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Study of Serum Lipid Profile in Patients with Beta-Thalassemia Major

Swati Choudhary*, A.M. Siddiqui, H. N. Khan**, A. R. Shinde*****

*PG Student, **Associate professor, ***Assistant professor,
Department of Biochemistry, Dr S.C. Government Medical College, Vishnupuri, Nanded, Maharashtra

Abstract:-

Introduction: *Beta-thalassemia is an inherited blood disease characterized by inadequate production of haemoglobin, globin subunits, ineffective hematopoiesis, and increased hemolysis.*

Objective: *The aim of the study was to examine the serum lipid profile in patients with beta-thalassemia major, and to determine the factors that affect it.*

Material and methods: *The study comprises a total of 80 subjects between age group 4 to 14 years including patients with beta-thalassemia major (n=40) and controls (n=40). Blood samples were collected and serum was separated to be tested for serum total cholesterol, high density lipoprotein cholesterol, low density lipoprotein cholesterol and serum triglycerides was done by Erba XL-640 fully automated analyser.*

Results: *Significant changes confirmed that lipid abnormality occur in beta-thalassaemia major patients when total cholesterol, high density lipoprotein cholesterol, low density lipoprotein cholesterol and serum triglycerides levels compared with healthy subjects.*

Conclusion: *Our results revealed that lipid profile changed in patients with beta-thalassemia major. Many factors such as iron overload, liver injury, hormonal disturbances and aging might cause these changes.*

Keywords: ***Beta-thalassemia, Serum total cholesterol, Serum Triglyceride****.*

INTRODUCTION:

Thalassemia is one of the major hemoglobinopathies among the population all around the world. It is a single gene hereditary hemoglobin disorder in human. It has been reported that now a day approximately 1 out of 14 peoples are carriers for different sub types of thalassemia [1]. Each year about 400,000 infants born with serious hemoglobinopathies and carrier frequency is about 270 million [2].

Patients with beta-thalassemia major may go through several complications as the transfusion-related infections like HBV, HCV, and HIV [3]. Patient with beta-thalassemia major are at risk of an iron overloading in various organs, which is through repeated blood transfusion and increased iron absorption from the gastrointestinal tract [4]. In Beta-thalassemia major, liver damage accounts for the low total-cholesterol (TC), high- density lipoprotein cholesterol (HDL-C) and low density lipoprotein cholesterol (LDL-C) serum levels[5].Thalassemic patients are also subjected to peroxidative tissue injury. It has been documented that circulating low density lipoprotein-C (LDL-C) in thalassemic patients show marked oxidative modification that could represent an event leading to pathogenesis. Free-radical production is increased in patients with iron overload. Iron-loaded patients have elevated plasma levels of thiobarbituric acid reactants and increased hepatic levels of aldehyde-protein adducts, indicating lipid peroxidation[6]. No studies are available on serum lipid profile and high prevalence of beta thalassemia major in population of Nanded district, so we have studied serum lipid profile in patients with thalassemia major in population of Nanded district.

MATERIALS AND METHODS:

This study was conducted at Dr. Shankarrao Chavan Government Medical College and Hospital, Vishnupuri, Nanded, Maharashtra. A total of 40 clinically diagnosed beta- thalassemia major patients (4-14 Years) and 40 controls were taken for study. The work was approved by ethical committee. About 3 ml of blood samples were collected from thalassemia patients and healthy controls in plain bulb and allowed to clot then centrifuged to obtain the serum. Serum Cholesterol, Serum Triglyceride Serum LDL

and HDLwere evaluated by Enzymatic colorimetric method by using Erba XL 640 fully auto analyzer.

Inclusion criteria:
Fourty beta-thalassemia patients (n=40), between 4 to 14 years of age participated in this study.

Exclusion criteria:
Patients with diabetes mellitus, hypothyroidism, hyper-thyroidism, renal failure and hereditary hyperlipidemia, patients not willing to give consent.

STATISTICAL ANALYSIS:

All obtained data were presented as mean ± S.D. (standard deviation). Study of unpaired t-test was used to compare the significance of the difference in the mean values of any groups ($p \leq 0.05$) were considered statistically significant.

RESULTS:

Table1: Serum lipid profile in patients with beta thalassemia major and control groups.

Parameters	Control groups (n=40)	Patients groups (n=40)	p-Value
TC (mg/dl)	166.3 ±21.3	149.6±30.5	0.005
TG (mg/dl)	115.8±26.7	186.1±54.1	0.0001
HDL-C (mg/dl)	36.5±2.1	34.9±3.0	0.009
LDL-C (mg/dl)	106.6±18.3	77.5±30.2	0.0001
VLDL-C (mg/dl)	23.1±5.3	37.1±10.8	0.0001

p- Value is highly significant in patients and controls as tabulated in table no.1

TC: Total cholesterol

TG: Triglyceride

HDL-C: High density lipoprotein cholesterol

LDL-C: Low density cholesterol

VLDL-C: Very low density cholesterol

DISCUSSION:

In our study it was found that low total cholesterol, HDL-C and LDL-C levels and triglyceride levels were substantially high. It appears, therefore, that many factors such as iron overload (high ferritin level), liver injury (disturbance of the ratio between AST and ALT), and hormonal disturbances affects lipids pattern among patients with major form of beta-thalassemia. Some authors suggested that accelerated erythropoiesis and increased uptake of LDL by macrophages and histiocytes of the reticuloendothelial system are the main determinants of low plasma cholesterol levels in beta thalassemia major(7,8). A study demonstrated that total phospholipids and its functions also decrease with the decrease of total cholesterol (9). The present findings are in agreement with those found by other studies as there is significant increase in plasma TG level, which is the same as detected by Pogana et al (10)

CONCLUSION:

Our study revealed that thalassaemia patients had hypertriglyceridaemia, hypocholesterolemia and low HDL-cholesterol levels. From the overall study, we tried to improve the lipid abnormality in thalassemic patients with the goal of

A. To prevent liver disease caused by viral hepatitis, iron overload
B. To monitor lipid abnormalities routinely, and provide treatment for iron overload and any underlying liver disorder.

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