

A COMPARATIVE STUDY OF LIPID PROFILE IN ISCHEMIC STROKE BETWEEN DIABETIC AND NON DIABETIC PATIENTS AT TERTIARY CARE CENTREJeetendrakumar¹, Ashoka², Chethan³, Shivraj⁴, Umesh⁵**HOW TO CITE THIS ARTICLE:**

Jeetendrakumar, Ashoka, Chethan, Shivraj, Umesh. "A Comparative Study of Lipid Profile in Ischemic Stroke between Diabetic and Non Diabetic Patients at Tertiary Care Centre". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 29, April 09; Page: 4930-4937, DOI: 10.14260/jemds/2015/720

ABSTRACT: BACKGROUND: Dyslipidemia is one of the cardiovascular risk factors, but the association with stroke is not as strong as with heart disease. Diabetic patients who suffered a stroke have hypertension and dyslipidemia in a higher percentage than non-diabetes patients. **OBJECTIVES:** 1. To compare the lipid profile in ischemic stroke patients among type 2 diabetes mellitus patients and non-diabetic patients in tertiary care hospital. **METHODS:** This study was conducted in Department of General medicine, ESIC-MC & PGIMSR, Rajajinagar, Bangalore. 60 ischemic stroke patients were included in the study, among which 30 type 2 diabetes patients and 30 non diabetes patients were included in the study. Fasting blood glucose, postprandial blood sugar, Glycosylated hemoglobin (HbA1c) and fasting lipid profile are measured both in diabetic and non-diabetic groups. **RESULTS:** 60 cases of stroke were studied to compare the lipid profile in diabetic and non-diabetic patients. The mean serum triglyceride level and mean VLDL cholesterol level in diabetic stroke patients is (365.16+49.9) and (70.3+11.42) was significantly higher than in non-diabetic stroke patients is (162.16+17.33) and (33.49+4.64) respectively. The mean serum HDL cholesterol level in diabetic stroke patients (22.33+3.75) was significantly lower than in non-diabetic stroke patients (44.7+12.41). There was no significant difference in the mean values of serum total and LDL cholesterol levels in diabetic (191.63+14.9 & 100+19.62) and non-diabetic (186.53+19.47 & 96.4+8.7) stroke patients. Thus the present study showed that diabetic patients with stroke had a significantly higher triglycerides and significantly lower HDL cholesterol levels. The total and LDL cholesterol levels were similar in both groups. **CONCLUSION:** In conclusion, the present study showed that diabetic patients with stroke had a significantly higher triglycerides and significantly lower HDL cholesterol levels. The total cholesterol and LDL cholesterol levels were similar in both groups. The mortality rate among stroke patients was not statistically significant between diabetic and non-diabetic patients, probably due to small sample size. Larger studies are needed for further confirmation.

KEYWORDS: Diabetes mellitus, dyslipidemia, stroke, FBS, PPBS, HbA1c.

INTRODUCTION: In developing countries stroke is the third leading cause of death after heart disease and cancer, out of which 85-90% are ischemic and 10-15% are hemorrhagic.¹ Evidence from Framingham survey and a number of earlier survey shown that patients with diabetes have 2 to 3 times greater risk of stroke than non-diabetic patients.

Dyslipidemia is associated with increased risk of stroke and carotid atherosclerosis. The multiple risk factor intervention trial demonstrated increased mortality among men with high cholesterol levels.²

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The dyslipidemia in Type 2 diabetes mellitus include: increased serum levels of triglycerides, decreased HDL and increased serum levels of LDL and VLDL cholesterol. Increased efflux of free fatty acids from adipose tissue and alteration of insulin response induce the increase of their concentration at the liver level.

Consequently, the liver increases VLDL production and synthesis of cholesterol esters. Free fatty acids combined with one molecule of cholesterol form cholesterol esters. The overproduction of triglyceride-rich lipoproteins and the alteration of the clearance, by decreasing lipoproteins lipase lead to hypertriglyceridemia, common in diabetes.

OBJECTIVE OF THE STUDY: To compare the lipid profile in ischemic stroke patients among type 2 diabetes mellitus patients and non-diabetic patients in tertiary care hospital.

METHOD OF COLLECTION OF DATA:

Design: A hospital based study was done for 2years from September 2012 to September 2014.

Setting: ESIC Medical College & Post Graduate institute of Medical Science & Research Rajajinagar, Bengaluru. Patients will be subjected to detailed history and complete physical examination. Data will be collected in a predesigned proforma. Patients taken in the study will be tested for FBS, PPBS, lipid profile and CT scan brain.

Inclusion Criteria:

1. Patients with ischemic stroke diagnosed clinically and radiologically (CT scan brain).

Exclusion Criteria:

1. All type 1 diabetes mellitus patients.
2. Patients with history of head injury and space occupying lesions.
3. Patients with renal failure.
4. Patients with liver failure.
5. Patients with haemorrhagic stroke.
6. Patients with history of smoking and alcohol intake.

Statistical Methods: To find the association between the study group and control group Z-test for proportion was applied. Data obtained were analysed using SPSS software. In all the test 'P' value less than 0.05 was taken to be statistically significant.

The study was approved by the institutional review board and all the participants gave written informed consent.

Investigations:

1. Blood sugars – Fasting (FBS) and Postprandial (PPBS).
2. Hemoglobin and HbA1c.
3. Fasting lipid profile.
4. Blood urea, Serum creatinine.
5. Liver function tests.
6. CT scan brain.

Diagnostic criteria Employed:

WHO criteria was employed for the diagnosis of diabetes mellitus.

FBS > 126mg/dl.

PPBS > 200mg/dl.

HbA1c > 7%.

Fasting blood sugars were done after 12 hrs of overnight fasting. Postprandial blood sugar was done 2 hrs after 75 gm of glucose load.

Lipid Profile: In the present study for the measurement of total cholesterol and HDL are measured by enzymatic calorimetric method and LDL and VLDL are calculated from above values.

RESULTS: A total number of 60 cases were suitable for analysis. 30 cases of type 2 diabetes mellitus (group A) and 30 non diabetes cases (group B) were taken as control groups. 60 cases of stroke were studied to compare the lipid profile in diabetic and non-diabetic patients. The mean serum triglyceride level and mean VLDL cholesterol level in diabetic stroke patients is (365.16+49.9) and (70.3+11.42) was significantly higher than in non-diabetic stroke patients is (162.16+17.33) and (33.49+4.64) respectively. The mean serum HDL cholesterol level in diabetic stroke patients (22.33+3.75) was significantly lower than in non-diabetic stroke patients (44.7+12.41). There was no significant difference in the mean values of serum total and LDL cholesterol levels in diabetic (191.63+14.9 & 100+19.62) and non-diabetic (186.53+19.47 & 96.4+8.7) stroke patients. Thus the present study showed that diabetic patients with stroke had a significantly higher triglycerides and significantly lower HDL cholesterol levels. The total and LDL cholesterol levels were similar in both groups.

DISCUSSION: Dyslipidemia is associated with increased risk of stroke and carotid atherosclerosis. The dyslipidemia in Type 2 diabetes mellitus include: increased serum levels of triglycerides, decreased HDL (the atheroprotective fraction) and increased serum levels of LDL and VLDL cholesterol.

In the present study increase in serum cholesterol in diabetic stroke patients is statistically insignificant, similar results were observed by Maurus et al (p value 0. 112).³ The decrease in the serum HDL cholesterol in diabetic stroke patients is statistically significant. Decreasing HDL levels in diabetic stroke was observed by Meng Q et al and RT benson et al.^{4,5}

In the present study increase in the serum VLDL cholesterol in diabetic stroke patients is statistically significant (p< 0. 05). A study by Marques et al showed that increase in serum VLDL in diabetic stroke patients is statistically not significant.³

There is stronger disposition to stroke in diabetic patients, because hyperglycemia is associated with accelerated atherogenesis⁶ and cerebrovascular risk factors like hyperlipidemia. The study by Lehto et al⁷ in which hyperlipidemia was a strong predictor of stroke in middle aged patients of diabetes probably because lipid abnormalities have been shown to be associated with cerebral atherosclerosis.

The study by Lehto et al showed there was a strong relationship between low HDL cholesterol and stroke in patients with diabetes.⁷ The studies by Murai A, Tanaka T, Miyahara T et al in their studies on lipoprotein abnormalities in stroke this association has been reported only in men.^{8,9}

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Low levels (< 35mg/ dl) of HDL cholesterol and high levels of triglycerides (>200mg/dl) are associated with a doubling of the risk of stroke mortality and morbidity.¹⁰ High titres of LDL cholesterol are a predictor of stroke in the general population.¹¹

There is some evidence to suggest that low HDL cholesterol which is a key component of dyslipidemia typically seen in type 2 diabetes is also associated with increased risk of ischemic stroke.¹² Furthermore Meta analyses have shown that the benefits of statin therapy for stroke prevention are independent of baseline lipid levels.¹³ This dyslipidemic picture is a frequent metabolic abnormality in diabetes and is consistent with the overall increased risk of stroke.

CONCLUSION: The present study showed that diabetic patients with stroke had a significantly higher triglycerides and significantly lower HDL cholesterol levels. The total cholesterol and LDL cholesterol levels were similar in both groups. The mortality rate among stroke patients was not statistically significant between diabetic and non-diabetic patients, probably due to small sample size. Larger studies are needed for further confirmation.

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	Range (mg/dl)	Mean	S. D
Group A (N= 30)	200-400	365. 16	49. 90
Group B (N=30)	120-199	162. 16	17. 33

Table no. 1: Serum triglycerides level in group A (Type2 DM) and group B (controls)

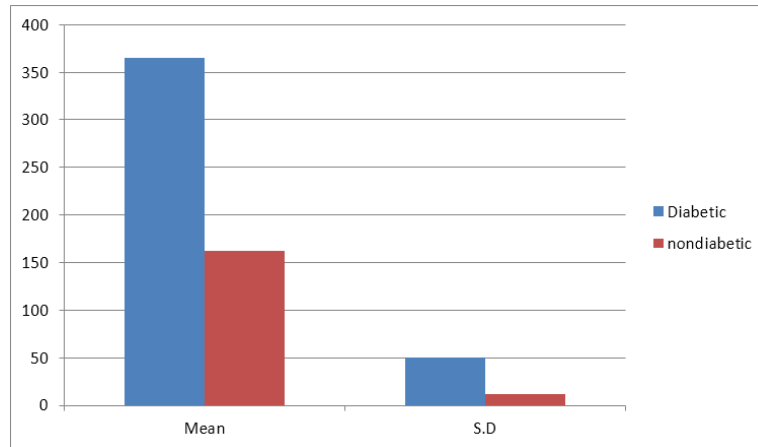


Fig. no. 1: Serum triglycerides level in group A (type2 DM) and group B (controls)

	Range (mg/dl)	Mean	S. D
Group A (N= 30)	130-204	191. 63	14. 9
Group B (N=30)	150-240	186. 53	19. 47

Table No. 2: Serum cholesterol level in group A (type2 DM) and group B (controls)

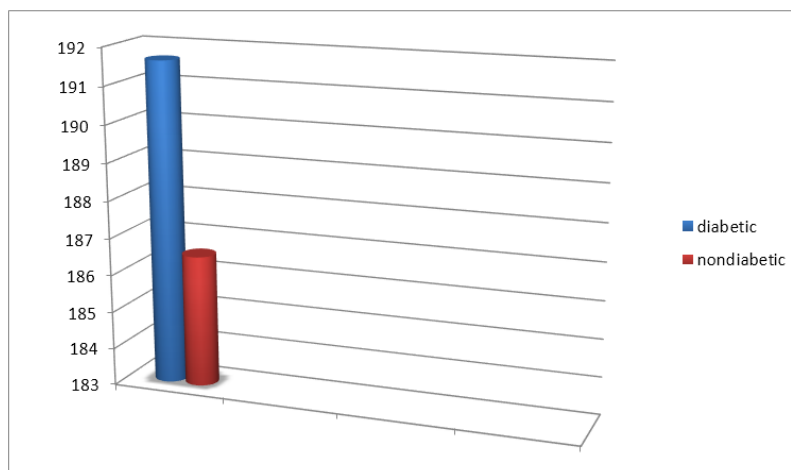


Fig. no. 2: Serum cholesterol level in group A (type2 DM) and group B (controls)

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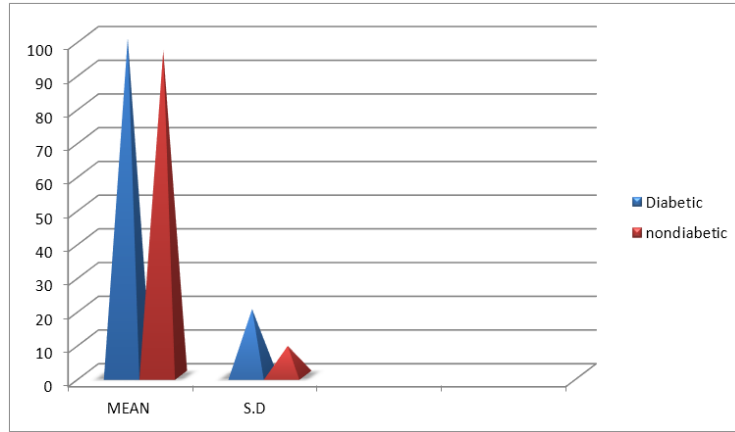


Fig. no. 3: Serum LDL cholesterol level in group A (type2 DM) and group B (controls)

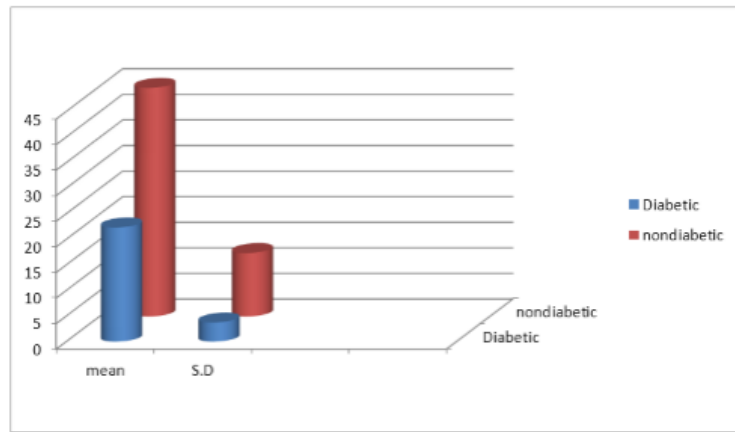


Fig. no. 4: Serum LDL cholesterol level in group A (type2 DM) and group B (controls)

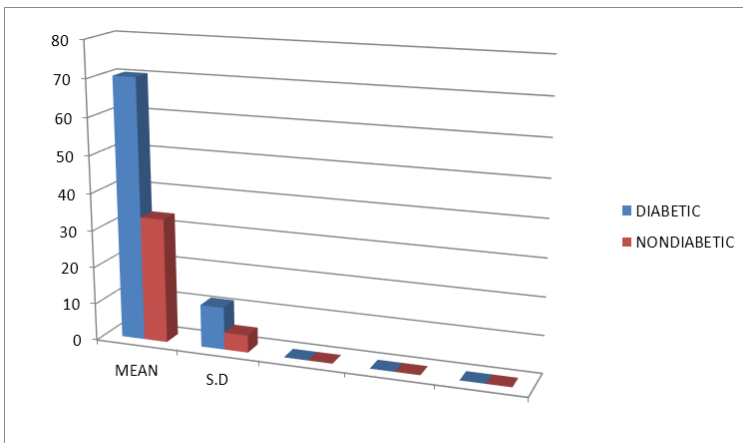


Fig. no. 5: Serum VLDL cholesterol level in group A (type2 DM) and group B (controls)

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	Serum triglycerides	Serum cholesterol	Serum LDL-C	Serum HDL-C	Serum VLDL
Group A (N= 30)	365.16	191.63	100.0	22.33	70.3
Group B (N=30)	162.16	186.53	96.40	44.7	33.49

Table no. 3: Serum lipid profile in group A (type2 DM) and group B (controls) in stroke patients

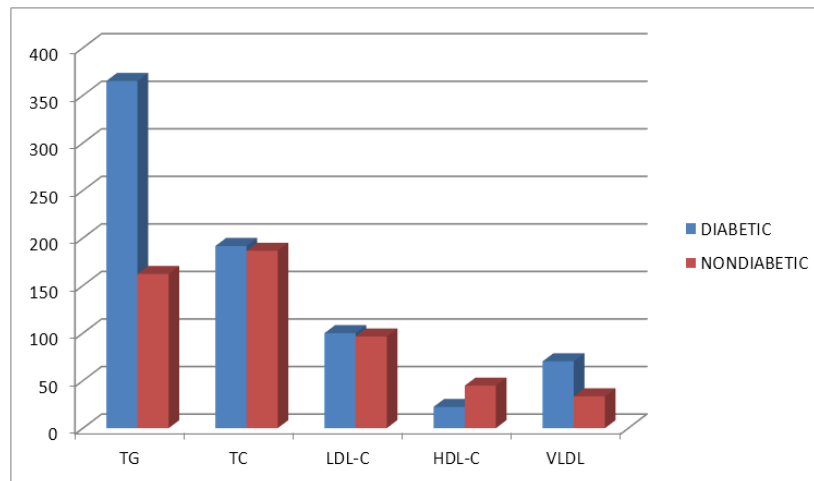


Fig. no. 6: Serum lipid profile in group A (type2 DM) and group B (controls) in stroke patients

CHOLESTEROL	DIABETICS	NONDIABETICS	X ²	P VALUE
TG> 150 mg%	30	28	2.06	> 0.1
LDL> 100 mg%	11	7	1.26	> 0.1
HDL< 40 mg% (males)	18	4	16.36	< 0.001
HDL< 50 mg% (females)	12	15	2.22	> 0.1

Table no. 4: Serum lipid profile in group A (type2 DM) and group B (controls) in stroke patients

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