



An Analysis of Lipid profile in patients with Type-2 Diabetes mellitus in Tertiary care hospital

Dr . Dipamala Sohela, Prof . (Dr) B.L. Parija

(Postgraduate resident ,Hi-Tech Medical college and Hospital, Bhubaneswar)

(Professor ,Hi-Tech Medical college and Hospital, Bhubaneswar)

Date of Submission: 05-02-2025

Date of Acceptance: 15-02-2025

ABSTRACT

Introduction-Diabetes mellitus refers to a group of common metabolic disorders that share the phenotype of hyperglycemia (1A). Factors contributing to hyperglycemia include reduced insulin secretion, decreased glucose utilization, and increased glucose production. Persons with diabetes are at increased risk for cardiovascular disease, which is the main cause of mortality and morbidity in this population. Poor glycemic control leads to diabetes dyslipidemia.

Aim-The objectives of this study was to assess the lipid profile i.e Total cholesterol levels, triglycerides levels, HDL cholesterol levels, LDL cholesterol levels, VLDL cholesterol levels in T2 DM patients for proper glycemic control to reduce risk of cardiovascular disease.

Materials and Methods-This prospective study was conducted at Hi-Tech Medical college and Hospital, Bhubaneswar, where all the diagnosed and newly diagnosed cases of T2 DM patients were sent for lipid profile investigation for analysis of diabetes dyslipidemia.

Results-100 cases of T2 DM patients were sent for lipid profile analysis .Out of which 60 cases of T2 DM had control glycemic status with normal or nearly normal lipid profile, while rest 40 cases had poor glycemic control showing deranged lipid profile.

Conclusion-This study highlights that T2 DM patients with uncontrolled glycemic status had increase in triglycerides levels, increase in LDL cholesterol levels and decrease in HDL cholesterol levels.

I. INTRODUCTION

Diabetes mellitus is a metabolic disorder, which increases the risk of cardiovascular disease like premature atherosclerosis leads to coronary heart disease and peripheral arterial disease (1B,2). Dyslipidemia is a common feature of diabetes. Increase in serum cholesterol levels and triglycerides levels increase risk of atherosclerotic cardiovascular disease(3,4). The risk of CHD is high irrespective of serum cholesterol levels in diabetes patients. Factors causing alteration in lipid

profile in diabetes include insulin deficiency or resistance, adipocytokins, hyperglycemia(5).

Insulin deficiency or resistance activates intracellular hormone sensitive lipase which increase release of non-esterified fatty acids (NEFA) from triglycerides stored in the adipose tissue (6).High circulating levels of NEFA increase hepatic triglycerides production , which increase secretion of apolipoprotein B (apoB) (7).

In addition to this there is loss of inhibitory effects of insulin on hepatic apoB production and triglyceride secretion in VLDL, resulting increase triglyceride rich VLDL production(8). Hypertriglyceridemia is augmented by reduced VLDL catabolism (9).

Lipoprotein lipase located on vascular endothelium is responsible for removal of triglycerides from the circulation. There is downregulation of lipoprotein lipase in case of insulin resistance or deficiency (9). This reduction in lipoprotein lipase leads to postprandial lipemia (10). Diabetes dyslipidemia consists of low HDL , increase triglycerides and postprandial lipemia. Diabetes dyslipidemia is associated with atherosclerotic cardiovascular disease. The pathophysiological alteration of lipid metabolism in diabetes increase risk of atherosclerotic cardiovascular disease.

II. MATERIAL AND METHODS

A prospective analysis was conducted on Department of General Medicine at Hi-Tech Medical and Hospital ,Bhubaneswar. The study included a sample size of 100 patients with prior history of diabetes on medication as well as newly diagnosed cases of type 2 diabetes mellitus based on their fasting blood sugar levels, 2 hrs postprandial blood sugar levels and glycated hemoglobin(HbA1c) levels. Then irrespective of their glycemic status blood samples were sent for analysis of lipid profile. Lipid profile (Total cholesterol, triglycerides, HDL, LDL, VLDL) of both controlled and uncontrolled glycemic status were observed.

Type1 diabetes mellitus and pancreatic diabetics were excluded from the study.



Ethics-Ethical approval for the study was obtained from the institution's ethics committee, and written informed consent was collected from all participating patients prior to their inclusion in the study.

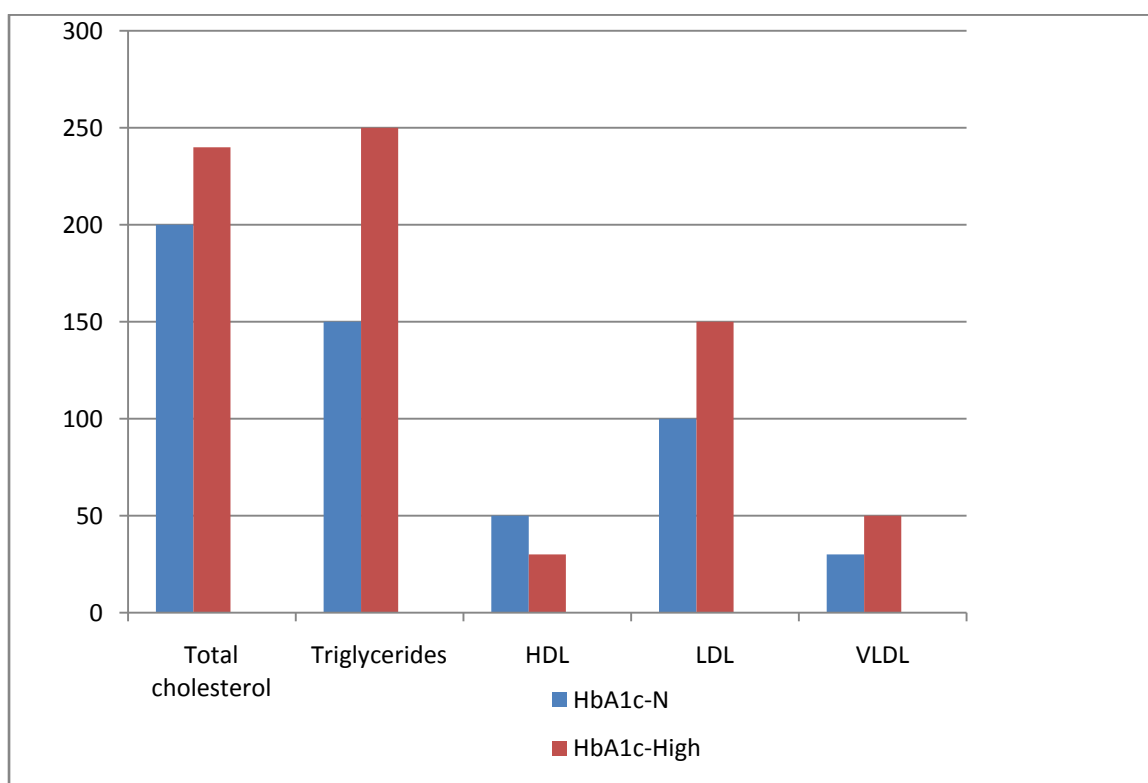
Statistics- Statistical analysis was performed using Microsoft Excel 2021. Descriptive statistics, including mean and standard deviation, were used to analyze quantitative data, while frequency and proportion were applied to categorical variables.

III. RESULTS

All 100 cases of T2 DM were sent for lipid profile analysis.

60 cases of T2 DM has controlled glycemic status with HbA1c 6.5-7% had total cholesterol levels less than equal to 200 mg/dl, triglycerides levels less than equal to 150 mg/dl, HDL levels in between 40-60 mg /dl, LDL levels more than equal to 100 mg/dl, VLDL level less than equal to 40 mg/dl.

While rest 40 cases with uncontrolled T2 DM with HbA1c more than equal to 7 had total cholesterol levels more than equal to 240 mg/dl, triglycerides levels more than equal to 250 mg/dl, HDL levels less than 30 mg/dl, LDL levels more than equal to 100 mg/dl, VLDL levels more than equal to 40 mg/dl.



IV. DISCUSSION

The present study provides an overview of diabetes dyslipidemia by analysis of lipid profile of T2 DM patients. T2 DM patients with controlled glycemic status had lipid profile within normal limit, while diabetes patients with poor glycemic control had dyslipidemia. Which in long run will increase risk of ASCVD and will increase mortalities and morbidities.

This is the indications for strict glycemic control with the help of anti diabetics like effective and adequate oral hypoglycemic agents as well as indicators for lipid lowering agents like statins, fibrates, niacins, ezetimibes, bempedoic acids, low

dose omega fatty acids, high dose omega fatty acids as monotherapy or in combinations.

REFERENCES

- [1]. 1A.Harrison's principal of Internal Medicine 21st editions
1B.Durrington PN. Hyperlipidaemia: diagnosis and management. London: Hodder Arnold; 2007. [Google Scholar]
- [2]. Laing SP, Swerdlow AJ, Slater SD, et al. Mortality from heart disease in a cohort of 23,000 patients with insulin-treated diabetes. Diabetologia. 2003;46:760-765. doi: 10.1007/s00125-003-1116-6. [DOI] [PubMed] [Google Scholar]



- [3]. West KM, Ahuja MM, Bennett PH, et al. The role of circulating glucose and triglyceride concentrations and their interactions with other “risk factors” as determinants of arterial disease in nine diabetic population samples from the WHO multinational study. *Diabetes Care*. 1983;6:361–369. doi: 10.2337/diacare.6.4.361. [DOI] [PubMed] [Google Scholar]
- [4]. Howard BV, Robbins DC, Sievers ML, et al. LDL cholesterol as a strong predictor of coronary heart disease in diabetic individuals with insulin resistance and low LDL: the Strong Heart Study. *Arterioscler Thromb Vasc Biol*. 2000;20:830–835. doi: 10.1161/01.ATV.20.3.830. [DOI] [PubMed] [Google Scholar]
- [5]. Taskinen MR. Diabetic dyslipidaemia: from basic research to clinical practice. *Diabetologia*. 2003;46:733–749. doi: 10.1007/s00125-003-1111-y. [DOI] [PubMed] [Google Scholar]
- [6]. Nikkila EA, Kekki M. Plasma triglyceride transport kinetics in diabetes mellitus. *Metabolism*. 1973;22:1–22. doi: 10.1016/0026-0495(73)90024-3. [DOI] [PubMed] [Google Scholar]
- [7]. Warraich HJ, Wong ND, Rana JS. Role for combination therapy in diabetic dyslipidemia. *Curr Cardiol Rep*. 2015;17:32. doi: 10.1007/s11886-015-0589-5. [DOI] [PubMed] [Google Scholar]
- [8]. McEneny J, O’Kane MJ, Moles KW, et al. Very low density lipoprotein subfractions in type II diabetes mellitus: alterations in composition and susceptibility to oxidation. *Diabetologia*. 2000;43:485–493. doi: 10.1007/s001250051333. [DOI] [PubMed] [Google Scholar]
- [9]. Chen YD, Swami S, Skowronski R, Coulston A, Reaven GM. Differences in postprandial lipemia between patients with normal glucose tolerance and noninsulin-dependent diabetes mellitus. *J Clin Endocrinol Metab*. 1993;76:172–177. doi: 10.1210/jcem.76.1.8421086. [DOI] [PubMed] [Google Scholar]