



## THE STUDY OF SERUM LIPID PROFILE IN STROKE PATIENTS IN RURAL EASTERN AREA OF BIHAR, INDIA.

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**ABSTRACT** **BACKGROUND:** Stroke is one of the leading causes of death and disability worldwide. It is a serious life threatening condition which continues to be a major public health problem leading to death and severe neurological disability. Dyslipidaemia refers to the presence of abnormal levels of lipids or lipoproteins in the blood. Dyslipidaemia is a major risk factor for cerebral infarction.

**AIMS AND OBJECTIVE:** This study was undertaken to establish the role of serum lipid profile in patients of stroke in eastern area of Bihar. Therefore this study was designed to find out the patterns of dyslipidaemia in cases of acute ischaemic stroke and its relation to age and sex.

**METHODS AND MATERIALS:** The study involved 140 patients of stroke who were admitted in Lord Budha Koshi Medical College, Saharsa, Bihar, from December 2014 to February 2016. The patients were classified as having ischemic or hemorrhagic stroke definitive on the basis of CT scan of head (plain and contrast) and Lipid profile estimation. Lipid profile data for a total of 140 patients with Ischaemic Stroke were collected from patients admitted into the medical ward was determined. The lipid profile of the study sample was analyzed according to the ATP III classification for identification of dyslipidaemia.

**RESULT:** In our study, we observe dyslipidaemia in 35.8% of the patients which constituting the risk factors in our ischaemic stroke. Furthermore the patterns of dyslipidaemia seen showed a high TC-31 %, LDL-13%, TG43% and low HDL-33% among the patients. The overall mean age of patient is 59.9±13.1 years, but mean age for male is 58.9±11.6 years, while female is 61.0±14.7 years. Out of 140 patients 46 had hemorrhagic stroke and 54 had Ischemic stroke. Abnormal lipid values were found in 54 patients.

**CONCLUSION:** Regular monitor of lipid profile among stroke patients may decrease the risk of atherosclerosis and cardiovascular disease among the stroke patients.

**KEYWORDS :** Lipid profile, Stroke, Rural area.

### INTRODUCTION:

The relation between serum lipids and ischaemic stroke remains controversial. Studies of lipid related risk factors in cerebrovascular disease have varied greatly in their findings and also in their definition of the cerebrovascular end points. Serum lipids are thought to interact with the pathogenesis of stroke through an atherosclerosis mechanism. Stroke in young patients have been shown to be related to non-atherosclerotic causes most of the time. Stroke is an important cause of disability among adults and is one of the leading causes of death worldwide [1]. A stroke, or cerebrovascular accident, is defined by the abrupt onset of a neurologic deficit that is attributable to a focal vascular cause [2]. Serum lipid levels have an established effect on short term mortality due to strokes. It is important to evaluate the serum lipid levels in both the types of strokes to guide lipid lowering therapy which can reduce incidence of stroke and related mortality by adapting primary and secondary preventive measures among the stroke patients [3, 4]. There is paucity of information on stroke especially in this part of India. Therefore, this study was undertaken to establish the role of serum lipid profile in patients of stroke in Northern India.

### AIMS AND OBJECTIVE:

1. To establish the role of serum lipid profile in patients of stroke.
2. To find out the patterns of dyslipidaemia in cases of acute ischaemic stroke and its relation to age and sex. The aim was to determine the serum lipid profile and the vascular risk factors for ischaemic stroke in a series of patients under 45 with an ischaemic stroke and to compare them with a series of controls of the same age.

### MATERIAL AND METHODS:

This one-year three months observational study involved all the patients with a definite diagnosis of stroke (acute cerebrovascular disease) admitted to the medical ward of General Medicine department at Lord Budha Koshi Medical College, Saharsa, Bihar. Ischaemic stroke was confirmed clinically using WHO criteria and radiologically by cranial computed tomography scan or MRI were included in this study. All patients had full clinical assessment and investigations. Lipid profile data for a total of 140 patients with Ischaemic Stroke were collected from patients Serum Lipid Profile of Patients with Ischaemic Stroke. The lipid profile of the study sample was analyzed according to

the ATP III classification for identification of dyslipidemia.

Prior permission from the institutional ethical committee was taken. Acute cerebrovascular disease was defined as "a stroke or cerebrovascular accident with rapidly developing clinical symptoms and signs of focal, and at the global loss of cerebral function with symptoms or leading to death, with no apparent cause other than that of vascular origin". The patients were classified as having ischemic or hemorrhagic stroke definitive on the basis of CT scan of head (plain and contrast). Lipid profile estimation: the percentage of abnormal lipid value (total cholesterol 200 mg/dl, triglycerides > 150 mg/dl, non-HDL cholesterol > 130 mg/dl and LDL cholesterol was taken abnormal according to NCEP ATP III.

### SELECTION CRITERIA:

**Inclusion Criteria:** Patients having age between 20-85 years of either sex with clinical finding (brain CT/MRI) of CVA were included in the present study.

**Exclusion criteria:** Patients with head injury, primary or secondary brain tumor, Patients with liver disease, familial hypercholesterolemia, taking anti lipid and sympatho mimetic drugs, transient ischemic attack (TIA) neurological symptoms recovered within 24 hours, secondary to cerebral tumor, trauma or previous coagulation disorder, not giving inform consent, pre-existing thyroid disorder and patient on thyroxin therapy and pregnancy and postpartum hypothyroidism were excluded from the study.

### STATISTICAL ANALYSIS:

All the data were analyzed using IBM SPSS- VER.20 software. Analysis was performed using chi-square test and independent sample student t test P values. Statistical significance by calculating the probability by using the percentage difference between the data and the standard error was calculated.

### RESULT:

The study dealt with 100 patients of stroke who were admitted in Lord Budha Koshi Medical College, Saharsa, Bihar, from December 2014 to February 2016.

**Table 1: Age and sex distribution of stroke patients.**

Age group (Yrs.)	Sex Number (%)		
	Female	Male	Total
30-39	4	2	6
40-49	9	12	21
50-59	22	27	49
60-69	9	19	28
70-79	9	9	18
80-89	10	5	15
>90	2	1	3
Total	65	75	140

The age distribution of patients were not normally distributed Shapiro-Wilks ( $W=0.97$ ,  $p = 0.009$ ). The overall mean age of patient is  $59.9 \pm 13.1$  years, but mean age for male is  $58.9 \pm 11.6$  years, while female is  $61.0 \pm 14.7$  year.

**Lipid Profile:**

The general distributions of lipid profile parameters are not normal (Shapiro-Wilks  $p < 0.05$ ). The lipid profile parameters TC ranged between 2.0 and 9.8 mmol/L, LDL ranged between 0.29 and 5.10 mmol/L, HDL ranged between 0.21 and 3.6 mmol/L, and TRIG ranged between 0.2 and 7.0 mmol/L. The mean concentrations are  $TC = 4.65 \pm 1.32$  mmol/L,  $LDL = 1.54 \pm 0.95$  mmol/L,  $HDL = 1.37 \pm 0.63$  mmol/L and  $TRIG = 2.27 \pm 1.27$  mmol/L. Lipid profile parameters in patients with Ischaemic stroke TC = Total cholesterol, LDL = Low density lipid, HDL = High density lipid, TRIG = Triglyceride Overall dyslipidaemia was seen in 35.8% of patients. Thirty-one percent of the patients had high TC, with more female patients (17%) contributing more than the male patients (14%). Forty three percent 43% of the total patients had elevated TG level, in which more male patients (24%) contributed than the female patients (21%). Thirty-three percent of the patients had low HDL and similarly, male patients (21%) contributed more than the female patients (12%). Thirteen percent of the patients had elevated LDL with 6.5% each of both male and female patients.

**Table-2: Site of hemorrhagic stroke according to CT scan head**

Site of lesion	No. of patients (%)
Putamen	13 (13.0)
Temporoparietal	08 (08.0)
Brain stem	04 (04.0)
Thalamus	04 (04.0)
Cerebellar	02 (02.0)
Frontoparietal	02 (02.0)
Frontal	01 (01.0)
Parietal	01 (01.0)
Temporal	01 (01.0)
Multiple site	10 (10.0)
Total	46 (46.0)

Table 2 shows in total 46% patients' hemorrhagic stroke were found. Put a men was the most common site (13%) followed by multiple site involvement (10%) and temporoparietal region (8%).

**Table-3: Site of ischaemic stroke**

Site (According to artery involved)	No. of Patients (%)
Medial cerebral artery	38 (38.0)
Vertebrobasilar artery	14 (14.0)
Internal carotid artery	02 (02.0)
Total	54 (54.0)

Table -3 shows most common site involved was along the MCA distribution (38%) followed by vertebra basilar artery (14%). Internal carotid artery involved in only 2% of patients. Thus, total number of patients of ischemic stroke was 54 (54%).

**Table-4: Outcome of stroke patients during hospitalization.**

Outcome (Results)	No. of Patients (%)
Died	21 (21.0)
LAMA	04 (04.0)
DISCHARGE WITH STATUS	
DOPR	10 (10.0)
Dependent	43 (43.0)
Independent	12 (12.0)
Total	100 (100.0)

Majority of patients was discharged with status of dependent on others (43%) followed by death (21%). Patient discharged independently and on personal request was 12% and 10% respectively. Four percent patients left ward against medical advice (LAMA).

**DISCUSSION:**

Stroke is a clinical syndrome characterized by rapidly developing symptoms and/or signs of focal and at times global (for patients in coma) loss of cerebral functions, with symptoms lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin [5]. Age is an important risk factor for stroke. The mean age of stroke onset in India (i.e. 63 years) [6]. Cerebral atherosclerosis with atheroma formation is the basic underlying patho-physiologic mechanism in ischemic stroke [7]. Out of 100 patients 46 had hemorrhagic stroke and 54 had ischemic stroke in present study. This is comparable to the study conducted by Sreenivasulu et al, where out of 100 cases 84 patients were Ischemic stroke and 16 patients were hemorrhagic stroke. In this study increased total cholesterol was present in 30 patients. Similar prevalence (34%) of hypercholesteremia was reported by Sreenivasulu et al [8]. Total cholesterol was abnormal in 83% of ischemic stroke and 17% of hemorrhagic stroke. This is comparable to study by Sreenivasulu et al, where elevated total cholesterol was seen in 34.5% of patients with Ischemic stroke and 31.2% of patients in Haemorrhagic stroke [8]. Qizilbash et al concluded that there was a significant association between serum lipid profile and prevalence of stroke [9] Tanveer et al, proved that hyperlipidemia was present in 16% patients of stroke [10]. In a study by Siddeswari et al, dyslipidemia in stroke patients was 14% [11]. Most of the patients were having low HDL (<40) which is a risk factor for stroke. The mean TC and LDL-C levels were significantly much higher in the ischemic stroke patients when compared to patients with haemorrhagic stroke by Gnanamoorthy K et al, (183.7±34.5 versus 148.5±30.6 and 118.7±26.7 versus 81.4±22.0) [12]. This is similar to the present study results. Dyslipidemia is a primary major risk factor for coronary artery disease (CAD) and ischemic stroke. It causes insulin resistance which results in increased levels of plasma triglycerides and low-density lipoprotein cholesterol (LDL-C) and a decreased concentration of HDL-C, as an important risk factor for peripheral vascular disease, stroke, and CAD [13,14]. Current guidelines of the American heart association and proposed modifications of the NCEP-III guidelines suggest that all patients at risk for stroke or who have had a cerebral infarction should be treated to a goal LDL level of below 70 mg/dL [15, 16].

**CONCLUSION:**

Current study shows lipid abnormalities among stroke patients attending a north Indian tertiary care hospital. Further large-scale studies are needed in the Indian population to find out the magnitude of this problem of dyslipidemia in patients with ischemic and hemorrhagic stroke. Regular monitor of lipid profile among stroke patients may decrease the risk of atherosclerosis and cardiovascular disease among the stroke patients.

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