Association of hba1c Level with the Severity of Coronary Artery Disease in Non-diabetic Patient

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Background:

An HbA1c level more than 4.6%; In non-diabetic patients increased the CAD (coronary artery disease) .For the rise of HbA1C 1% that increase the CAD risk more than 2.36%. Moreover less than 4.6%; of HbA1c level had no impact on CAD. It has already been established that DM is the one of the risk factor for CAD. However it was also observed that who's HbA1c more than 4.6 the risk of coronary artery disease increase though he was not diabetic. In our present study main concern was HbA1c level in non-diabetic patients associate with CAD among our population.

Keywords: HbA1c, coronary Angiogram, NSTEMI, Vessel score, Gensini score

Patients and Methods:

This research work was carried out in NICVD from July 2015 to 2018 July in Interventional cardiology department NICVD Dhaka. Which is the only largestest Institute in Bangladesh and all patients with NSTEMI without diabetes mellitus.

Result:

Table 1 shows that out of 400 samples the average age of the studied patients was 51.0±9.0 years they are in-between 30 to 80 years. In group I average age was 50.8±9.0 years in-between 30 to 72 years and in the group II average age was 51.1±9.0 years they were in-between from 35 to 80 years. The mean age of the two groups were observed almost similar which was not significant (p=0.81). It was between two groups. Group II was found the highest percentage were in the range of 51-60 years (42.5%) followed by 41-50 years 30.5%, ≤40 years 16.5% and lowest in age group of >60 years (10.5%).

Table 2 shows biochemical status of the study sample. The mean value of total, triglyceride, Low density lopoprotein and High density lipo protein cholesterol level were 209.2±43.5, 151.9±37.5, 121.0±26.5 and 37.9±5mg/dl in group II, and 197.8±35.9, 145.1±34.7, 116.7±23.0 and 40.0±4.8 mg/dl in group I respectively without significant difference (p=0.10, p=0.08, p=0.11 and p=0.07). The mean creatinine and RBS were 1.24±0.33 mg/dl and 7.1±1.4 mmol/L in group II and 1.04±0.20

mg/dl, 6.2±1.2 mmol/L in group I showing p=0.01which was significant difference (p=0.01) of mean RBS level in group II. The mean troponin I level was 14.2±10.2 ng/ml in group II and 13.0±9.3 ng/ml in group I with statistically no significant difference (p=0.24).

According to the vessel score group II. sample showed the more severe CAD and they had 3 vessel score 34.0% ,2 vessel score 33.0%, 26.0% had 1 vessel score and 7.0% 0 vessel score. On the other hand in group I, maximum had 1 vessel disease 49.5% followed by 2 & 0 vessel score 22.5% & 20.0% and 8.0% patient had 3 vessel score. No vessel involvement was found significant in group I (p=0.01). Single vessel involvement was significantly higher in group I than group II (p=0.001). Double vessel involvement was observed significantly higher in group II (p=0.04). TVD was found in highest number in group II (p=0.001)

The table 3 shows the mean HbA1c level of sample population with normal CAG (angiographic) findings was 5.27±0.59. The mean HbA1c level of one, two and three (triple) vessel disease were 5.47±0.54, 5.81±0.47 and 6.05±0.57 (in percentage) respectively. There were increase number of CAD with increase level of HbA1C.and p value was0. 001.(p=0.001).

Table 4 shows Gensini severity of the sample patients. Mild Gensini score was 92 (46.0%) in group II sample and 155 (77.5%) sample in group I. Moderate to severe Gensini score was found 108 (54.0%) patients in group II and 45 (22.5%) patients in group I. The table observed that moderate to severe Gensini score was significantly higher in group II (p=0.001).

Age in years	Group I (n= 200)		Group II (n=200)		Total (N=400)		p value
	Number	%	Number	%	Number	%	
≤ 40	31	15.5	33	16.5	64	16.0	
41 – 50	80	40.0	61	30.5	141	35.3	
51 – 60	63	31.5	85	42.5	148	37.0	
> 60	26	13.0	21	10.5	47	11.8	
Mean ± SD	50.8±9.0		51.1±9.0		51.0±9.0		0.810[ns]

Table 1: Distribution of Age of sample population (n=400).

HbA1c <5.7% in Group 1.and HbA1c ≥5.7-6.4% in Group ll, ns= Not significant (p>0.05) p value for unpaired student t test.

Biochemical parameters	Group I (n= 200)		Group II (n=200)		P value
	Mean SD		Mean SD		
Total Cholesterol (mg/dl)	197.8±35.9		209.2±43.5		0.10 ns
Triglyceride (mg/dl)	145.1±34.7		151.9±37.5		0.08 ns
LDL cholesterol (mg/dl)	116.7±23.0		121.0±26.5		0.11 ns
HDL cholesterol (mg/dl)	40.0±4.8		37.9±5.2		0.07 ns
Creatinine (mg/dl)	1.04±0.20		1.24±0.33		0.09 ns
RBS (mmol/L)	**6.2±1.2**		**7.1±1.4**		**0.01 s**
Troponin I (ng/ml)	13.0±9.3		14.2±10.2		0.24ns

Table 2: Comparison of the study sample according to biochemical Parameters (n=400)

HbA1c <5.7% in Group I and HbA1c ≥5.7-6.4%in Group ll, p values for unpaired student t test s= Significant (p<0.05)

No. of vessel involved	HbA1c in %		P value
	Mean	SD	
No vessel involvement (n=23)	5.27	0.59	
Single (n=64)	5.47	0.54	
Double (n=47)	5.81	0.47	**0.001 s**
Triple (n=36)	6.05	0.57	

Table 3: Association between HbA1c and number of vessels involved (n=400)

s= Significant

p value for ANOVA test.

Gensini Score	Group I (n= 200)		Group II (n=200)		P value
	Number	%	Number	%	
Mild CAD (≤36)	155	77.5	92	46	**0.001 s**
Moderate to severe CAD(>36)	45	22.5	108	54	

Table 4: Distribution of the study patients according to Gensini score (n=400)

HbA1c <5.7% in Group I and HbA1c ≥5.7-6.4% in Group ll,s= Significant value for Chi Square test.

Conclusion:

The present study concluded that the elevated HbA1c levels in non-diabetic individuals with non-ST- EMI patients are associated with the severity of CAD. This simple HbA1c level measurement could be used as an Single important risk for coronary artery disease and its severity in non-diabetic subjects. Early screening may help to maintain an optimal HbA1c level, therefore aggressive treatment in early stage glycometabolic disorder may prevent more severe coronary artery disease.

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