Original Research Article

Association of HbA1c with coronary heart diseases like ischemic heart disease and myocardial infarction in diabetic patients

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Abstract

Background: Caradiac affliction is by far the commonest cause of mortality in patients with Diabetes. Cardiac involvement in Diabetes commonly manifests as coronary artery diseases like IHD, Myocardial Infarction. Diabetes puts patients at increased risk for Coronary Heart Disease (CHD) and its associated complications. Compared with non diabetics, Diabetics have a 2 to 4 times increased rate of death from heart disease and is also influenced by Chronic hyperglycemia and poor control of blood sugars. Recent studies have linked higher HBA1C levels with increased risk of Coronary Heart disease Thus the present study was designed and conducted with an aim to evaluate association between HBA1C with Ischemic Heart disease (IHD) and Myocardial Infarction (MI) in patients with Diabetes mellitus. **Aims and objectives:** This study was done with an objective to know the Association between HBA1C with CHD like IHD and MI in patients with Diabetes mellitus. **Methodology:** This was a retrospective study where medical records between January 2018 and December 2018 of all diabetic patients admitted in CCU with diagnosis of MI and IHD were enrolled after obtaining the approval from the institutional ethical committee. 65 Diabetic patients (with and without CHD) admitted to CCUS were enrolled who met inclusion and exclusion criteria. HbA1c concentrations on CCU admissions were taken from the patients reports. Age, sex, duration of Diabetes was taken. Data was summarized by frequency and percentage and represented in the form of diagrams. Inferential methods such as Chi square test/ Fischer Exact test were used to compare .Analysis was performed by SSP17 software and P value less than 0.05 considered as significant. **Results**: Coronary Heart diseases like Ischemic heart disease and myocardial infarction were more common in Diabetics with higher HbA1c values above 8 % (poor control) when compared to diabetics with HAB1C below 8% (fair control). And was also significantly increased with prolonged duration of Diabetes. **Conclusions**: Uncontrolled Diabetes is related significantly with risk of CHD, this association is affected by chronic hyperglycemia.

Key Words: Diabetes mellitus (DM), HBA1C, Ischemic Heart Disease (IHD), Myocardial Infarction (MI), Coronary Heart Disease (CHD)

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INTRODUCTION

Diabetes mellitus is an important cardiovascular risk factor. The rate of death due to cardiovascular disease in diabetic patients is 2 – 4 times higher than in Non diabetic population[1]. The diffuse nature of arterial disease with accompanying metabolic derangement contribute to impaired compensatory mechanisms, increased infarct size and a disproportionately more substantial impairment of left ventricular function contribute to the increased mortality and morbidity. The adverse macrovascular consequences of DM are well recognized, as is the accompanying accelerated rate of atherosclerosis that predisposes patients to occlusive coronary artery disease, Myocardial infarction and death. Atherosclerosis is augmented in Diabetics then Non Diabetics due to Endothelial injury, associated presence of microangiopathy, hyperglycemia and its direct and indirect effects, Hormonal and enzymatic aberration

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underlying the altered metabolic biochemical state either as a cause or as an effect of diabetes. Glycosylated hemoglobin (HBA1C) reflects average blood glucose concentration over the preceding 2 to 3 months. Compared with fasting blood glucose test, it has higher repeatability.It can be assessed in non-fasting state, less biological variability and greatest stability. Hyperglycemic control in the form of elevated HbA1c has been established as a risk factor for developing micro and macrovascular complications.[2] The American Heart Association has recommended that HBA1C breakpoint of 7% would have cardiovascular benefit[2]. Hyperglycemia predicts not only Diabetes but also cardiovascular morbidity and mortality among people with Diabetes. It has been estimated that each 1% augmentation in HbA1c concentrations, is associated with 15–20% greater cardiovascular risks[3].

MATERIALS AND METHODS

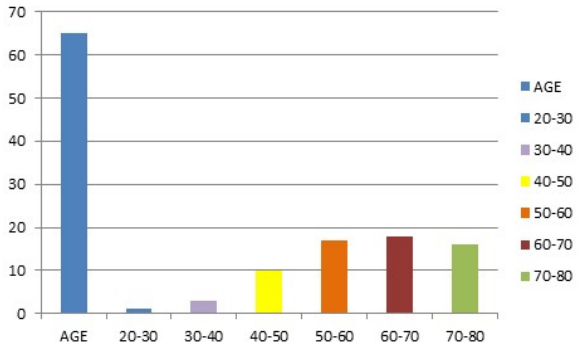
This was a retrospective study where medical records between January 2018 and December 2018 of all Diabetic patients admitted in CCU with and without diagnosis of CHD (MI and IHD) were enrolled after obtaining the approval from the institutional ethical committee. 65 diabetic patients admitted to CCUs with diagnosis of IHD OR MI and without CHD were enrolled who met inclusion and Exclusion criteria. HbA1c concentrations on CCU admissions were taken from the patients reports. Age, sex, history of Diabetes mellitus and Duration of Diabetes mellitus were taken. Exclusion were smokers and patients with Hypertension . Data was summarized by frequency and percentage and represented in the form of diagrams.Inferential methods such as Chi square test/ Fischer Exact test were used to compare .Analysis was performed by SSP17 software and P value less than 0.05 considered as significant.

RESULTS

65 Diabetic patients admitted in critical care unit were enrolled in the study. Age, sex, history of Diabetes and the demographic characteristics of the patients have been presented .

Table 1: AGE DISTRIBUTION OF STUDY GROUP

Age Group	Frequency	Percent
20-30 Years	1	1.53
30-40 Years	3	4.61
40-50 Years	10	15
50-60 Years	17	26.1
60-70 Years	18	27.27
70-80 Years	16	24.6
Total	**65**	**100.0**



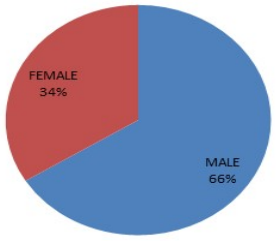
GRAPH 1: AGE DISTRIBUTION OF STUDY GROUP

Among 65 patients studied 1 (1.53%) were in the age group 20-30years, 3 (4.61%) were in the age group 30-40 years, 10 (15%) were in the age group of 40-50 years, 17 (26.1%) were in the age group of 50-60 years, 18 (27.27%) were in the age group of 60-70 years and 16 (24.6%) were in the age group of 70-80 years

Table 2: SEX DISTRIBUTION OF STUDY POPULATION

SEX	Frequency	Percent
Male	43	66.2
Female	22	33.8
Total	**65**	**100.0**

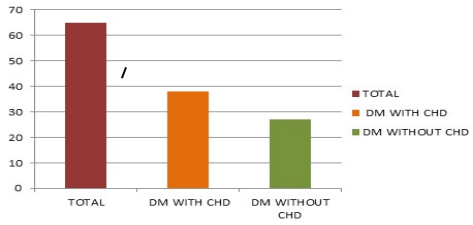
Among 65 patients studied 43 (66.2%) were males, and 22 (33.8%) were females.



GRAPH 2: SEX DISTRIBUTION OF STUDY POPULATION

Table 3: NO OF DIABETIC PATIENTS WITH AND WITOUT CHD (MI/ IHD)

DIABETES	NO OF PATIENTS	PERCENTAGE
WITH CHD	38	58.4%
WITHOUT CHD	27	41.53%



Graph 3

Among 65 diabetic patients studied 38 (58.4%) were Diabetes with CHD and 27 (41.53%) were Diabetes without CHD

Table 4: DURATION OF DIABETES IN PATIENTS WITH CHD AND WITHOUT CHD

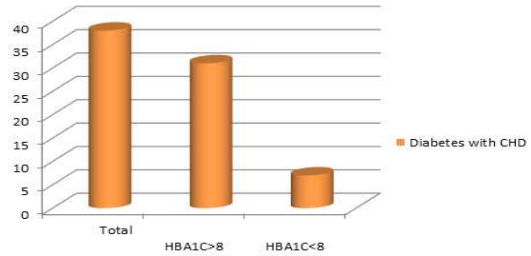
	DURATION OF DIABETES MORE THAN 5 YEARS	DURATION OF DIABETES LESS THAN 5 YEARS
CHD (38)	31	7
WITHOUT CHD (27)	8	19

Among 38 patients with CHD, 31(81%)patients had duration of diabetes more than 5 years and 7 (18%) had diabetes less than 5 years. Among 27 patients with CHD 8 (29.6 %) patients had duration of Diabetes more than 5 years and 19 (70.3 %) had diabetes less than 5 years

Table 5: HBA1C IN DIABETES WITH CHD AND WITHOUT CHD

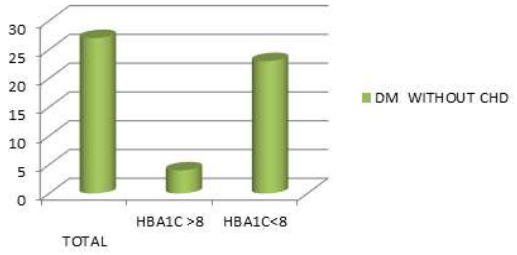
	HbA1c	HbA1c
Total (65)	>8 %	<8 %
DM WITH CHD (38)	31 (81%)	7 (18%)
DM WITHOUT (27) CHD	4 (14.8%)	23 (85%)

p value -0.000 highly significant for HbA1c > 8 % in DM with CHD



Graph 4: HBA1C IN Diabetes with CHD

Among 38 Diabetic patients with CHD ,31 (81%)patients had HBA1C > 8 % and 7 (18%) had HBA1C <8 %



Graph 5: HBA1C IN Diabetes without CHD

Among 27 Diabetic patients without CHD, 4 (18%) had HBA1C >8% and 23(81%)patients had HBA1C < 8 %

DISCUSSION

Around 65 Diabetic patients who fulfilled the inclusion and exclusion criteria were studied, The relationship between HBA1C and CHD like IHD and MI were studied among these Diabetic patients. Patient data were collected and charted according to age,sex, duration of Diabetes, finally results were compared and high incidence of CHD was found in Diabetics with HBA1C > 8 %. In the study group, 1 (1.53%) was in the age group 20-30years, 3 (4.61%) were in the age group 30-40 years, 10 (15%) were in the age group of 40-50 years, 17 (26.1%) were in the age group of 50-60 years,18 (27.27%) were in the age group of 60-70 years and 16 (24.6%) in the age group of 70-80 years . Among the study group 43(66.2%) patients were males, and 22 (33.8%) patients were females. 38 (58.4%) patients were Diabetics with CHD like MI, IHD and 27 (41.53%) were Diabetics without CHD. Among 38 patients with CHD ,31 (81%)patients had duration of diabetes more than 5 years and 7 (18%) had diabetes less than 5 years. Among 27 patients without CHD, 8 (29.6 %) patients had duration of Diabetes more than 5 years and 19 (70.3 %) had diabetes less than 5 years. Among 38 Diabetic patients with CHD, 31 (81%)patients had HBA1C > 8 % and 7 (18%) had HBA1C <8 % , with P value of 0.000 which is highly significant. Among 27 Diabetic patients without CHD 4 (18%) had HBA1C >8% and 23(81%)patients had HBA1C less than 8 %. This indicated that higher the levels of HBA1C i.e >8% reflecting poor glycemic control , higher the chances of CHD like MI and IHD among Diabetics. In our study HBA1C levels was an independent predictor of prevalence of CHD. We established that higher HBA1C levels >8% were significantly associated with CHD. Study conducted by Ahmad etal showed Higher HBA1C levels is related significantly with coronary artery diseases[2], this association is affected by chronic hyperglycemia.

CONCLUSION

There is an increase in the prevalence of Coronary heart diseases like MI and IHD among Diabetic patients with poor control , indicated by higher HBA1C levels >8 % and this association is also affected by chronic Diabetic state. Hence good control of blood sugars reflected by low HBA1C is needed to prevent development of CHD.

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