

Patterns and Prevalence of Dyslipidemia in Diabetics Presenting with STEMI VS Non-STEMI in Local Population of Sialkot, Pakistan

Dyslipidemia in Diabetics with STEMI VS Non-STEMI

Zeeshan Hassan¹, Muhammad Arsalaan Naveed² and Ali Javaid Chughtai²

ABSTRACT

Objective: The prospect of this study is to ascertain the safe ranges of TGs in diabetics to prevent the mortality and morbidity associated with transmural infarcts (STEMI).

Study Design: Observational study.

Place and Duration of Study: This study was conducted at the Cardiology Department of Allama Iqbal Memorial Teaching Hospital, Sialkot during Nov 2019-Nov 2020.

Materials and Methods: A total of 1000 patients having age ranges 20-80 years were inducted during Nov 2019-Nov 2020 presenting in ER with chief complaint of typical chest pain having concomitant diabetes. HbA1c performed with Rosche Cobbas C311.

Results: The data was collected from 1000 patients. The mean age of the patients was 51.3 ± 11.5 years in STEMI patients and 57.4 ± 9.4 in NSTEMI. 45 (45%) have diabetic history with STEMI and 55 (55%) with NSTEMI patients. 81 (81%) have smoking history and 17 (17%) have family history of CVD with STEMI. Our study revealed that patients with poor control of their glycemic indexes, HbA1c >7 had deranged cholesterol profile especially triglycerides were significantly raised beyond >150mg/dl.

Conclusion: The intricate balance of natural antithrombins and atherogenic factors is hence disturbed in context of the people having diabetes and hypertriglyceridemia together, paving the way for the most fatal variants of Acute Coronary Syndrome (STEMI>NSTEMI).

Key Words: Dyslipidemia, Diabetics, STEMI, NSTEMI, Local Population, Sialkot

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INTRODUCTION

We have witnessed an increased incidence of Acute Coronary Syndrome (Unstable Angina, NSTEMI, STEMI) in the recent past years, chiefly due to the shifting trends of lifestyle, eating habits, urbanization etc, inflicting all sectors of the community. Despite numerous advances and achievements in understanding the pathophysiology and mitigating the acceleration of atherosclerosis we are still unable to halt the formation of fatty streaks in vessel walls which starts in early childhood of all the contributing Modifiable Factors, Hyperlipidemia especially Triglycerides remain the

main culprit determining the stability of atherosclerotic plaque¹.

As soon as the endothelial health is compromised through the toxic insult of diabetes, hypertension, hyperuricemia, smoking, trans-fats, alcohol, soft drinks etc. Inflammatory and oxidative modifications at the susceptible sites of endothelial malfunction lead to the lipid retention, intimal thickening and ballooning of the atheroma having internal core fibrous cap². Ultimately due to sheering stress the rupture of thin cap fibro atheroma occurs exposing TGs causing the more atherogenic LDL-C to come in contact with the platelets and thus an avalanche of cascades operate causing the recruitment, migration and stimulation of vascular endothelium to promote the synthesis of plasminogen activator inhibitor (PAI-1)³.

The result of this catastrophic event is the formation of platelet plug which hampers the oxygen and nutrients delivery to the end organ resulting in ischemia, Acute Coronary Syndrome in this case. It is an established fact that the diabetics experience a higher mortality and morbidity in acute and post ACS period respectively⁴. Optimizing the glycemic control in terms of HbA1c <7 can not only improve the metabolic profile of the

¹. Department of Cardiology, Government Khawaja Muhammad Safdar Medical College, Sialkot.

². Department of Cardiology, AIM Teaching Hospital, Sialkot.

Correspondence: Dr. Zeeshan Hassan, Assistant Professor of Cardiology, Government Khawaja Muhammad Safdar Medical College, Sialkot.

Contact No: 0321-4079977

Email: zee_196@hotmail.com

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patients but also bridle the psychosocioeconomic burden associated with the acute coronary syndrome⁵⁻⁷.

MATERIALS AND METHODS

The study was conducted in Cardiology Department of Allama Iqbal Memorial Teaching Hospital, Sialkot. A total of 1000 patients having age ranges 20-80 years were inducted during Nov 2019-Nov 2020 presenting in ER with chief complaint of typical chest pain having concomitant diabetes.

Inclusion Criteria:

- Age 20-80 years
- HbA1c >7
- Quantitative Troponin I value > 0.5
- Typical Chest Pain with relevant EKG changes on presentation.
- Not previously diagnosed cases of Ischemic heart disease.

Exclusion Criteria:

- Age <20 and >80 years
- HbA1c <7
- Other causes of myocardial infarction such as anemia, trauma and surgery.

Data collection: After presentation in ER of Cardiology Department of Allama Iqbal Memorial Teaching Hospital Sialkot, necessary history and examination was followed by a 12 leads EKG. Acute STEMI was diagnosed by convex ST elevation of 2 mm in precordial or 1mm in limb, in 2 contiguous leads and presence of reciprocal depression in other leads, ST elevations with T wave inversions and absence of Q waves. NSTEMI was diagnosed by horizontal ST depressions and T wave inversions in any leads with elevated Troponin I >0.5. The serum lipid profile was done by the venous blood drawn within 12 hours of onset of chest pain and before administration of any anti lipid medication.

Statistical analysis: The data was collected and analyzed by using SPSS version 19. All the values were expressed in mean and standard deviation.

RESULTS

The data was collected from 1000 patients. The mean age of the patients was 51.3 ± 11.5 years in STEMI patients and 57.4 ± 9.4 in NSTEMI. 45 (45%) have diabetic history with STEMI and 55 (55%) with NSTEMI patients. 81 (81%) have smoking history and 17 (17%) have family history of CVD with STEMI. All the data is represented in table 01. Patients with NSTEMI were more established than those with STEMI, and introduced all the more regularly history of hypertension, past MI and coronary revascularization techniques, and clinical indications of metabolic disorder.

Variation of lipid profile values with high and low Lp concentrations is stated in Table 2. Our study revealed that patients with poor control of their glycemic indexes, HbA1c >7 had deranged cholesterol profile especially triglycerides were significantly raised

beyond >150mg/dl. Resultantly the incidence of STEMI was higher in such pool because of the infliction caused by the rupture of thin cap fibro atheroma plaque compromising endothelial health and propagating clot burden towards a transmural infarct.

Table No.1: Demographic data of patients with STEMI and NSTEMI

	STEMI	NSTEMI	P ²
Age, years	51.3 ± 11.5	57.4 ± 9.4	
Cardiovascular risk factors			
Diabetes, n (%)	145 (45%)	55 (55%)	0.045
Hypertension, n(%)	234 (34)	66 (66)	< 0.001
Smoking habit, n (%)	181 (81)	19 (19)	0.001
Family history, n (%)	117 (17)	83 (83)	0.159
Previous CABG, n (%)	71 (71)	29 (29)	< 0.001
PCI, n (%)	113 (13)	87 (87)	< 0.001
AMI Previously, n (%)	121 (10)	39 (33)	< 0.001
Stroke history, n (%)	5 (2)	6 (5)	0.187
AMI characteristics			
Anterior, n	38	62	< 0.001
Inferior, n	76	24	0.002
Other, n	4	96	< 0.001
Left ventricle ejection fraction,%	46.8 ± 8.2	43.4 ± 13.1	
Patients with LVEF < 40%, n	43	57	0.005
Patient with heart failure at initial admission, n	15	75	0.002

Table No.2: Lipid profile parameters in patients with ACS in diabetic patients

Lipid test	STEMI	NSTEMI
TC (< 200 mg/dL)	154.6 ± 32.2	143.3 ± 39.6
LDLc (< 100 mg/dL)	95.4 ± 28.9	84.4 ± 33.5
HDLc (> 40 mg/dL)	34.3 ± 7.4	33.0 ± 11.9
TG (<150)	128.7 ± 47.0	138.5 ± 77.0
TC:HDLc (< 5)	4.6 ± 1.2	4.6 ± 1.4

DISCUSSION

Dyslipidemia preponderated among the nine major risk factors (smoking, diabetes, hypertension, visceral obesity, psychosocial stress, sedentary life, low fruit and vegetable consumption and alcohol consumption), and alone accounted for more than 50% of population attributable risk. Dyslipidemia, manifested by elevated levels of total- and low density lipoprotein cholesterol (TC, LDL-C)⁸, low levels of high density lipoprotein cholesterol (HDL-C) and high levels of triglycerides (TG), is an important risk factor for CAD. Recent advances in cardiometabolic drug delivery and targets have created new horizons of safety and faith associated

with prognostic window of the Acute Coronary Syndrome⁹. Time tested studies have proven diabetes to be an independent risk factor for deranged lipid levels in the serum making the population prone to cardiovascular hazards¹⁰. Framingham Risk Score also shows that diabetes alone doubled the risk in men and tripled it in women in comparison with other variables like age, hypertension, smoking and left ventricular hypertrophy¹¹. The complications arise from the generation of advanced glycation end products (AGE), lipid oxidation, chemical modification of lipoproteins, vascular inflammation, leading to endothelial dysfunction forming a lipid rich atherosclerotic plaque with thin fibrous cap¹². The stability of the plaque is challenged by the above mentioned CV risk factor causing either its rupture or erosion¹³. Thus an avalanche of platelets and coagulation factors forms a platelet plug compromising the perfusion of the end organ, heart here¹⁴.

Hence HbA1c has the potential to be used as prognostic tool to assess the metabolic functioning of a body beyond its glycemic significance¹⁵⁻¹⁶.

CONCLUSION

It is concluded that patients having sub optimal to poor control of their glycemic levels HbA1c >7 are more prone to develop dyslipidemias specifically the atherogenic fractions LDL-C, Triglycerides and HDL-C are markedly deranged in the patients developing STEMI (transmural infarcts) as compared to NSTEMI. HbA1c being a dynamic tool can be used to assess the cardio metabolic status, predict the incidence and prognosis of acute coronary syndrome in high risk diabetics for prompt intervention with high dose anti lipid drugs and thus reducing the psychosocioeconomic burden associated with cardiovascular events.

Author's Contribution:

Concept & Design of Study: Zeeshan Hassan
 Drafting: Muhammad Arsalaan
 Naveed
 Data Analysis: Ali Javaid Chughtai
 Revisiting Critically: Zeeshan Hassan,
 Muhammad Arsalaan
 Naveed
 Final Approval of version: Zeeshan Hassan

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

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