

Full Length Research Article

Lipid Profile in Diabetic Retinopathy

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ABSTRACT

Background

Aim: This study is aimed to assess the role of lipid profile in diabetic retinopathy.

Materials and Methods: The study comprised of 60 individuals of 30-60 yrs age group. Among those 20 were clinically diagnosed diabetic retinopathy cases (group A), 20 were diabetics without retinopathy (group B) and 20 were Nondiabetic normal healthy individuals (group c), and serum cholesterol, triglycerides, HDL cholesterol levels were estimated VLDL, LDL cholesterol levels were derived by Friedwalds formula and compared in them.

Statistical Analysis: Results were analysed using epi info 3.5.4 by students t-test

Results Mean values of total serum cholesterol levels are 202.8 ± 41.78 , 186.2 ± 39.49 , 163.6 ± 28.19 mg/dL, mean values of serum triglycerides are 170.6 ± 57.77 , 151.48 ± 56.04 , 110.5 ± 37.52 mg/dL, mean values of HDL cholesterol are 35.6 ± 5.68 , 36.75 ± 4.06 , 38.45 ± 3.48 mg/dL, mean values of LDL cholesterol are 133.19 ± 46.28 , 118.5 ± 32.17 , 102.85 ± 29.96 mg/dL, mean values of V-VLDL cholesterol are 34.09 ± 11.47 , 30.06 ± 13.89 , 22.25 ± 7.58 mg/dL in groups A,B,C respectively.

Conclusion: Mean values of lipid profile levels were not significantly higher in diabetic retinopathy cases (group A) when compared to diabetic controls without diabetic retinopathy (group B). mean values of total cholesterol and triglycerides are significantly raised in diabetic retinopathy cases (group A) when compared with nondiabetic normal healthy individuals (group C)

Key Words

Diabetic Retinopathy, Lipid Profile.

INTRODUCTION

93 million people are suffering from diabetic retinopathy worldwide (Joanna *et al.*, 2012). Over 60% of type 2 diabetics have retinopathy during their first 20 years of disease (Zhang *et al.*, 2010). Risk factors in incidence of diabetic complications are duration of diabetes, glycemic control, dyslipidemias, hypertension, smoking, alcoholism, lifestyle. Diabetes mellitus results in chronic complications that are classified as Macrovascular like coronary artery disease, cerebrovascular disease, peripheral vascular disease and Microvascular complications like retinopathy, nephropathy and neuropathy. Diabetes with its allied complications increases the morbidity and mortality (Alpana Mathur and Rishi mathur, 2013). Diabetic retinopathy is classified into background retinopathy and proliferative diabetic retinopathy. Background retinopathy includes microaneurysms, macular edema, intraretinal hemorrhages, cotton wool spots, venous beading, circinate retinal abnormalities. Proliferative diabetic retinopathy includes surface neovascularisation, neovascularisation, vitreous hemorrhages, tractional retinal

detachment and eventually leads to complete blindness (Yousef H Aldebasi *et al.*, 2013). Various studies done on lipid profile in diabetic retinopathy were showing conflicting results. So we have taken up estimation of lipid profile in diabetic retinopathy here in this study.

MATERIALS AND METHODS

This is a cross sectional study carried out in department of Biochemistry and department of ophthalmology at Sri Venkateswara Medical college and S.V.R.R Government general hospital, Tirupati on a total of 60 subjects of 30-60 years age of both sexes. Among the 60 subjects, 20 were Non Insulin Dependent Diabetes Mellitus (NIDDM) cases with diabetic retinopathy changes considered as Group A, 20 were age and sex matched NIDDM controls without diabetic retinopathy considered as Group B and 20 were nondiabetic age and sex matched normal subjects without any disease considered as Group C.

Inclusion criteria

Group A & B were diagnosed as diabetics and Group C as nondiabetics based on the guidelines proposed by American Diabetic Association (American Diabetes Association, 2012).

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Group A and Group B were subjected to fundoscopic examination by an experienced ophthalmologist.

Exclusion criteria

Subjects with mixed pathology, history of hypertension, coronary artery disease, renal and hepatic diseases, patients who are seriously ill, patients who were on statins, smokers and alcoholics.

After taking ethical committee acceptance and informed consent from subjects, 8 ml of overnight fasting venous blood samples were collected from all the subjects under aseptic conditions and then each sample was divided into 2 aliquots of 2 ml into oxalate and fluoride bulb for estimation of fasting blood glucose by GOD-POD enzymatic kit method and 6ml into another test tube with no anticoagulant for estimation of serum lipid profile (total serum cholesterol, HDL- cholesterol, triglycerides) by using Dr. Reddy Laboratory enzymatic kit method in Biosystems BTS 320 semiautoanalyser. LDL, VLDL cholesterol calculated by friedwald 's formula

Statistical analysis

Data obtained was analysed by epi info 3.5.4 students 't' test. P-value <0.05 was considered as significant

RESULTS

Table 1. Table showing Mean and Standard Deviation in Diabetic retinopathy cases (group A), Diabetic controls without retinopathy (Group B) and Nondiabetic normal individuals (Group C)

| Parameter | Group A (cases) | Group B (Controls) | Group C (Normals) |
|---------------------------------|-----------------|--------------------|-------------------|
| Fasting blood glucose (mg/dL) | 132.47 ± 58.31 | 109.35±32.73 | 88.25 ±9.76 |
| Total serum cholesterol (mg/dL) | 202.8 ±41.78 | 186.2 ±39.49 | 163.6± 28.19 |
| Triglycerides (mg/dL) | 170.6±57.77 | 151.48±56.04 | 110.5±37.52 |
| HDL-c (mg/dL) | 35.6±5.68 | 36.75±4.06 | 38.45±3.48 |
| LDL -c (mg/dL) | 133.19±46.28 | 118.5±32.17 | 102.85±29.96 |
| VLDL-c (mg/dL) | 34.09±11.47 | 30.06±13.89 | 22.25±7.58 |

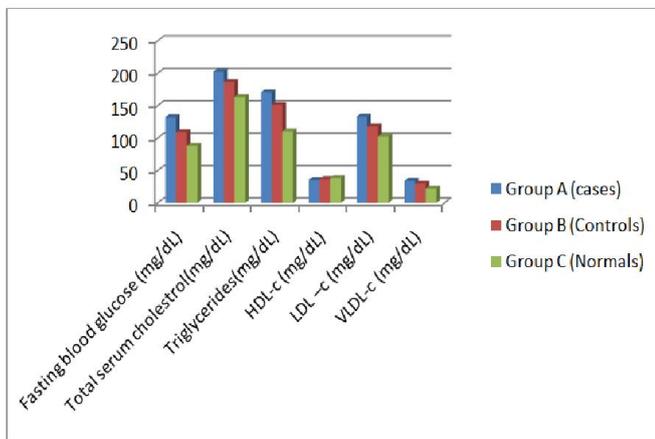


Fig. 1. Bar diagram comparing Mean values of FBS and lipid profile in Groups A,B,C

Table 2. Mean, S.D, t-value and P-value in groups A and B

| Parameter | Group A (cases) | Group B (Controls) | t-value | p-value |
|---------------------------------|-----------------|--------------------|---------|---------|
| Total serum cholesterol (mg/dL) | 202.8 ±41.78 | 186.2 ±39.49 | 1.42 | >0.05 |
| Triglycerides (mg/dL) | 170.6±57.77 | 151.48±56.04 | 1.06 | >0.05 |
| HDL-c (mg/dL) | 35.6±5.68 | 36.75±4.06 | 1.47 | >0.05 |
| LDL -c (mg/dL) | 133.19±46.28 | 118.5±32.17 | 1.20 | >0.05 |

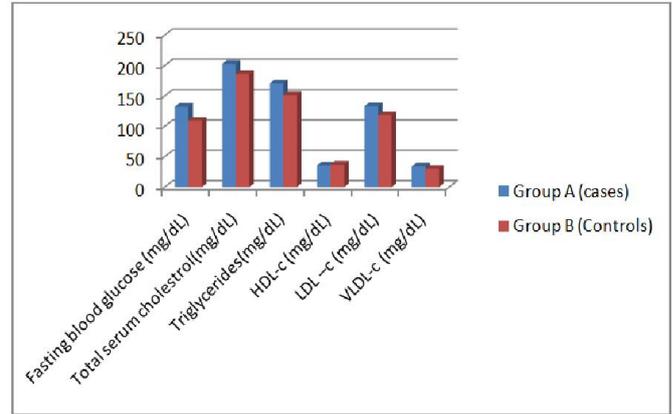


Fig. 2. Comparison of mean values of lipid profile between Groups A and Group B

Table 3. Mean, S.D, t-value and P-value in groups A and C

| Parameter | Group A (cases) | Group C (Normals) | t-value | p-value |
|---------------------------------|-----------------|-------------------|---------|---------|
| Total serum cholesterol (mg/dL) | 202.8 ±41.78 | 163.6± 28.19 | 3.5 | <0.01* |
| Triglycerides (mg/dL) | 170.6±57.77 | 110.5±37.52 | 3.9 | <0.01* |
| HDL-c (mg/dL) | 35.6±5.68 | 38.45±3.48 | 2.01 | >0.05 |
| LDL -c (mg/dL) | 133.19±46.28 | 102.85±29.96 | 2.5 | >0.05 |

*- statistically significant

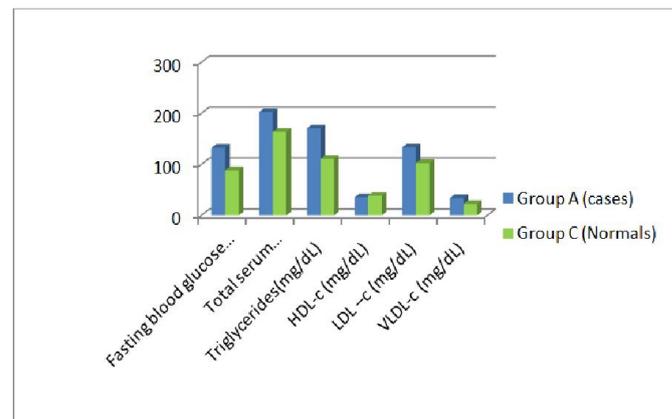


Fig. 3. Comparison of FBS and lipid profile in groups A and C

DISCUSSION

Our study shows that there is no significant increase in the lipid profile values in diabetic retinopathy cases(Group A) over diabetic controls without retinopathy (Group B) but there is a significant raise in the mean values of total serum cholesterol and serum triglycerides in diabetic retinopathy cases (Group A) when compared to nondiabetic healthy normals (Group C).

Diabetic retinopathy is one among the commonest microvascular complication of Diabetes mellitus. High lipid levels causes endothelial dysfunction due to reduced bioavailability of nitric oxide. Endothelial dysfunction plays a role in exudate formation in diabetic retinopathy. (Landmessee *et al.*, 2000). Hyperglycemia and its biochemical sequelae affects pathways of growth factors, cytokines and vasoactive agents and thus influence endothelial cell functioning. Peroxidation of lipids in lipoproteins of vascular wall leads to local production of carbonyl species that mediate recruitment of macrophages, cellular activation and proliferation, chemical modification of vascular proteins that affects both structure and function of vascular wall. Hyperlipidemia can cause endothelial dysfunction, breakdown of blood retinal barrier leading to exudation of serum lipids and lipoproteins (Ebru Nevin Cetin *et al.*, 2013). In diabetes increased glucose flux and free fattyacids is associated with overproduction of mitochondrial reactive oxygen species (ROS) which inturn leads to increased oxidative stress (Yousef H Aldebasi *et al.*, 2013).

Conclusion

Our study shows that there is no significant increase in the lipid profile values in diabetic retinopathy cases (Group A) over diabetic controls without retinopathy (Group B) but there is a significant raise in the mean values of total serum cholesterol and serum triglycerides in diabetic retinopathy cases (Group A) when compared to nondiabetic healthy normals (Group C).

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