**Scholars Journal of Applied Medical Sciences**
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublisher.com/sjams/

OPEN ACCESS

**Cardiology**

# Acute Coronary Syndromes and Diabetes Mellitus in Morocco: Study of 430 Patients

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**DOI:** 10.36347/sjams.2020.v08i01.057 | **Received:** 20.01.2020 | **Accepted:** 27.01.2020 | **Published:** 30.01.2020

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**Abstract** **Original Research Article**

In diabetic patients, coronary artery disease (CAD) is the mean cause of morbidity and mortality. To evaluate CAD among diabetic patients, we conducted retrospective study concerning 430 patients hospitalized for CAD in the cardiology department of the Avicenne Military Hospital of Marrakesh from January1, 2008 to December 31, 2016. Our patients were divided into 2 groups: 230 were diabetics (GI) and 200 were non-diabetics (GII). The average age of patients in group I was 58 years versus 60 years in group II (p = 0.043). The statistical analysis did not show any significant difference between the two groups regarding sex. Diabetic patients had more co-morbid factors with a higher frequency of hypertension, dyslipidaemia, while non-diabetics are more likely to be smoking. LV systolic and diastolic dysfunction was higher in group I. Coronary angiography showed damage in three arteries was more common in the group I, while single artery damage was more frequent in the non-diabetic group. Our study focuses on the severity of CAD among diabetic patients and its prevalence, prompting to draw the attention of health professional on the epidemiological situation of this phenomenon in our country.

**Keywords:** Diabetes mellitus, acute coronary syndrome, coronary angiography.



## INTRODUCTION

Diabetes mellitus has reached epidemic proportions worldwide and the prevalence is rising, according to the World Health Organisation (WHO) the incidence of diabetes is expected to double in 2025. Cardiovascular disease especially; coronary artery disease is the leading cause of morbidity and mortality in diabetics (75% of mortality).

Despite moderate therapy and management strategies for CAD, diabetes confers a significant adverse prognosis which high lights the importance of aggressive strategies to manage this high risk population with ischemic heart disease.

This work aims to:

1. Establish the epidemiological profile of acute coronary syndrome among diabetic population.
2. Evaluate the short-term outcome of acute coronary syndromes in diabetics.

## MATERIALS AND METHODS

We conducted a mono-centric comparative, descriptive, retrospective study over a nine-year between, January 1, 2008 and December 31, 2016, at the department of cardiology of the military hospital in Marrakech, Morocco. In our study, 430 patients were admitted for ACS during this period; 230 were diabetics; all our patients benefited from a complete clinical examination, a 18 lead ECG, echocardiography, and biological assay with fasting plasma glucose, HbA1c and complete lipid profile including HDLc, LDLc and triglyceride and high sensitive troponin; patients were classified as having diabetes based on medical history, or discovered during admission based a blood glucose intake above 2g/l on a sample taken at any time during the day or in the case of fasting glucose greater than 1.26g/l twice. Left ventricular function was performed by using modified Simpson's method in 4-ch and 2-ch apical views; reduced ejection fraction was considered a less than 50%. In coronary angiography, CAD was defined as stenosis of coronary artery of 50% or greater. Multivessel disease was defined as the involvement of any three or more of the following four arteries: the left mean artery, the left descending artery, the left circumflex artery and the right coronary artery. Multilesion disease was defined as three or more lesions in a single vessel, whereas an extensive lesion was defined as a stenosis of more than 10mm in length. Data analysis was performed in SPSS 13.0 software.

Quantitative variables were compared by Student's T test. The qualitative variables were compared by the Khi2 test. The threshold of statistical significance was set at 5%. The collection of data was done with respect of agreement of the patients and confidentiality of their information.

## RESULTS

From the 430 patients, 53.4% were diabetic (group I) and 46.6% were not diabetic (group II); the average age of patients in group I was 58+9 years versus 60+3 years in group II. Statistical analysis showed a significant difference between the two groups of patients in mean age (p=0.043). The statistical analysis did not show any significant difference between the two groups regarding sex. Group I patients had more co-morbid factors with a higher frequency of hypertension, dyslipidemia, while non-diabetics are more likely to be smoking (Table-1).

The symptoms of ACS were more atypical in patients of the group I than group II (32.2% versus 3.2%). Diabetics had more prevalence of heart failure than non-diabetic patients (Table-2). LV systolic and diastolic dysfunction was higher in group I (Table-3).

Coronary angiography was performed in 84.7% (195 cases) of patients in group I, and 83.5% (167 cases) in group II patients. Diabetics have readily avascular and diffuse coronary artery disease predominantly on the left descending artery (Table-4).

**Table-1: Coronary artery diseases risk factors in the population of the 2 groups**

| | GI N=230 | GII N=200 | p |
|---|---|---|---|
| Hypertension | 48.6%<br>122 cas | 22.5%<br>45 cas | 0.0005 |
| Smoking | 39.5%<br>91 cas | 65%<br>130 cas | 0.0003 |
| dyslipidaemia | 35.6%<br>82 cas | 11.5%<br>23cas | <0.0001 |
| Obesity | 28.6%<br>66 cas | 14%<br>28 cas | 0.005 |

**Table-2: Hemodynamic statue based on killip classification**

| Killip | GI N=230 | GII N=200 | p |
|---|---|---|---|
| Killip 1 | 62.6%<br>144 cas | 82.5%<br>165 cas | 0.004 |
| Killip 2 | 9.1%<br>21 cas | 8.5%<br>17 cas | NS |
| Killip 3 | 25.2%<br>58 cas | 9%<br>18 cas | 0.002 |
| Killip 4 | 2.6%<br>6cas | 1.5%<br>3cas | NS |

**Table-3: Left ventricular assessment by echocardiography**

| | GI N=230 | GII N=200 | P |
|---|---|---|---|
| LVEF<50% | 43.9%<br>101cas | 31%<br>62cas | 0.017 |
| Diastolic dysfunction | 51.7%<br>119cas | 33%<br>66cas | 0.008 |
| Left chamber dilatation | 30.4%<br>70cas | 18%<br>36cas | 0.037 |

**Table-4: The findings of coronary angiography**

| | Groupe I n=195 | Groupe II N=167 | P |
|---|---|---|---|
| Normal coronarography | 8.7% 17cas | 10.7% 18cas | NS |
| Non significatif lesions | 5.6% 11cas | 5.3% 9cas | NS |
| Mono troncular | 37.9% 74cas | 63.4% 106cas | 0.002 |
| Bi-troncular | 8.7% 17cas | 10.1% 17cas | NS |
| Tri-troncular | 37.9% 74cas | 7.1% 12cas | <0.001 |
| Left main artery | 8.7% 17cas | 2.9% 5cas | NS |
| Interventicular artery | 77.9% 152cas | 56.2% 94cas | 0.005 |
| Multi-vessels lesions | 35.8% 70cas | 14.9% 25cas | 0.004 |

## DISCUSSION

The risk of CAD is significantly high in diabetics compared to non-diabetics and accounts about 30% of deaths in this population [1, 2]. Diabetes is a determinant of the severity of coronary heart disease and potentiates other cardiovascular risk factors [3]. In DM population, the association of several cardio-vascular risk factors has been described. Indeed, dyslipidemia, arterial hypertension and obesity are common in diabetics [4]. The symptom nevertheless can be atypical, or even absent, because of abnormalities in the perception of pain [1].

In our series, 27.8% of diabetic were admitted to stage 3 or 4 of Killip dyspnea, while 10.5% of non-diabetic patients are admitted to stage 3 and 4 of Killip. This can be explained by several mechanisms: a significantly lower ejection fraction in diabetics, as shown by the studies of José [5] and Fazel [6], the effect of diabetic-specific cardiomyopathy, the effect of autonomic cardiac neuropathy which itself participates in diastolic and systolic LV dysfunction [7, 8]. Coronary angiography alone makes it possible to assess the number and site of so-called hemodynamically significant stenosis, as well as the downstream bed [9]. In our series, coronary lesions are extensive, diffuse and multitruncular in diabetic patients compared to non-diabetic patients. This is consistent with literature data. Autopsy and angiographic studies of Goraya [10] showed from an autopsy study in 293 diabetics and 736 non-diabetics that the presence of stenosis>75% was found in 75% of diabetics and 55% of non-diabetics ($p<0.01$); multitroncular involvement was observed in 58% of diabetics compared to 41% of non-diabetics ($p<0.01$). Similar results have benne reported by Ledru [11] from an angiographic study performed in 193 diabetics and 373 non-diabetics. This is explained by the fact that diabetes alone accentuates the atheromatous process by causing endothelial dysfunction and by amplifying the inflammatory reactions involved in atherosclerosis [12]. The severity of the prognosis in diabetics is attributed primarily to the extensive, diffuse and distal features of coronary lesions, in addition to coagulation abnormalities and endothelial dysfunction, and consequently a high frequency of recurrence of ACS [13].

## CONCLUSION

Patients with DM type 2 have a higher prevalence of coronary artery disease, a greater extent of coronary ischemia, and are more likely to have a myocardial infarction (MI) and silent myocardial ischemia compared to non-diabetic patients. The increase in cardiovascular risk is due both to diabetes and the presence of other risk factors. Diabetes type 2 is considered to be a CAD equivalent, as twofold of threefold increased risk of clinical atherosclerotic disease has been reported in patients with DM. although, a significant progress has been made in the recent days regarding the treatment of diabetes mellitus, many more large scale studies are required to examine the implication of diabetes CAD and to evaluate the impact to different therapeutic strategies on patients with DM type 2.

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