Original Article

Acute Coronary Syndrome in Diabetic VS Non-Diabetic

In-Hospital Outcomes of Acute Coronary Syndrome in Diabetic Versus Non-Diabetic

Muhammad Usama Khan, Sana Aslam and Hamna Javed

ABSTRACT

Objective: In present study we evaluated the in-hospital outcomes of Acute Coronary Syndrome in diabetic versus non-diabetic patients.

Study Design: Descriptive / comparative study.

Place and Duration of Study: This study was conducted at the Department of Coronary Care Unit, DHQ hospital Kasur from November 1st 2016 to April 30th 2017.

Materials and Methods: A total number of one hundred and fifty (150) patients who presented with acute coronary syndrome were included. Patient who presented with ACS between November 2016 to April 2017 were included in this analysis. Diagnosis of diabetes mellitus was based on previous history of patients of patients (i.e. a patient already taking oral or subcutaneous diabetic treatment) or new diagnosis of diabetes mellitus on routine clinical labs (fasting blood sugar levels >125 mg/dl). Development of left ventricular failure, cardiogenic shock, and in-hospital mortality were the primary study endpoints.

Inclusion and Exclusion Criteria: Patients who were presented with ST segment elevation myocardial infarction and non-ST segment elevation myocardial infarction were included. Patients with stable angina pectoris were excluded

Results: Out of 150 patients, 72 (48.0%) patients were diabetic and 78 (52.0%) patients were non-diabetic. 63 (87.5%) diabetic patients were presented with acute ST-elevation myocardial infarction (STEMI) and 9 (12.5%) were presented with non-ST elevation myocardial infarction (non-STEMI). While there were 71 (91.0%) non-diabetic patients who were presented with STEMI and 7 (9.0%) with non-STEMI (p-value 0.48). Regarding in-hospital outcomes of study patients. left ventricular (LV) failure occurred in 17 (23.6%) diabetic patients and in only 7 (9.0%) non-diabetic patients (p-value 0.01). incidence of occurrence of cardiogenic shock was not-significantly different between the patients (p-value 0.20). However, in-hospital mortality was very high in diabetic patients 12 (16.7%) versus only 4 (5.1%) in non-diabetic patients (p-value 0.02).

Conclusion: Diabetes mellitus significantly increases the risk of LV failure and in-hospital mortality in patients with acute Coronary Syndrome.

Key Words: Diabetes mellitus, acute coronary syndrome, in-hospital mortality.

Citation of article: Khan MU, Aslam S, Javed H. In-Hospital Outcomes of Acute Coronary Syndrome in Diabetic Versus Non-Diabetic. Med Forum 2017;28(6):105-108.

INTRODUCTION

Diabetes mellitus has now become a major risk factor for early development of cardiovascular disease. Studies have found a higher incidence of cardiovascular disease in diabetic patients as compared to non-diabetic patients.[1] Diabetes not only increases the risk of cardiovascular disease but is also associated with significantly higher morbidity and mortality in these patients.[2-4] Studies have also found 2.5 times higher incidence of heart failure in diabetic patients as compared to non-diabetic patients, with a 10 times higher risk in patients with age <45 years.[5]

Department of Coronary Care Unit, DHQ hospital Kasur.

Correspondence: Dr. Muhammad Usama Khan, Medical Officer, Department of Coronary Care Unit, DHQ hospital Kasur.
Contact No: 0304-4621720
Email: usamaaakhan@gmail.com

Received: April 23, 2017; Accepted: May 25, 2017

South Asians have a much higher prevalence of acute coronary syndrome (ACS) as compared to Europe and other countries.[6] Studies have also found much higher prevalence of diabetes in Asian population. Even it is also said that may be it is the diabetes mellitus that is responsible for early onset of ACS and mortality due to ACS syndrome in South Asian patients.[7] Even in White population there is no decrease in the incidence of ACS in diabetic population despite there is an overall reduction in the incidence of ACS in normal general population. And studies conducted in these populations have also found a significantly higher mortality due to ACS even after adjusting other modifiable risk factors of mortality in ACS patients.[8-10] Studies have concluded that increased mortality in diabetic patients may be due to the reasons that diabetic patients have a more severe coronary artery disease and also there is a higher risk of arrhythmias in diabetic patients and these factors are the major reason of increased mortality in diabetic patients.[11-13] In present study we evaluated the in-

hospital outcomes of Acute Coronary Syndrome in diabetic versus non-diabetic patients.

MATERIALS AND METHODS

This descriptive study was conducted in department of coronary care unit, DHQ hospital Kasur. A total number of one hundred and fifty (150) patients who presented with acute coronary syndrome were included. Patient who presented with ACS between November 2016 to April 2017 were included in this analysis. Patients who were presented with ST segment elevation myocardial infarction and non-ST segment elevation myocardial infarction were included. Patients with stable angina pectoris were excluded. All patients signed an informed consent before they were included in study. Ethical approval from administration of hospital was also taken.

We noted all the patient variables on a special Proforma designed for this study. Diagnosis of diabetes mellitus was based on previous history of patients of patients (i.e. a patient already taking oral or subcutaneous diabetic treatment) or new diagnosis of diabetes mellitus on routine clinical labs (fasting blood sugar levels >125 mg/dl). Development of left ventricular failure, cardiogenic shock, and in-hospital mortality were the primary study endpoints.

For data analysis we used computer software SPSS v23. We used Chi-square test to compare LV failure, cardiogenic shock and mortality between the diabetic and non-diabetic patients and independent sample t-test for comparison of age considering a significant difference at p-value $\leq$0.05..

RESULTS

Out of 150 patients, 72 (48.0%) patients were diabetic and 78 (52.0%) patients were non-diabetic. The mean age of diabetic patients was 55.06$\pm$8.96 years and in non-diabetic patients mean age was 53.52$\pm$9.29 years (p-value 0.30). There was no difference in gender distribution in diabetic and non-diabetic patients. 63 (87.5%) diabetic patients were presented with acute ST-elevation myocardial infarction (STEMI) and 9 (12.5%) were presented with non-ST elevation myocardial infarction (non-STEMI) (Fig. 1).

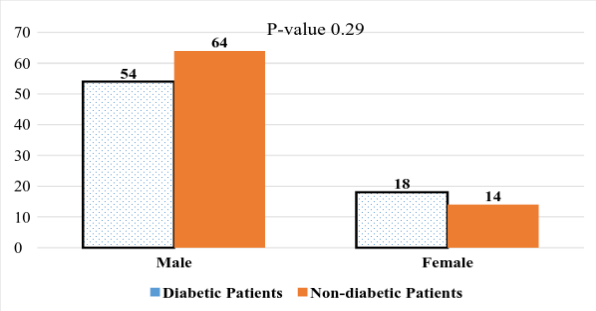

Figure No.1: Frequency of gender distribution in Diabetic and non-diabetic patients.

While there were 71 (91.0%) non-diabetic patients who were presented with STEMI and 7 (9.0%) with non-STEMI (p-value 0.48) (Fig. 2).

Regarding in-hospital outcomes of study patients. left ventricular (LV) failure occurred in 17 (23.6%) diabetic patients and in only 7 (9.0%) non-diabetic patients (p-value 0.01). incidence of occurrence of cardiogenic shock was not-significantly different between the patients (p-value 0.20). However, in-hospital mortality was very high in diabetic patients 12 (16.7%) versus only 4 (5.1%) in non-diabetic patients (p-value 0.02) (Table 1).

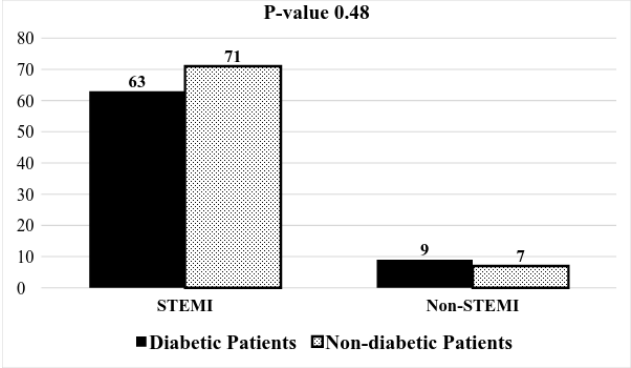

Figure No.2: Frequency of Type of Acute Coronary Syndrome in diabetic and non-diabetic patients. (STEMI= ST elevation myocardial infarction, Non-STEMI= Non-ST elevation myocardial infarction).

Table No.1: In-hospital Outcomes of Study Participants.

	Diabetic Patients (N=72)	Non-diabetic Patients (N=78)	P-value
LV failure	17 (23.6%)	7 (9.0%)	0.01
Cardiogenic Shock	9 (12.5%)	5 (6.4%)	0.20
In-hospital mortality	12 (16.7%)	4 (5.1%)	0.02

LV= left ventricular

DISCUSSION

The improved changes in results of patients with ACS over the previous decades have been credited to development of new invasive and noninvasive treatment techniques such as development of new better antiplatelet and antithrombotic drugs. In spite of these advancement, mortality in ACS stays still high, and ideal treatment is still indistinct, particularly in patients with DM. Researches have demonstrated that patients with DM have a 3-fold higher mortality rate after adjusting for age related cardiovascular mortality.[14, 15] Studies have also demonstrated that ACS patients who are diabetic have higher 30-day and 1-year mortality rate as compared to the non-diabetic patients.[16]

In this study, we compared the in-hospital outcomes such as LV failure rate, cardiogenic shock and mortality

in nondiabetic and diabetic patients. we found significant effect of diabetes mellitus on worsening the in-hospital outcomes of patients with ACS. In our study, there were 48.0% diabetic patients who presented with diabetes mellitus. Other studies have also confirmed higher prevalence of diabetic patients in ACS patients. Ali et al. also found similar results, in that study there were 48.5% diabetic patients who presented with ACS.[17] In SPACE trial[18] there was 57.9% proportion of diabetic patients in patients with ACS. In Gulf Registry of Acute Coronary Events (Gulf RACE)[19], there were 40.0% proportion of diabetic patients. On the other hand, studies conducted in European countries have found significantly low prevalence of diabetics in ACS patients with the prevalence rate ranging from 20.0% to 30.0%.[20,21] A study conducted in Egypt have found only 24.5% prevalence of diabetes in ACS patients.[22] So studies conducted in Asian populations have found a higher proportion of diabetes mellitus in ACS patients as compared to the studies in other regions of the World.

In our study, there were 23.6% patients with diabetes mellitus and only 9.0% patients without diabetes who developed LV failure during hospital stay. Ali et at.[17] found 24.0% incidence of LV failure in diabetic patients and only 8.0% in non-diabetic patients. Ferrer et at.[23] also found a significantly higher incidence of heart failure (17.0%) in diabetic patients versus only 7.0% in non-diabetic patients with Non-STEMI.

In our study, 12.5% diabetic patients and only 6.4% non-diabetic patients underwent in cardio-genic shock during hospitalization but with insignificant difference. Ali et al.[17] also did not found any significant difference in cardiogenic shock in diabetic versus non-diabetic patients with ACS. Iqbal et al.[24] have found contrary results as compared to our study and found significant difference in the incidence of cardiogenic shock in diabetic versus non-diabetic patients with ACS. In their study, 17.1% diabetic patients developed cardiogenic shock and only 9.8% non-diabetic patients developed cardiogenic shock.

In our study, we found higher in-hospital mortality in diabetic patients, 16.7% versus 5.1% in non-diabetic patients. in the study by Ali et al.[17] this mortality rate was 14.0% in diabetic patients and only 4.0% in non-diabetic patients. The GREECS Study also found similar results with 5.60% mortality rate in diabetic patients and 2.0% in non-diabetic patients who admitted in hospital with ACS.[25] Miettinen et al.[16] also found higher mortality rate in diabetic patients with ACS. Other studies have also confirmed higher mortality rate in diabetic patients with acute coronary syndrome.[26,27]

CONCLUSION

So we found significant negative effects of diabetes mellitus on in-hospital outcomes of patients admitted with ACS and we concluded that diabetes mellitus significantly increases the risk of LV failure and in-hospital mortality in Acute Coronary Syndrome patients.

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Goldberg RB. Cardiovascular disease in diabetic patients. Med Clin North Am 2000;84(1):81-93.
2. Toto RD, editor Heart disease in diabetic patients. Seminars Nephrol: Elsevier; 2005.
3. Simpfendorfer C. Efficacy of beta blockade, thrombolytic therapy, and coronary angioplasty in diabetic patients with coronary artery disease. Cleveland Clin J Med 1992;60(2):145-9.
4. Orchard TJ, Nathan DM, Zinman B, Cleary P, Brillon D, Backlund J-YC, et al. Association between 7 years of intensive treatment of type 1 diabetes and long-term mortality. J Am Med Assoc 2015;313(1):45-53.
5. Nichols GA, Gullion CM, Koro CE, Ephross SA, Brown JB. The incidence of congestive heart failure in type 2 diabetes. Diabetes Care 2004;27(8):1879-84.
6. Sheth T, Nair C, Nargundkar M, Anand S, Yusuf S. Cardiovascular and cancer mortality among Canadians of European, south Asian and Chinese origin from 1979 to 1993 an analysis of 1.2 million deaths. Can Med Assoc J 1999;161(2):132-8.
7. Ethnic differences in the prevalence of diabetes. British Heart Foundation Statistics. http://www.heartstats.org/datapage.asp?id=1111.
8. Löwel H, Koenig W, Engel S, Hörmann A, Keil U. The impact of diabetes mellitus on survival after myocardial infarction: can it be modified by drug treatment? Diabetologia 2000;43(2):218-26.
9. Yudkin JS, Oswald GA. Determinants of hospital admission and case fatality in diabetic patients with myocardial infarction. Diabetes care. 1988; 11(4):351-8.
10. Herlitz J, Bång A, Karlson BW. Mortality, place and mode of death and reinfarction during a period of 5 years after acute myocardial infarction in diabetic and non-diabetic patients. Cardiol 1996;87(5):423-8.
11. Luo M, Guan X, Luczak ED, Lang D, Kutschke W, Gao Z, et al. Diabetes increases mortality after myocardial infarction by oxidizing CaMKII. J Clin Invest 2013;123(3):1262-74.
12. Gregg EW, Li Y, Wang J, Rios Burrows N, Ali MK, Rolka D, et al. Changes in diabetes-related complications in the United States, 1990–2010. New Engl J Med 2014;370(16):1514-23.
13. Gwilt D, Petri M, Lewis P, Nattrass M, Pentecost B. Myocardial infarct size and mortality in diabetic patients. Br Heart J 1985;54(5):466-72.

14. Nissen SE, Wolski K. Effect of rosiglitazone on the risk of myocardial infarction and death from cardiovascular causes. New Engl J Med 2007; 356(24):2457-71.
15. Dormandy JA, Charbonnel B, Eckland DJ, Erdmann E, Massi-Benedetti M, Moules IK, et al. Secondary prevention of macrovascular events in patients with type 2 diabetes in the PROactive Study (PROspective pioglitAzone Clinical Trial In macroVascular Events): a randomised controlled trial. Lancet 2005;366(9493):1279-89.
16. Miettinen H, Lehto S, Salomaa V, Mähönen M, Niemelä M, Haffner SM, et al. Impact of diabetes on mortality after the first myocardial infarction. Diabetes Care 1998;21(1):69-75.
17. Ali M, Butt UM, Akram Z, Qureshi MA. Impact of diabetes on early complications in acute coronary syndrome patients. Pak Heart J 2016;49(3):113-6.
18. AlNemer KA, AlFaleh HF, AlHabib KF, Ullah A, Hersi A, AlSaif S, et al. Impact of diabetes on hospital adverse cardiovascular outcomes in acute coronary syndrome patients: data from the Saudi project of acute coronary events. J Saudi Heart Assoc 2012;24(4):225-31.
19. Zubaid M, Rashed WA, Almahmeed W, Al-Lawati J, Sulaiman K, Al-Motarreb A, et al. Management and outcomes of Middle Eastern patients admitted with acute coronary syndromes in the Gulf Registry of Acute Coronary Events (Gulf RACE). Acta Cardiol 2009;64(4):439-46.
20. Wallander M, Malmberg K, Norhammar A, Rydén L, Tenerz Å. Oral glucose tolerance test: a reliable tool for early detection of glucose abnormalities in patients with acute myocardial infarction in clinical practice. Diabetes Care 2008;31(1):36-8.
21. Bartnik M, Rydén L, Ferrari R, Malmberg K, Pyörälä K, Simoons M, et al. The prevalence of abnormal glucose regulation in patients with coronary artery disease across Europe. Eur Heart J 2004;25(21):1880-90.
22. AbuShady M, Mohamady Y, Enany B, Nammas W. Prevalence of prediabetes in patients with acute coronary syndrome: impact on in-hospital outcomes. Int Med J 2015;45(2):183-8.
23. Ferrer HJ, Domínguez RA, García GM, Abreu GP, Bethencourt MM, Marrero RF. Influence of diabetes mellitus on the management and prognosis of non-ST-elevation acute coronary syndrome. Revist Espanol Cardiol 2006;59(4):383-6.
24. Tahira I, Javed MT, Iqbal MJ. Complications and Mortality in St-Segment Elevation Acute Myocardial Infarction in Diabetic and Non-Diabetic Patients. Med J Islamic World Acad Sci 2011;19(2):87-94.
25. Pitsavos C, Kourlaba G, Panagiotakos DB, Stefanadis C. Characteristics and in-hospital mortality of diabetics and nondiabetics with an Acute Coronary Syndrome; the GREECS study. Clin Cardiol 2007;30(5):239-44.
26. Nijjar AP, Wang H, Dasgupta K, Rabi DM, Quan H, Khan NA. Outcomes in a diabetic population of south Asians and whites following hospitalization for acute myocardial infarction: a retrospective cohort study. Cardiovasc Diabetol 2010;9(1):4.
27. Franklin K, Goldberg RJ, Spencer F, Klein W, Budaj A, Brieger D, et al. Implications of diabetes in patients with acute coronary syndromes: the Global Registry of Acute Coronary Events. Arch Int Med 2004;164(13):1457-63.