervention	<b>4/34</b>	<b>10/295</b>	<b>0.045</b>	<b>S</b>
Beta blockers	19	167	0.805	NS
ACE-inhibitor	24	237	0.231	NS
External electric shock	<b>10/51</b>	<b>22/416</b>	<b>0.001</b>	<b>S</b>
<b>Echocardiography</b>				
Ejection fraction of left ventricle $<$ 40 %	<b>12/47</b>	<b>51/400</b>	<b>0.030</b>	<b>S</b>
Mean left atrium surface	<b>17.867</b>	<b>16.569</b>	<b>0.030</b>	<b>S</b>
Left atrium surface $\geq$ 20 cm <sup>2</sup>	<b>17/45</b>	<b>79/385</b>	<b>0.014</b>	<b>S</b>

Mean Diastolic diameter of left ventricle	<b>56.362</b>	<b>53.870</b>	<b>0.010</b>	<b>S</b>
Diameter of left ventricle $\geq$ 56 mm	<b>29/47</b>	<b>157/400</b>	<b>0.005</b>	<b>S</b>
Akinetic segment	<b>37/47</b>	<b>234/400</b>	<b>0.011</b>	<b>S</b>
Thrombus	<b>4/46</b>	<b>8/397</b>	<b>0.027</b>	<b>S</b>
<b>Coronary angiography</b>				
Severe coronary artery lesions	9/34	93/295	0.683	NS
Left main coronary artery severe lesion	0/34	12/295	0.263	NS
Left anterior descending artery lesion	23/34	186/295	0.734	NS
Left circumflex coronary artery lesion	7/24	111/295	0.090	NS
Right coronary artery lesion	9/34	130/295	0.095	NS
Two-vessel coronary artery disease	9/34	119/295	0.166	NS
Multi-vessel coronary artery disease	3/34	58/295	0.191	NS
TIMI flow grade 0	6/34	59/295	0.921	NS
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, RBBB: Right Bundle Branch Block, SBP: Systolic Blood Pressure.				

Treatment at admission and during hospitalization: Metalyse (Tenecteplase) as fibrinolytics treatment were administered in 46 patients (90.19 %), 42 patients had presented complete RBBB at admission before any therapy, 4 patients had presented complete RBBB after thrombolysis. (Figure 3)



**Figure 3: Complete Right bundle branch block onset delay as a Function of Fibrinolytic treatment**

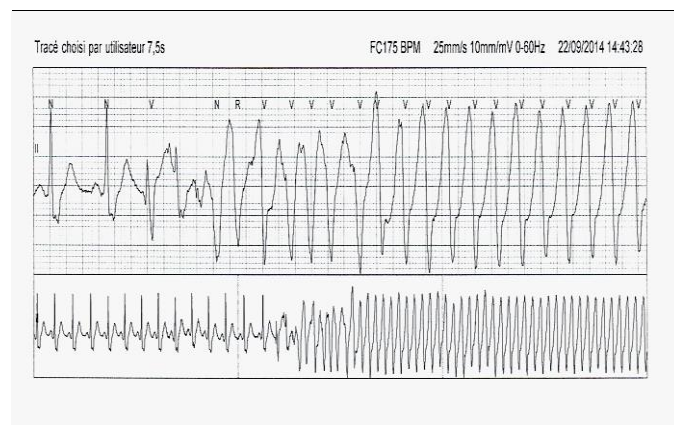
Aspirin, Clopidogrel and Anticoagulants were administered in 51 patients (100 %), beta blockers in 19 patients (37.25 %), ACE inhibitors in 24 patients (47.05 %), sympathomimetic agents in 3 patients (6 %), diuretics in 8 patients (15.08 %), external electric shock in 10 patients (19.60 %), Amiodarone in 7 patients (13.37 %), Magnesium and Potassium supplementation at admission in 27 patients (52.94 %), Insulin in 23 patients (45.09 %).

**Thrombolysis failure:** the persistence of chest pain and ST segment elevation after thrombolysis was observed in 10 patients and persistence of ST segment elevation in 8 patients.

**Doppler echocardiography** was performed in 47 patients, the left ventricular fraction less than 40 % was found in 12 patients

(25.53%), left ventricular hypertrophy in 11 patients (23.91 %), the mean area of the left atrium:  $17.86 \pm 4.26$  cm<sup>2</sup>, left atrium surface above or equal 20 cm<sup>2</sup>, in 17 patients, the mean area of the right atrium:  $11.6 \pm 2.70$  cm<sup>2</sup>, the mean diastolic diameter of the left ventricle:  $56.36 \pm 6.25$  mm, the mean diastolic diameter of the right ventricle was  $24.65 \pm 3.30$  mm, the systolic pulmonary blood pressure:  $29.22 \pm 9.86$  mm Hg, wall akinesia in 37 patients (78.72%), apical thrombus in 4 patients (8.69 %) and significant mitral insufficiency in 5 patients (10.63%).

**Holter ECG** was performed in 47 patients; this exam had participated in the recording of complete RBBB, also showed its character (transient or persistent), and detected associated arrhythmias. (Figure 4)



**Figure 4: Holter ECG showed complete right bundle branch block and initiation of fast ventricular tachycardia in patient with anterior acute coronary syndrome with ST segment elevation**

Several arrhythmias were associated with complete RBBB, ventricular fibrillation (VF) in 8 patients, sustained ventricular tachycardia (SVT) in 3 patients, non-sustained ventricular tachycardia (NSVT) in 8 patients, atrial fibrillation (AF) in 6 patients, complete atrioventricular block (AVB) in 1 patient, bursts of ventricular premature beats in 13 patients, accelerated idioventricular rhythm in 5 patients, polymorphic ventricular

premature beats in 1 patient.

**Evolution and complications:** persistence of chest pain in 10 patients, and ventricular septal perforation in one patient.

**Coronary angiography** was performed in 34 patients, severe coronary artery lesions were found in 9 patients (26.47%), severe stenosis of the left anterior descending artery in 23 patients (67.64%), circumflex artery in 7 patients (20.58%), right coronary artery in 9 patients (26.47 %), two-vessel coronary artery lesions in 9 patients (26.47%), Multi-vessel coronary artery lesions in 3 patients (8.82 %), TIMI flow grade 0 in 6 patients (17.64 %).

**Mortality:** four patients died during the first 48 hours of their hospitalization; 1 patient died 1 hour after admission and the three patients after 24 hours.

**Biology:** the average blood glucose: 1.77±1.00 g/l, average serum potassium 4.07 ± 0.65 mmol/l, average blood urea: 0.39± 0.21 g/l, blood creatinine: 13.04 ± 9.60 mg/l; High-Sensitivity Troponin (hs-Trop) above or equal 5 ng/ml in 20 patients (47.61 %).

**Predictive factors**

According to the univariate study, several variables had a statistically significant association with the occurrence of complete RBBB: diabetes type 2, persistence of chest pain, extensive anterior acute coronary syndrome, ST segment elevation above or equal 5 mm, persistence of ST segment elevation, heart rate above or equal 80 beats/min, left ventricular ejection fraction less than 40 %, left atrium surface ≥ 20 cm<sup>2</sup>, Diameter of left ventricle ≥ 56 mm, presence of akinetic segment, presence of apical thrombus, persistence of chest pain after thrombolysis, and persistence of ST segment elevation after thrombolysis. (Table 2)

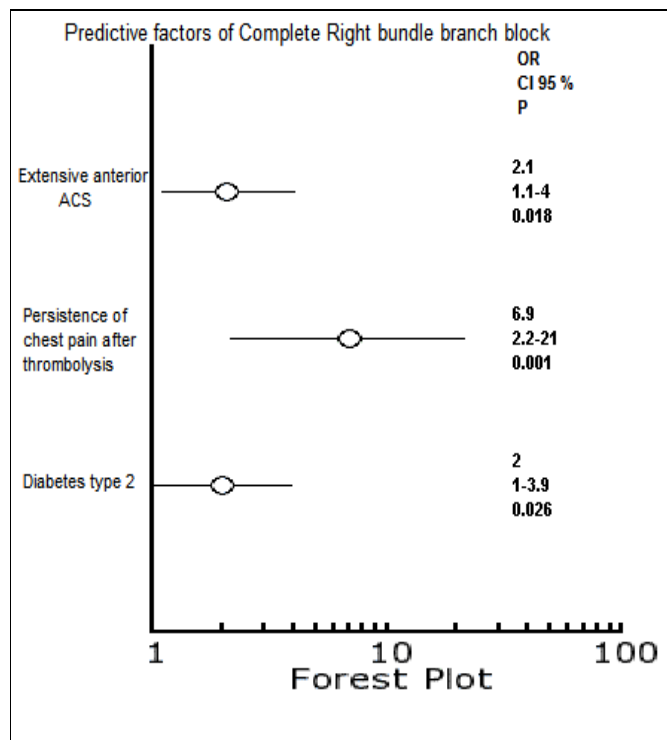
**Table 2: Univariate study: variables associated with complete right bundle branch block (RBBB)**

Variables	RR	CI 95%	P
Diabetes type 2	1.77	1.06-2.97	0.04
Persistence of chest pain	3.82	2.15-6.80	0.0002
Extensive anterior acute coronary syndrome	2.35	1.39-3.95	0.001
ST segment elevation ≥ 5 mm	2.78	1.64-4.73	0.0001
Persistence of ST segment elevation	2.70	1.40-5.21	0.01
Heart rate ≥ 80 beats/min	1.84	1.06-3.21	0.03
Left ventricular ejection fraction < 40 %	2.09	1.15-3.80	0.03
left atrium surface ≥ 20 cm <sup>2</sup>	2.11	1.21-3.69	0.01
Left ventricular diameter ≥ 56 mm	2.26	1.29-3.95	0.005
Akinetic segment	2.40	1.23-4.71	0.01
Thrombus	3.42	1.46-8.00	0.02
Persistence of chest pain after thrombolysis	4.06	2.28-7.23	0.0001
Persistence of ST segment elevation after thrombolysis	2.94	1.53-5.66	0.006

But after the multivariate analysis using binary logistic regression, three predictive factors were identified: extensive anterior acute coronary syndrome, Persistence of chest pain after thrombolysis, and diabetes type 2. (Table 3) (Figure 5)

**Table 3 : Predictive factors of complete right bundle branch block**

Predictive factors	OR	CI 95%	P
Extensive anterior acute coronary syndrome	2.151	1.140-4.056	0.018
Persistence of chest pain after thrombolysis	6.940	2.265-21.257	0.001
Diabetes type 2.	2.070	1.092-3.932	0.026



**Figure 5: Predictive factors of complete right bundle branch block**

**ACS: Acute coronary syndrome**

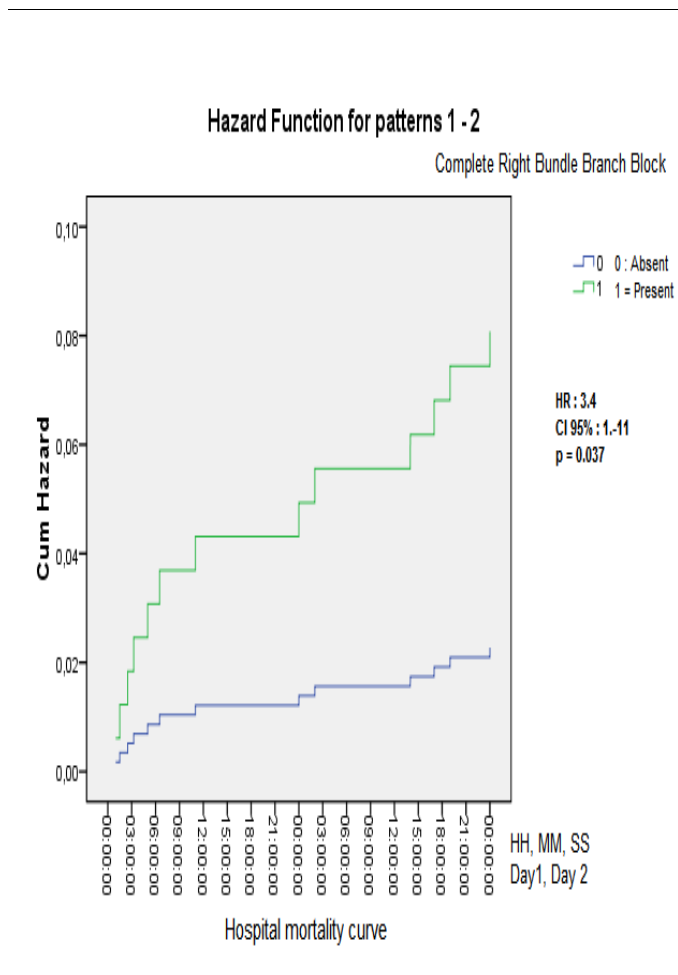
The magnitude of the relationship between complete RBBB and persistence of chest pain is moderate; the Cramer V coefficient exceeds 0.2, but this magnitude is low for the two others, the Cramer V coefficient doesn't exceed 0.2. (Table 4)

**Table 4: Magnitude of the relationship between complete right bundle branch block and its predictive factors**

Predictive factors of complete right bundle branch block	Cramer V coefficient	P
Extensive anterior acute coronary syndrome	0.027	0.561
Persistence of chest pain after thrombolysis	0.236	0.000
Diabetes type 2.	0.100	0.034

**Mortality**

Hospital mortality (first 48 hours), in the complete RBBB group is 7.84 % while it does not exceed 3.12 % in the group without complete RBBB, but this difference isn't significant (p=0.102), but when using Cox regression, this difference becomes significant and hospital mortality is high, with HR at 3.4, CI 95% [1.07-11.35], p = 0.037. (Figure 6)



**Figure 6: Hospital mortality curve (48h) in complete right bundle branch block (RBBB) group versus group without complete RBBB**

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 complete RBBB group. (Table 5)

Factors	OR	IC95%	P
Female gender	4	1.3-11.9	0.013
Age ≥ 65 years	10.2	2.2-46	0.003
Right heart failure	59	19.5-180	0.000
Left heart failure	7.3	2.4-22	0.000
Cardiogenic shock	235.8	50.9-1091	0.000
Persistence of ST segment elevation	85	17.6-300.9	0.000
Persistence of chest pain	36.8	11-122.8	0.000
Diastolic blood pressure ≤ 60 mm Hg	3.3	1.1-10.3	0.032
Systolic blood pressure ≤ 100 mm Hg	9.5	3.2-28.7	0.000
Blood creatinine ≥ 17 mg/l	8	2.2-29	0.001
GRACE Score	9	1.9-41	0.004
Ventricular fibrillation	7.9	2.2-28.2	0.001

According to multivariate analysis, persistence of chest pain after thrombolysis was identified as predictive factor of

mortality in complete RBBB group. (Table 6)

Predictive factor of mortality in Complete right bundle brunch group	OR	CI95%	P
Persistence of chest pain after thrombolysis	66	17.6-249.9	0.000

The magnitude of the relationship between mortality and its predictive factor in the complete RBBB group was strong; the Cramer V coefficient exceeds 0.5. (Table 7)

Predictive factors of mortality in Complete right bundle brunch Block group	Cramer V Coefficient	P
Persistence of chest pain after thrombolysis	0.676	0.000

**Discussion**

Complete right bundle branch block (RBBB) in acute coronary syndrome with ST segment elevation, represents the most frequent conductive disorder.

It may reflect the importance of myocardial damage; predict hemodynamic instability with poor prognosis.

After acute coronary artery occlusion, ischemia and necrosis are the principal mechanisms of complete RBBB.

The right proximal branch is irrigated by the atrioventricular node artery, which frequently originates from the right coronary artery and also by the septal branch of the left anterior descending artery. [1]

According to several studies conducted before thrombolysis era, the incidence of RBBB varied between 3 % and 29 % . [2][3][4] [5][6]

This incidence has declined significantly in the reperfusion era, and varies between 2 and 11 % [7]; according to another study published in 2013, the incidence of the complete RBBB is about 9% . [8]

The incidence of complete RBBB in our study was 11 % (51 patients), CI 95% [8.1%-13.7%]. This incidence is within the range of that reported in the literature; the high incidence in our study was probably related to the more frequent extensive anterior localization of acute coronary syndrome, and also the failure of thrombolysis especially for patients who developed complete RBBB during hospitalization, in our study RBBB was persistent in 33 patients, which could be related to necrosis.

Predictors of complete RBBB have not been reported in the literature.

According to our study three predictive factors were identified: extensive anterior acute coronary syndrome, persistence of chest pain after thrombolysis and diabetes type 2.

The extensive anterior ACS, which reflects the importance of the lesions and their extension to the conduction pathways, is principally linked to the occlusion of the left anterior descending artery in its proximal portion, preventing the irrigation of the septal arteries thus inducing the suffering of the right branch brunch.

The persistence of chest pain after thrombolysis reflects the failure of thrombolysis and therefore the persistence of myocardial damage (ischemia and necrosis), which induces

hemodynamic and electro physiological consequences with conduction disruption in the right bundle branch.

Diabetes increases the risk of developing a complete right branch block, this risk related to the micro and macroangiopathy of diabetes, inducing ischemia and fibrosis. Several international studies have reported risk of mortality related to complete RBBB,

Before thrombolytic era, complete RBBB was associated with high risk of mortality, which related to severe ventricular arrhythmias, left ventricular failure, and cardiogenic shock. [2][3][4][5][6]

In ACS, mortality related to left or right bundle branch block is 23.6% without thrombolysis and 18.7% with thrombolysis. [9] According to Hindman et al, the rate of mortality related to RBBB is high (28 % in RBBB group versus 12 % in group without RBBB) [10]; Ricou et al (32% versus 8%) [11]; for Klein et al, the rate of mortality related to RBBB is about 35 % [12]

According to another study published in 1997, occurrence of complete RBBB increases the risk of mortality (25.9 % with RBBB versus 9.9 % without RBBB). [7]

According to another study, the rate mortality related to RBBB in inferior ACS is about 11.4 % (p=0.03), while the rate mortality related to RBBB in anterior ACS is about 31.6 % (p=0.001) if RBBB is present at admission, and 33 % (p= 0.001) if RBBB occurred 60 min after thrombolysis. [13]

In our study, the occurrence of complete RBBB increases the risk of in-hospital mortality (first 48 hours) with HR at 3.4.

The persistence of chest pain after thrombolysis is the predictive factor of mortality, which reflects the extension of myocardial damage (ischemia and necrosis), which induces severe hemodynamic and electro physiological consequences.

## Conclusion

Complete right bundle branch block in acute coronary syndrome with ST segment elevation is frequent, its predictive factors according to our study are: extensive anterior acute coronary syndrome, persistence of chest pain after thrombolysis, and diabetes type 2.

The occurrence of complete RBBB increases the risk of in-hospital mortality, related to reperfusion failure, and extensive myocardial damage.

To our knowledge, predictive factors of complete RBBB were reported for the first time.

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