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COMPARISON OF IN-HOSPITAL CLINICAL OUTCOMES IN PATIENTS WITH ACUTE CORONARY SYNDROME (ACS) WITH OR WITHOUT DIABETES MELLITUS.

Medicine

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ABSTRACT

Background: Coronary artery disease is the leading cause of death in industrialized countries and most patients with diabetes die from complications of atherosclerosis. There are limited data describing the presenting characteristics, management, and outcomes of diabetic and nondiabetic patients with an acute coronary syndrome (ACS).

Materials & Methods: This is a Prospective Case-Control study. A total number of 100 Acute Coronary Syndrome patients, out of which 50 patients with diabetes was considered as group I and 50 non-diabetic patients considered as group II fulfilling the criteria for inclusion was considered.

Results: Most (36.0% vs 40.0%) of the patients were in 5th decade and 6th decade in group I and group II respectively. Male to female ratio was 2.8:1. Majority of the study patients had typical Chest Pain (angina) in both groups. Hypertension was the most common risk factor in both groups, 43(86.0%) in group I and 39(78.0%) in group II. Dyslipidaemia 37(74.0%) and smoking 17(34.0%) were next common risk factors in group I. However, smoking 30(60.0%) and dyslipidaemia 29 (58%) were the next common risk factors in group II. Family history of IHD was present in more than one fifth of the study patients. Smoking was significantly ($p<0.05$) higher in group II patients. Majority of the patients had regular pulse rate in both groups ($p>0.05$). The mean pulse rate was significantly ($p<0.05$) higher in group I patients however, mean systolic and diastole BP were almost consistent between two groups. Regarding the Anterior MI and Antero-septal MI it was 40.0% in group I and 52.0% in group II. Among the NSTEMI/Unstable angina, anterior ischaemia was found almost two third (66.0%) in group I and 76.0% in group II. Inferior ischaemia and anterior ischaemia were significantly ($p<0.05$) higher in group I and group II respectively. The mean HbA1C and Total cholesterol difference were statistically significant ($P<0.05$) between two groups. Recovery & discharge, heart failure, atrial fibrillation, 2nd degree heart block, junctional bradycardia, ventricular tachycardia, recurrent angina, asystole and death was statistically significant ($P<0.05$) between two groups. The duration of hospital stay was 5.94±1.72 days in group I and 5.44±1.89 days in group II, no statistical significant ($p>0.05$) difference was found between two groups.

Conclusion: This study was done to observe the in-hospital clinical outcomes of Acute Coronary Syndrome in diabetic patients in comparison to non-diabetic patients. Diabetic patients with acute coronary syndrome encountered more in- hospital adverse outcome.

KEYWORDS

Acute Coronary Syndrome (ACS), Diabetes Mellitus (DM), In Hospital Outcome.

INTRODUCTION:

It is well known that coronary artery disease (CAD) is strongly associated with diabetes mellitus (DM). It increases the risk of coronary artery disease (CAD) by two fold to six fold, which account for 80% of deaths among patients with DM.[1] Furthermore, when CAD develops in diabetic patients; the incidence of acute coronary syndrome (ACS) becomes double (McGuire et al. 2003).

Since diabetic patients have an increased propensity for blood clotting, impaired fibrinolysis and increased platelet reactivity, it is more likely that atherosclerotic plaque rupture or erosion results in thrombotic occlusion of the artery (Beckman, Creager and Libby 2002). Overall 20-35% of all ACS patients are diabetic (Basand et al. 2007).

In addition to being a risk factor, diabetes mellitus is also associated with worse outcome after an acute coronary event (Franklin et al. 2004; McGuire et al. 2000 and Malmberg et al. 2000). They are more prone to develop cardiogenic shock, congestive heart failure (CHF), arrhythmias and recurrent ischaemic events after ACS (Franklin et al. 2004; McGuire et al. 2000 and Malmberg et al. 2000).

The Global Registry of Acute Coronary Events (GRACE) also revealed in- hospital case fatality rate was twice in diabetic ACS patients in comparison to nondiabetic patients (Franklin et al. 2004).

There are only few studies so far available comparing the various outcomes of ACS in patients with and without DM. We know that the burden of ACS and DM in our population is high.

Therefore, this study was designed to find out various in-hospital outcomes of ACS in diabetic and non diabetic patients in our perspective.

MATERIALS & METHODS:

This is a Prospective, Case-Control study. A total number of 100 Acute Coronary Syndrome patients, out of which 50 patients with diabetes was considered as group I and 50 non-diabetic patients considered as group II who admitted patients in the Department of Cardiology, Dhaka Medical College Hospital, Dhaka; University Cardiac Centre (UCC), Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka and Department of Cardiology, Ibrahim Cardiac Hospital & Research Institute, Shahbag, Dhaka, during the period of March 2011 to August 2011 were enrolled in this study.

Informed written consent was taken from each patient before enrollment. Meticulous history was taken regarding symptoms. Demographic data such age, sex, weight (kg) was noted. Risk factors were recorded for all patients. Relevant lab testing was done. Patients were followed up throughout their hospital stay up to discharge & development of complications or mortality was noted.

RESULTS & DISCUSSION:

In this study it was observed that the mean age was 58.42±11.37 years

in group I and 59.94±9.23 years in group II, which was almost similar in both groups. Majority (36.0%) of the patients were in 5th decade in group I. However, in group II most (40.0%) of the patients were in 6th decade. Similar age range was obtained by Al Suwaidi et al. (2001), where they found age range from 17 to 82 years. Ockenel et al. (2001) observed the mean age of patients was 49 years with range from 20—70 years. **(Table I)**

In the current study, male were 62.0% & 86.0% and female were 38.0% & 14.0% in group I and group II respectively. Male to female ratio was almost 3:1 that indicates, ACS was more common in male subject which was closely resembled with a study done by Gonzalez-Porras et al. (2007), where the authors found male female ratio almost 6:1. Similarly, Puri et al. (2003), Khan et al. (2004) mentioned that CAD affects male more frequently and severely than female. **(Figure 1)**

In this present series it was observed that majority (82.0 vs 90.0) of the study patients had typical Chest Pain (angina) in both groups, that was almost consistent in both groups. No statistical significance (p>0.05) was observed between two groups, which is similar with Sarker et al. (2009). **(Table II)**

In this current series it was observed that majority of the study patients in both groups were in NYHA Class IV. However NYHA Class II difference in both groups was statistically significant (P<0.05). This finding was similar to other studies done by Cingoz, et al. (2004), Wu et al., (2000) and Tasdemir et al., (1991). In another study, Borger et al. (2002) showed NYHA class IV were 35.0% in group A and 44.0% in group B, that was significant (p=0.002) between two groups. . **(Table III)**

Regarding the risk factors of the study subjects hypertension was the most common risk factor in both groups, 43(86.0%) in group I and 39(78.0%) in group II. Dyslipidaemia 37(74.0%) and smoking 17(34.0%) were next common risk factors in group I. However, smoking 30(60.0%) and dyslipidaemia 29 (58%) were the next common risk factors in group II. Family history of IHD was present in more than one fifth of the study patients. Smoking was significantly (p<0.05) higher in group II patients. Puri et al. (2003) showed that hypertension, smoking, positive family history and dyslipidaemia were the most common risk factors in patients with ACS. Similarly Avezum et al. (2005) reported that HTN, smoking, obesity, dyslipidemia and family history of CAD were most frequent risk factors in patients with ACS. **(Table IV)**

Regarding wall involvement, Antero-septal MI it was observed in this present study that 40.0% in group I and 52.0% in group II. Among the NSTEMI/Unstable angina, anterior ischaemia was found almost two third (66.0%) in group I and 76.0% in group II. Inferior ischaemia and anterior ischaemia were significantly (p<0.05) higher in group I and group II respectively. Patients with UA/NSTEMI had diabetes more often than those presenting with STEMI (22.4% vs 15.4%, P<0.001). The UA/NSTEMI population also had significantly more comorbid conditions than the STEMI population, including an increased prevalence of hypertension, known hyperlipidemia, prior MI, and a history of heart failure obtained by Donahoe et al. (2007). **(Table V)**

Regarding the outcome parameters it was observed in this current study that heart failure, atrial fibrillation, 2nd degree heart block, junctional bradycardia, ventricular tachycardia, recurrent angina, asystole and death were significantly (P<0.05) higher in group I patients. Similarly, Sarker et al. (2009) showed cardiogenic shock 7.1% in ACS patients with diabetes and 8.0% in ACS without diabetes. Heart failure 19.0% and 13.6% in ACS patients with diabetes and without diabetes respectively. Arrhythmias was almost one fourth (23.8%) in ACS patients with diabetes and 13.6% in ACS patients without diabetes. Recurrent angina was observed 7.1% in ACS patients with diabetes but not observed in ACS patients without diabetes. Sarker et al. (2009) found congestive heart failure and arrhythmias occurred more in diabetic group. Franklin et al. (2004) and McGuire et al. (2000) also demonstrated that ACS patients with DM encountered more CHF and arrhythmias. That can be partly explained by 'diabetic cardiomyopathy' and autonomic neuropathy.

Granger et al. (2003) described 8 predictors of hospital mortality. These are age, blood pressure, heart rate, Killip class, resuscitated cardiac arrest, positive findings for cardiac biomarkers, serum creatinine and ST-segment shift. Out of these 8 predictors 5 were present in diabetic patients of this study. These might contribute to more in-hospital morality in diabetic group. Moreover, Diabetes mellitus is a strong independent predictor of adverse outcomes for patients admitted across the entire spectrum of ACS (Fergus et al. 2004). Several studies (Franklin et al. 2004; Malmberg et al. 2000; Danhoe et al. 2007) also demonstrated that ACS patients with DM had poor prognosis both in short and long term. **(Figure 2)**

In this current study it was observed that the mean(±SD) duration of hospital stay was 5.94±1.72 ranging from 3 days to 11 days in group I and 5.44±1.89 days with ranging from 3 days to 12 days, which was similar between two group, no statistical significant (p>0.05) difference was found between two groups. Sarker et al. (2009) found the mean duration of hospital stay was found significant higher in ACS patients with diabetes than in ACS patients without diabetes (8.1±2.2 vs. 7.1±2.2) days, which was higher with the current study, this may be due to others comorbid condition were associated with their study patients.

CONCLUSION:

This study showed diabetic patients with acute coronary syndromes encountered in hospital mortality and other adverse outcomes at a greater extent than those of non diabetic patients. Most of the predictors of adverse outcomes were also more prevalent in diabetic groups. So, they should be monitored closely, given more care and treated with all effective evidence based therapy.

Limitation of the study:

This study was conducted with small sample size. Only 100 patients were studied. Follow-up period was also very short. Results of this study should be proved in larger trial.

Table I: Age distribution of the study patients (n=100)

Age (in years)	Group I (n=50)		Group II (n=50)		P value
	n	%	n	%	
≤40	1	2.0	2	4.0	
41-50	18	36.0	9	18.0	
51-60	15	30.0	20	40.0	
61-70	10	20.0	12	24.0	
71-80	6	12.0	5	10.0	
>80	0	0.0	2	4.0	
Mean ± SD	59.94	±9.23	58.42	±11.37	0.464ns
Range	(35	-80)	(35	-86)	

Table II: Chest Pain (angina) of the study patients (n=100)

Chest pain (angina)	Group I (n=50)		Group II (n=50)		P value
	n	%	n	%	
Typical	41	85.4	45	90	0.249ns
Atypical	9	18.0	5	10	

Table III: Categorization of study patients presenting with shortness of breath according to NYHA classification (n=100)

NYHA classification	Group I (n=50)		Group II (n=50)		P value
	n	%	n	%	
Class I	2	3.7	3	6.3	0.500ns
Class II	7	14.8	16	31.3	0.032s
Class III	7	14.8	3	6.3	0.182ns
Class IV	33	66.7	28	56.3	0.305ns

Table IV: Risk factors of the study patients (n=100)

Risk factors	Group I (n=50)		Group II (n=50)		P value
	n	%	n	%	
Smoking/Chewing tobacco					
Present	17	34.0	30	60.0	0.009s
Absent	33	68.8	20	40.0	
Hypertension					
Present	43	86.0	39	78.0	0.297ns
Absent	7	14.0	11	22.0	
Dyslipidaemia					
Present	37	74.0	29	58.0	0.091ns
Absent	13	26.0	21	42.0	
Family history of IHD					

Present	11	22.0	11	22.0	0.974ns
Absent	16	32.0	17	34.0	
Not known	23	46	22	44.0	

Table V: Distribution of the study patients according to ECG findings (n=100)

ECG findings	Group I (n=50)		Group II (n=50)		P value
	n	%	n	%	
Anterior MI					
Antero-septal	20	40.0	26	52.0	0.085ns
Anterior	15	30.0	6	12.0	
Extensive Anterior	15	30.0	18	36.0	
Inferior MI					
Without RV infraction	8	16.0	11	22.0	0.602ns
With RV infraction	1	2.0	2	4.0	
Posterior MI	2	4.0	1	2.0	0.500ns
Lateral MI					
Antero-lateral	0	0.0	3	6.0	0.132ns
High lateral	1	2.0	0	0.0	
NSTEMI/Unstable Angina					
Anterior ischaemia	33	66.0	38	76.0	
Inferior ischaemia	16	32.0	7	14	0.037s
Lateral ischaemia	1	2.0	5	10	

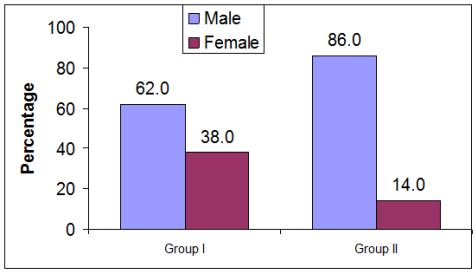

Figure 1: Bar diagram showing the sex distribution of the study patients

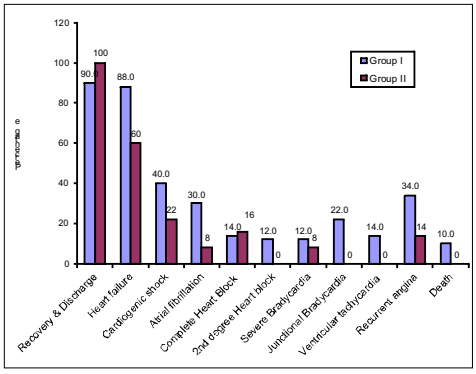

Figure 2: Bar diagram showing the outcome parameters of the study patients

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