SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspjournals.com/sasjm/

OPEN ACCESS

Influence of Diabetes on the Prognosis of Acute Coronary Syndrome

M. A Raouah*, A. Chetoui, L. Bendriss, A. Khatouri

Cardiovascular Department, Military Hospital Avicenna, University Marrakech, Morocco

DOI: 10.36347/SASJM.2019.v05i09.007 | **Received:** 21.09.2019 | **Accepted:** 28.09.2019 | **Published:** 30.09.2019

***Corresponding author:** Raouah Mohamed Amine

Abstract **Original Research Article**

Coronary heart disease (CAD) is the leading cause of morbidity and mortality among diabetic patients. The aim of our study was to analyze the prognosis of the CAD among these patients. This is a retrospective, descriptive and comparative study over a period of 6 years, from 2011 to 2016; with a total of 386 patients admitted for acute coronary syndrome including 197 diabetic and 186 non diabetic. We compared the epidemiological, clinical, angiographic and therapeutic data for both groups, and analyzed their prognosis. The average age was comparable between the two groups (57.6 for the diabetic versus 58.6 year for non-diabetic). Diabetic patients have more comorbidity with a higher frequency of hypertension (39.3% versus 24.2%), dyslipidemia (83% versus 25.7%) and coronary heredity (7.8 % versus 3.1 %). Left ventricular dysfunction was significantly higher in diabetics VG (53% versus 36 %). Coronary angiography showed damage in three arteries was more common in the diabetes group (38 % versus 6.02%), while single artery damage was more frequent in the non-diabetic group (65.06 % versus 37.69%). In the short term, diabetics are at higher risk of developing left ventricular failure (27.8% versus 11%). The major cardiac event rate was also higher in diabetics (4.1% vs 1%). A more severe prognosis was also found in the short term in the diabetic population with a higher rate of recurrence of acute coronary syndrome (15% versus 7%). In sum, our work focuses on the severity and poor prognosis of coronary artery disease in diabetic patients and its prevalence, which should lead to the attention of health professional and officials on the epidemiological situation of this constantly increasing phenomenon in Morocco.

Keywords: Acute coronary syndrome- Diabetic –angioplasty.

INTRODUCTION

Diabetes mellitus is a major public health problem, 382 million people around the world have diabetes, and this number might reach around 592 million by 2035 according to the world health organization assumptions [1]. Every year 548 billions of dollars are spent to treat misdeeds of diabetes mellitus.

In Middle East and Africa 1 person out of 10 is diabetic [1]. Cardiovascular illnesses are the first cause of morbidity and mortality in the diabetic population, especially the ischemic heart disease (65% of mortality) [2].

Diabetic patients are more likely to have a cardiovascular disease than the general population [2].

The American heart association considers diabetes as one of the 7 major controllable risk factors of cardiovascular diseases.

Diabetic coronary heart disease is known to have an often insidious evolution, making the silent myocardial ischemia and epicardial coronary atherosclerosis the center of the diagnostic and therapeutical approach.

The aim of this study is to evaluate the influence of diabetes on the prognosis of acute coronary syndrome.

MATERIAL AND METHODS

This is a retrospective, descriptive and comparative study over a period of 6 years, from 2011 to 2016; with a total of 386 patients admitted, to cardiology department of the military hospital Avicenna of Marrakesh, for acute coronary syndrome including 197 diabetic and 186 non diabetic.

Included are patients admitted for ACS according to the definition of the European and the American conference, and according to the third global definition of the ACS and the myocardial infract.

Excluded are patients with not enough criteria allowing a complete diagnosis of an ACS, most of them have experienced another origin of chest pain.

For this study, we used records archives of the cardiology department, as well as on anamnestic, clinical, para-clinical data collected in coronary consultation at one month.

Anonymity and confidentiality of Patients' information were respected during the data collection.

RESULT

The incidence of diabetes in the target population is 51%. Diabetic patients are often feminine (65% vs 41 %). Compared to the non-diabetic patients, diabetic have more associated risk factors with a higher frequency of high blood pressure (39% vs 24,2%), of dyslipidemia (83% vs 25,7%), of abdominal obesity (43,2 % vs 17,1%) and familial history of coronary diseases (7,8% vs 3,1%); on the contrary smoking is more frequent in the non-diabetic group (63,7% vs 57,7%).

The history of cardiovascular diseases (nephropathy, peripheral artery occlusive disease (PAOD) and stroke) are far more predominant in the diabetic group.

The most found complication in diabetic patients is the nephropathy (11,5%) followed with strokes (p=0,004/p=0,01).

Clinically the symptomatology is significantly unusual in diabetic patients, Dyspnea being the most found symptom in this population

According to the Killip Classification, diabetic patients are more likely to present a heart failure immediately upon admission compared to the non-diabetic: 41,9% of diabetics versus 18,36% of non-diabetics. (p=1,5); they're also more likely to present massive acute pulmonary oedema upon admission compared to the non-diabetic (p=0,008).

The 18-lead resting electrocardiogram is systematically practiced searching for any repolarization disorder compatible with the diagnosis of ACS.

In any cases the most frequently found anomaly is ST-segment elevation (49,74%) with no significant difference.

In diabetic group the troponin average value is more important than in the non-diabetic group (7,87 +/- 2,7 µg/L versus 1.27 +/- 1.1 µg/L).

The echocardiography was systematically performed upon admission as well as upon discharge, Showing dilated left ventricle and a systolic dysfunction of the left ventricle more important in the diabetic group (49,1% versus 27,5%) (p=0,03).

The diastolic dysfunction of the left ventricle is significantly more important in the diabetic population (53% vs 36%).

Rates of coronary angiography and coronary angioplasty are comparable within the two groups (61,03% vs 38,98% for the coronary angiography and 35,53% vs 35,44% for coronary angioplasty).

The results of the coronary angiography showed that triple vessel disease is more frequent in the diabetic group (38% versus 6,02%) though mono truncal is more frequent in the non-diabetic group (65,06% vs 37,69%).

In short term, diabetics are at higher risk to develop a left ventricular failure (27,8% vs 11%). With a higher rate of major cardiac events (4,1% vs 1%).

Table-1: Coronary angiography aspects in ACS in diabetic and non-diabetic patient

Coronary Lesions	Diabetic N=130	Non-diabetic N=83	P
Normal Coronarography	9,2%	12,04%	NS
Non-significant lesions	6,9%	6,02%	NS
Mono truncal	37,69%	65,06 %	0,002
Bi truncal	9,23%	10,84	NS
Triple truncal	38%	6,02%	0,001
TCG	9,23%	2,4%	NS
IVA	81%	57,83%	0,005
Circumflex	50,76%	36;14%	NS
Right coronary	44,61%	38,55%	NS
Collaterals	9,23%	3,61%	NS
Diffuse lesions	36,9%	15,66%	0,004

Table-2: Complications of ACS in diabetic and non-diabetic patients

Complications	Diabetics		Non-diabetics		P
	N	%	N	%	
Death	8	3,9	1	0,7	0,9
Cardiogenic shock	8	4,1	2	1	0,7
Left ventricular failure	55	27,8	21	11	0,01
Ventricular arrhythmia	26	13	9	5	0,02
Recurrent angina	30	15	13	7	0,003

DISCUSSION

Diabetes is a major public health problem in morocco considering its important complications despite the progress in its management and prevention. Our study showed that patient with diabetes suffering an ACS have unique characteristics compared to the non-diabetic population.

The high prevalence of diabetic patient presenting an ACS have been detected in lots of studies in the US and Europe. In the « American registry Crusade » [1] the prevalence of diabetes was at 33% in a population of 46410 patients with an ACS. Our study showed that the prevalence of diabetes is more important in the case of an ACS because 51% of patients with coronary heart diseases had diabetes. Diabetic patients have more combined cardiovascular risk factors: high blood pressure, dyslipidemia, family history of coronary heart diseases and obesity.

Non-diabetic patients have smoking as a principal cardiovascular risk factor, that remains the most important controllable cardiovascular risk factor as shown in many studies [3].

The diabetic neuropathy leads to a defective alarm system for angina, the chest pain is significantly atypical in diabetic patients as it was stated in literature particularly David Brieger's study [4] and RF Bradley's [5] stating respectively 23,8% versus 8,4 % and 26,3 versus 12,6%.

The echocardiography evaluation of the ejection fraction showed a more important alteration in diabetic patients than in the non-diabetic, which is comparable to the results found in the literature as seen in Fazel's [6] and José's study [7].

Diabetes accentuates the atheroma process by causing endothelium dysfunction and amplifies inflammatory reactions in atherosclerosis [8].

It increases the instability of atheromatous plaques and the coronary thrombosis that rushes the occurrence of an ACS. This explains the results found in our study and in the one found on the American archives of NHLBI [9] ; Who have listed coronary angioplasty practiced between 1985 and 1986 in 16 American centers who have noted that diabetic patients have frequently multi truncal and distal lesions.

In our series, angioplasty was performed in 39,6% cases in diabetic patients and in 61,53% in non-diabetic patients. This matches the data found in a JAVA meta-analysis [10] where percentages were respectively 46% and 78,2%. This may be related to the use of aorto-coronary bypass surgery in patients with diabetes. These results matches the results found in the literature where a meta-analysis based on 11 randomized trails (OPUS, In Time II, TACTICS, INTEGRITY, A to Z, PROVE IT, ENTIRE, FASTER, EXTRACT, JUMBO et CLARITY-TIMI) done between 1997 and 2006 on more than 62000 patients with ACS.

Left ventricular heart failure and the recidivist angina are still the most two common complications found in diabetic population. The exact same results were found in the studies of Fazel [11] FINACS [12] and Ben SALEM [13], this is mostly explained by the low ejection fraction in people with diabetes as it was demonstrated by José [7] and FAZEL [6], and by the effect caused by the diabetic cardiomyopathy, the cardiovascular autonomic neuropathy, that participates in diastolic and systolic dysfunction. the ventricular arrhythmia and the auriculo-ventricular conduction dysfunction that are frequently found in people with diabetes and their presence conditions the prognosis knowing that the mortality rate, in the presence of conduction dysfunction in the acute phase, is at 70% [14].

The severity of the prognosis is at the first place allotted to the extensive diffuse and distal coronary lesions in patients with diabetes, then to the presence of comorbidities (hypertension blood pressure, obesity, dyslipidemia) and finally to coagulation abnormalities and endothelial dysfunction which leads to a high frequency of recurrence of an ACS in coronary patients with diabetes [15].

CONCLUSION

Acute coronary syndrome in patient with diabetes has a particularly poor prognosis given the metabolic alterations in endothelioma associated with diabetes, the thrombosis phenomena, and the combination with numerous cardiovascular risk factors and the severity of the coronary lesions.

Increased risk for diabetic patients after acute coronary syndrome presents a real therapeutic challenge and must be multidisciplinary, involving the

cardiologist, the diabetologist and the general practitioner, who is a constant pillar in this equation.

Enhancing the prognosis resides in the treatment of the associated cardiovascular risk factors, the screening of silent myocardial ischemia in at-risk communities by performing a yearly stress test and a therapeutic based principally on antiplatelet agent and an appropriate reperfusion strategy.

It is important to draw the healthcare professionals and the people in charge's attention on the epidemiological situation of this phenomena in our country and the importance of the establishment of a codified approach to reduce its prevalence as well as its complications that can be fatal.

Other prospective and multicentric studies prove to be necessary for a better approach and management of this affection.

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