International Journal of Research in Pharmacy and Science

ISSN 2249-3522

Research Article

The prevalence of diabetes mellitus in patients with acute coronary syndrome in King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia

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ABSTRACT

Coronary atherosclerosis is accelerated and highly prevalent in patients with diabetes mellitus. Acute coronary syndrome (ACS) is common in diabetes mellitus and is a major cause of mortality and morbidity in these patients. The aim of this study is to assess prevalence of diabetes mellitus among patients with acute coronary syndrome in King Abdulaziz University hospital, Jeddah, Saudi Arabia. The study included 115 patients (21 females and 94 males) with acute coronary syndrome out of 133 patients admitted to CCU ward of KAUH from January to June 2014.ECG changes and levels of myocardial enzymes (troponin), HbA1C, serum triglycerides and cholesterol were recorded at admission. Out of all patients 70% were diabetics and 20% were prediabetics. Approximately 21% had unstable angina (UA) and 79% had myocardial infarction (MI). Out of 24 patients with unstable angina 4% were nondiabetics, 30% were prediabetics, and 66% were diabetics. Out of 91 patients with myocardial infarction 12% were nondiabetics, 18% were prediabetics, and 70% were diabetics. Serum cholesterol, triglycerides, and LDL levels did not differ between diabetic patients with or without acute coronary syndrome. Diabetes was more frequent among females than males (80.95% vs. 67.02%).In this prospective study about 70% of patients with acute coronary syndrome have diabetes, which may cause more serious complications of acute coronary syndrome.

Key words: *Atherosclerosis, Diabetes, Jeddah, Acute Coronary Syndrome*

INTRODUCTION

Diabetes mellitus (DM) and acute coronary syndrome (ACS) are widely distributed diseases that occurs in many persons all over the world. Despite the advances in the diagnosis and management, cardiovascular diseases (CVD) remain the main important cause of mortality and morbidity in diabetic persons[1,2]Worse outcomes for diabetic patients with ACS established compared with nondiabetic patients[3]. The prevalence of diabetes in ACS population increased from 18% in 1997 to 30% in 2006[4].Diabetes mellitus seems to double the risk for coronary disease (CAD) in men and triple the risk in women[5,6].Moreover, The poor prognosis associated with AMI in patients with diabetes mellitus was observed in many studies despite adjustment for age[7,8], sex[9], additional comorbidities[10], and coronary risk factors[11,12].The aim of this study is to assess the prevalence of diabetes based on the HbA1c results among patients admitted with the diagnosis of acute coronary syndrome in KAUH, Jeddah, Saudi Arabia

PATIENTS AND METHODS

After ethical approval (Registration no. HA-02-J-2008) (Reference no. 195-16) from KAUH ethical committee, the present work studied the patients who were admitted consecutively to CCU, KAUH, Jeddah, Saudi Arabia, between January 2014 and June 2014 with a diagnosis of acute coronary syndrome. All patients admitted to the coronary care unit with

ISSN 2249-3522

the diagnosis of acute coronary syndrome were included in our study, all the investigations and management steps were according to the policy and procedure of the hospital and following the hospital guide lines of ACS management protocol. Patients that had missing data of some of the investigation were excluded from the study. The total number of patients included in the present study were 133 patients, 18 patients of them were excluded because they did not do HbA1c.Laboratory investigations including myocardial enzymes (troponins), glycated hemoglobin (HbA1c), serum triglycerides, total cholesterol, and low-density lipoprotein were done. The criteria for the diagnosis of myocardial infarction and unstable angina depended on clinical manifestations, levels of troponins, and ECG changes. According to the level of HbA1c (table 1)[12], the patients were classified as nondiabetics, prediabetics, and diabetics

Table 1: American diabetes association standards of medical care in diabetes 2014

	Normal	Prediabetes	Diabetes
Fasting blood glucose	70-99 mg/dL	100-125 mg/dL	126 mg/dL or more
Postprandial blood glucose	<140/dL	140-199 mg/dL	200 mg/dL or more
HbA1c	5.6%	5.7-6.4%	6.5% or more

RESULTS

Out of 115 patients studied in the present work 70% were diabetics and 20% were prediabetics. Approximately 21% had unstable angina (UA) and 79% had myocardial infarction (MI). Out of 24 patients with unstable angina 4% were nondiabetics, 30% were prediabetics, and 66% were diabetics. Out of 91 patients with myocardial infarction 12% were nondiabetics, 18% were prediabetics, and 70% were diabetics. Diabetic patients with myocardial infarction had significantly higher HbA1c than diabetic patients with unstable angina. Diabetic patients with myocardial infarction had significantly higher HbA1c than diabetic patients with unstable angina. It was found that the frequency of diabetes is higher in females than in males (80.95% vs. 67.02%). Regarding serum cholesterol, triglycerides, and LDL levels there was no difference between patients with diabetes & ACS and diabetic patients without ACS. The results are summarized in tables (2), (3), and (4).

Table 2: The prevalence of diabetes and hyperlipidemia in patients with unstable angina (UA) and myocardial infarction (MI).

	Patients with UA (n=24)	Patients with MI
Diabetes mellitus, No (%)	16 (66.8%)	64 (70.3)
Hypercholesterolemia, No (%)	1(4.2%)	6 (6.6%)
Hypertriglyceridemia, No (%)	4 (16.8%)	20 (21%)
High LDL, No (%)	2 (8.3%)	10 (11%)

Table 3: Clinical and laboratory characteristics of patient classified according to a HbA1c

Clinical characteristics		HbA1c classification		
		No diabetes	Prediabetes	Diabetes
N=115		12 (10%)	23 (20%)	80 (75%)
Age (Mean)		56 years	56 years	60 years
Sex (men %)		75	96	79
Cardiac diagnosis	UA (n=24)	1 (4%)	7 (30%)	16 (66%)
	AMI (n=91)	11 (12%)	16 (18%)	64 (70%)
Laboratory variables	HbA1c (%)	5.26	6.16	9.9
	Cholesterol (mmol/I)	4.5	4.4	4.3
	Triglyceride (mmol/I)	1.5	1.6	1.6
	LDL (mmol/I)	3.2	3	2.9

*UA=Unstable angina
*AMI=Acute myocardial infarction
*LDL=Low density lipoprotein

Table 4: The frequency of risk factors in different genders

	Females (N=21)	Males (N=94)
Unstable angina {n(%)}	4 (19%)	20 (21.3%)
Acute myocardial infarction {n (%)}	17 (81%)	74 (78.7%)
Diabetes mellitus {n (%)}	17 (81%)	63 (67%)
Cholesterol	3.87 mmol/l	4.43 mmol/l
Triglycerides	1.32 mmol/l	3 mmol/l
Low density lipoprotein	2.3mmol/l	1.6mmol/l
Age	67 years	58 years

DISCUSSION

Diabetes is a frequent finding in patients with acute coronary syndrome. Internationally this subject has been dealt in detail. Many studies are available in which not only the prevalence of diabetes in ACS but also its relation with prognosis and treatment of ACS is made clear [12-20]. To the best of our

knowledge no study regarding the prevalence of diabetes in patients with acute coronary syndrome was done in KAUH, Jeddah.

Kristen Franklin et al. studied the prevalence of diabetes mellitus in patients with ACS in 94 hospitals in USA, Europe, Australia, and New Zealand. Their results showed that a large number of patients with an ACS has diabetes (approximately 1 in 4 patients). Patients with diabetes were older and more often women[14].

Sean M. et al. and Gunjan et al. reported that approximately 17% of patients with ACS had diabetes mellitus in USA. Patients with diabetes at ACS presentation were older, more often women, obese, and more likely to have a history of known hyperlipidemia[15,16].

Magorzata B. et al. studied the prevalence of abnormal glucose regulation in patients with coronary disease in 110 centers in 25 European countries[17]. They found that the prevalence of prediabetes and diabetes mellitus in patients with acute coronary syndrome was 36% and 22% respectively.

Based on studies done by Tenerz A. et al. in Sweden; Liu J. et al in China; Alireza E. et al. in Iran; and Ayman A. et al. in Quarter, the prevalence of diabetes in patients with acute coronary syndrome was 25%, 22.6%, 30%, and 54% respectively[18-21].

In the present population-based study the prevalence of diabetes mellitus in patients admitted with acute coronary syndrome was 70%. This is higher than those reported by others[14-20], but it is comparable to other studies[21].

The high prevalence of diabetes in patients with ACS in our study may be attributed to high prevalence of diabetes in Saudi Arabia[22]. In addition, many factors present in the developing countries including increased consumption of energy-rich foods and decreased energy expenditure, through less physical activity, increase prevalence of atherosclerosis especially in diabetic patients.

Our data also showed that both prediabetic and diabetic patients with long standing high blood glucose levels(as indicated by higher HbA1c) had more myocardial infarction than patients with normal blood glucose indicating that long standing elevated blood glucose levels may play an important role in the development of acute coronary syndrome. This observation is consistent with other studies that observed the high prevalence and poor prognosis of acute coronary syndrome in patients with abnormal glucose metabolism[17-23]. It is suggested that long standing hyperglycemia may accelerate the development of coronary atherosclerosis in prediabetic and diabetic patients and consequently may contribute to the risk of acute coronary syndrome[2].

The present study showed that the prevalence of acute myocardial infarction was higher in diabetic women than in diabetic men. This is consistent with studies done by others who observed that diabetic women with ACS were more than diabetic men with ACS, and they were more subjected to morbidity and mortality[2,24,25]

LIMITATIONS TO THE STUDY

The small number of patients studied in the present work is a limitation. In addition, the study did not correlate the effect of the duration of diabetes mellitus on the incidence and outcome of acute coronary syndrome. Also, the present work did not include patients who developed hyperglycemia due to stress of acute myocardial infarction. Further prospective studies are needed to clarify these issues.

CONCLUSION

In this prospective study about 70% of patients with acute coronary syndrome have diabetes which may cause more serious complications of acute coronary syndrome. Therefore, it is essential pay more attention on the treatment of DM for the purpose of secondary prevention of ACS.

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