ORIGINAL ARTICLE

Frequency of Recently Poor Glycemic Control as Assessed by Hba1c in Diabetics Presented with Acute Coronary Syndrome

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ABSTRACT

Aim: To find the frequency of recently poor glycemic control as assessed by HbA1c in diabetic patients with acute coronary syndrome

Study design & Setting: Observational study.

Methods: The study included 60 diabetic patients presented with acute coronary syndrome. Diagnosis of acute coronary syndrome was based on patient's symptoms, ECG changes and cardiac enzyme results. HBA1c level report was collected for all patients from their hospital record. SPSS 21 version was used to analyze the collected data. The qualitative data was presented in the form of graphs while the quantitative data was presented by simple descriptive statistics in the form of mean, range and standard deviation.

Results: Out of sixty patients enrolled in this study 2(45%) were females and 33(55%) were males. 28(46.67%) patients presented with ST-elevation MI (STEMI) whereas 25(41.66%) patients presented with non ST-elevation MI. 7(11.66%) had unstable angina. Out of sixty patients 21(35%) patients were having poor glycemic control (HBA$_1$C >7%) whereas 39(65%) patients had fair glycemic control (HBA1C< 7%). Fifty eight (96%) patients were using oral anti diabetic tablets whereas 2(3.33%) patients were using insulin before hospital admission.

Conclusion: This study shows that amongst patients admitted with acute coronary syndrome a significant proportion of patients (35%) had poor glycemic control over past three months as assessed by HBA$_1$C implying that recent poor glycemic control is a significant risk factor for acute coronary events in diabetic patients.

Keywords: Acute coronary syndrome, Glycemic control, Diabetes mellitus.

INTRODUCTION

Diabetes mellitus is a global health care problem with a variety of social and economic consequences. An estimate reveals globally 285 million people (approximately 6.4% of the adult population) are suffering from this.[1] People with diabetes mellitus are more prone to suffer from a number of serious health problems including cardiovascular disease (CVD), premature death mainly due to cardiovascular events and kidney failure, and functional limitation due to peripheral ulcers and amputation. The most feared cardiac manifestation in diabetic patients is the development of acute coronary syndrome (ACS) which is a term used to describe a group of conditions including unstable angina and myocardial infarction. Recent studies have shown that a strict control of diabetes by intensive glucose lowering leads to reduction in cardiovascular events and overall mortality in type-II diabetic patients.[2] Epidemiological studies have shown that high post-prandial blood sugar level is an independent risk factor for cardiovascular events[3]. Preventive strategies with special emphasis to correct post-prandial hyperglycemia may help to reduce acute coronary events[4]. Epidemiological analyses have shown that each 1% increase in HBA1c level causes 18% increase in death from cardiovascular causes. Similarly fair reduction in HbA1c reduces cardiac events and it is estimated that each 1% decrease in HbA1c level results in 37% reduction in micro vascular complications, 14% reduction in incidence of myocardial Infarction and 21% reduction in diabetes related deaths[2,5]. The objective of this study was to find out the frequency of poor glycemic control assessed by HBA1c in diabetics presented with acute coronary syndrome.

MATERIALS AND METHODS

This observational study was carried out in department of cardiology Gulab Devi Teaching Hospital, Lahore. Using nonprobability sampling technique a calculated sample of 60 diabetic patients presented with acute coronary syndrome were taken; using α=0.05, P=0.041, q=0.959 and margin of error=0.05 and z value was taken from z table which is (3.8416).

Data Collection: Diagnosis of acute coronary syndrome was based on patient's symptoms, ECG changes and cardiac enzyme results. HBA1c level report was collected for all patients from their hospital record. Glycemic control was considered as poor if HBA1c > 7mmol/l. This reference value of HBA1c was taken in context of local setting. The collected data was analyzed by using SPSS v.21.0. Data was presented by descriptive statistics in the form of mean, range and standard deviation and percentages

RESULTS

Out of sixty patients enrolled in this study there was an overall male predominance 33(55%). Family history of diabetes was positive in 19(31.67%) patients.

Table. 1: Baseline Characteristics

Age (mean ± S.D) in years	50±8.8
Gender n(%)	
Males	33 (55%)
Females	27 (45%)
Pattern of ACS n(%)	
STEMI	28 (46.7%)
NSTEMI	25 (41.6%)
Unstable Angina	07 (11.7%)
Raised Cardiac Biomarkers n(%)	
Trop-T	32 (53.3%)
Trop-I	07 (11.7%)
Mode of Anti-diabetic Drugs n(%)	
Oral	58 (96.7%)
Insulin	02 (3.3%)

19(31.67%) were smokers. 28(46.67%) patients presented with ST-elevation MI (STEMI) whereas 25(41.66%) patients were having (NSTEMI). 7(11.66%) presented with Unstable angina. Out of sixty patients 21(35.0%) patients were having poor glycemic control (HBA$_1$C >7%) whereas 12(20%) patients were having moderate glycemic control, 13(21%) patients had fair control and 14(23%) had good glycemic control. 58(97%) patients were taken oral anti diabetic tablets where 2(03%) patients were using insulin

Table 2: Distribution of HBA1C level

	Levels	Frequncy
Normal	4.5-5.5mmol/l	Nil
Good control	5.0-5.5mmol/l	14(23%)
Fair control	5.6-6.5mmol/l	13(21%)
Moderate control	6.5-7.0mmol/l	12(20.%)
Poor control	>7.0mmol/l	21(35.%)

DISCUSSION

Cardiovascular diseases pose a huge medical and public health issue throughout the world including both developing and developed countries. Developing countries like Pakistan face the added burden of still prevalent infectious diseases like polio and rheumatic heart diseases along with an increasing burden of non-communicable diseases like diabetes and cardiovascular diseases. A study done by Basit et al showed that diabetes mellitus is widely prevalent in Pakistani population with overall prevalence of 26.3%, of which had known diabetes and 7.1% patients had newly diagnosed diabetes. Prevalence of diabetes was slightly higher in urban population as compared to rural population.[6]

Diabetes mellitus is considered to be an independent risk factor for the development of coronary atherosclerosis and acute coronary syndrome. Diabetics have manifold increased risk for developing coronary artery disease (CAD) than non-diabetics with subsequent elevated risk for morbidity and mortality due to cardiovascular events.[7] Ten to 20% of patients hospitalized with acute myocardial infarction have diabetes and more than one third of patients have abnormal blood glucose levels at presentation. A study showed that 25% of the total ACS patients presented with acute coronary syndrome (ACS) in hospitals had diabetes mellitus.[8] Our study further showed that amongst diabetic patients admitted to hospital with acute coronary syndrome (ACS), approximately one third had recent poor glycemic control as shown by elevated HBA$_1$C levels (> 7%).

The recent EDIC Study concluded that a tight glycemic control with target mean HbA$_{1c}$ less than 7% resulted in 42% decrease in cardiac and other macro vascular complications along with 57% reduction in mortality from cardiovascular causes[9]. This highlight the importance of fact that there should be a close working relationship between cardiologist and diabetes specialist with intent to reduce morbidity and mortality in diabetic patients especially due to cardiovascular events. This further highlight the importance of fact that patients with sub-optimal glycemic control needs more care and planning especially the implementation of primary prevention strategies with use of aspirin and high dose statins which may help to reduce the frequency of acute coronary events and mortality in these patients[10].

CONCLUSION

This study shows that amongst patients who were admitted with acute coronary syndrome a significant proportion (35%) had poor glycemic control over past three months as assessed by HBA$_1$C implying that recent poor glycemic control is a significant risk factor for acute coronary events in diabetic patients. This analysis can help to plan the implementation of primary prevention strategies in patients with poor glycemic control especially with use of aspirin and statins with aim to reduce the acute coronary events.

Limitations of the study: This study is done on a small number of patients and larger studies are required to suggest the benefits of use of preventive strategies in diabetic patients with poor glycemic control.

REFERENCES

1. Kaul K, Tarr JM, Ahmad SI, Kohner EM, Chibber R. Introduction to diabetes mellitus. Diabetes: Springer; 2013. p. 1-11.
2. Goff DC, Gerstein HC, Ginsberg HN et al. Prevention of cardiovascular disease in persons with Type 2 DM: Current knowledge and rationale for the action to control cardiovascular risk in Diabetes (ACCORD) trial. Am J Cardiol 2007;99:4i-20i.
3. Undas A, Wiek I, Stêpień E, Zmudka K, Tracz W. Hyperglycemia is associated with enhanced thrombin formation, platelet activation, and fibrin clot resistance to lysis in patients with acute coronary syndrome. Diabetes care. 2008;31(8):1590-5.
4. Ceriello A. Postprandial hyperglycemia and diabetes complications: is it time to treat? Diabetes. 2005;54(1):1-7.
5. Imam K. Management and treatment of diabetes mellitus. Diabetes: Springer; 2013. p. 356-80.
6. Basit A, Fawwad A, Qureshi H, et al. Prevalence of diabetes, pre-diabetes and associated risk factors: second National Diabetes Survey of Pakistan (NDSP), 2016–2017. BMJ Open 2018; 8:e020961. Doi: 10.1136/ bmjopen-2017-020961
7. Raza JA, Movahed A. International Journal of Cardiology. Volume 89, Issue 2-3, June 2003, pages 123-134.
8. Esteghamati A, Abbasi M, Afshar H. Cardiovascular Diabetology, Article no 15 (2006).
9. Ryden L, Standl E, Bartnick M et al. Guidelines on diabetes, prediabetes and cardiovascular diseases. European Heart Journal, volume 28, issue 1, January 2007, pages 88-136.
10. Niskanen L, Hedner T, Hansson L et al. Reduced Cardiovascular Morbidity and Mortality in Hypertensive Diabetic Patients on First-Line Therapy With an ACE Inhibitor Compared With a Diuretic/β-Blocker–Based Treatment Regimen. Diabetes Care 2001 Dec; 24(12): 2091-2096.