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Original Research Article

Study of serum lipid profile in stroke patients in Northern India

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ABSTRACT

Background: Stroke is one of the leading causes of death and disability worldwide. This study was undertaken to establish the role of serum lipid profile in patients of stroke in Northern India.
Methods: The study involved 100 patients of stroke who were admitted to B.R.D. medical college, Gorakhpur. 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 was done.
Results: Out of 100 patients 46 had hemorrhagic stroke and 54 had Ischemic stroke. Abnormal lipid values were found in 54 patients. Total cholesterol was abnormal in 83% of ischemic stroke and 17% of hemorrhagic stroke. LDL cholesterol was abnormal in 86% of ischemic stroke and 14% of hemorrhagic stroke.
Conclusions: 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

INTRODUCTION

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

METHODS

This one-year observational study involved all the patients with a definite diagnosis of stroke (acute cerebrovascular disease) admitted to the medical ward of the Nehru hospital attached to BRD medical college, Gorakhpur. 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". Patients with head injury, primary or secondary brain tumor were excluded from the study.

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. The data were analyzed using SPSS software. Statistical significance by calculating the probability by using the percentage difference between the data and the standard error was calculated.

RESULTS

The study dealt with 100 patients of stroke who were either admitted in Nehru hospital, B.R.D. medical college Gorakhpur.

Table 1: Age and sex distribution of stroke patients.

Age (years)	Male (%)	Female (%)	Total (%)
30-40	05 (05.0)	01 (01.0)	06 (06.0)
41-50	09 (09.0)	05 (05.0)	14 (14.0)
51-60	16 (16.0)	16 (16.0)	32 (32.0)
61	29 (29.0)	19 (19.0)	48 (48.0)
Total	59 (59.0)	41 (41.0)	100 (100.0)

Table 1 show the age and sex distribution of patients. Males were (59.0%) more commonly affected with stroke as compared to females (41.0%). Maximum incidence of stroke was observed in those aged above 60 years (29%) (Table 1). Out of 100 patients 46 had hemorrhagic stroke and 54 had Ischemic stroke.

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)

In total 46% patients' hemorrhagic stroke was found. Putamen was the most common site (13%) followed by multiple site involvement (10%) and temporoparietal region (8%) (Table 2).

Table 3: Site of ischemic stroke.

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

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 (result)	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).

Table 5: Total number of patients of stroke in normal and abnormal lipid profile.

Lipid profile	No. of patients
Normal lipid values	46
Abnormal	54
Increase total cholesterol	30
Increase LDL cholesterol	35
Increase triglycerides	34
Increase non-HDL cholesterol	53

Abnormal lipid values were found in 54 patients. Out of which increased non-HDL cholesterol was found in 53% patients. Increased LDL cholesterol was found in 35% patients followed by increased triglycerides in 34% patients. Increased total cholesterol was present in 30 patients (Table 5).

Table 6: Lipid abnormalities in patients based on type of stroke.

Abnormal parameters	Total	Ischemic stroke (%)	Hemorrhagic stroke (%)	'p' value
Total cholesterol	30	25 (83.0%)	05 (17.0%)	<0.001
LDL cholesterol	35	30 (86.0%)	05 (14.0%)	<0.001
Triglycerides	34	23 (68.0%)	11 (32.0%)	<0.01
Non-HDL cholesterol	53	38 (72.0%)	15 (28.0%)	<0.01

Total cholesterol was abnormal in 83% of ischemic stroke and 17% of hemorrhagic stroke. LDL cholesterol was abnormal in 86% of ischemic stroke and 14% of hemorrhagic stroke. (Table 6).

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.[8]

In this study increased total cholesterol was present in 30 patients. Similar prevalence (34%) of hyper cholesteremia 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 haemorrhagic 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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REFERENCES

1. Bonita R, Mendis S, Truelsen T, Bogousslavsky J, Toole J, Yatsu F. The global stroke initiative. Lancet Neurol. 2004;3:391-3.
2. Powers AC. Harrison's Principles of Internal medicine, Cerebrovascular Accident. Maryland. 2012;338:2275-304.
3. Kirshner HS. Medical prevention of stroke. South Med J. 2003;96:354-8.
4. Bhalla A, Gupta OP, Gupta SB. Predicting mortality in stroke. Neurol India. 2002;50(3):279-81.
5. Banerjee TK, Das SK. Fifty years of stroke researches in India. Ann Indian Acad Neurol. 2016;19(1):1-8.
6. Wasay M, Khatri IA, Kaul S. Stroke in South Asian countries. Nat Rev Neurol. 2014;10:135-43.
7. Khan J, Attique-ur-Rehman, Ali SA, Jielani A. Frequency of hypertension in stroke patients presenting at Ayub teaching hospital. J Ayub Med Coll Abbottabad. 2006;18(1):59-61.

8. Sreenivasulu C, Bai LS, Kumar KN. Study of serum lipid profile in stroke patients, medical science. Indian J Applied Res. 2016;6(2):385-6.
9. Qizilbash N, Duffy SW, War low C, Mann J. Lipids are risk factors for ischemic stroke: overview and review. Cerebrovascular Disease. 1992;3(2):127-36.
10. Tanveer A. Localization and management in cerebrovascular accident: a comparison of clinical assessment versus CT scan (dissertation). J Coll Physician Surg Pak. 1996:5-6.
11. Siddeswari R, Sudarsi B, Abhilash T, Rao NS. A study on risk factors and lipid profile pattern in patients of stroke in Osmania general hospital, Hyderabad, India. Int J Res Med Sci. 2015;3:3337-41.
12. Gnanamoorthy K, Suthakaran PK, Rajendran K, Deepak K. Comparison of fasting lipid profile in ischemic and haemorrhagic stroke patients of a tertiary care hospital. Int J Adv Med. 2016;3:755-8.
13. Wild SH, Byrne CD, Tzoulaki I, Lee AJ, Rumley A, Lowe GD, et al. Metabolic syndrome, haemostatic and inflammatory markers, cerebrovascular and peripheral arterial disease. Edinburgh Artery Study. Atherosclerosis. 2009;203:604-9.
14. Sacco RL. Risk factors and outcomes for ischemic stroke. Neurol. 1995;45:S10.
15. Anthony S, Kim N, S. Claiborne Johnston. Neurologic complications of hypertension. eds. Aminoff's Neurology and General Medicine. 2nd ed. USA: Academic Press; 1996:1216.
16. Grundy, Sacco, Anthony S. Kim N, S. Claiborne Johnston. Neurologic complications of hypertension. In: Grundy, Sacco, Anthony S. Kim N, S. Claiborne Johnston, eds. Aminoff's Neurology and General Medicine. 2nd ed. USA: Academic Press; 1996 and 2004:1216.

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