

## Original Research Article

**Association of Lipid Profile in Patients with Acute Ischemic Stroke****Dr. Tavish Arora<sup>1</sup>, Dr. P.G. Mantur<sup>2</sup>, Dr. R.C. Bidri<sup>3</sup>, Dr. M.S. Mulimani<sup>4</sup>**<sup>1</sup>Post Graduate, Department of Medicine, Shri B. M. Patil Medical College Hospital & Research Centre, Vijayapur, Karnataka, India<sup>2</sup>Associate Professor, Department of Medicine, Shri B. M. Patil Medical College Hospital & Research Centre, Vijayapur, Karnataka, India<sup>3</sup>Professor, Department of Medicine, Shri B. M. Patil Medical College Hospital & Research Centre, Vijayapur, Karnataka, India<sup>4</sup>Professor and Head, Department of Medicine, Shri B. M. Patil Medical College Hospital & Research Centre, Vijayapur, Karnataka, India**\*Corresponding author**

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**Abstract:** The aim was to study the association between lipid profile and acute ischemic stroke. 60 patients of acute ischemic stroke were included in the study. The blood samples were taken and CT/MRI brain as appropriate was done on admission. Out of 60 patients 43 were males and 17 were females. In the study group 81.7% of patients had abnormal lipid profile. This study shows that abnormal lipid profile is strongly associated with risk for developing acute ischemic stroke and proper measures taken to modify it can lead to better prognosis as it is a modifiable risk factor.

**Keywords:** Acute ischemic stroke, Lipid profile

**INTRODUCTION**

A stroke or cerebrovascular accident is defined as an abrupt onset of a neurological deficit that is attributable to a focal vascular cause. A definition of stroke is clinical and laboratory studies including brain imaging are used to support the diagnosis. The clinical manifestations of stroke are highly variable because of the complex anatomy of the brain and its vasculature. Cerebral ischemia is caused by reduction in blood flow that last longer than several seconds [1].

Stroke is the second leading cause of death worldwide and it is also one of the leading causes of adult disability [2]. Numerous risk factors are involved in the development of stroke such as hypertension, smoking and diabetes mellitus. Dyslipidemia has been reported to be an independent predictor of stroke.

Several evidences have contributed to our current understanding of the relationship between increase in plasma cholesterol and development of atherosclerosis. Premature atherosclerosis results from

high cholesterol levels, even in the absence of other cardiovascular risk factors.

The onset of atherosclerosis occurs early in life with diffuse regular thickening of the arterial intima in childhood. The smooth appearance of the arterial tree is usually lost during the teenage years with formation of nodular aggregates or cushions of fibro-elastic tissue, termed fatty streaks [3].

Fatty streaks are collections of lipid, mainly cholesterol esters in macrophages and smooth muscle cells deposited in the intima of the artery. These fatty streaks are the precursors of the hallmark of atherosclerosis, the fibrous atheromatous plaque. The fibrous plaques are white lesions that usually protrude into the vessel lumen and consist of a core of cholesterol, cholesterol ester, phospholipid and necrotic cells covered by a fibrous cap of elastin and collagen. There is also proliferation of the smooth muscle cells into the media. Another important component is the foam cells, which contain a large quantity of lipid [4].

Hypertriglyceridemia also maybe a marker of an individual with a genetic defect of lipoprotein metabolism, such as accumulation of VLDL remnants which are associated with premature atherosclerosis.

An important factor for the development of atheromatous plaques is oxidized LDL, which causes increased chemotaxis of monocytes, and increased uptake of oxidized LDL by macrophages [5].

**AIM AND OBJECTIVES**

To study the association of lipid profile in patients with acute ischemic stroke.

**METHODOLOGY**

**Source of Data**

The materials for the study were collected from patients who attended the Outpatient and Inpatient department in Shri B.M. Patil Medical College Hospital and Research Centre, Vijayapur from January 2015 to June 2016.

**Method of collection of data**

- a. By detail history
- b. By detail examination
- c. By relevant investigations like CBC, RBS, Blood urea, Serum creatinine, Lipid profile, Urine routine, Chest X-ray, ECG, CT/ MRI brain as appropriate.

**Inclusion criteria**

All patients with acute ischemic stroke identified based on clinical as well as laboratory and radiological evaluation (including CT/MRI) admitted in our hospital were included in the study.

**Exclusion criteria**

The patients with any underlying diseases especially liver disease, familial hypercholesterolemia and hypothyroidism, taking hypolipidemic and sympathomimetic drugs, and the patients in whom the cerebral hemorrhage was secondary to cerebral tumor, trauma or previous coagulation disorders were excluded from the study.

**Statistical Analysis**

All characteristics were summarized descriptively. For continuous variables, the summary statistics of N, mean, standard deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries. Chi-square ( $\chi^2$ )/Fisher exact test was employed to determine the significance of differences between groups for categorical data. The difference of the means of analysis variables was tested with the unpaired t-test. If the p-value was < 0.05, then the results will be considered to be significant. Data were analyzed using SPSS software v.23.0.

**RESULTS**

In the present study, 60 patients of acute ischemic stroke were included. Out of which 43 were males and 17 were females. Dyslipidemia was observed in 81.7% of patients.

Table 1 and figure 1 shows lipid profile according to age and dyslipidemia was predominant in age group between 56 – 70 years. P value <0.05 was considered significant.

**Table 1: Dyslipidemia and Age**

Age(Yrs)	Dyslipidemia		Normal		p value
	N	%	N	%	
25-40	4	8.2%	2	18.2%	0.513
41-55	8	16.3%	2	18.2%	
56-70	29	59.2%	3	27.3%	
71-85	7	14.3%	3	27.3%	
>85	1	2.0%	1	9.1%	
Total	49	100.0%	11	100.0%	

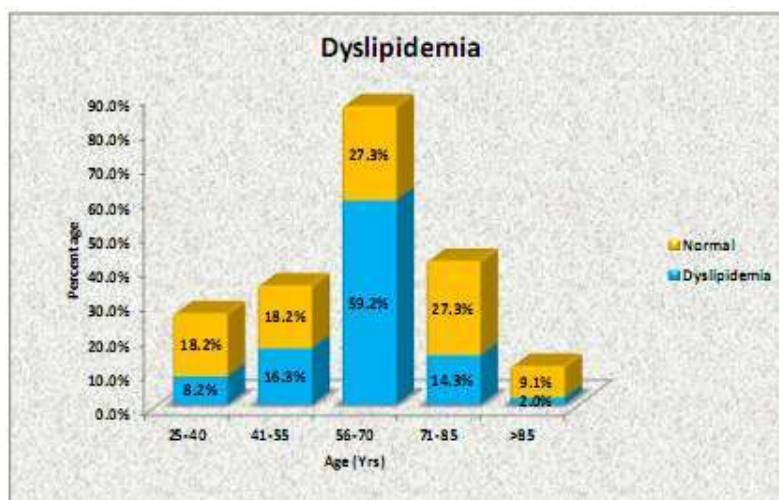


Fig-1: Dyslipidemia and Age

Table 2 and figure 2 shows lipid profile according to sex and dyslipidemia was predominantly

seen in males than females. P value <0.05 was considered significant.

Table 2: Dyslipidemia and Sex

Sex	Dyslipidemia		Normal		p value
	N	%	N	%	
Male	36	73.5%	7	63.6%	0.299
Female	13	26.5%	4	36.4%	
Total	49	100.0%	11	100.0%	

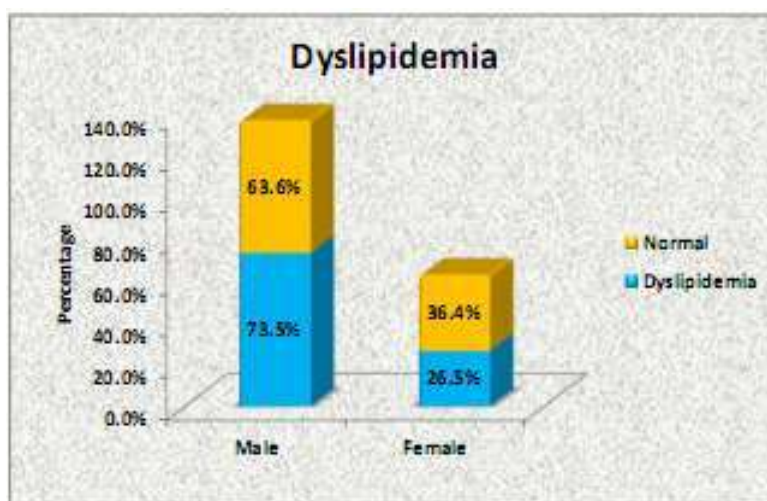


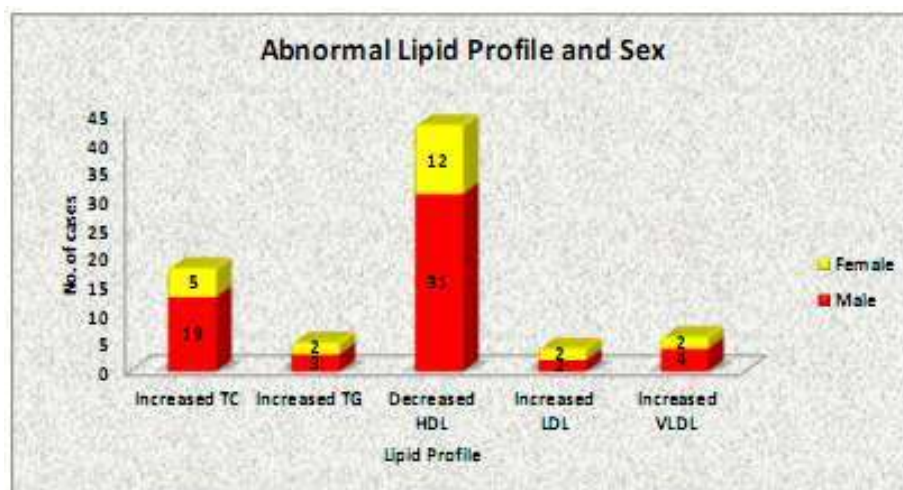
Fig-2: Dyslipidemia and Sex

Table 3 and figure 3 shows individual lipid parameter according to sex. Decreased HDL is seen predominantly followed by increased total cholesterol,

increased VLDL, increased triglycerides and increased LDL respectively. P value <0.05 was considered significant.

**Table 3: Abnormal Lipid Profile and Sex**

Lipid Profile	Male		Female		Total	p value
	N	%	N	%		
Increased TC	13	72.2%	5	27.8%	18	0.95
Increased TG	3	60.0%	2	40.0%	5	0.545
Decreased HDL	31	72.1%	12	27.9%	43	0.907
Increased LDL	2	50.0%	2	50.0%	4	0.320
Increased VLDL	4	66.7%	2	33.3%	6	0.774



**Fig-3: Abnormal Lipid Profile and Sex**

**DISCUSSION**

Stroke continues to have a great impact on public health. Stroke is frequent, recurring, and is more often disabling than fatal. Although some determinants of stroke, such as age, gender, race, ethnicity and heredity cannot be modified, they are risk markers. However controlling the more important modifiable factors like lipid levels may reduce the incidence of the disease [6].

In the present study dyslipidemia was seen in 49 (81.7%) patients (Males were 36 and females were 13). It was predominant in the age group between 56-70 years.

Albucher J.F concluded that low HDL cholesterol was the only serum lipid index to be associated to an increased risk of stroke in the population as seen in our study [7].

In another study done by Siddeswari R concluded that low HDL level as a risk factor for acute ischemic stroke. The similar results were seen in our study [8].

Baluch U studied 53 patients of which 32 were males and 21 were females. 28% of patients were in age group of 61-70 years. 19% patient had dyslipidemia of them, 18% had low HDL, while high LDL, cholesterol and triglycerides were observed in 26%, 24% and 32% respectively [9].

**CONCLUSION**

The study concludes than dyslipidemia can lead to acute ischemic stroke and it is a modifiable risk factor. Hence proper measures taken to improve abnormal lipid profile can lead to better prognosis and can prevent future stroke.

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