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Cardiac Conduction Disorders in Acute Coronary Syndrome with St Elevation: Study of 51 Cases

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Abstract **Original Research Article**

Introduction: Cardiac conduction disorders are complications that can occur in the early development of acute coronary syndrome with ST segment elevation and have a significant influence on the patients prognosis. ***Objective:*** The determine the epidemiological clinical and therapeutic aspects of conduction disorders with elevation in the ST segment. ***Methods:*** We have performed a descriptive retrospective study of 51 cases of conductiondisorder among 228 cases of coronary syndromes with ST segment elevation. ***Results:*** The prevalence of cardiac conduction disorders was 14.1% over a period of 4 years. The average age of our patients was 59 years old (extremes: 42 to 81 years old). Diabetes was the most prevalent risk factor (52.4%). Low location was the most found (56%) and conduction disorders were dominated by atrioventricular block (45.09%).Coronary angiography was performed in all our patients. The found lesions in coronary angiography concerned more the right coronary (37.3%) and circumflex artery (34.1%). Coronary angioplasty has been performed in 72 % of cases, and thrombolysis in 9, 8%. The implantation of temporary pace maker was done in 33% of cases. The evolution wasfavorable for all our patients. ***Conclusion:*** Conduction disorders in ST-segment elevation coronary syndrome should be diagnosed early for timely and adequate management in order to reduce the high objectivemortality rates.

Keywords: Atrioventricular Blmock; Conduction disorder; Acute coronary syndrome withST elevation.

INTRODUCTION

Electrical conduction abnormalities are well-recognized complications of acute myocardial infarction. They may be caused by either autonomic imbalance or ischemia/infarction involving the conduction system.

Cardiac conduction disorders are complications that can occur in the early development of acute coronary syndrome with ST segment elevation and are related to an obstructive lesion of one or both coronary arteries. A severe bilateral coronary artery injury is partly responsible for the very high rate of mortality from complicated myocardial infarction from a conduction disorder.

The most common arrhythmic consequence is bradycardia, which may or may not be symptomatic. Complete heart block with a slow escape rhythm is a potentially life-threatening event in this setting if not detected and treated promptly. In addition, it is important to recognize which bradyarhythmias are transient and which are likely to progress to irreversible and symptomatic high- degree atrioventricular (AV) block.

Regional myocardial ischemia or injury may affect the cardiac conduction system at various locations. Sinoatrial and atrioventricular blocks are more frequent in inferior than anterior STEMI, while new left anterior fascicular block and right bundle branch block indicate proximal occlusion of the left anterior descending coronary artery. New left bundle branch block is associated with multi-vessel disease.

Most conduction disorders associated with STEMI are reversible with reperfusion therapy, but they may still impair prognosis because they indicate a large area at risk, extensive myocardial infarction or severe coronary artery disease.

The purpose of our study was to assess the prevalence of different conduction disorders during

acute coronary syndrome at the University Hospital of Marrakech.

PATIENTS AND METHODS

This is a descriptive retrospective study, conducted over a 3-year period from December 2018 to December 2021.

We collected 228 hospitalized patients for ACS with above offset of the ST segment of diverse topography at the Intensive Care Department at the University Hospital in Marrakech.

Patients hospitalized for acute coronary syndrome without ST elevation, chronic coronary syndrome and patients with a history of ischemic heart disease were excluded from our study. The retrospective analysis was done by collecting data from the department folders.

The study involved 51cases of cardiac conduction disorder among 362 hospitalized patients with acute coronary syndrome with ST segment shift. The parameters studied were epidemiological (age, sex, and cardiovascular risk factors), clinical (blood pressure, heart rate and Killip stage), angiographic and therapeutic data.

RESULTS

The prevalence

The prevalence of cardiac conduction disorders in acute coronary syndrome with ST-segment overload was 14.1%.

Cardiovascular risk factors

There were 43 men (84.31%) and 8 women (15.68%) with a sex ratio of 5.37.

The average age was 59 years, with extremes of 42 and 81 years. Eighty- six percent of our patients were 50 years of age or older.

Diabetes was the most frequently encountered risk factor (52.4%) followed by high blood pressure (24.5%), dyslipidemia (20.8%) and smoking (18%).

Clinically, the mean systolic blood pressure was 137.1 mmHg, the mean diastolic blood pressure was 76.2 mmHg, and the mean heart rate was 76.4 beats perminute. Stage 1 of Killip was the most common in our patients (61.2%).

Table 1: Baseline characteristics

	Number	Rate
Age (years)		
>60	36	70.58%
<60	15	29.42%
Sex		
Male	43	84.31%
Female	8	15.68%
Diabetes	26	52.4%
High Blood Pressure	12	24.5%
Dyslipidemia	10	20.8%
Smokers		
Current	3	5.88%
Ex	6	11.76%
Previous myocardial infarction	12	23.52%
Thrombolysis	5	9.81%
Left ventricular failure	16	31.37
Hospital Death	7	13.72%

EKG anatomical territory

The lower territory was most affected in our case by necrosis (29 cases or (56%) followed by the anterior territory (19 cases or 37%) and circumferential territory (3 cases or 7%).

Cardiac enzymes

Of the 228 patients with Troponine measurements, peak values were significantly higher in groups with than without conduction defects.

Coronary angiography

All of our patients had undergone coronaryangiography with an average management time of 11.2 hours with extremes of 0 to 34 hours.

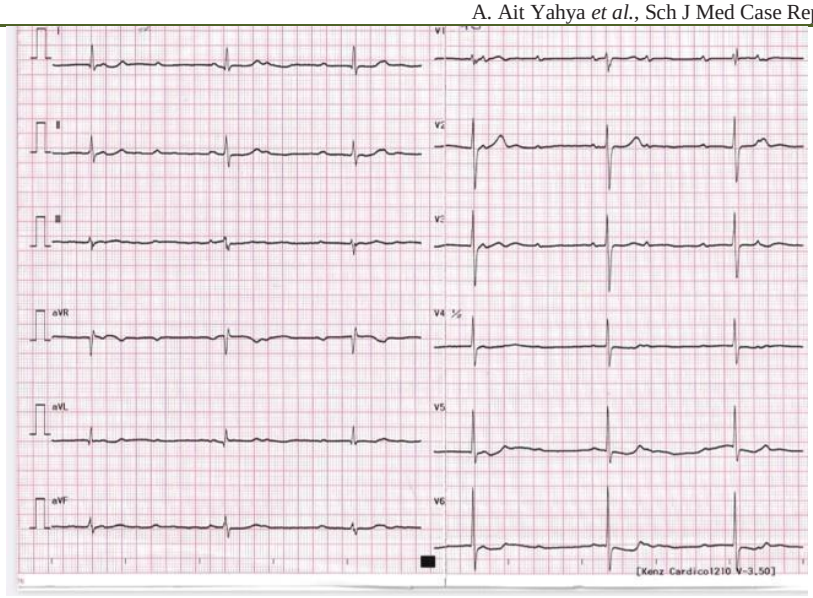
The culpable arteries found were dominated by the right coronary artery (37.3%), followed by the circumflex artery (34.1%) and the anterior inter ventricular artery (28.6%).

Conduction disorders

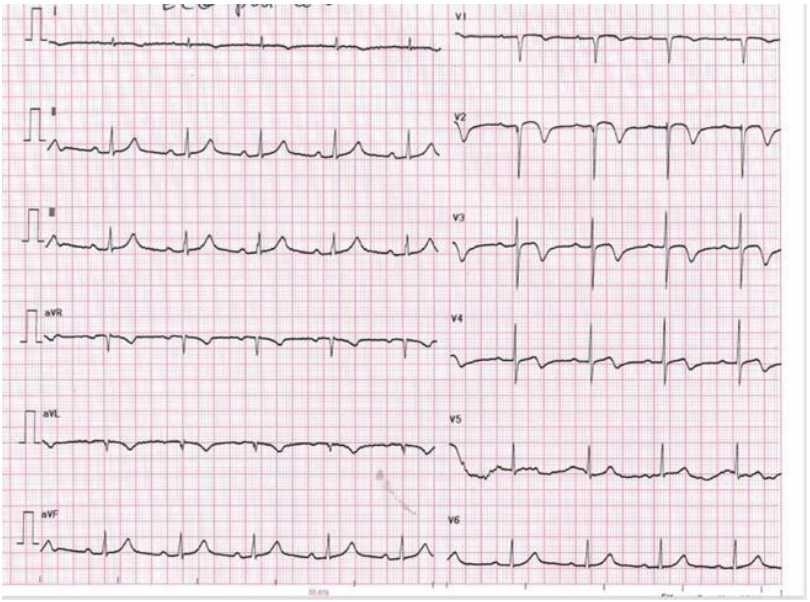
Table 2: Descriptive study of conduction disorders

Conduction disorders	Rate (%)
Right Branch Block	12(23.52%)
AV block	
AVB 1	6(11.76%)
AVB 2	9(17.64%)
AVB 3	8(15.68%)
Total	**51(100%)**

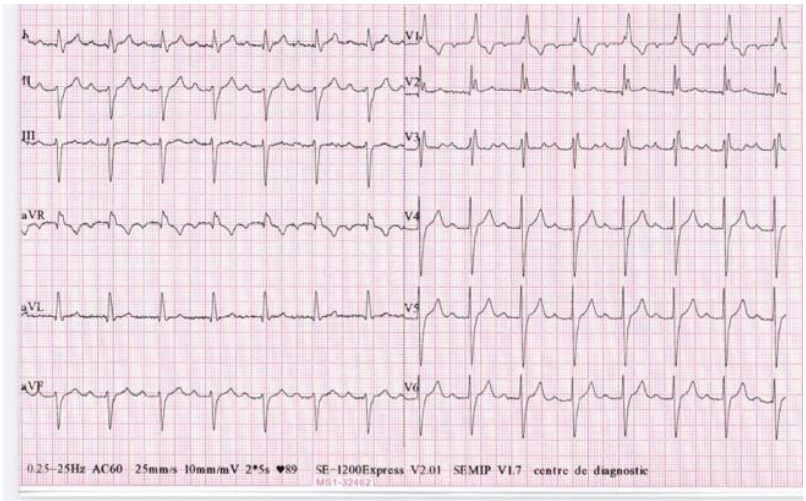
Left bundle branch hemiblock 11(21.56%) Left Branch Block 5(9,8%)



AVB3



AVB1



Bifascicular Block

The treatment

A temporary pace maker was implementedin 17 patients (33%). Angioplasty was performed in 37 patients (72%) and thrombolysis in 5 patients (9.8%).

The evolution of cardiac conduction disorders in hospitals was favourable in all our patients. The average length of stay was 8 days.

Conduction disorders and survival

Survival analysis showed that patients with conduction disorders had a higher cardiac mortality than patients with normal conduction.

There was a clear gradient of risk for patients with conduction disorders, with an increase in the estimated mortality from 19% in patients with normal conduction, to38% in patients with right bundle branch block, to 57% in patients with left bundle branch block, to 58% in patients with bifascicular block and to 60% in patients with complete heart block.

DISCUSSION

Cardiac conduction disorders are common complications in coronary syndrome with ST elevation.

In the literature, there was an increased risk for the development of a conduction disorder in patients with acute coronary syndrome with ST elevation compared to those without ST elevation [4, 5].

The prevalence of heart rhythm disorders in our series in hospitalized patients with ST segment offset coronary syndrome was 16.9%.

The average age of our patients was 59 years, which is higher than that found in a study in the literature. On the other hand another study found the same average age 58 years for men and 62years for women [7].

High blood pressure was a dominant cardiovascular risk factor, the same finding had been made by other authors [8]. We stratified various variables that are cardiovascular risk factors (hypertension, overweight, dyslipidemia, stress) if there was a correlation of these with the development of conduction disorders but we found no significant effects.

The significant effect of these variables and the incidence of conduction disorders remained the same in both groups.

Clinically with respect to left ventricular failure, It is noted in the literature that patients with persistently coronary syndrome with ST-segment elevation associated with cardiac conduction disorder had an increased risk of developing a high Killip class [9].

In our series, 68.63% of our patients did not develop left ventricular failure; this could be explained by the fact that they were properly managed.

The anatomical location of myocardial infarction was especially common in lower myocardial territory (53%). This same observation is also observed by some authors [10]. The lower infarction account for 30-50% of all STEMIs and are generally good prognosis compared to anterior STEMIs [11].

Cardiac conduction disorders during coronary syndrome with persistently ST segment elevation are immediate complications and remain a cause of sudden death, especially second- and third-degree atrioventricular blocks [12]. The recent appearance of a right-limb block on a standard electrocardiogram during acute coronary syndrome with persistence of ST segment elevation is likely to further increase the risk of long-term mortality due to the occurrence of ventricular arrhythmia and cardiogenic shock [8].

The exact mechanism for the development of cardiac conduction disorders during coronary syndrome is still unclear, but some authors would think that it is due to an activation of parasympathetic related nerves in the lower part of the posterior wall of the left ventricle that may be responsible for reflex bradycardia [13, 14]. Some authors in the United States [15] reported high-grade atrioventricular block as conduction disorder heart frequently observed during acute coronary syndrome with ST segment elevation and with a prevalence of 29%.

The high degree atrioventricular block in coronary syndrome with excess ST segment elevation was associated with high rates of complications in hospital, such as heart failure, cardiogenic shock and sudden death.

Disorders of cardiac conduction due to their unpredictable evolution allowed the management of patients by thrombolysis, angioplasty and implantation of provisional pace maker.

The average global lead time in our series was 32.2 hours. In France, the average time to manage coronary syndromes with ST segment overload was 2.9 hours [16]. This speed of management is explained by the presence on most sites of an angioplasty tray available and also of pre-hospital thrombolysis practiced by doctors of the Emergency Medical Assistance Service.

The patients in our series who had a high atrioventricular block all benefited from treatment by

implantation of a provisional pace maker and proscription of treatment by beta-blocker.

The establishment of a temporary pacemaker is formally recommended for the rapid management of high-grade atrioventricular blocks during acute coronary syndrome with persistence of ST segment elevation and also to prevent sudden death [17].

The prognosis for the majority of our patients was favourable after angioplasty, thrombolysis and implantation of atemporary pacemaker.

Early revascularization of patients in Western countries by primary angioplastyor pre-hospital thrombolysis significantlyreduced overall mortality after coronary syndrome.

CONCLUSION

Conduction defects complicated acute myocardial infarction had a graded impact on the short- and long-term prognosis, patients with advanced bundle branch involvement faring worst. The data showeda small decline in the rate of severe conduction defects compared with previous studies, which may reflect the beneficial effects of thrombolytic therapy and angioplasty.

Early consultation and a better understanding of these complications allow for timely and adequate management in order to reduce the high objective mortalityrates in our population.

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