

Hospital Based Cross-Sectional Assessment of Lipid Profile in Non-Diabetics with Stroke

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Abstract

Aim: To study serum lipid profile in patients with stroke and to determine significant correlation between them.

Methodology: A type of observational, cross-sectional study was conducted on 100 non-diabetic stroke patients after obtaining informed consent. This is a cross-sectional study conducted in Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India. Detailed history, clinical examination, radiological examination, serum total cholesterol, LDL, VLDL, HDL, triglycerides were estimated by enzymatic method.

Results: Out of 100 enrolled patients, 46 were males with mean age of 64.74 ± 17.34 years and 54 were females with mean age of 58.56 ± 14.67 years. 72 patients had ischemic stroke, while 28 patients had hemorrhagic stroke. There was no significant relationship found in the levels of total glycerides (P value= 0.548), but there was a significant relationship (P-value < 0.05) in other parameters like total cholesterol (TC) (P-value=0.008), LDL-C (P-value=0.03), and HDL-C (P-value=0.01).

Conclusion: There was a significant relationship between gender and serum lipid profile. There is a definite increase in serum total cholesterol, Low density lipoproteins while decrease in high density lipoproteins in non-diabetic stroke patients when compared to control groups. The serum levels of lipid profile parameters were higher in women than men. In order to validate our findings, a larger number of samples and long-term assessments are necessary.

Keywords: Ischemic Stroke, Hemorrhagic Stroke, Lipoproteins.

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Introduction

Stroke is defined as abrupt onset of neurological deficit, which is attributable to a focal vascular cause. Stroke is a leading cause of mortality and morbidity

throughout the world. [1] Stroke or cerebro-vascular accident is broadly classified as ischemic and hemorrhagic stroke. Cerebral ischemia is due to reduced

blood flow for several second if it persists for minutes, infarct or brain tissue death occurs. Intracranial hemorrhage due to bleeding into or around the brain may produces stroke. According to the India stroke factsheet updated in 2012, the estimated age-adjusted prevalence rate for stroke ranges between 84/100,000 and 262/100,000 in rural and between 334/100,000 and 424/100,000 in urban areas.[2]

A hemorrhagic stroke is also called an intra-cerebral hemorrhage. It occurs when a blood vessel ruptures, and blood accumulates in the tissue around the rupture. This puts pressure on the brain and causes a loss of blood to the surrounding areas. An ischemic stroke happens when blood flow through the artery that supplies oxygen-rich blood to the brain becomes blocked.

Dyslipidemia is a modifiable risk factor for stroke. Aggressive management of dyslipidemia decreases the risk of stroke. Recent studies have shown that hypercholesterolemia is a moderate risk factor for stroke. [3] Elevated plasma concentrations of low-density lipoproteins (LDL) and low high-density lipoproteins (HDL) are associated with an increased risk of atherosclerosis. [3] Freiberg et al. showed that it is possible to predict mortality associated with cardiovascular diseases in the next 30 years by determining the level of cholesterol in the youth and adults. [4]

Carotid and vertebral artery atherosclerosis is associated with hypercholesterolemia patients with elevated lipid levels are at higher risk of atherothrombotic brain

infarction than those with normal values and this applies mainly to premature ischemic stroke. So, dyslipidaemia has emerged clearly as a major risk factor associated with increased risk of atherosclerosis either alone or in combination with other risk factors in young stroke patients.

Methodology:

A type of observational, cross-sectional study was conducted on 100 non-diabetic stroke patients after obtaining informed consent. This is a cross-sectional study conducted in Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India.

Inclusion criteria:

Patients with ischemic stroke or hemorrhagic stroke; and are non-diabetic.

Exclusion criteria:

Patients with diabetes mellitus, on drugs for dyslipidemia, on dietary modification for dyslipidemia, or/and having cerebral infarct associated with trauma or tumour.

Methodology

Detailed history, clinical examination, radiological examination, serum total cholesterol, LDL, VLDL, HDL, triglycerides were estimated by enzymatic method.

Results:

Out of 100 enrolled patients, 46 were males with mean age of 64.74 ± 17.34 years and 54 were females with mean age of 58.56 ± 14.67 years. 72 patients had ischemic stroke, while 28 patients had hemorrhagic stroke.

Table 1: Distribution of gender, age, and type of stroke in patients

Variable		Number (%)
Gender	Male	46 (46%)
	Female	54 (54%)
Mean age (in years)	Male	64.74 ± 17.34
	Female	58.56 ± 14.67

Stroke	Ischemic stroke	72 (72%)
	Hemorrhagic stroke	28 (28%)

After analysis of serum lipid profile of both males and females, it was found that the serum levels of these parameters were higher in women than men. There was no significant relationship found in the levels of total glycerides (P value= 0.548). but

there was a significant relationship (P-value < 0.05) in other parameters like total cholesterol (TC) (P-value=0.008), LDL-C (P-value=0.03), and HDL-C (P-value=0.01).

Table 2: Comparison of Serum Lipid Profile by Gender

Variable	Males	Females	P-value
Total glycerides (mg/dl)	122.07 ± 55.77	128.06 ± 57.38	0.548
Total cholesterol (TC) (mg/dL)	175.80 ± 43.10	192.4 ± 46.15	0.008
LDL-C (mg/dL)	115.28 ± 38.57	128.10 ± 41.21	0.03
HDL-C (mg/dL)	36.03 ± 10.17	39.90 ± 10.64	0.01

Discussion:

A stroke is a medical condition in which poor blood flow to the brain causes cell death. There are two main types of strokes: ischemic, due to lack of blood flow, and hemorrhagic, due to bleeding. [7] Both cause parts of the brain to stop functioning properly. The symptoms of a stroke can be permanent. A stroke or TIA often requires emergency care. [7]

According to our study, 54% of patients with stroke were women and 46% were men; this finding is in line with the results of a study by Iranmanesh et al. (55% women and 45% men) [8]. The mean age of stroke in the Netherlands was reported to be 73.4 years, while the mean age for men and women in Sweden was 73.1 and 79.7 years, respectively. [5] In addition, in a study by Iranmanesh et al., the average age of stroke was 70.32 and 64.25 years in women and men, respectively [6]; our results are consistent with these reports.

An ischemic stroke happens when blood flow through the artery that supplies oxygen-rich blood to the brain becomes blocked. Blood clots often cause the blockages that lead to ischemic strokes. A hemorrhagic stroke happens when an artery in the brain leaks blood or ruptures

(breaks open). The leaked blood puts too much pressure on brain cells, which damages them. High blood pressure and aneurysms—balloon-like bulges in an artery that can stretch and burst—are examples of conditions that can cause a hemorrhagic stroke. In our study, majority of the patients (72%) had ischemic stroke, while only 28% of patients had hemorrhagic stroke. In a study conducted by Virani SS et al also, most strokes (87%) were ischemic strokes. [9]

The results of the present study showed that there is a significant association between gender and serum levels of TC, LDL-C, and HDL-C in stroke patients; in other words, the serum levels of all three factors were higher in women than men. The serum level of TG and the mean age of stroke events were also higher in women, although the difference was not statistically significant. In this regard, Tohidi et al. [10] showed a gender-dependent relationship between the level of serum lipids and the incidence of IS. The findings showed that the levels of TC, LDL-C, and HDL-C in women with IS had a direct relationship with IS.

A study on lipid profile in non-diabetics with stroke done by Sridharan,[11] in 2010, showed a definite increase in serum

TC in non-diabetic stroke patients when compared to control groups. In his study, he showed that both ischemic and hemorrhagic strokes are associated with increased cholesterol levels. Mohankar et al., [12] in 1993, showed that increased LDL levels and low HDL levels were associated with atherosclerosis. Albucher et al. [13] study clearly indicated HDL cholesterol as the only lipid associated with stroke risk. He emphasized the need for the management of low HDL cholesterol in young patients regardless of atherosclerosis.

LDL-C is believed to be the most atherogenic lipoprotein. Majority of cholesterol in plasma is found in LDL-C. The present study revealed significant increase in levels of serum LDL-C in stroke patients, when compared to controls. This is in accordance with previous study by Sridharan [11], which also showed that raised levels of serum LDL cholesterol had significant risk of ischemic stroke in non-diabetics. Hachinski et al. [14] have showed positive correlation between LDL cholesterol levels and risk of stroke.

The serum triglyceride levels were significantly higher in cases of stroke patients than in controls. This observation is in full agreement with the studies conducted by Lipska et al. [15] and S. Dinesh Nayak et al. [16].

Conclusion:

There was a significant relationship between gender and serum lipid profile. There is a definite increase in serum total cholesterol, Low density lipoproteins while decrease in high density lipoproteins in non-diabetic stroke patients when compared to control groups. The serum levels of lipid profile parameters were higher in women than men. In order to validate our findings, a larger number of samples and long-term assessments are necessary.

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