ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)
Vol 2, Issue 10, October 2017

Prevalence of undiagnosed diabetes mellitus in acute coronary syndrome patients – A hospital based study

Dr Aamir Rashid
MD, DNB MEDICINE, DM, DNB CARDIOLOGY, MRCP UK, MNAMS
POST DOCTORAL FELLOW PAEDIATRIC CARDIOLOGY
Senior Resident, Department of Cardiology, SKIMS, Soura, Srinagar, J & K, India

***Abstract*— Diabetes mellitus and cardiovascular disease are two widely connected entities .The prevalence of undiagnosed Diabetes in and impact on survival of ACS patients is largely unknown in our population .*Aims and objectives* To study the prevalence of undiagnosed diabetes mellitus in acute coronary syndrome patients and study short term all cause mortality in different diabetic and non diabetic subgroups -a hospital based study. *Material & Methods* The study was conducted in the Postgraduate Department of Medicine at Government Medical college, Srinagar. It was prospective Observational study .It included all patients, admitted as acute coronary syndrome in medicine department in between the period from April 2014 to August 2015 with diagnosis of acute coronary Syndromes which include STEMI, NSTEMI and Unstable Angina. Patients was categorized into 5 groups known T2DM , prediabete, first time detected Diabetes ,Non –Diabetic ACS patients (5) Stress induced hyperglycemia . .All cause 30 day mortality was seen in all patient taken under study. *Observation and results* . In our study total of 693 ACS patients were enrolled. The mean age of patients was 61.20 ± 11.69 years. Males predominated in comparision to females with 4:1 ratio. 102 (14.7%) had undiagnosed (first time detected) diabetes. Diabetic and 1st time detected diabetic had double the mortality as compared to the normal and pre-diabetic group(10.8 %,8.8% vs 5.8%). *Conclusion:* Undiagnosed diabetes in patients with ACS is not uncommon in our population .Diabetic status profoundly affects the short term mortality of ACS patients .**

Key words: Undiagnosed diabetes, ACS, Kashmiri population.

I. INTRODUCTION

Diabetes mellitus (diabetes) and cardiovascular disease (CVD) are two widely interconnected entities1. The Euro Heart Survey on Diabetes and the Heart1 indicate not only a high prevalence of diabetes, but also the high rates of undiagnosed diabetes or prediabetic states such as impaired glucose tolerance (IGT) or impaired fasting glucose (IFG) in patients with stable or unstable coronary heart disease (CHD). With CHD ranking as the number one cause of death worldwide2 with diabetes increasing by two to three times the risk of CHD3 and with diabetes and the often preceding metabolic syndrome dramatically increasing their prevalence in Europe over the past 20 years, diabetologists and cardiologists have started to join their forces to improve the management of the millions of patients suffering from both dieases4. More than 18 million people in the United States have diabetes mellitus, and approximately 35% of the population is prediabetic5. More importantly, another 7 million Americans have undiagnosed diabetes and are at high risk of developing diabetic complications, including cardiovascular disease.6,

Acute coronary syndrome consist of three entities -1.ST-segment elevated myocardial infarction 2.Non ST-segment elevated myocardial infarction 3.Unstable angina(UA). In addition to being a risk factor for the development of coronary disease, diabetes influences outcomes following ACS. GUSTO Trial 7 ,OASIS registry 8 & GRACE registry observed an increased rate of post-MI complications and mortality among patients with diabetes compared with patients without diabetes

Increased risk for subsequent adverse cardiac events in diabetic ACS patients may be explained by the observation that diabetic patients often have multiple comorbidities and tend to be hospitalized later after the onset of ACS symptoms.9 Mechanistically, diabetic patients have reduced endothelium-dependent vasodilation and increased platelet reactivity with blunted response to antithrombotic therapy that may contribute to the development of ACS as well as post- ACS complications.10 - Furthermore, pathophysiological mechanisms involved with previously undiagnosed diabetes or prediabetes (such as impaired endothelial function and increased oxidative stress at the vessel wall leading to activation of platelets, inflammation, and thrombosis) might be affected more severely by the

ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)
Vol 2, Issue 10, October 2017

combination of hyperglycemia and ACS than has been observed in patients with known diabetes.11,12
Diabetes mellitus is associated with an increased risk of cardiovascular morbidity and mortality.13,14 Findings of a met regression analysis suggest that even blood glucose levels below the threshold for diabetes are related to raised cardiovascular risk.15 Patients with a longer duration of diabetes more frequently show signs of diabetic neuropathy that can result in atypical symptoms during myocardial infarction. Thus, diagnosis of an acute coronary syndrome (ACS) is more difficult in these patients and initiation of adequate therapy is often delayed.15 Among patients with acute myocardial infarction (AMI), diabetes mellitus is associated with higher mortality rates, both in-hospital16 and during long-term follow-up.16,17 This is the case across the whole spectrum of ACS.18 In that study, ACS patients with diabetes had a higher risk of both death and re-infarction at 30 days than those without diabetes, and the rates of death or reinfarction at six months remained higher in the diabetic group, whether they presented with ST-elevation myocardial infarction (STEMI) or non-ST-elevation myocardial infarction (NSTEMI). High blood glucose levels in patients admitted for ACS/AMI are common and are associated with an increased risk of death in both patients with diabetes19-24 and patients without diabetes. Admission hyperglycaemia is an even stronger predictor for mortality in patients without a medical history of diabetes.19 The studies conducted earlier determine the correlation of diabetes with acute coronary syndrome but aim of our study is to determine the prevalence of undiagnosed diabetes in patient with acute coronary syndrome and to measure 30 days mortality among the patient with undiagnosed diabetes as compared to normal glycemic and known diabetic patients.

AIMS AND OBJECTIVES :

To study the prevalence of undiagnosed diabetes mellitus in acute coronary syndrome patients and study short term all cause mortality in different diabetic and non diabetic subgroups -a hospital based study.

MATERIAL & METHODS

The study was conducted in the Postgraduate Department of Medicine at Government Medical college, Srinagar. It was prospective Observational study .It included all patients, admitted as acute coronary syndrome (STEMI,NSETMI ,UA) in medicine department in between the period from April 2014 to August 2015 with diagnosis of acute coronary Syndromes which include STEMI, NSTEMI and Unstable Angina. Patients was categorized into 5 groups : (1) ACS with known T2DM (HbA1c level ≥ 6.5 and fasting blood glucose values ≥126 mg/dl for all patients) or use of glucose-lowering drugs at admission) (2) ACS with prediabetes (fasting blood sugar 100-125,HbA1c;5.7-6.4) (3) ACS with first time detected Diabetes / Undiagnosed T2DM (fasting glucose ≥126 mg/dL or HbA1c ≥6.5% with no previous diabetes history) (4) Non –Diabetic ACS patients (fasting glucose <100mg/dl, HbA1c< 5.7) (5) Stress induced hyperglycemia (fasting glucose >126mg/dl, HbA1c level <5.7). .All cause 30 day mortality was seen in all patient taken under study.

INCLUSION CRITERIA
All adult acute coronary syndrome patients of either sex.

EXCUSION CRITERIA
ACS due to substance abuse

OBSERVATION AND RESULTS

In our study total of 693 ACS patients were enrolled. The distribution of various patients as per blood sugar status is shown in table & Fig 1 .The mean age of patients was 61.20 ± 11.69 years. The mean age was comparable in various subgroups as shown in Table 2. Males predominated in comparision to females with 4:1 ration. The sex distribution is shown in Table 3. 102 (14.7%) had undiagnosed (first time detected) diabetes. Of various categories of ACS, STEMI was the most common .The distribution of types of ACS among various subgroups is shown in table 4. First time detected diabetics had higher mean blood sugar (fasting) and Hba1c as compared to the diabetics as shown in Table 5 & 6. Multi vessel disease was more prevalent in diabetic and first time detected diabetic patients as shown in table 7. Diabetic and first time detected diabetic come in more advanced Killip class (2-4) as a shown in table 8. Diabetic and 1st time detected diabetic had double the mortality as compared to the normal and pre-diabetic group as shown in table 9 and Fig 2.

DISCUSSION:

The increased risk of cardiovascular morbidity and mortality in diabetes mellitus has been validated in my studies[25,26]. Proposed mechanisms include platelets reactivity through variety of mechanisms[27,28] and endothelial dysfunction leading to decreased coronary reserve and increased platelet agreeability.29 Diabetes mellitus can become first time manifested in patients who develop ACS.
In our study total of 693 ACS patients were enrolled. 102 (14.7%) had undiagnosed (first time detected) diabetes which was consistent with studies of Roberto R. et al.,

ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)
Vol 2, Issue 10, October 2017

(2013) . W.K. Abdullatef et al. (2013) Darcy Green Conaway et al., (2005) .

In our study all cause 30 days mortality in known diabetic acute coronary syndrome patients was 10.8% and those of first time detected diabetic acute coronary syndrome patients was 8.8% which is almost double of the normal glycemic acute coronary syndrome patients [5.8%]. In patients with prediabetes the mortality was 3.7% and that of stress induced hyperglycemia was 3.4% which was comparable with normal glycemic patients. Though many studies have shown hyperglycemia as an independent risk factor for mortality in ACS, Aleksandar et al., (2012) in his study concluded that stress induced hyperglycemia has higher mortality, similar results couldn't be reproduced in our study because of small number of patients having stress induced hyperglycemia. Our study concluded that diabetic status has a significant impact on short term (30-days) mortality among ACS patients. Our study results were consistent with study from Sean M. Donahoe et al., (2007) showing mortality at 30 days was significantly higher among patients with diabetes than without diabetes presenting with STEMI 8.5% vs 5.4%. Roberto R. Giraldez et al., (2013) Showed that all-cause mortality at 30 days in non STEMI patients with known diabetes was 3.7% and for undiagnosed diabetes was 3.6% as compared to group with normal glycemic status, which was 1.8% thus mortality was almost double in diabetic and undiagnosed group and prediabetic group equalled that of normal population.

As CREATE-ECLA study clearly demonstrated that elevated glucose at hospital admission was a predictor of worse outcomes among non-diabetic patients but not among diabetic patients.[65] but early strict control of sugars can reduce early mortality as our study showed that in undiagnosed group, early glycemic control did not let mortality exceed to that belonging to diabetic group.

The prevalence of stress induced hyperglycemia increased to 82.8% in patients of STEMI which is consistent with Jorik R. Timmer, et al showing hyperglycemia in 70% of patients with STEMI patients. Other study by W.K. Abdullatef et al., (2013), showed stress induced hyperglycemia in acute STEMI was 66.7%. In patients of unstable angina, hyperglycemia was not documented as our sample size for this group was small to comment. Similarly the frequency of first time detected diabetes was more in STEMI 52.9% compared to NSTEMI 35.9% and unstable angina 11.8%. There is no literature which shows the frequency of different ACS groups but overall prevalence of STEMI- ACS is more in our study which is consistent with Sudhakar Venkata Nuti et al., (2014) showing higher prevalence of STEMI (86%) in Chinese population and the prevalence of NSTEMI is more in diabetic group as compared with patients having normal sugars.

Diabetic status had a significant impact on morbidity status of the patients with ACS in our study. Patients with diabetes and first time detected diabetes had more number of patients in advanced Killip class (Killip class 3 -32.3% and 20.6% resp.) compared to patients with normal blood sugar (8.6%). Number of patients in Killip class 4 were comparable in all groups, no logical inference can be made from this data as number of patients presenting in Killip class 4 were very less. Abdulla Shehab et al., (2012) in his study showed higher Killip class (2-4) belonged to the diabetic group [27.3%]. Other study Sean M.et al., showed higher Killip class (2-4) in diabetes group 13.6% as compared to nondiabetic group about 9.6%.

In our study we concluded that male sex is a risk factor for ACS irrespective of glycemic status. Male to female ratio in our study was 4:1 in all groups approximately. Our results are consistent with Rajni Sharma et al., (2014) in which male population in ACS was 79.5%

In our study, prevalence of multi-vessel disease (double vessel disease and triple vessel disease) is almost double in diabetic, newly detected diabetes (63.8%, 51%) as compared to normal glycemic status group in which double vessel disease plus triple vessel disease is 31.7% which is consistent with study conducted by Sean M. Donahoe et al., (2007) which showed that in diabetic group multi-vessel disease is 62% as compare non diabetic group in which multi-vessel disease is approximately 48%.Other study by Dubey L et al., (2013) showed that diabetic patients had more multi-vessel disease 64.2%. other study by SrinidhiS. Hegde et al., (2014) showed that multi-vessel disease is more common among diabetes as compare to normal glycemic group(44%vs 16%).

Mean Hba1c level among first time detected diabetes was more as compare to known diabetic groups in our study. Mean Hba1c level among first time detected diabetes was 9.43±0.94 consistent with W.K. Abdullatef et al., (2013) which shows mean HbA1c among first time detected diabetes was 8.7 ±1.9. Higher Hba1c level at presentation was associated with high risk of ACS as shown by Raju Hosuru Narayana et al (2015) so undiagnosed population are more prone to develop acute coronary events and worse outcomes.

CONCLUSION:

Undiagnosed diabetes in patients with ACS is not uncommon in our population .Diabetic status profoundly affects the short term mortality of ACS patients .