

The Prevalence and Association of Dyslipidemia with the Prognosis of Patients Diagnosed with Cerebrovascular Accident: A Prospective Cross Sectional Study

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Abstract:

Background: It has been stated that lipid abnormalities are one of the risk factors for ischemic stroke. There are, however, few investigations correlating patient lipid profiles to the pattern of a stroke (hemorrhage and infarction). Incidence and association of lipid abnormalities in patients with cerebrovascular accidents (CVAs) were the focus of this investigation.

Methods: Hundred and twenty seven subjects were studied after dividing into Cases (n=102, with CVA) and Control (n=25, without CVA) in the Department of Medicine, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar from August 2019 to June 2020. Detailed history and lipid profile was recorded for each subject. Stroke pattern was analyzed using brain CT/MRI for each patient.

Results: Most of the subjects among Cases and Control belong to the age groups of 61-85 years (45.09%) followed by 41-60 years (44%) respectively. Among Cases, maximum patients were males (61.76%) whereas among Control, maximum patients were females (84%). Most of the cases were smokers (53.92%). Among smokers of Case group, infarction (55%) was more common compared to hemorrhage (51%). Dyslipidemia was more common among cases (56.86%) compared to control (28%) (p=0.009). Majority of patients (63.07%) with infarct had dyslipidemia as compared to patients with hemorrhage (45.94%). Decreased high density lipoprotein (HDL) level (74%) was the main culprit among Cases followed by decreased total cholesterol (64%). Out of 14 expired patients in Cases, 71.42% had dyslipidemia.

Conclusion: Decreased level of HDL was most commonly reported among ischemic compared to hemorrhagic stroke. Dyslipidemia was most commonly reported in patients who died because of stroke.

Keywords: Dyslipidemia, Stroke Pattern, Cerebro Vascular Accidents, Smokers.

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Introduction

A cerebrovascular accident, often known as a stroke, is characterized by quickly emerging symptoms and/or indications of localized and global loss of cerebral function that can persist for a minimum of twenty-four hours and have no apparent cause other than the vascular origin. The World Health Organization has released data showing that stroke is the second leading cause of death worldwide. [1]

As per the recent data released by American Heart Association, stroke accounts for nearly 801,000 deaths in the US. [2] Recent studies from Indian population has revealed that age-adjusted prevalence rate of stroke was between 250-350/100,000. [3] Hypertension and atrial fibrillation are the independent risk factors in the occurrence of CVA, but data of prognostic role of

abnormal lipid profile in Indian population is lacking. [4] Many previous reports have suggested the role of increased total cholesterol (TC) in the development of CVA, but role of TC along with other lipid parameter in hemorrhagic stroke is not clear. [5,6]

Hence, present study was performed to establish the relationship between abnormal lipid profile or dyslipidemia in patients with CVA in Indian population.

Material and Methods

A cross sectional prospective study was done including 102 CVA patients (Cases group) and compared with 25 age and sex matched healthy subjects (Control group, no CVA) in the Department of Medicine, Sri Krishna Medical

College and Hospital, Muzaffarpur, Bihar between August 2019 to June 2020. After taking detailed history from each patient, clinical diagnosis and laboratory investigation including lipid profile was performed on all the subjects.

Patients having age between 20-85 years of either sex with clinical finding (brain CT/MRI) of CVA were included in the present study. Patients with liver disease, familial hypercholesterolemia, taking anti lipid and sympathomimetic drugs, transient ischemic attack (TIA) neurological symptoms recovered within 24 hours, secondary to cerebral tumor, trauma or previous coagulation disorder, not giving informed consent, pre-existing thyroid disorder and patient on thyroxin therapy and pregnancy and postpartum hypothyroidism were excluded from the study.

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 <0.05 was considered to be significant.

Results

Most common age group among Cases and Control were 61-85 years [46 (45.09%)] and 41-60 years

[11 (44%)] respectively. Majority of the patients among Cases were male [63 (61.76%) whereas in Control groups most of them were female [21 (84%)]. Out of 102 CVA patients, infarction was the most common stroke pattern [65 (63.72%)] followed by hemorrhage [37 (36.27%)]. Out of 55 smokers in Case group, 36 (55%) were of infarcts and 19 (51%) were of hemorrhage, whereas among non-smokers (n=47), 29 (61.70%) were of infarcts and 18 (38.29%) were of hemorrhage (p=0.0001).

Dyslipidemia was reported in 58 (56.86%) and 7 (28%) subjects in cases and control groups respectively (p=0.009). Out of 65 infarct cases, 41 (63.07%) had dyslipidemia and among 37 hemorrhage stroke patients, 17 (45.94%) were dyslipidemic (p=0.14).

Decreased HDL level [43 (74%) in cases and 7 (100%) in Control] was the most common pattern of dyslipidemia observed in stroke followed by increase in total serum cholesterol [37(64%) in Case]. Out of 102 strokes patients, 14 (13.72%) expired and among them 10 (71.42%) had dyslipidemia.

Table 1: Pattern of lipid profile in relation to CVA type

Lipid profile pattern	Infarct (n=65)	Hemorrhage (n=37)	Total (n=102)	P value
Increased TC	27(72.97)	10 (27.02)	37 (100)	NS
Increased TG	17 (68)	8 (32)	25 (100)	NS
Decreased HDL	33 (76.74)	10 (23.25)	43 (100)	0.03

Data is expressed as no of 0patients (percentage), NS; not significant, TC; total cholesterol, TG; triglyceride; HDL; high density lipoprotein, p value of <0.05 is considered as

Discussion

Ischemic stroke is associated with significant morbidity and mortality and it is one of the four top causes of the death throughout the world. Infarction and ICH are the main reason for CVA. [7] There are multiple causes and risk factors that determine the risk of developing strokes. Abnormal lipid profile is thought to be the one of the risk factor for stroke. [6]

Togha et al enrolled 258 acute stroke patients and reported higher percentage of ischemic stroke compared to hemorrhagic patients, also most of the ischemic stroke patients were reported to have high level of TC. [7] Opposite to that in present study most of the cerebral infarct patients had decreased HDL levels. But reports of Denti et al showed higher concentration of LDL-C (100 mg/dl) level along with low HDL-C levels which were associated with higher stroke risk. [8]

Cynthia et al reported that 56% of stroke patients had dyslipidemia, which exactly matches with the present study results. Cynthia et al also highlighted that most of them had high TC and low level of HDL, which is in accordance to present study data.

[1] Study done on Tribal Population of West Bengal concluded that ischemic stroke patients had higher level of TC and lower level of HDL in comparison to haemorrhagic stroke which is what the present study has revealed. [9] Another study by Nirmala et al in Karnataka reported decreased level of HDL and VLDL among stroke patients. [10]

An international study on 94 ischemic stroke patients from France has again strengthened the findings of the present study which reported that low level of HDL cholesterol is the only serum lipid index associated with development of ischemic stroke. [11] Contrary to that Ogunrin et al did not find any significant difference in serum cholesterol, HDL-C and low density lipoprotein (LDL) levels of stroke patients compared to control but they surly reported higher level of TC among stroke patients. [12] Small sample size and cross sectional nature were the few limitation of present study; a large randomized clinical trial is required to strengthen the present study findings.

Conclusion

The findings suggest that a lower HDL level and an increase in TC may be associated with an increased

risk of both infarction and hemorrhagic strokes. Therefore, actions aimed at lowering TC and raising HDL may be helpful in lowering events and ultimately mortality.

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