

Original Article

**Risk factors for stroke:
Role of hyperlipidemia**

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100 consecutive cases of stroke, including 84 males and 16 females between the ages of 20 and 80 years (mean age 55.5 ± 12.7), were studied to explore the relationship of stroke with lipids in a tertiary care centre within four weeks of onset of stroke during years 1994-96. 16 cases were below 40 years of age. The lipid profiles were found abnormal in 56% of LDL/HDL Cholesterol and in 40% of Total Cholesterol/HDL Cholesterol ratios. The authors conclude that intervention to lower the levels of lipids would facilitate decreasing the incidence of stroke.

Keywords: Ischaemic stroke, haemorrhagic stroke, abnormal lipid profiles.

The relationship of atherosclerotic cerebrovascular disease and stroke has been under study especially since the strong relationship between hyperlipidemia and atherosclerotic coronary disease was brought out by Kannel et al [1]. Many studies have pointed out the role of the various constituents of lipids in stroke. Whatever the risk of lipids on stroke incidence may be, all studies point out that there is a significant decrease in the incidence of fatal stroke when active interventions were carried out to lower lipid levels through drugs or diet.

Kannel [1] in 1976 stated that in cerebral circulation the association of serum cholesterol, cholesterol rich beta lipoprotein and triglyceride rich prebeta lipoprotein can be found in men under the age 55 with accelerated atherosclerosis. Bansal et al [2] in the study of ischaemic strokes compared serum lipids and carotid angiography after 3 weeks of onset of stroke. When comparing

14 patients with abnormal angiograms to the remaining 16 patients with normal angiograms, the former group had significantly higher mean levels of total cholesterol (188 vs 168 mg%) and triglycerides (142 vs 103 mg%).

A surprisingly consistent finding has been the relationship between low total serum cholesterol and increased incidence of intracerebral haemorrhage. This was initially noticed in the Japanese population but evidence from a follow-up in the USA in people screened for MRFIT showed that this finding was not restricted only to orientals.

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Participants and methods

The study sample included 100 consecutive cases of stroke studied over a period of 2 years from 1994 to 1996 in a tertiary care hospital. The age group of the patients ranged from 20 to 80 years. The patients were questioned in details regarding the mode of onset, duration of stroke, extent of deficit, history of systemic illness, associated diseases including hypertension, diabetes, cardiac diseases, vascular diseases, smoking, alcohol, drug intake etc.

All patients who were studied, whether in-patient or out-patient, had a stroke within the preceding 4 weeks. Baseline tests included haemoglobin, blood glucose, lipid profile, renal and liver functions. Cardiac evaluation was carried out with an electrocardiogram, echocardiogram and Doppler studies when indicated.

Results

The age group of the patients ranged from 20 to 80 years. 16 of the patients were below 40 years. 84 of the patients were males and 16 were females. The mean age was 55.5±12.71 years.

Table 1: Distribution of Subjects

Age group	No. of patients	Male	Female
20-30 yrs	6	2	4
31-40 yrs	10	8	2
41-50 yrs	14	12	2
51-60 yrs	28	26	2
61-70 yrs	34	30	4
71-80 yrs	8	6	2

The commonest age incidence of stroke was in the age groups 51-70 years, more common in the males. The commonest type of stroke was ischaemic.

Table 2: Type of stroke

Type of Stroke	No. of patients
Ischaemic stroke	78
Haemorrhagic stroke	22

Table 3: Mean Cholesterol and its fractions

Type of lipid	Range mg/dl	Normal levels
Cholesterol	193.25 ± 48.93	< 200 mg/dl
LDL	130.45 ± 43.93	< 130 mg/dl
HDL	36.3 ± 6.79	> 30 mg/dl
VLDL	36.25 ± 29.99	< 30 mg/dl
Triglycerides	134.35 ± 64.25	< 150 mg/dl
Tot Chol/HDL	5.54 ± 2.16	Males < 4.97 Females < 4.44
LDL/HDL	3.79 ± 1.86	Males < 3.55 Females < 3.22

Table 4: No. of patients and type of abnormality

Lipid fraction	No. of patients
Serum cholesterol	32
HDL	20
LDL	36
VLDL	30
Triglycerides	30
Tot chol/HDL	56
LDL/HDL	40

32 patients had abnormal values of various fractions of cholesterol. 8 patients with haemorrhagic stroke had cholesterol less than 160 mg%. The other type of lipid abnormalities are shown in Table 4.

Doppler studies of extracranial carotids were done in 70 patients. Majority of patients had unilateral block and most of them had <50% stenosis. Results of Doppler studies are shown in Table-5.

Table 5: Doppler findings

Type of occlusion	No. of patients
Rt. Carotid	
< 50%	4
> 50% but < 75%	2
La. Carotid	
< 50%	8
> 50% but < 75%	4
Bilateral carotid < 50%	4

Discussion

Total serum cholesterol is significantly and independently related to the development of coronary artery disease. Serum lipids have been related to carotid artery atherosclerosis using the ultrasonographic evidence of extracranial carotid artery atherosclerosis or internal carotid artery wall thickness as an indicator of atherosclerosis.

In a study on victims of young stroke, abnormal total cholesterol/HDL cholesterol was found in 28 patients (56%) [3]. Similarly abnormal LDL cholesterol/HDL cholesterol ratio showed abnormally high values in 40% of the patients. Crause et al in 1987 reported association atherosclerosis with higher total serum cholesterol, triglyceride and low HDL cholesterol in univariate analysis and the association with atherosclerosis persisted with only low HDL cholesterol on multivariate analysis.

Harhinski et al in 1996 showed elevated LDL cholesterol and triglyceride as significant independent risk factors in patients with proven acute brain infraction.

In this study 32 of the patients had abnormal values of one or the other fractions of the lipid profile. This was only seen in ischaemic strokes. The abnormality noted in patients with haemorrhagic stroke was low cholesterol levels. There were 20 cases which were associated with extracranial carotid artery atherosclerosis and all the cases had abnormal lipid profiles.

Conclusion

This study was carried out to find out the relationship of stroke with lipid levels. Lipid profiles were abnormal in a significant number of patients with abnormal total cholesterol/HDL cholesterol ratio and LDL/HDL cholesterol in a significant number of patients (56% and 40% respectively). The mean values of cholesterol and its components were in the normal range. We conclude that abnormalities in lipid profile were seen in a significant number of patients with stroke and intervention to lower the level of lipids will go a long way in decreasing the incidence of stroke.

This study also stresses the importance of treating hyperlipidemia in otherwise healthy population of Armed Forces and Aviators to prevent cerebrovascular diseases.

References

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