ORIGINAL ARTICLE

STUDY OF HBA1C LEVELS IN ACUTE CORONARY SYNDROME

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ABSTRACT: Diabetes mellitus is a disease of Antiquity known to mankind since the past 3500 years. It is a big concern because of devastating effects of its complications. Diabetes is considered a highly vascular disease with both microvascular and macrovascular complications. Macrovascular complications start taking place long before the patient has over diabetes.[1] Hyperglycemia accelerates the process of atherosclerosis by the formation of glycated proteins and advanced glycation end products, which act by increasing the endothelial dysfunction.[2] High admission blood glucose levels after acute Myocardial Infarction are common and are associated with an increased risk of death in subjects with and without diabetes.[3] Glycometabolic state at hospital admission is an important risk Marker for long-term mortality in patients with AMI. Glycosylated hemoglobin provides a measure of average blood glucose levels during the period of 8 to 12 weeks.[4] So it could prove useful for the diagnosis of diabetes mellitus in ACS when stress induced hyperglycemia is a confounding factor as it is unlikely to rise with acute hyperglycemia. This study has been carried out in Medicine department of Rangaraya medical college GGH Kakinada, Sraddha Hospital, Visakhapatnam, Andhra medical college, KGH, Visakhapatnam, GEMS hospital Srikakulam with an aim to estimate glycosylated Hemoglobin in ACS which is a prognostic factor for ACS. Among various variables and clinical details during course of disease, the estimation of glycosylated hemoglobin (HbA1c) gives useful estimation for ACS in prognosis, outcome and sequelae of complications. Patients with higher levels of glycosylated hemoglobin have higher risk factors like hypertension, obesity, dyslipidemia and hence predisposed to ACS in early age.

KEYWORDS: Anterior Myocardial infarction, Inferior Myocardial infarction, Troponins, HbA1c levels.

INTRODUCTION: MATERIAL AND METHODS: A total of 100patients were studies in the last 3 years during the period of January 2012 to November 2014 age ranging from 38 to 73. There were 76 males and 24 females, follow-up periods ranging from 6 months to 2 and half years. ACS refers to any constellation of clinical symptoms that are compatible with acute myocardial ischemia and for easier understanding can be divided into STEMI, NSTEMI and UA.[5,6] STEMI is defined based on ECG criteria (ST- Segment elevation >1mV in at least two contiguous leads or a new LBBB).Diagnosis of Acute Myocardial Infarction was made as per WHO Guidelines. Known cases of Congenital heart diseases, Rheumatic Heart Diseases, Haemoglobinopathies, Hemolytic Anemia, History of Blood Donation in recent past, Sepsis, Age<30 years and >80 years are Excluded. Detailed Clinical examination is done as per clinical Proforma, Patients were subjected through History of index event, risk factors and through physical examination. Patients were considered hypertensive if history of HTN is present and diagnosed, and is on medication with BP >140 mm of hg. Patients were considered dyslipidemic as per NCEP ATP III Guidelines.[7] Patients were considered to diabetic when the patient has diabetes regardless of duration of disease, need for anti-diabetic agents, fasting blood sugar ≥ 126mg/dl or HbA1c ≥ 6.5%.[8] Patients were considered obese if the weight circumference was more than 90cm in males and 80cm in females.[9] Patient was considered active smoker if he had history of smoking in the

ORIGINAL ARTICLE

last year and was considered non-smoker if he never smoked or had history of stopping smoking for more than 1 year. Investigations done were: TROPONIN – T at initial diagnosis of AMI and later repeated after 12 hours if initially it was negative, Blood sugar, Lipid Profile, HbA1c levels in blood and ECG,[10,11] done on admission and whenever post Infarction angina occurred.

OBSERVATIONS: In this prospective study, 100 Patients with Acute Coronary Syndrome in and around RMC, AMC, Visakhapatnam in ICCU 56 Patients had a value of HbA1c in the Non-Diabetic range (<6.5%), and 44 patients (44%) had HbA1c in the diabetic range (>6.5%). 14% of the total patients had previously unrecognized diabetes mellitus that has come to light after HbA1c estimation. 22% of total patients on admission had hyperglycemia that was secondary to stress of ACS, therefore HbA1c Measurement at the time of admission clearly and quickly differentiates stress hyperglycemia from hyperglycemia seen in undiagnosed Diabetes Mellitus. Mean age of presentation of ACS patient with HbA1c level 6.5% was 56.05 years, for ACS patient with HbA1c level 6.5%-8.5% was 52.16 years and for ACS with HbA1c level >8.5% was 53.35 years. Out of 100 patients 76 % were male and 24% were female. Hypertension is more prevalent in patient with higher HB a1c level as evidenced by incidence of hypertension 23.21% in patient with HbA1c level of <6.5% and 65% in patient with HbA1c levels of >8.5% this was found to be a statistically significant. Smoking was more common in patients with HbA1c level less than 6.5% (60.71%) vs in patients with HbA1c level of 6.5%-8.5% (41.6%) vs in patients with HbA1c >8.5% (30%). 35% of patient with HbA1c level >8.5% were found to be obese. Past history of IHD was more common with patient with higher level of HbA1c level 35% in HbA1c >8.5%. Dyslipidemia was more common in patients with the level of HbA1c >8.5% with high triglyceride level and low HDL level. 90% of the patient had chest pain, 88% had sweating, 65% had dyspnea, 10% of patient presented with no chest pain. In our study, 44(44%) of patients had STEMI, 27(27%) had NSTEMI and 29(29) patient had Unstable Angina. STEMI was more common in group of patients having HbA1c levels >8.5% as compared to patient with HbA1c levels <6.5%. This relationship of type of coronary event with HbA1c level was found to be significant. Majority of patients presented with anterior wall infarction 31 % followed by inferior wall involvement 22%. 22 patients expired in study, with 50% mortality in patient with HbA1c level >8.5 %. In patient with HbA1c <6.5 percent 16 out of 56 developed complication like left ventricular failure, cardiogenic shock, arrhythmias as compared to 16 of 20 patients with HbA1c >8.5 % which was statistically significant. Left ventricular failure was most common complication followed by cardiogenic shock and Arrhythmia in patient having ACS.

DISCUSSION: HbA1c estimation clearly and quickly differentiates stress hyperglycemia from hyperglycemia of diabetes mellitus in ACS. Soleret al.[12] concluded that HbA1c estimation is useful for early and accurate interpretation of hyperglycemia following MI. This measurement permits identification of previously undiagnosed diabetes which effects about 10 % of all patients admitted to a coronary Care Unit with ACS. This is important because any attempts at lowering stress induced hyperglycemia may cause hypoglycemia leading to tachycardia and its resultant deleterious effects. Thus HbA1c levels can be used to diagnose latent diabetes and differentiate it from stress hyperglycemia. In the present study has 14% newly diagnosed diabetes mellitus which was comparable with observation made by Iraqi study Razzaq et al.[13] Glycometabolic state at hospital admission is an important risk marker for long term mortality in patients with ACS. Hyperglycemia following ACS may result from stress or maybe due to previously unrecognized Diabetes mellitus.

ORIGINAL ARTICLE

It is frequently difficult to separate the two conditions clinically and blood sugar estimation alone cannot be taken as a Diagnostic tool for diabetes mellitus. HbA1c which is unlikely to rise with acute hyperglycemia could prove useful for the diagnosis of diabetes mellitus when stress induced hyperglycemia is a confounding factor. Patient HbA1c <6.5% had maximum number of ACS event in age group of 51 to 60 with mean of 56.05±8.53. In our study no statistical significance was found between HBa1c level and age and sex distribution and obesity of patient. in ACS patients with diabetes mellitus has higher mortality than non-diabetic.[14,15] The relationship of history of IHD and Family history of IHD is statistically not significant.[16] In patient with elevated HbA1c they were higher progressive comorbidities like hypertension 73% vs 59% in normal HbA1c.[17] In the present study high level of cholesterol was observed in patient with low HbA1c level. Complications in ACS patient with respect to HbA1c: left ventricular failure was the most common complication occurred in patient with ACS followed by cardiogenic shock with increase in glycosylated hemoglobin rate of complication increased. Elevated levels of HBA1C not only increases incidence of CHD but also extends into subsequent complications of CHD. Each 1% rise in HBA1C results in more coronary events and more hospitalizations due to worsening heart failure.[18] Elevated HbA1c (6.5%-7%)is associated with poor prognosis in patients with minimal left ventricular dysfunction <45%.[19] When incidence of heart failure was compared between diabetic and non-diabetic population the incidence was 2.5 times higher among diabetic patients with elevated HbA1c.[20] The difference in incidence heart failure was much higher amount the younger age group emphasizing the need for a good glycemic control just after diagnosis. Arrhythmias are also associated with the duration of DM and HbA1c level in DM type 2. This can be concluded from clinical outcome in comparison with HbA1c and RBS that HbA1c has significant relationship in predicting clinical outcome and is prognostically important in assessment of patient presenting with acute coronary syndrome.

CONCLUSION: Glycated hemoglobin has been used to monitor glycemic control in diabetics for more than two decades. It helps clinicians and their patients to stratify the treatment strategy and avoid long term complications. Elevated HbA1c increases the risk of microvascular and macrovascular complications in diabetics and non–diabetics, where value >6.5% are diagnostic of existing diabetes. Glycosylated Hemoglobin estimation is useful for early and accurate interpretation of hyperglycemia following ACS.HbA1c estimation at the time of admission in ICU clearly and quickly differentiates stress induced hyperglycemia in ACS from hyperglycemia seen in undiagnosed DM. Thus it helps in prompt and precise identification of previously undiagnosed DM. Patients with high levels of HbA1care predisposed to ACS at an early age and subsequently high incidence of complications of ACS. It can be used as the prognostic marker of outcome of ACS. Patients with high HbA1c level have a higher incidence of post ACS complication.

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ORIGINAL ARTICLE

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ORIGINAL ARTICLE

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