

Serum HDL Level and Extent of Cardiovascular Risk in Type II Diabetes Mellitus

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ABSTRACT

Introduction: Serum high density lipoproteins levels were estimated in type II diabetes mellitus patients with different systemic complications.

Methods: Total 60 subjects (both male & female) of age group 35-60 years were selected for the study, of which 30 subjects were control (nondiabetic). Fasting high density lipoproteins levels were determined by cholesterol esterase-cholesterol oxidaseperoxidase method. Proportion of different complications was also determined.

Conclusion: It was found that average serum values of high density lipoproteins in type II diabetes mellitus patients was significantly decreased as compared to control group. Majority of systemic complications were cardiovascular in which hypertension was commonest. The study indicated a positive correlation between serum high density lipoproteins levels and cardiovascular risk in type II diabetic patients.

Keywords: HDL, Diabetes.

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INTRODUCTION

The incidence of diabetes mellitus (DM) in human population has reached to epidemic proportions worldwide and it is increasing at the rapid rate. 90% of the present cases are of "type II Diabetes" which has been called 'more a disease of lipid than of carbohydrate metabolism.' In long standing diabetes there occurs various complications such as microvascular, macrovascular and neuropathic.¹ Insulin resistant state is characterized by hypertriglyceridemia; increase in very low density lipoproteins (VLDL) secretion from liver; an increase in low density lipoproteins (LDL) and decrease in high density lipoprotein (HDL). Each of these lipid abnormalities is an independent risk factor for coronary heart disease.² HDL system transfers cholesterol to the liver, which is then excreted in the bile. In this way, it lowers plasma cholesterol which is the main reason why HDL-bound cholesterol is sometimes called "good cholesterol". Epidemiological studies have shown that high concentrations of HDL (over 60 mg/dL) have protective value against cardiovascular diseases such as ischemic stroke and myocardial infarction. Low concentrations of HDL (below 40 mg/dL for men, below 50 mg/dL for women) increase the risk for atherosclerotic diseases.³

The present study was undertaken in order to assess the correlation between serum HDL levels and magnitude of cardiovascular risk in type II diabetic patients.

MATERIALS AND METHODS

This observational study was conducted at Department of Medicine, S. P. Medical College Bikaner since July 2017 to December 2017 Total 60 subjects were selected of age group (35-60 yrs), including both sexes and divided into 2 equal groups as - Group I - Control group. including normal, healthy subjects. Group II - type II DM patients with systemic complications like macroangiopathic, microangiopathic and neuropathic. Type II DM patients were maintained on oral antidiabetic treatment. Systemic complications were detected on the basis of detailed history, general and systemic examinations, and specific investigations like ECG, fundoscopy etc.

To all the groups following exclusion criterion was applied:- Cigarette smoking; alcoholism; obesity based on body mass index (BMI) and waist/hip ratio; past history of hypertension; patients on antilipid treatment, in order to exclude their individual effects on serum HDL levels.

Methods

Blood samples were collected after overnight fasting of 8-10 hrs for separation of sera. Serum HDL levels were estimated by cholesterol esterase-cholesterol oxidase-peroxidase (CE-CO-PAP) colorimetric method in both the groups and was compared by applying unpaired 't' test.

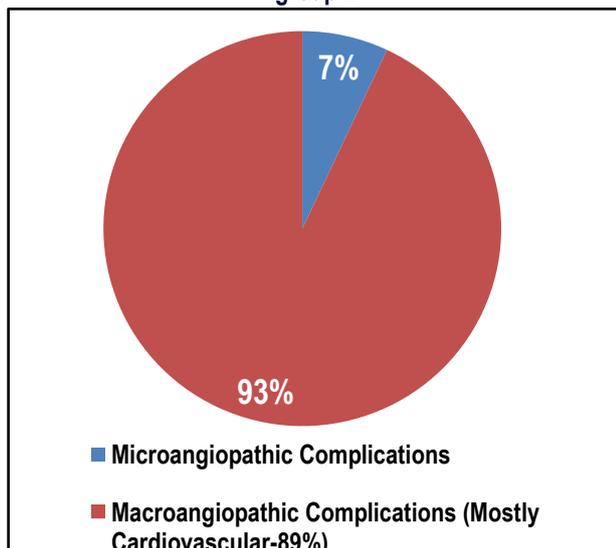
Table I: Serum HDL values in mg %; observed in Group I and Group II

Sr. No.	GROUP I	GROUP II
1	73	47
2	47	33
3	52	35
4	47	42
5	57	40
6	50	42
7	85	33
8	38	45
9	54	45
10	47	50
11	38	47
12	45	52
13	40	50
14	61	42
15	47	28
16	48	48
17	45	36
18	52	46
19	50	42
20	42	40
21	54	40
22	58	45
23	33	40
24	38	42
25	48	54
26	46	50
27	60	50
28	42	64
29	54	30

Table II: Comparison between average values of serum HDL (mg%) in Group I and Group II

Group I (Mean ± SD)	49.4 ± 11.01
Group II (Mean ± SD)	42.9 ± 7.8
Difference between means	6.5*

Fig 1: Proportion of systemic complications found in group II



RESULTS AND DISCUSSION

HDL is synthesized in the liver and the intestine. It was found that HDL levels were significantly lower in NIDDM of both sexes and the differences persisted after adjustment for obesity, cigarette smoking, alcohol, exercise, and estrogen use in women.⁴ Nearly one of every two patients with type 2 diabetes has low HDL cholesterol levels and that low HDL cholesterol was more prevalent in patients with existing cardiovascular disease (CVD) and those with worse glycemic control.⁵

Many patients with diabetes have an atherogenic pattern of dyslipidemia characterized by relatively normal levels of dense LDL cholesterol particles coupled with low levels of HDL cholesterol.⁶ Serum HDL concentration decreases due to excess catabolism and negative relationship between HDL and LDL.⁷ Changes in HDL in DM favor the development of atherosclerotic changes.⁸

Low HDL cholesterol represents a highly prevalent and potentially modifiable risk factor for cardiovascular disease prevention in type 2 diabetes. Given the high prevalence of low HDL cholesterol and the substantial residual risk for CVD events in patients with low HDL cholesterol, development of more potent HDL cholesterol-raising therapies or publication of more compelling evidence for current combination therapy has the potential to result in substantially reduced cardiovascular morbidity and mortality among patients with type 2 diabetes. American Diabetes Association guidelines⁹ recommend additional therapy for patients at LDL cholesterol goal with low HDL cholesterol. Each 1-mg/dl increase in HDL cholesterol is associated with significant reductions of CVD mortality rates (3.7% in men and 4.7% in women).¹⁰

SUMMARY AND CONCLUSION

The above study showed the significant decrease in HDL concentration and its relation to increased cardiovascular risk in type II diabetic patients who were being treated with oral hypoglycemic drugs but not with anti-lipid therapy. Further studies are needed to exclude the effects of factors such as gender, exercise, sedentary life style etc which can affect serum HDL levels independently; so that more precise correlation between HDL and diabetes mellitus can be obtained.

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