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"Association of HbA_1C Level with Angiographic Severity of Coronary Artery Disease (CAD) in Acute Myocardial Infarction Patients: A Study in National Institute of Cardiovascular Diseases, Dhaka, Bangladesh"

Kofil Uddin[1], Bijon Kumar Saha[2], Md. Anisul Goni Khan[3], Md. Abul Kalam Azad[4], Lakshman Chandra Barai[5]

[1]*Assistant Registrar, MD, National Institute of Cardiovascular Diseases and Hospital, Dhaka, Bangladesh*
[2]*Assistant Registrar, MBBS, D.CARD, National Institute of Cardiovascular Diseases and Hospital, Dhaka, Bangladesh*
[3]*Consultant, MBBS, MD (Cardiology), National Institute of Cardiovascular Diseases and Hospital, Dhaka, Bangladesh*
[4]*Medical Officer (Cardiology), MBBS, D.CARD, National Institute of Cardiovascular Diseases and Hospital, Dhaka, Bangladesh*
[5]*Assistant Professor, Cardiology, MBBS, D.CARD, MCPS, National Institute of Cardiovascular Diseases and Hospital, Dhaka, Bangladesh*
Corresponding Author: *Kofil Uddin*

Abstract
Background: *Coronary Artery Disease (CAD) has emerged as the single most important cause of death worldwide. In 2013 CAD caused an estimated 7.5 million deaths worldwide accounting for 13.3% of all deaths.[1] Diabetes mellitus (DM) is a major risk factor for CAD and among the most common chronic diseases in the world.* ***Objective:*** *To see association of HbA_1C level with Angiographic Severity of Coronary Artery Disease (CAD) in acute Myocardial Infarction patients.* ***Materials and Methods:*** ***A*** *Cross-sectional observational study Department of Cardiology, National Institute of Cardiovascular Diseases, Dhaka from April 2017 to August 2018.All diabetes patients with Acute Myocardial Infarction. Purposive sampling as the sampling population was confined within patients of DM admitted with acute myocardial Infarction in the Department of Cardiology NICVD, the sample size calculation was that for sample size calculation in case of cross sectional study. ST-Elevation Myocardial infarction (ACC Clinical Data Standard, 2001): The patient should manifest a typical rise and gradual fall (troponin) or more rapid rise and fall (CK-MB) of biochemical markers of myocardial necrosis, and new or presumed new ST-segment elevation at the J point in 2 or more contiguous leads with the cutoff points greater than or equal to 0.2 mV in chest leads such as VI, V2, or V3, or greater than or equal to 0.1 mV in other leads.* ***Results:*** *This study was included 170 patients had (100%) diabetes, 85(50.0%) were smoker, 50(29.4%) had dyslipidemia, 34(20%) had hypertension and 13(7.6%) had positive family history. among the four HbA1c group, maximum mean age was found 53.95±8.47 years in HbA1c >7.6 % and 49.19±10.17 in HbA1c <6.7%, which was not statistically significant (p>0.05). majority 44(39.3%) patients had ejection fraction 40-49%, 36(32.1%) had 50-59%, 28(25.0%) had >60% and 04(3.6%) had 30-39%. Fifty nine (59) patients had vessel score 1 out of which majority 32 patients had HbA1c <6.7%. Seventy one (71) patients had vessel score 2 among them 10 patients had HbA1c <6.7%, 16 had HbA1c 6.7-7%, 27 had HbA1c 7.1-7.6%. Thirty six (36) patients had vessel score 3 out of which majority 20 patients had HbA1c >7.6%. A subject with HbA1c >7 % vs ≤7.0 % had 0.074 (95% CI 0.034 to 0.160) times increase in odds having SYNTAX >11 score. Which was significantly associated with SYNTAX >11 score.* ***Conclusion:*** *The present study conclude that increased level of HbA1C is associated with more severe coronary artery disease in patient with AMI irrespective of other risk factors. So aggressive treatment of diabetes to maintain HbA1c near normal to prevent more severe coronary disease.*

Keywords: *Coronary Artery Disease (CAD), HbA_1C level, Angiographic Severity.*

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I. Introduction

Coronary Artery Disease (CAD) has emerged as the single most important cause of death worldwide. In 2013 CAD caused an estimated 7.5 million deaths worldwide accounting for 13.3% of all deaths.[1] Diabetes

mellitus (DM) is a major risk factor for CAD and among the most common chronic diseases in the world. According to seventh edition of International Diabetes Federation Diabetes Atlas 2015, worldwide around 415 million people are suffering from DM and nearly half of these are undiagnosed. This number is expected to rise to 640 million in 2040. At the same time, another 318 million people have impaired glucose tolerance and this number expected to increase to 482 million in 2040. Compared to non-diabetics, persons having diabetes have a two to fourfold increased risk of development of and death from CAD.[2] In patients having Acute Coronary Syndrome (ACS), more than one in three may be affected by diabetes and those with diabetes have worse outcomes after ACS.[3-4] Also this graded association of increased risk observed in diabetics in the setting of ACS extends to glucose values in the range way below threshold for diabetes.[5] In addition, diabetes is also associated with increased HF risk in the setting of ACS.[6] Acute coronary syndrome (ACS) indicates serious clinical manifestation of coronary artery disease (CAD) and is the major cause of morbidity and mortality worldwide. The severity of coronary atherosclerosis is closely associated with cardiovascular prognosis in patients with ACS.[7]Consequently, prediction and diagnosis of the extent of coronary lesion in ACS is important for clinical management of this disease. Haemoglobin-A1c (HbA1c) concentration is an established marker of average blood glucose concentration and has been suggested as a diagnostic or screening tool for diabetes.[8] Elevated HbA1c levels in patients with or without diabetes mellitus (DM) are associated with an increased risk for cardiovascular disease and mortality.[9-10] A community based population study including 11,092 patients without DM found that elevated HbA1c level was strongly associated with the risks of cardiovascular disease and mortality.[10] Elevated HbA1c level was associated with adverse outcome in non-diabetic patients with ST-segment-elevation myocardial infarction (STEMI).[11] On the other hand, an increase of 1% in HbA1c concentration was associated with roughly a 30% increase in all cause and 40% increase in cardiovascular or ischaemic heart disease mortality among individuals with diabetes.[12] However, the prognostic role of HbA1c in the acute phase in patients with STEMI is not clear.[13] A recent study reported that there was no overall association between HbA1c level and the prognosis of non-diabetic. However, another study found that HbA1c appeared to be an independent predictor for the severity of CAD and poor outcome in patients with stable angina.[14] Glycosylated Haemoglobin (HbA1c) is an established marker of long-term glycaemic control in patients with Diabetes Mellitus (DM) and elevated HbA1c levels are associated with an increased risk for further micro-vascular and macro-vascular disease.[15] HbA1c levels can be assessed in the non-fasted state and has higher reproducibility than fasting glucose. There have been few studies, which have shown HbA1c to be predictive of coronary artery disease and only in limited studies HbA1c has been correlated with angiographically proven CAD (coronary artery disease) using SYNTAX score. An estimate of coronary artery disease burden can be obtained by analysing each lesion with help of syntax score found at angiography. The SYNTAX (Synergy between PCI with Taxus and Cardiac Surgery) Score (SS) was developed as part of the SYNTAX trial with the object to characterize and objectively quantify the severity and extent of coronary artery disease.[18] Atherosclerosis is defined as a chronic inflammatory disease caused by sustained injury to the vessel wall. Atherosclerotic disease accounts for most of the excess mortality in patients with Diabetes Mellitus (DM).**[19]** In 1999, the American Heart Association defined diabetes mellitus as a major risk factor for cardiovascular disease.**[20]** In patients with type 2 diabetes, the incidence of coronary artery disease (CAD) is higher than in non-diabetic individuals.[21] In patients with type 2 diabetes, the prognosis of chronic CAD and acute myocardial infarction is worse compared with non-diabetic patients.[22-23] Poor metabolic control of type 2 diabetes predicts CAD-associated events[24] and deteriorates the prognosis of acute myocardial infarction.[25] For any of the established risk factors for cardiovascular disease, the death rate is several-fold higher in persons with diabetes compared with non-diabetic persons.[26] Cardiovascular disease is, therefore, listed as the cause of death in about 65% of persons with diabetes,[27] accounting for a loss of 8 years (age group 55-64 years) and of 4 years (age group 65-74 years) in life expectancy compared with non-diabetic persons in the National Health And Nutrition Examination Survey (NHANES) study.[28] In hospitalized US patients with overt diabetic hyperglycemia, only two thirds have known diabetes, whereas one third have undetected diabetes that is only rarely recognized and treated during routine clinical care.[29] Early recognition and treatment of diabetes has a potential benefit of reducing the incidence of vascular complications of type 2 diabetes. Therefore, strategies to improve early diagnosis of type 2 diabetes, especially in patients with CAD, are urgently needed.

II. Review of literature

Vora et al.[30] studied to the blood levels of HbA1C in patients of ACS at time of admission and its relation with early outcome and complications in ACS. Patients with high HbA1C levels were associated with more severe disease and complication rate was also higher. Bastawesyet al.[31]studied to assess the relationship between HbA1c level and the severity of coronary artery disease (CAD) among non-diabetic patients. One hundred patients with acute coronary syndrome (ACS) who referred to coronary angiography were included. According to American Diabetes Association (ADA) patients were classified into high risk group (HbA1c 5.7 – 6.4%) or low risk group (HbA1c <5.7%). Among non-diabetic patients, higher HbA1c is significantly correlated

with the severity of CAD. HbA1c level has a prognostic value to predict the severity of CAD among non-diabetic patients. Cai et al.[32] studied to investigate relationship between glycated hemoglobin (HbA1c) level and coronary artery disease (CAD) severity. Observational study was conducted and 573 participants were enrolled and baseline characteristics were collected. Clinical presentations in terms of stable angina, unstable angina or acute myocardial infarction were diagnosed. All participants were performed coronary angiography to figure out the numbers of coronary artery stenosis in terms of none-stenosis (< 50% stenosis), single or multiple vessels stenoses (≥50% stenosis). All participants were divided into subgroups according to two categories in terms of severity of clinical presentation (stable angina, unstable angina, or acute myocardial infarction) and the number of coronary artery stenosis (none, single, and multiple vessels). Primary endpoint was to evaluate relationship between baseline HbA1c value and CAD severity. Consistent to previous studies, participants with CAD had more risk factors such as elderly, smoking, low HDL-C and high CRP levels. Notably, HbA1c level was more prominent in CAD group than that without CAD. As compared to stable angina subgroup, HbA1c levels were gradually increased in unstable angina and acute myocardial infarction groups. Similar trend was identified in another category in terms of higher HbA1c level corresponding to more vessels stenoses. HbA1c may be a useful indicator for CAD risk evaluation in non-diabetic adults. Dutta et al.[33] to evaluate the relationship between increasing HbA1c level and severity of coronary artery disease in type 2 diabetic patients using syntax score in a cohort of proven Coronary Artery Disease (CAD) on angiography at Gauhati Medical College. Glycosylated Haemoglobin (HbA1c) is an established marker of long-term glycaemic control in patients with diabetes mellitus (DM) and elevated HbA1c levels are associated with an increased risk for further microvascular and macrovascular disease. Dubeyet al.[34] studied to define the relationship between HbA1c levels with mortality, morbidity and severity in patients with Acute Coronary Syndrome (ACS). Coronary Artery Disease (CAD) has emerged as the single most important cause of death worldwide and as well as in India. Diabetes Mellitus (DM) is a major risk factor for CAD and there appears to be a graded rise in cardiovascular risk with increasing degrees of glucose intolerance well below the definition of overt diabetes. ACS can be presenting manifestation of DM thus each patient of ACS should be screened for diabetes and glucose intolerance. Patients with DM when compared to non-diabetics have increased morbidity and severity after an ACS.

III. Objectives

a. General

1. To see association of HbA_1C level with Angiographic Severity of Coronary Artery Disease (CAD) in acute Myocardial Infarction patients.

b. Specific

1. To measure HbA1c
2. To see the angiographic severity
3. To see the association between HbA1c with angiographic severity.

IV. Materials and Methods

A Cross-sectional observational study Department of Cardiology, National Institute of Cardiovascular Diseases, Dhaka from April 2017 to August 2018. All diabetes patients with Acute Myocardial Infarction. Purposive sampling as the sampling population was confined within patients of DM admittedwith acute myocardial Infarction in the Department of Cardiology NICVD, thesample size calculation was that for sample size calculation in case of cross sectional study.

Sample size: In our study sample no is 170

Study population: All diabetes patients with Acute Myocardial Infarction.

Sampling method: Purposive sampling

Inclusion criteria:

All diabetes patients with Acute Myocardial Infarction

Exclusion criteria:

- Patients with history of prior re-vascularisation PCI or CABG
- Patients with haemoglobinopathies
- Anaemia
- History of recent blood transfusion
- Other co-morbid condition like CKD, CLD

Procedures of data analysis: Statistical analyses were carried out by using the Statistical Package for Social Sciences version 23.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Student t-test was used for continuous variables. A p value of< 0.05 accepted as statistically significant.

Ethical implications: BCPS was approving the study protocol. Informed written consent was taken from every patient or near relatives. The aims and objectives of the study were explained to the patients in easily understandable local language. Data was collected in an approved data collection form. It is assured that all information's and records were kept confidential and the procedure was helpful for both the physician and the patients in making rational approach of the case management.

V. Results

This study was included 170 patients had (100%) diabetes, 85(50.0%) were smoker, 50(29.4%) had dyslipidemia, 34(20%) had hypertension and 13(7.6%) had positive family history. among the four HbA1c group, maximum mean age was found 53.95±8.47 years in HbA1c >7.6 % and 49.19±10.17 in HbA1c <6.7%, which was not statistically significant (p>0.05). majority 44(39.3%) patients had ejection fraction 40-49%, 36(32.1%) had 50-59%, 28(25.0%) had >60% and 04(3.6%) had 30-39%. Fifty nine (59) patients had vessel score 1 out of which majority 32 patients had HbA1c <6.7%. Seventy one (71) patients had vessel score 2 among them 10 patients had HbA1c <6.7%, 16 had HbA1c 6.7-7%, 27 had HbA1c 7.1-7.6%. Thirty six (36) patients had vessel score 3 out of which majority 20 patients had HbA1c >7.6%. A subject with HbA1c >7 % vs ≤7.0 % had 0.074 (95% CI 0.034 to 0.160) times increase in odds having SYNTAX >11 score. Which was significantly associated with SYNTAX >11 score.

Table 1: Association between HbA1c and age (N=170)

HbA1c (%)	Total (n)	Age (years) Mean±SD	p value
<6.7	47	49.19±10.17	0.123^{ns}
6.7-7.0	34	52.35±93.74	
7.1-7.6	49	52.04±9.09	
>7.6	40	53.95±8.47	

ns=not significant

P value reached from ANOVA test

[Table 1] shows that among the four HbA1c group, maximum mean age was found 53.95±8.47 years in HbA1c >7.6 % and 49.19±10.17 in HbA1c <6.7%, which was not statistically significant (p>0.05).

Table 2: Association between HbA1c and sex (N=170)

Sex	HbA1c (%)				Total	p value
	<6.7	6.71-7.0	7.1-7.6	>7.6		
Male	39 (22.9%)	31 (18.2%)	44(25.9%)	33(19.4%)	147 (86.5%)	0.545^{ns}
Female	8 (4.7%)	3(1.8%)	5(2.9%)	7(4.1%)	23 (13.5%)	

ns=not significant

P value reached from Chi square test.

[Table 2] shows that sex was homogenously distributed in all four groups (HbA1c).

Table 3: Risk factor of study population (N=170)

Risk factors	Number	Percentage
Diabetes	170	100
Hypertension	34	20.0
Dyslipidemia	50	29.4
Smoking	85	50.0
Positive family history	13	7.6

[Table 3] shows all patients had (100%) diabetes, 85(50.0%) were smoker, 50(29.4%) had dyslipidemia, 34(20%) had hypertension and 13(7.6%) had positive family history.

Table 4: ECG diagnosis of the study population (N=170)

ECG findings	Number	Percentage
Antero-Septal	35	20.6
Lateral	04	02.4
Anterior	44	25.9
Inferior	87	51.2
Total	170	100.0

[Table 4] shows majority 87(51.2%) had inferior, 35(20.6%) had anterio-septal, 44(25.9%) had anterior, 04(2.4%) had lateral.

Table 5: LVEF of study population (N=170)

Ejection fraction	Number	Percentage
<40 %	05	02.9
40-49 %	66	38.8
50-59 %	59	34.7
≥ 60 %	40	23.5
Total	170	100.0

[Table 5] shows majority 44(39.3%) patients had ejection fraction 40-49%, 36(32.1%) had 50-59%, 28(25.0%) had >60% and 04(3.6%) had 30-39%.

Table 6: Distribution of the study population by diagnosis (N=170)

Diagnosis	Number	Percentage
Normal	04	02.4
SVD	57	33.5
DVD	78	45.9
TVD	31	18.2
Total	170	100.0

[Table 6] shows majority 78(45.9%) patients had DVD, 57(33.5%) had SVD, 31(18.2%) had TVD and 4(2.4%) had normal coronaries.

Table 7: Distribution of the study patents by HbA1c (N=170)

HbA1c (%)	Number	Percentage
<6.7	47	27.6
6.7-7.0	34	20.0
7.1-7.6	49	28.8
>7.6	40	23.5
Total	170	100.0

[Table 7] shows majority 31(27.7%) patients had HbA1c <6.7% followed by 30(26.8%) had >7.6%, 29(25.9%) had 7.1-7.6% and 22(19.6%) had 6.7-7.1%.

Table 8: Association between HbA1c and SYNTAX score (N=170)

HbA1c (%)	SYNTAX Score	p value
	Mean±SD	
<6.7	4.32±3.09	
6.7-7.0	8.16±3.69	<0.001
7.1-7.6	13.44±5.17	<0.001
>7.6	26.65±5.62	<0.001

p value reached from unpaired t test

[Table 8] shows patients who had HbA1c <6.7% and their mean SYNTAX score was 4.91±3.20. Patients who had HbA1c 6.7-7.1 and their mean SYNTAX score was 9.06±3.46. Patients who had HbA1c 7.1-7.6 and their mean SYNTAX score was 15.60±4.45. Patients who had HbA1c >7.6 and their mean SYNTAX score was 27.01±5.02. The table indicate that when HbA1c level increased gradually SNTAX score was significantly increased.

Table 9: Mean SYNTAX score between Thrombolized and non thrombolized (N=170)

	Thrombolized n=99 Mean ±SD	Non thrombolized n=71 Mean ±SD	p value
SYNTAX score	12.61 (±9.60)	13.47(±9.35)	0.56

[Table 9] shows patients those were not thrombolized has higher mean SYNTAX score but not statistically significant (p >0.05).

Table 10: Association between vessel score with HbA1c (N=170)

Vessel Score	HbA1c (%)				Total
	<6.7	6.7-7	7.1-7.6	>7.6	
0	3	1	0	0	04
1	32	13	12	2	59
2	10	16	27	18	71
3	2	4	10	20	36
Total	47	34	49	40	170

[Table 10] shows 4 patients had vessel score 0 among them 3 patients had HbA1c <6.7% and 1 patient had HbA1c 6.7-7.1%. Fifty nine (59) patients had vessel score 1 out of which majority 32 patients had HbA1c <6.7%. Seventy one (71) patients had vessel score 2 among them 10 patients had HbA1c <6.7%, 16 had HbA1c 6.7-7%, 27 had HbA1c 7.1-7.6%. Thirty six (36) patients had vessel score 3 out of which majority 20 patients had HbA1c >7.6%.

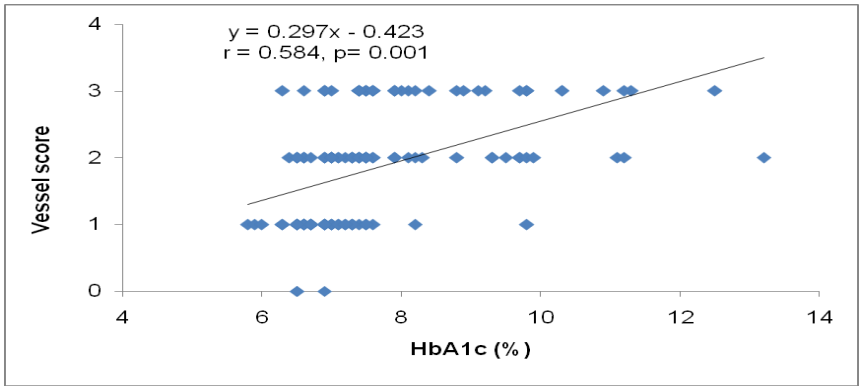

Figure 1: Scatter diagram showing positive significant correlation (r=0.584; p=0.001) between HbA1c and vessel score.

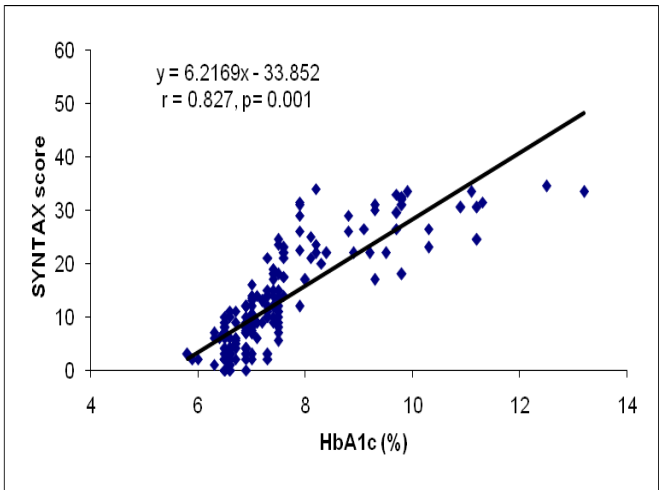

Figure 2: Scatter diagram showing positive significant correlation (r=0.827; p=0.001) between HbA1c and SYNTAX score.

Table 11: Univariate logistic regression analysis between risk factors with SYNTAX >11 score (N=170)

Risk factors	OR	95% CI	p value
		Lower- Upper	
HbA1c (>7%)	0.074	0.034- 0.160	0.001^{s}
Hypertension	2.073	0.942- 4.561	0.070^{ns}
Dyslipidemia	1.189	0.765- 1.850	0.442^{ns}
Smoking	1.485	0.841- 2.621	0.173^{ns}
Family	0.462	0.136- 1.567	0.215^{ns}

s=significant, ns= not significant

Univariate logistic regression analysis was performed

A subject with HbA1c >7 % vs ≤7.0 % had 0.074 (95% CI 0.034 to 0.160) times increase in odds having SYNTAX >11 score. Which was significantly associated with SYNTAX >11 score [Table 11].

VI. Discussion

This cross sectional observational was enrolled at the National Institute of Cardiovascular Disease and Hospital, Dhaka during the period from April 2017 to August 2018. The study was performed with an aim to find out the association of HbA1c with angiographic severity of coronary artery disease. A total of 170 diabetic patients with acute myocardial infarction were included in the study after meeting the inclusion and exclusion criteria. On the basis of HbA1c patient were divided into four groups. Coronary angiogram was done during index hospitalization. The maximum mean age was 53.95± 8.47 years in group having HbA1c >7.6% and

minimum mean age was 49.19 ± 10.17 years in group having HbA1c<6.7%. Vora et al.[30] study reported youngest patient in their study was 27 years old while the oldest patient was 100 years old and mean age was 55.73±12.69. Maximum number of patients was in the age group of 40-59 years. Cai et al.[32] reported that the mean age was found 63.83±11.0 years. Both study support our result. Males were predominant 147(86.47%) and females were 23(13.53%). Similar observation was found in the study of Duttaet al.[33] they reported 87.2% (116) were males. Voraet al.[30] reported similar results they showed M: F ratio was found 4:1.Bastawesyet al.[31] found male gender pre-dominated which was (83%). Cai et al.[32] and Taubert et al.[35] also supported our study, they reported male gender was found 76.2% and 66.0% respectively. All patients had (100%) diabetes, 85(50.0%) were smoker, 50(29.4%) had dyslipidemia, 34(20%) had hypertension and 13(7.6%) had positive family history. Dutta et al. (2016) study reported 54.1% (72) were hypertensive, 21.1% (28) were smokers and 39.1% (52) were dyslipidaemic. Cai et al.[32] Hypertension was found 58.6%, smoking 37.1% and family history 6.9%. Majority 87(51.2%) had inferior, 35(20.6%) had antero-septal, 44(25.9%) had anterior, 04(2.4%) had lateral MI. Similar observation was found in Vora et al.[30] study they showed 20(45.5%) had Anterior wall (A/W) MI, 15(34.1%) had Inferior wall (I/W) MI, 2(0.05%) had Lateral wall(L/W) MI.Ghaffari et al.[37] reported anterior MI was 55.2%. In involvement of vessel 78(45.9%) patients had DVD, 57(33.5%) had SVD, 31(18.2%) had TVD and 4(2.4%) had normal coronaries. Voraet al.[30] reported that SVD was found 67.01%, DVD was 30.92% and TVD 2.06%. In Cakmaket al.[39] study 21, 22 and 35 patients were with single, double and triple vessel disease respectively. In Rasoulet al.**[40]** study comprising of 504 total patients 416 had HbA1C < 6, amongst which 62% had SVD and 38% had DVD or TVD or more severe disease. The percentage of patient among the four groups are as follows 31(27.7%) had HbA1c <6.7% followed by 30(26.8%) had >7.6%, 29(25.9%) had 7.1-7.6% and 22(19.6%) had 6.7-7.1%.Voraet al.[30] out of 44 patients with HbA1C value > 6.5%, while of 56 patients with HbA1C value < 6.5%. In Rasoulet al.[40] study 82.50% patients were with HbA1C < 6.5 and 17.50% patients were with HbA1C >6.5. Bastawesyet al.[35] seventy four patients were in high risk group with (HbA1c 5.7 – 6.4%) while only 26 patients were in low risk group with (HbA1c <5.7%). Duttaet al.[33] study observed that patients were divided into four groups (interquartiles) according to HbA1c levels less than 6.7 %, 6.7% to 7.1%, >7.1% to 7.6% and >7.6%. These groups had 24.8% (33), 29.3 (39), 21.0% (28), 24.8% (33) patients, respectively. Among diabetics mean HbA1c was 7.1%. Patients who had HbA1c <6.7% have mean SYNTAX score was 4.91±3.20, HbA1c 6.7-7.0% have mean SYNTAX score was 9.06±3.46. Those who had HbA1c 7.1-7.6%, mean SYNTAX score was 15.60±4.45 and who had HbA1c >7.6 mean SYNTAX score was 27.01±5.02. The table indicate that when HbA1c level gradually increased vessel score and SNTAX score was significantly increased. Duttaet al.[33] study compared different quartiles of HbA1c among diabetics with regard to SYNTAX score and number of diseased vessels. On analysis, they found that Coronary Artery Disease (CAD) severity by SYNTAX score as well as number of vessels involved was significantly different among quartiles (p values <0.001 and <0.001, respectively). Mean syntax scores significantly increased with increasing HbA1c levels (SYNTAX scores were 7.8, 10.5, 16.58 and 25.9 in patients with HbA1c levels 6.5-6.7, 6.7-7.1, 7.1-7.6 and >7.6, respectively). In syntax subgroups (<23, 23-32 and >32), mean HbA1c values were 6.8±0.2, 7.4±0.5 and 8.0±0.4, respectively. In a study by Ayhanet al.**[41]** only HbA1c was found to be an independent risk factor for the presence of severe CAD using Gensini score. MiShu-Huaet al.**[42]** has also observed HbA1c to be an independent determinant of CAD with Gensini score. Ghaffariet al.[37]utilised multivariate logistic regression analysis to show HbA1c >5.8% as an independent predictor of Califf scores >6 (OR = 3.17, 95% CI 1.79-5.69; p = 0.001). Ikeda et al.**[43]** showed that HbA1c is significantly associated with the complexity of coronary lesions. Ravipati et al.**[44]** showed increasing mean HbA1c with increasing severity of CAD in diabetics. In study by Kaya et al.**[45]** cutoff value of 6.0% for HbA1c predicted severe atherosclerosis with a sensitivity and specificity of 54% and 74%, respectively. Similar to our study, Karakoyun et al.[46] has utilized SYNTAX score to show relationship between increasing HbA1c and severity of CAD. Present study observed that patients those were non-thrombolized has higher mean SYNTAX score but not statistically significant (p >0.05).Vessel score was significantly higher when HbA1c was increasing. Four (4) patients had vessel score 0 among them 3 patients had HbA1c <6.7% and 1 patient had HbA1c 6.7-7.1%. Fifty nine (59) patients had vessel score 1 out of which majority 32 patients had HbA1c <6.7%. Seventy one (71) patients had vessel score 2 among them 10 patients had HbA1c <6.7%, 16 had HbA1c 6.7-7%, 27 had HbA1c 7.1-7.6%. Thirty six (36) patients had vessel score 3 out of which majority 20 patients had HbA1c >7.6%.Bastawesyet al.[35] study showed a positive association between increasing levels of HbA1c and the number of coronary segments (p<0.0001). Duttaetal.[33] in subgroup analysis where only chronic stable angina patients were considered, there was significant linear correlation between HbA1c and severity of CAD by SYNTAX score (R-0.820; p<0.001). Similar to our study, Hong and colleagues13 reported a direct correlation between HbA1c levels and the severity of CAD based on the number of involved vessels in patients with stable angina. Univariate logistic regression analysis showed that HbA1c >7% is an independent predictor of SYNTAX score >11 (OR= .074, CI 0.034- 0.160, p<0.001).

VII. Limitations of the study

The study population was selected from one selected hospital in Dhaka city, so that the results of the study may not reflect the exact picture of the country.

VIII. Conclusion

The present study conclude that increased level of HbA1C is associated with more severe coronary artery disease in patient with AMI irrespective of other risk factors. So aggressive treatment of diabetes to maintain HbA1c near normal to prevent more severe coronary disease.

Reference:

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