ORIGINAL ARTICLE

FREQUENCY OF DIABETES MELLITUS IN PATIENTS WITH ACUTE CORONARY SYNDROME

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Background: Diabetes mellitus is a major risk factor for atherosclerosis which eventually causes cardiovascular disease specially affecting coronary arteries. Patients with diabetes have a risk for coronary events similar to that of patients without diabetes who have already had an event, and conversely many patients with established coronary artery disease suffer from diabetes or its pre-states. The objective of study was to determine the frequency of diabetes mellitus in patients presenting with acute coronary syndrome in our setup. **Methods:** This cross sectional study was conducted in the Department of Cardiology and Medical unit-B of Ayub Medical College, Abbottabad from October 22, 2009 to April 22, 2010. All patients of either gender presenting with acute coronary syndrome above 25 years of age were included in the study by consecutive non-probability sampling. **Results:** Two hundred and fifty patients were included in study. Of these 161 (64.4%) were males and 89 (34.6%) were females. The mean age of the study participants was 57.75 years. Frequency of diabetes mellitus was 31.6% and most (62%) of the known diabetics with ACS were having poor glycaemic control. The coronary event which was seen in the majority (74%) of patients was ST segment elevation myocardial infarction. **Conclusion:** The frequency of diabetes mellitus in this study was significant as one out of every third patient with acute coronary syndrome was diabetic.

Keywords: Diabetes mellitus, cardiovascular disease, acute coronary syndrome

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INTRODUCTION

Diabetes mellitus is rapidly emerging as a global health care problem that may reach pandemic levels by 2030, with the most noticeable increase occurring in developing countries.[1] Pakistan was at number 8 in world in 1995 with 4.3 million people affected by diabetes mellitus and it is estimated that it will be at number 4 with 14.3 million people with this disease by the year 2025.[2] The annual mean direct cost for each person with diabetes was estimated to be US $ 197 and it was also found that increasing age, the number of complications and longer duration of disease significantly increase the burden of cost on society.[3] People with diabetes are at elevated risk for a number of serious health problems including cardiovascular disease (CVD), premature death, blindness, kidney failure, amputations, depression, and cognitive decline.[4] CVD is the most common complication associated with diabetes.

According to global registry for acute coronary events, approximately one in four patients presented with acute coronary syndrome has history of diabetes[5] and this confers an adverse prognosis with mortality at 30 days and at one year significantly higher than in patients without diabetes.[6] Acute coronary syndrome (ACS) is a term used to describe a group of conditions resulting from acute myocardial ischemia and ranging from unstable angina to myocardial infarction. The most common cause of this myocardial ischemia is atherosclerosis of coronary arteries. The risk factors for atherosclerosis are hyperlipidemia, hypertension, cigarette smoking, and diabetes mellitus. Because of the importance of diabetes mellitus and ACS in the context of public health, it is pertinent to know the prevalence of diabetes mellitus in ACS in our patients. This will help the care givers to concentrate on this problem as well as the policy makers to suggest meaningful interventions.

MATERIAL AND METHODS

This cross-sectional study was conducted in the department of cardiology and medical unit-B of Ayub Medical College, Abbottabad from 22 October, 2009 to 22 April, 2010 by enrolling 250 patients. Consecutive (non-probability) sampling technique was used to register patients. All patients admitted with ACS of both genders and above the age of 25 years were included in the study. The patients, who were already having ischemic heart disease, were excluded from the study. Informed consent of patients was taken before data collection. The institutional ethical committee approved the study. Data was collected using structured *pro forma*. Patients presenting with chest pain were carefully evaluated by checking previous medical records were checked. ACS was confirmed by doing ECG and cardiac enzymes. ST Elevated Myocardial Infarction (STEMI) was confirmed by ST elevation of 2mm or more in chest

leads or ST elevation of ≥ 1mm in two or more limb leads. Patients who had ST-T changes with raised cardiac enzymes were labelled as non-ST elevation myocardial infarction (NSTEMI) while negative cardiac enzymes with ST-T changes had unstable angina. Fasting blood sugars were done on Metro lab-2300; Ravelon access clinical analyzer in Ayub Teaching Hospital laboratory and reported by a pathologist. Patients were labelled as newly diagnosed diabetics who had fasting blood sugars more than 7.0mmol/l. Glycosylated haemoglobin measurement by the chromatographic assay with pre-weighted resins was performed in known diabetics with ACS to assess their glycaemic status. Data was analysed using SPSS-10.

RESULTS

A total of 250 patients with ACS were included in this study. There were 161 (64.4%) males and 89 (35.6%) females. Mean age for the participants was 57.75±10.88 years (range 32–90 years). Mean age for males was 57.25±10.86 years and for females it was 58.65±10.91 years.

STEMI was found in 185 (74%) patients. with 128 males and 57 females. There were 34 (13.6%) patients with NSTEMI and unstable angina (UA) was present in 31 (12.4%) patients. Fourteen male patients and 20 female patients had NSTEMI. Unstable angina was present in 19 male patients and 12 female patients (Table-1).

In patients with STEMI, most of them had anterior wall involvement. The distribution of type of acute coronary syndrome according to area of myocardium involved is illustrated below in Table-2. Distribution of patients with area of myocardium involved by gender are shown in Table-3.

There were 79 (31.6%) patients out of 250 patients of ACS who had diabetes. There were 64 (25.6%) patients who had history of diabetes while 186 (74.4%) had no history of diabetes. There were 15 (6%) patients who were newly diagnosed diabetics. Forty-one patients with diabetes were males and 38 were females.

The mean age of diabetic patients was 57.66± 10.88 years while non-diabetics were of 57.80±10.90 years. The male diabetics were having mean age of 57.49±10.85 years. The mean age of female diabetics was 57.84±11.06 years. Fifty five diabetic patients had STEMI, 11 were having NSTEMI and UA was present in 13 diabetic patients.

There were total of 79 diabetic patients in this study. Fifty-two diabetic patients had anterior wall involvement. Inferior wall was involved in 20 diabetic patients. One patient had antero-inferior wall, 3 patients had antero-lateral wall, one patient antero-posterior and 2 patients had infero-lateral wall involvement (Table-4).

Glycaemic status of the known sixty four (64) diabetic patients with ACS was assessed by measuring Glycosylated haemoglobin (table-5).

Table-1: Distribution of type of ACS by gender

Type of ACS	Male	Female	Total
STEMI	128	57	185
NSTEMI	14	20	34
UA	19	12	31
Total	161	89	250

Table-2: Distribution of type of sACS according to area of myocardium involved

Area of myocardium involved	STEMI	NSTEMI	UA	Total
Anterior wall	108	27	28	163
Antero-inferior wall	6	00	01	7
Antero-lateral wall	10	00	00	10
Antero-posterior wall	1	00	00	1
Inferior wall	54	06	1	61
Infero-lateral wall	1	01	00	2
Infero-posterior wall	5	00	00	5
Lateral wall	00	00	1	1
Total	185	34	31	250

Table-3: Distribution of area of myocardium involved according to gender

Area of myocardium involved	Male	Female	Total
Anterior wall	106	57	163
Antero-inferior wall	5	2	7
Antero-lateral wall	6	4	10
Antero-posterior wall	00	1	1
Inferior wall	40	21	61
Infero-lateral wall	00	2	2
Infero-posterior wall	3	2	5
Lateral wall	1	00	1
Total	161	89	250

Table-4: Distribution of diabetes mellitus according to area of myocardium involved

Area of myocardium involved	Diabetes mellitus		Total
	Yes	No	
Anterior wall	52	111	163
Antero-inferior wall	1	06	7
Antero-lateral wall	3	07	10
Antero-posterior wall	1	00	1
Inferior wall	20	41	61
Infero-lateral wall	2	00	2
Infero-posterior wall	00	5	5
Lateral wall	00	1	1
Total	79	171	250

Table-5: Glycaemic status of known diabetic patients with ACS

Glycosylated haemoglobin(HbA1c)*	Glycaemic status	No. of Patients
<6.5	Good	14
6.5–≤ 7.5	Satisfactory	09
>7.5	Poor	41

*Referenced to a non-diabetic range of 4–5.6 gm% of HbA1c using Bio-Systems based assay

DISCUSSION

Cardiovascular diseases are important medical and public health issues throughout the world with more so for developing countries like Pakistan which face

the dual burden of still prevalent communicable diseases as well as an increasing burden of non-communicable diseases like cardiovascular illnesses and diabetes. From 1990 to 2020, the rise in mortality due to ischemic heart disease in developing countries is predicted (137% in men and 120% in women) to be much higher than in developed countries (48% in men and 29% in women). According to National Health Survey of Pakistan, cardiovascular diseases result in more than one hundred thousand deaths per year in the country, which is 12% of all causes of mortality.[7]

The International Diabetes Federation gives an estimate of 12% prevalence in Pakistan with a total of 7.8–8 million people with diabetes in 2000, which is expected to increase to about 14.5 million people by the year 2025.[8] Diabetes mellitus is associated with an increased risk of cardiovascular morbidity and mortality.[9] It is an independent risk factor for coronary artery disease. The incidence of diabetes mellitus in patients hospitalized with myocardial infarction ranges between 10–20%[11], and approximately 40% have impaired glucose levels.

In the present study patients with acute coronary syndrome were studied for the presence of diabetes mellitus. Frequency of diabetes was 31.6% in patients with ACS. A study in Japan observed 37% frequency of diabetes in ACS patients.[12] Maria and colleagues mentioned 33.1% frequency of diabetes in ACS in their study[13]. Okosieme OE *et al* found 27% of ACS patients had diabetes.[14] Palwasha *et al* found 37.34% diabetics with ACS during their study.[15] Iqbal MJ *et al* observed 32% diabetics in total with 4.48% newly diagnosed diabetics in patients with ACS.[16] Another study of ACS patients in Larkana by Sheikh BA *et al* revealed 30.5% diabetics with 6% newly diagnosed diabetes mellitus.[17] Ishihara M *et al* in their study found 7% newly diagnosed diabetics with ACS.[18] In our study newly diagnosed diabetics were 6%.

In our study male to female ratio was 1.8:1. The mean age of study group was 57.75±10.88 years. There was no gender specific difference in mean age of the patients. Diabetics and non-diabetics also had no difference in mean age.

Coronary artery disease is more common in men than women as observed in Greece in Cardio 2000 study.[19] A higher prevalence of ischemic heart disease in male than female has also been reported from England[20] and from Karachi.[21] Our study too demonstrated more male patients than females with ACS. In Palwasha's study diabetic patients with ACS had mean age of 56.5±9.23 years while Sheikh *et al* reported mean age of diabetics as 53.48 years and 55.58 years mean age of non-diabetics. A study conducted in China mentioned 65±11 years as the mean age of patients with ACS.[22] So it is quite obvious from our study and other studies mentioned above that ACS becomes progressively more common with increasing age and as the average age of world population is increasing, this problem will also rise.

This study had STEMI in 185 (74%) patients, NSTEMI in 34 (13.6%) patients and unstable angina in 31 (12.4%). The most frequent type of ACS in our study appeared to be STEMI and the most frequently involved area of the myocardium was anterior wall (65.2%) followed by inferior (24.4%). Iqbal *et al* and Palwasha *et al* had also reported the same types of findings.

There were 67 (26.8%) patients who had FBS ≥7 mmol/l and out of these 67 patients, only 15 were labelled as newly diagnosed diabetics. An important observation during this study was that most of the known diabetics (62%) had poor glycemic control and the patients with ACS who have hyperglycemia represent a high risk population.

CONCLUSION

Our study showed that diabetes mellitus was frequently present in patients with acute coronary syndrome. The frequency was found to be 31.6%. So the proportion of diabetics among the patients with ACS was one out of every three (1:3). Diabetes was equally present in males and females. There were 6% patients who were unaware of their diabetic status and most of diabetic patients had poor glycemic control. STEMI was the most frequent type of ACS and anterior wall of myocardium was the most frequently involved area.

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