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CORRELATION OF LIPID PROFILE IN DIABETES PATIENTS: THE POTENTIAL FOR RISK REDUCING OF ATHEROSCLEROTIC CARDIOVASCULAR DISEASE

Naveed Yaqoob[1], Azmatullah[2*], Faisal Shehzad Roomi[3], Beenish Ghafar Memon[4], Fahad Asim[5], Shameem Nisar[6]

[1]Associate Professor of Cardiology, FG Polyclinic Hospital, NUST School of Health Sciences, Islamabad
[2*]Cardiologist (DIP Card NICVD Karachi), Medical Officer, CAT C Hospital Wari Dir Upper
[3]Assistant Professor, Department of Cardiac Surgery, Chaudhary Pervaiz Elahi Institute of Cardiology Wazirabad, Punjab
[4]Assistant Professor Biochemistry, LUMHS Jamshoro
[5]Senior Lecturer in Pharmacology & Therapeutics, Faculty of Pharmacy, The University of Lahore, Lahore, Pakistan
[6]Quality Assurance Manager, Rasco Pharmaceuticals, Lahore, Pakistan

***Corresponding author:** Azmatullah,
*Cardiologist (DIP Card NICVD Karachi), Medical Officer, CAT C Hospital Wari Dir Upper
Email: azmatullah0780@gmail.com

Abstract:
Objectives:
To evaluate the efficacy of lipid therapy in mitigating the risk of Atherosclerotic Cardiovascular Disease (ASCVD) among individuals with Diabetes.

Materials and Methods: This was a prospective cohort study in which a total of 90 patients with DM were enrolled. This study was conducted at multiple centers including FG Polyclinic Hospital, NUST School of Health Sciences, Islamabad, CAT C Hospital Wari Dir Upper and LUMHS Jamshoro in the duration from March, 2023 to August, 2023. Participants had lipid profile tests to check total cholesterol, LDL, HDL, and Tg. Statin medication was prescribed for both existing and newly diagnosed high cholesterol. After six months, patients were followed to see if they developed atherosclerotic cardiovascular disease (ASCVD). For statistical analysis we used SPSS Version 25.

Results: In this study, 90 patients, with a mean age of 49.21 years, were enrolled. Their mean LDL cholesterol, HDL cholesterol, triglycerides, and total cholesterol levels were 113.9 mg/dL, 43.13 mg/dL, 124.6 mg/dL, and 191.04 mg/dL respectively. The mean HbA1C (%) value was 7.93. 15 patients (16%) developed ASCVD. There is week positive correlation between ASCVD and LDL cholesterol, HDL cholesterol and Triglycerides in DM patients with statin medication after 6 month.

Conclusion: It was concluded that individuals at high risk for heart disease could benefit from taking statins.

Key words: Atherosclerotic Cardiovascular Disease, Diabetes, LDL, HDL

INTRODUCTION:

Type 2 diabetes mellitus (T2DM) is indeed associated with various comorbid conditions, particularly cardiovascular complications and hyperlipidemia(1). These comorbidities significantly increase the risk of developing atherosclerotic cardiovascular disease (ASCVD).(2) According to epidemiological data, around two-thirds of deaths in people with diabetes are attributable to cardiovascular complications.(3) Ischemic heart disease, including conditions such as coronary artery disease and myocardial infarction, accounts for a significant proportion of these cardiovascular deaths, approximately 40%.(4) Additionally, other types of heart disease, primarily congestive heart failure (CHF) resulting from various factors including coronary artery disease, hypertension, and diabetic cardiomyopathy, contribute to approximately 15% of deaths in individuals with diabetes. In the past two decades, there has been a decrease in the occurrence rates of complications associated with diabetes mellitus, including cardiovascular disease (CVD).(5)

Globally, T2DM is speedily becoming a significant public health concern, with substantial effects for human health, quality of life, economic well-being, and healthcare systems. According to data from the International Diabetes Federation (IDF), there are currently 425 million adults globally with DM, and projections suggest that by 2045, this number will rise to 629 million. Additionally, the IDF estimates that 352 million individuals are at risk of developing T2DM.(6) Patients with T2DM are susceptible to developing a condition known as diabetic dyslipidemia, which increases their risk of experiencing both macrovascular complications such as stroke, peripheral vascular disease, and coronary artery disease (CAD), as well as microvascular complications like nephropathy, neuropathy, and retinopathy. In the United States, individuals with T2DM who underwent intensive risk factor management procedures experienced significant improvements in their 10-year risk of coronary heart disease (CHD) and a decrease in morbidity and mortality related to ASCVD.(7) Atherosclerosis and CHD are notably impacted by levels of low-density lipoprotein cholesterol (LDL-C).(8) The literature provides a bundles of information about the several benefits linked to reducing LDL-C levels in diabetics.(9)

Objective:

To evaluate the efficacy of lipid therapy in mitigating the risk of Atherosclerotic Cardiovascular Disease (ASCVD) among individuals with Diabetes.

MATERIALS AND METHODS:

Study Design: Prospective cohort study.

Study setting: Conducted at multiple centers including FG Polyclinic Hospital, NUST School of Health Sciences, Islamabad, CAT C Hospital Wari Dir Upper and LUMHS Jamshoro.

Duration of the study: Duration of the study was 6 month (March, 2023 to August, 2023).

Inclusion Criteria:

- Patients suffering from DM.
- Adults aged 18 years to 65 years.
- Both males and females.

Exclusion Criteria:

- Individuals with a history of cardiovascular diseases.
- Pregnant women.

- Participants with significant chronic conditions other than diabetes, such as CKD, liver disease, or active malignancy.
- Participants currently taking lipid-lowering medications (e.g., statins, fibrates, PCSK9 inhibitors)
- Current smoker.

Methods:

This prospective cohort study took place in the duration from March, 2023 to August, 2023, following the approval of the hospital's ethical committee. In this study total of 90 patients were enrolled. Demographic information, medical history, diabetes duration, current medications, and lifestyle factors data were collected. Blood samples were obtained following an overnight fast to ensure precision. Participants underwent lipid profile examinations to evaluate total cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride levels. Statin medication was prescribed for individuals with both previously diagnosed and recently diagnosed hyperlipidemia. Follow-up assessments were conducted after six months to monitor the occurrence of ASCVD. A predesign questionere was used to collect data. For statistical analysis we used SPSS Version 25.

RESULTS:

A total of 90 patients, with a mean age of 49.21±11.7 years, participated in the study. The mean duration of DM was 5.62±1.59 years. The mean value of LDL, HDL, Triglycerides and Total cholesterol was 113.9±10.03, 43.13±8.15, 124.6±12.40 and 191.04±16.4 mg/dL respectively. The mean value of HbA1C (%) was 7.93±0.84 (Table 1). In our study 15(16%) patients develop ASCVD. Correlation of ASCVD with LDL cholesterol, HDL cholesterol and Triglycerides in DM patients with statin medication after 6 month was found as given in table 4.

Table 1: Base line characteristics of all enrolled Patient *(n=90)*

Variables	Mean±SD
Age (Years)	49.21±11.7
Duration of DM (years)	5.62±1.59
LDL cholesterol (mg/dL)	113.9±10.03
HDL cholesterol (mg/dL)	43.13±8.15
Triglycerides (mg/dL)	124.6±12.40
Total cholesterol (mg/dL)	191.04±16.4
HbA1C (%)	7.93±0.84

Table 3: Frequency of gender (*n=90)*

Gender	Frequency	Percentage
Male	54	60.0
Female	36	40.0
Total	90	100.0

Table 3: Frequency of patients on the basis of ASCVD (*n=90)*

ASCVD	Frequency	Percentage
YES	15	16.7
NO	75	83.3
Total	90	100.0

Table 4: Correlation of ASCVD with LDL cholesterol, HDL cholesterol and Triglycerides in DM patients with statin medication after 6 month.

Variable	R Value	P Value
LDL cholesterol (mg/dL)	0.019	0.85
HDL cholesterol (mg/dL)	.059	0.85
Triglycerides (mg/dL)	.024	0.82

Discussion: The study of correlation between lipid profiles and cardiovascular risk in diabetes patients is extensive and critical for understanding the mechanisms underlying atherosclerotic cardiovascular disease (ASCVD) in this population. Diabetes is a significant risk factor for ASCVD, and abnormalities in lipid metabolism contribute to its development and progression. Managing lipid abnormalities in diabetes involves a multifaceted approach, including lifestyle modifications, pharmacotherapy (statins), and addressing other cardiovascular risk factors (hypertension, smoking, etc.). The main aim of the present study was to evaluate the efficacy of lipid therapy in mitigating the risk of ASCVD among individuals with Diabetes. In our study we have found that only 16% patients have developed ASCVD. Individuals of South Asian descent residing in Western nations often exhibit a distinctive lipoprotein profile marked by elevated triglyceride levels and diminished high-density lipoprotein cholesterol (HDL-C) levels. While LDL cholesterol (LDL-C) levels might not seem notably elevated, this group often experiences a heightened prevalence of LDL-C particles characterized by qualitative anomalies, including smaller size and lower densities.(10)

As per the American Diabetes Association's Standards for Diabetes Care in 2019, LDL cholesterol levels below 100 mg/dL are considered a risk factor for atherosclerotic cardiovascular disease (ASCVD).(11) However, for individuals with diabetes who either already have ASCVD or are at high risk of developing it, the recommended LDL cholesterol level is even lower, specifically below 70 mg/dL. This lower target reflects the heightened cardiovascular risk associated with diabetes and underscores the importance of aggressive management of lipid levels to reduce the risk of cardiovascular complications in this population. In our study, we found mean LDL cholesterol level of 113.9±10.03 mg/dL and triglyceride levels of 124.6±12.40 mg/dL as stated by a number of previous studies.(12, 13) In the present study the HBA1c was found to be 7.93±0.84. This elevated levels of HbA1c were correlated with higher lipid profiles. This observation is consistent with previous research, which also demonstrated a significant correlation between lipid profiles and HbA1c levels in diabetic patients with cardiovascular disease (CVD).(14) our study was also supported by the study of Muhammad Rahman Khalid et al. (13)

After using statin in our study only 16% of patients in our study were suffering from ACSVD. This mean that there is negative correlation of statin medication and the risk of developing of ASCVD. As the patients in our study uses statin the reduction occur in the occurrence of diseases. Statins play a crucial role in the primary prevention of ASCVD, addressing disease-specific conditions that increase cardiovascular risk is essential for optimizing preventive strategies and reducing the burden of cardiovascular disease. Absolutely, clear guidelines on the responsible use of statin medication for primary prevention of ASCVD are crucial for promoting healthy aging, especially given the increasing life expectancy of the population. In this study by the use of statin the incidence of ASCVD decreases. In our study we have found weak positive correlation between ASCVD and LDL cholesterol, HDL cholesterol and Triglycerides after 6 month of using statin. Which means the relationship is very weak. A new study in Pakistan found that when doctors prescribed statin medications, they were very careful to avoid giving other medicines that might not be right for the patient. Only about 9% of the time did doctors give medicines that might not have been the best choice along with statin.

Conclusion: In Pakistani patients with type 2 diabetes, the usual lipid issues are high LDL and low HDL cholesterol levels. Many of these people, who are at high risk for heart disease, could benefit from taking statins, but a large number of them aren't using these medications.

References:

1. Vesa CM, Popa L, Popa AR, Rus M, Zaha AA, Bungau S, et al. Current data regarding the relationship between type 2 diabetes mellitus and cardiovascular risk factors. Diagnostics. 2020;10(5):314.
2. Amelia R, Sari Wahyuni A, Yunanda Y, Wijaya H. Atherosclerotic Cardiovascular Disease in Diabetes Patients. Current Diabetes Reviews. 2023;19(8):62-9.
3. Glovaci D, Fan W, Wong ND. Epidemiology of diabetes mellitus and cardiovascular disease. Current cardiology reports. 2019;21:1-8.
4. Nowbar AN, Gitto M, Howard JP, Francis DP, Al-Lamee R. Mortality from ischemic heart disease: Analysis of data from the World Health Organization and coronary artery disease risk factors From NCD Risk Factor Collaboration. Circulation: cardiovascular quality and outcomes. 2019;12(6):e005375.
5. Alzahrani SH, Baig M, Aashi MM, Al-Shaibi FK, Alqarni DA, Bakhamees WH. Association between glycated hemoglobin (HbA1c) and the lipid profile in patients with type 2 diabetes mellitus at a tertiary care hospital: a retrospective study. Diabetes, metabolic syndrome and obesity: targets and therapy. 2019:1639-44.
6. Federation I. IDF Diabetes Atlas, 9th edn. 2019.
7. Butool I, Nazir S, Afridi M, Shah SM. Evaluation and assessment of prescribing patterns in elderly patients using two explicit criteria based screening tools:(The PRISCUS list and STOPP/START criteria). Pakistan journal of medical sciences. 2018;34(6):1357.
8. Care D. Standards of medical care in diabetes 2019. Diabetes Care. 2019;42(Suppl 1):S124-38.
9. Chapman MJ, Zamorano JL, Parhofer KG. Reducing residual cardiovascular risk in Europe: Therapeutic implications of European medicines agency approval of icosapent ethyl/eicosapentaenoic acid. Pharmacology & therapeutics. 2022;237:108172.
10. Gonzalez-Jaramillo N, Wilhelm M, Arango-Rivas AM, Gonzalez-Jaramillo V, Mesa-Vieira C, Minder B, et al. Systematic review of physical activity trajectories and mortality in patients with coronary artery disease. Journal of the American College of Cardiology. 2022;79(17):1690-700.
11. Committee ADAPP, Committee: ADAPP. 10. Cardiovascular disease and risk management: Standards of Medical Care in Diabetes—2022. Diabetes care. 2022;45(Supplement_1):S144-S74.
12. Jagpal A, Navarro-Millán I. Cardiovascular co-morbidity in patients with rheumatoid arthritis: a narrative review of risk factors, cardiovascular risk assessment and treatment. BMC rheumatology. 2018;2(1):1-14.
13. Khalid MR, Lakho MA, Zubair M, Bhutto A, Abbas S, Yousif A. Correlation of lipid profile in diabetes patients: The potential for risk reducing of atherosclerotic cardiovascular disease.
14. Jayakumari C, Jabbar PK, Soumya S, Jayakumar R, Das DV, Girivishnu G, et al. Lipid profile in Indian patients with type 2 diabetes: the scope for atherosclerotic cardiovascular disease risk reduction. Diabetes Spectrum. 2020;33(4):299-306.