

A Hospital Based Clinical Study of Serum Lipid Profile in Non-Proliferative Diabetic Retinopathy with Type 2 Diabetes Mellitus Patients in Tertiary Health Care-2019

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Abstract: *Progressive dysfunction of the retinal vasculature caused by chronic hyperglycemia resulting in structural damage to the neural retina. Worldwide prevalence of DR is supposed to increase by 5.4% by 2025. (5). Hyperlipidemia is more common in diabetic patients. Choroidal blood flow increased in NPDR patients. Serum lipids which apparently play an effective role in the creation and acceleration of nonproliferative diabetic retinopathy we therefore determined the relationship of serum lipids level in patient with nonproliferative diabetic retinopathy in the present study. This study was carried out in Regional Institute of Ophthalmology, Gauhati Medical College and Hospital for a period of 6 months. A total of 63 patients were taken in the study who were diagnosed case of non proliferative diabetic retinopathy. On analysis of individual components of lipid profile it was found that 26 (41%) patient have been found with raised LDL. Thus a positive correlation is found with LDL levels in DR. Patients with diabetic retinopathy must be screened for lipid profile and must be put under medication if required.*

Keywords: PDR-Proliferative Diabetic Retinopathy, NPDR-Non Proliferative Diabetic Retinopathy, Hyperlipidemia, Serum LDL

1. Introduction

Progressive dysfunction of the retinal vasculature caused by chronic hyperglycemia resulting in structural damage to the neural retina. (1)The global prevalence of diabetes mellitus has increased for last two decades and has reached approximately 177 million in 2000. Expected that if the situation continues, more than 360 million people will suffer from diabetes by 2030, and even some third world countries as India will become the world diabetes center (2-4). Worldwide prevalence of DR is supposed to increase by 5.4% by 2025. (5). Diabetic retinopathy the most common micro-vascular complication of diabetes mellitus and foremost cause of blindness in the working age group. (6) Micro-vascular complication of diabetic retinopathy associated with **increase risk of cardiovascular disease.** (6, 7) Diabetes leads to ocular complication including retinopathy, macular edema. Diabetic retinopathy is classified into two stages: early stage (NPDR; non proliferative diabetic retinopathy) and advanced stage (PDR; proliferative diabetic retinopathy). Loss of vision in diabetic retinopathy is due to macular edema, macular ischemia following capillary blockage, and post-ischemic neovascularization (8, 9). Diabetic macular edema (DME) leads to serious visual effect caused by alteration in permeability of retinal vessels in patients with diabetic retinopathy (9). Nonproliferative DR (NPDR) is characterized by microaneurysms, cotton-wool spots, intraretinal microvascular abnormalities, hard exudates and venous beading, whereas proliferative DR (PDR) is characterized by neovascularization of the optic disc or elsewhere, pre-retinal and vitreous haemorrhage [10, 11]. PDR is less common but more sight-threatening than NPDR. Hyperlipidemia is more common in diabetic patients. Choroidal blood flow increased in NPDR patients. High lipid levels are known to create endothelial dysfunction leading to a reduced bioavailability of nitric oxide and this endothelial dysfunction was suggested to play a role in retinal exudate formation in DR. Serum lipids which

apparently play an effective role in the creation and acceleration of nonproliferative diabetic retinopathy we therefore determined the relationship of serum lipids level in patient with nonproliferative diabetic retinopathy in the present study.

2. Materials and Methods

This study was carried out in Regional Institute of Ophthalmology, Gauhati Medical College and Hospital for a period of 6 months. A total of 63 patients were taken in the study who were diagnosed case of non proliferative diabetic retinopathy. Informed consent was taken from the patient and the identity was kept hidden. Predesigned proforma was used.

Inclusion Criteria

- Diagnosed case of type 2 DM with NPDR
- Outdoor patients are included in the study
- Age group of 35-75 year
- Both sexes are included

Exclusion Criteria

- Patients who were in lipid lowering drugs
- Patients with media opacity bilaterally
- Patients with known kidney disease
- Patients with pregnancy

Patients on hemodialysis

A complete history was taken and due importance was given on the following points-

- 1) Age, Sex and Socioeconomic status.
- 2) The duration of diabetes mellitus.
- 3) Treatment with compliance.
- 4) Associated co morbid diseases.
- 5) History of visual loss with duration.
- 6) History of any ocular treatment
- 7) Dietary habits

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8) Relevant family history.

The study information consisting of age, sex, medication taken, serum level of VLDL, LDL, HDL, TG, and cholesterol were measured and recorded in the files and prepared for each patient.

Aims and Objective

- 1) To study the serum lipid profile in Type 2 DM patient with Non Proliferative Diabetic Retinopathy.
- 2) To assess the component of serum lipid profile in Type 2 DM patient with Non Proliferative Diabetic retinopathy.

3. Results and Observation

63 patients of non-proliferative diabetic retinopathy were taken in this hospital based observational study. The age taken for the patient was in range of 35-75 years , where the age group affected were 46-55 years around 23 (37%).

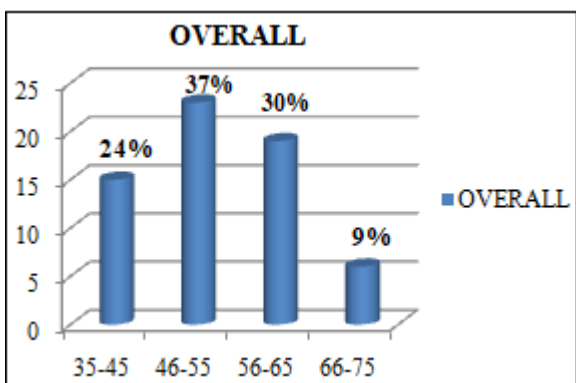


Figure 1: Bar diagram showing age distribution in years of the patients

Considering the sex distribution among the patients, males are more affected around 34 (54%).

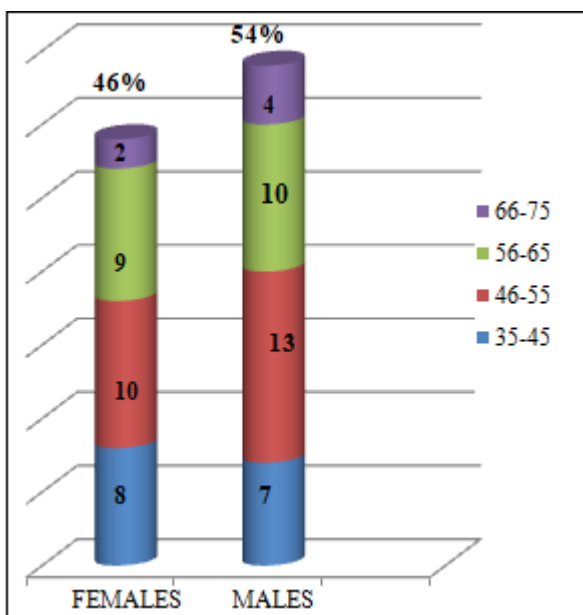


Figure 2: Bar Diagram Showing Sex Distribution in Males and Females

It was seen that among the 63 patients, oral hypoglycemic agents were taken by 25 (43%).

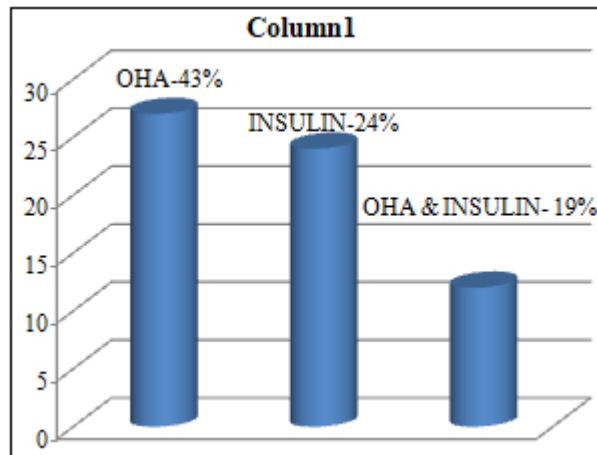


Figure 3: Bar Diagram Showing Patients Daily Taking Antidiabetic Drugs

It was seen that, on estimating the lipid profile in nonproliferative diabetic retinopathy low density lipoprotein was highest in 41% cases, triglycerides 22%, total cholesterol 24%, very low density lipoprotein in 6.3% , high density lipoprotein in 6.3% patients. On analysis of individual components of lipid profile it was found that 26 (41%) patient have been found with raised LDL.

Serum Lipid Profile	Number of Patients	Percentage
LDL	26	41%
TG	14	22%
TC	15	24%
VLDL	4	6.3%
HDL	4	6.3%

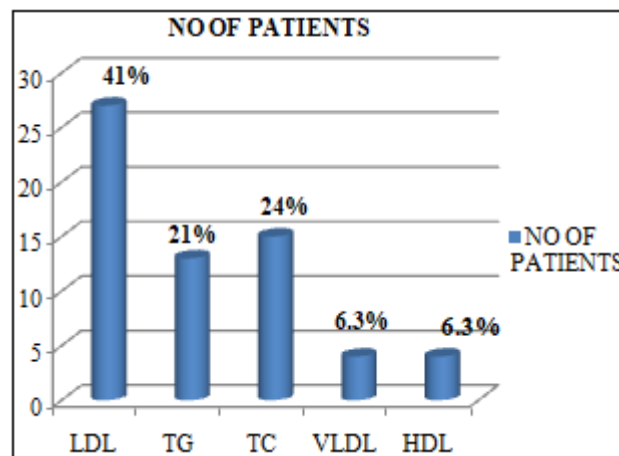


Figure 4: Bar Diagram based on lipid profile of diabetic retinopathy patients

4. Discussion

Dysfunction of the vascular endothelium is important risk factor in the pathogenesis of diabetic vascular complications and has been shown to originate from hyperglycaemia. Also reported that the peroxidation of lipids present in lipoproteins in the vascular wall leads to immediate production of reactive carbonyl species locally that leads generation of macrophages production, cellular activation and proliferation, along with chemical modification of vascular proteins by advanced lipoxidation end-products which affect both the structure and function of the vascular wall. Consequently, it was proposed that, hyperlipidemia

causes DR and ME by altering function of normal endothelial and breakdown of the blood retinal barrier leading to exudation of serum lipids and lipoproteins also. (13) In ETDRS report, Chew *et al* [14] stated that patients with high total cholesterol and LDL levels were more likely to have retinal hard exudates in comparison to patients with normal lipid profile. Chennai Urban Rural Epidemiology Study, Rema *et al* [15] showed that mean cholesterol, triglyceride and non-HDL levels were higher in patients with DR. YUE ZHOU reported that little higher levels of LDL-C with borderline statistical significance were observed in patients with diabetic retinopathy. (16) SACK FM reported that diabetic retinopathy is associated with triglycerides and HDL matched analysis. (17) Chew Dy reported that fenofibrate is associated with decrease retinopathy in patients with altered lipid profile. (18) There were some other studies which are conflicting our study and found that there are no such association exists. Multi-Ethnic Study of Atherosclerosis, which show no association between serum lipids and DR and the Australian Diabetes, Obesity, and Lifestyle Study [19], [20], [21]. Similarly, Hove *et al* [22] in Denmark reported no significant association seen between DR, triglycerides, HDL and total cholesterol in diabetic population. Miljanovic *et al* [23] reported no lipid profile association with progression of DR or with PDR. In another study, done by Benarous it was seen that there was no association between DR and lipid profile [21]. Moreover, Singapore Malay Eye study showed that higher cholesterol levels were protective of any retinopathy [24]. It was speculated that serum lipids may have a strong influence only in the severe forms of diabetic microvascular disease. Our study has some limitations. Firstly, the sample size of this study was relatively small, which may have limited the statistical strength of the analysis and reduced our ability to perform correlational analyses.

5. Conclusion

Out of total 63 patients, diabetic retinopathy is seen more in male patients- 34 (54%). Maximum incidence of diabetic retinopathy is seen age group of 46-55 years- 23 (37%). **On analysis of individual components of lipid profile it was found that 26 (41%) patient have been found with raised LDL.** Thus a positive correlation is found with LDL levels in DR. Patients with diabetic retinopathy must be screened for lipid profile and must be put under medication if required. To conclude we found a significant correlation between LDL, HDL, VLDL, TG, TC and diabetic retinopathy and hence significant association was found between serum lipids and the severity of DR. Large multi-centric prospective studies are needed about this subject, especially to clarify the reasons of discrepancies between the findings of studies

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