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Original article

Lipid profile in diabetic and non-diabetic stroke: A comparative study from Navodaya medical College and Hospital, Raichur, Karnataka

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Abstract

Background: Stroke is a global health problem. It is the leading cause of adult disability and the second leading cause of mortality worldwide. Mortality from strokes is the second leading cause worldwide. About 15 million people suffer from non-fatal strokes leading to disability in about a third of patients.

Methodology: The present descriptive observational study was carried out in Medicine OPD and IPD at Navodaya medical College, Raichur from June 2023 to December 2023 involving 50 diagnosed cases of stroke of both sex

Results: Mean age of the study population was 63.47±10.21 years. Males were predominant in our study with male to female ratio of 2.03:1. Mean total cholesterol in diabetic patients was 205.23±33.31 and in non-diabetic patient was 146.05±17.21 ($p<0.01$). Mean VLDL in diabetic patients was 33.15±7.62 and in non-diabetic patient was 29.10±5.11 ($p<0.01$). Mean LDL in diabetic patients was 116.71±38.23 and in non-diabetic patient was 75.25±16.17 ($p<0.01$).

Conclusion: Mean values of lipid parameters like total cholesterol, LDL and VLDL were significantly elevated in diabetic stroke as compared to non-diabetic stroke patients in our study ($p<0.05$).

Key words: Lipid profile, diabetes stroke, non-diabetes stroke

Introduction:

The World Health Organization (WHO) definition of stroke is: “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin”. By applying this definition transient ischemic attack (TIA), which is defined to last less than 24 hours, and patients with stroke symptoms caused by subdural hemorrhage, tumors, poisoning, or trauma are excluded.[1]

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The pathological background for stroke may either be ischemic or hemorrhagic disturbances of the cerebral blood circulation. Thrombotic cerebral infarction results from the atherosclerotic obstruction of large cervical and cerebral arteries, with ischemia in all or part of the territory of the occluded artery. This can be due to occlusion at the site of the main atherosclerotic lesion or to embolism from this site to more distal cerebral arteries. Embolic cerebral infarction is due to embolism of a clot in the cerebral arteries coming from other parts of the arterial system, for example, from cardiac lesions, either at the site of the valves or of the heart cardiac cavities, or due to rhythm disturbances with stasis of the blood, which allows clotting within the heart as seen in atrial fribrillation.[2]

Stroke is a global health problem. It is the leading cause of adult disability and the second leading cause of mortality worldwide. Mortality from strokes is the second leading cause worldwide.[3] About 15 million people suffer from non-fatal strokes leading to disability in about a third of patients. It is a leading cause of functional impairments, with 20% of survivors requiring institutional care after three months and 15-30% being permanently disabled. [4]

Dyslipidemia is a major contributing determinant in the development of ischemic heart diseases, stroke, and other vascular diseases. An earlier study conducted by ICMR documented that 79% of the people had abnormalities in one of the lipid parameters. Earlier studies have documented that dyslipidemia account for 47 % of ischemic heart diseases and 26% of strokes.[5]

Objective: To study and compare the fasting lipid profile in diabetic stroke patients and non-diabetic stroke patients

Materials and Methods

- **Type of study:** Descriptive observational study.
- **Study setting:** Medicine OPD and IPD at Navodaya medical College, Raichur.
- **Duration of study:** From June 2023 to December 2023
- **Study population:** All diagnosed cases of stroke of both sex
- **Sample size: 50**
- **Sampling method used:** Simple random sampling method

Inclusion criteria:

- All confirmed cases of stroke patients presenting to Medicine OPD and IPD
- Age above 18 years
- Those who are willing to participate in study after written consent

Exclusion criteria:

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- All type 1 diabetes mellitus patients.
- Patients with history of head injury and space occupying lesions.
- Patients with renal failure.
- Patients with liver failure.
- Patients with haemorrhagic stroke.
- Patients with history of smoking and alcohol intake
- Those not willing to give consent
- Those CVA patients who are on lipid lowering agent

Data collection: After obtaining informed consent, detailed history, clinical examination, lab investigation reports were entered in the proforma specially designed for this study

Laboratory investigations:

- RBS
- Lipid profile
- CT brain/MRI brain

Blood collection:

A venous blood sample was collected in the morning after overnight fast of 12 hours. The blood sample was collected in plain bulb; serum was obtained and was subjected to test. The lipid profile (total cholesterol, serum triglycerides, HDL cholesterol, VLDL cholesterol, LDL cholesterol) with the use of fully automated analyzer Erba Mannheim XL 640'in laboratory.

National Cholesterol Education Programme (NCEP)[6] guidelines were used for definition of dyslipidemia as follows:

- Hypercholesterolemia-serum cholesterol levels ≥200 mg/ dl ≥5.2 mmol/l). Hypertriglyceridemia-serum triglyceride levels ≥150 mg/ dl (≥1.7 mmol/l).
- Low HDL cholesterol-HDL cholesterol levels ≤40 mg/dl (≤1.04 mmol/l).
- High LDL cholesterol-LDL cholesterol levels ≥130 mg/dl (≥3.4 mmol/l) calculated using the Friedewald's equation.

Statistical analysis and methods-

Data was collected by using a structure proforma. Data entered in MS excel sheet and analysed by using SPSS 24.0 version, IBM USA. Qualitative data was expressed in terms of proportions. Quantitative data was expressed in terms of Mean and Standard deviation. Descriptive statistics of each variable was presented in terms of Mean, standard deviation, standard error of mean. Association between two qualitative variables was found out by using chi square/Fischer's exact test. Comparison of mean and standard deviation between

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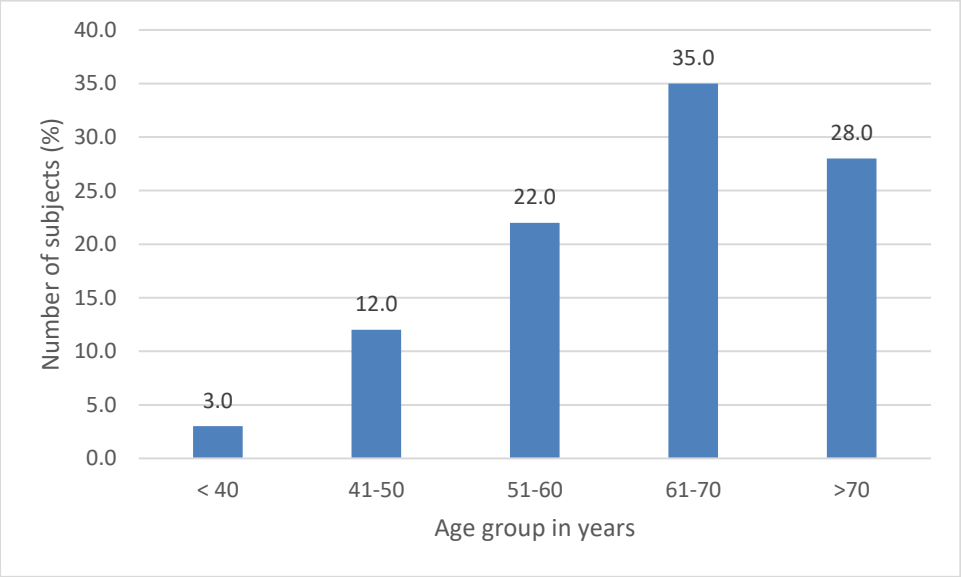
two groups was carried out by using unpaired t test to see whether the difference in the mean values was significant or not.

A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered as highly significant.

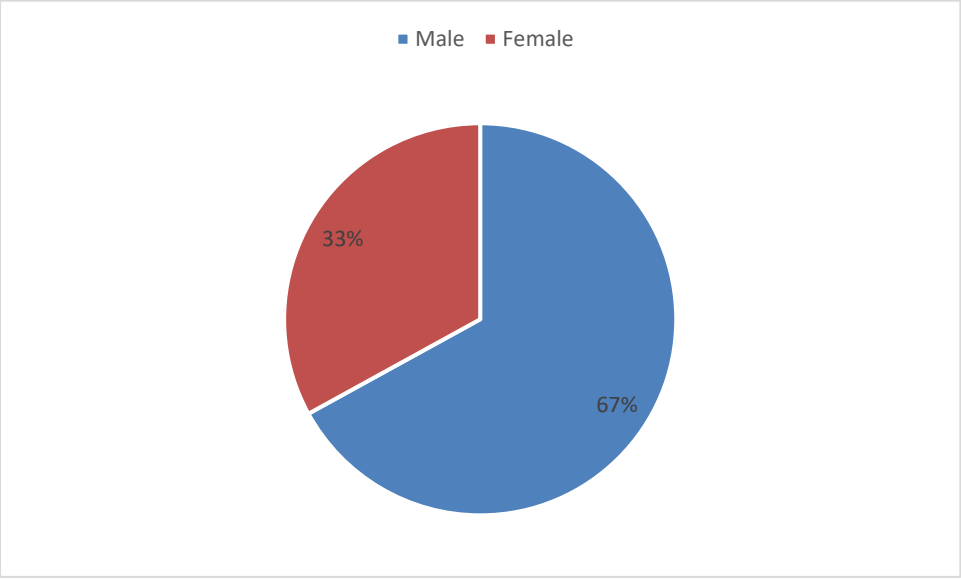
Results

Figure 1: Distribution according to age group



We included total 50 patients of stroke in our study. Majority of them were from 61-70 years age group i.e. 35% followed by 28% from above 70 years, 22% from 51-60 years, 12% from 41-50 years and 3% from below 40 years. Mean age of the study population was 63.47±10.21 years.

Figure 2: Distribution according to gender



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67% were males and 33% were females. Males were predominant in our study with male to female ratio of 2.03:1

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Table 1: Comparison of mean TC between diabetic and non-diabetic stroke patients

Group		N	Mean	Std. Deviation	t	p	Inference
TC	Diabetic	28	205.23	33.31	10.708	0.0001	Highly significant
	Non diabetic	22	146.05	17.21		(<0.01)	

Mean total cholesterol in diabetic patients was 205.23±33.31 and in non-diabetic patient was 146.05±17.21. When we compared mean total cholesterol between two groups, the difference was found to be statistically highly significant ($p<0.05$). It means total cholesterol value was significantly higher in diabetic patients as compared to non-diabetic patients.

Table 2: Comparison of mean TG between diabetic and non-diabetic stroke patients

Group		N	Mean	Std. Deviation	t	p	Inference
TG	Diabetic	28	165.00	49.44	-0.036	0.971	Not significant
	Non diabetic	22	165.41	64.26		(>0.05)	

Mean triglyceride in diabetic patients was 165±49.44 and in non-diabetic patient was 165.41±64.26. When we compared mean triglyceride between two groups, the difference was not found to be statistically highly significant ($p<0.05$). It means triglyceride value was comparable in both groups.

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Table 3: Comparison of mean HDL between diabetic and non-diabetic stroke patients

Group		N	Mean	Std. Deviation	t	p	Inference
HDL	Diabetic	28	39.63	3.60	2.464	0.015	Significant
	Non diabetic	22	37.95	3.09		(<0.05)	

Mean HDL in diabetic patients was 39.63±3.6 and in non-diabetic patient was 37.95±3.09. When we compared mean HDL between two groups, the difference was found to be statistically highly significant ($p<0.05$). It means HDL value was significantly higher in diabetic patients as compared to non-diabetic patients.

Table 4: Comparison of mean VLDL between diabetic and non-diabetic stroke patients

Group		N	Mean	Std. Deviation	t	p	Inference
VLDL	Diabetic	28	33.15	7.62	3.030	0.003	Highly significant
	Non diabetic	22	29.10	5.11		(<0.01)	

Mean VLDL in diabetic patients was 33.15±7.62 and in non-diabetic patient was 29.10±5.11. When we compared mean VLDL between two groups, the difference was found to be statistically highly significant ($p<0.05$). It means VLDL value was significantly higher in diabetic patients as compared to non-diabetic patients.

Table 5: Comparison of mean LDL between diabetic and non-diabetic stroke patients

Group	N	Mean	Std. Deviation	t	p	Inference

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LDL	Diabetic	28	116.71	38.23	6.730	0.0001	Highly significant
	Non diabetic	22	75.25	16.17		(<0.01)	

Mean LDL in diabetic patients was 116.71±38.23 and in non-diabetic patient was 75.25±16.17. When we compared mean LDL between two groups, the difference was found to be statistically highly significant ($p<0.05$). It means LDL value was significantly higher in diabetic patients as compared to non-diabetic patients.

Discussion

Demographic information

We included total 100 patients of stroke in our study. Majority of them were from 61-70 years age group i.e. 35% followed by 28% from above 70 years, 22% from 51-60 years, 12% from 41-50 years and 3% from below 40 years. Mean age of the study population was 63.47±10.21 years. 67% were males and 33% were females. Males were predominant in our study with male to female ratio of 2.03:1.

Hakim Mohammad Shafi[7] conducted study in Department of Radiodiagnosis, SMHS hospital, Jammu and Kashmir, India. A total of 100 subjects (59 males and 41 females) were registered for the study. The mean age of the subjects was 57.41±12.4 years with a male: female ratio of 1.44:1.

Deshpande JJ et al[8] from Maharashtra conducted a study on lipid profile in patients with Ischemic Stroke in Rural coastal region of Maharashtra. Average age of Patients of Stroke was 60 ± 4.56 Yrs. The male and Female ratio in both the group was comparable with each other 1.25.

Our study findings are consistent with the findings of above-mentioned authors.

Lipid comparison between diabetic and non-diabetic stroke

Mean total cholesterol in diabetic patients was 205.23±33.31 and in non-diabetic patient was 146.05±17.21 ($p<0.01$). Mean triglyceride in diabetic patients was 165±49.44 and in non-diabetic patient was 165.41±64.26 ($p>0.01$). Mean HDL in diabetic patients was 39.63±3.6 and in non-diabetic patient was 37.95±3.09 ($p<0.01$). Mean VLDL in diabetic patients was 33.15±7.62 and in non-diabetic patient was 29.10±5.11 ($p<0.01$). Mean LDL in diabetic patients was 116.71±38.23 and in non-diabetic patient was 75.25±16.17 ($p<0.01$).

Hakim Mohammad Shafi[7] in their study observed that prevalence of dyslipidemia was higher in diabetic stroke as compared to non-diabetic stroke. TG (200.23±34.22 in diabetics vs 141.05±15.11 in non-diabetics). Mean VLDL in diabetic patients was 35.15±6.3 and in non-diabetic patient was 29.00±3.91 ($p<0.01$).

Onkar Nath Rai et al[9] reported abnormal lipid values in 54 patients. Out of which increased non-HDL cholesterol was found in 53% patients. Increased LDL cholesterol was found in 35%

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patients followed by increased triglycerides in 34% patients. Increased total cholesterol was present in 30 patients.

Gupta R et al[10] reported that mean levels of lipids were significantly higher in diabetic strokes as compared to non-diabetic strokes in their study

Conclusion

Mean values of lipid parameters like total cholesterol, LDL and VLDL were significantly elevated in diabetic stroke as compared to non-diabetic stroke patients in our study ($p<0.05$).

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