

Research Article

A study on risk factors and lipid profile pattern in patients of stroke in Osmania General Hospital, Hyderabad, India

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ABSTRACT

Background: Aim of current study was to study the risk factors and dyslipidemia in 100 patients of stroke admitted in Osmania General Hospital.

Methods: This was a retrospective descriptive study, which included 100 patients of both ischemic and haemorrhagic strokes who were admitted in Osmania General Hospital. Patients on lipid lowering therapy were excluded from study. History of risk factors like hypertension, diabetes, alcohol and smoking were taken. To determine the subtype of stroke, clinical examination followed by computed tomography scan of brain was done. A serum sample after 8 hours of overnight fasting was taken and total serum cholesterol (TC), triglycerides (TG), LDL-cholesterol, VLDL-cholesterol and HDL-cholesterol was determined, using enzymatic colorimetric method.

Results: A total of 100 patients were studied. There were 72 males & 28 females. Patients with age <40 years were 4, age between 40-60 years were 63 and age >60 years were 33, with a mean age of 57.6 ± 12.15 . Out of 100 patients, 82 had ischemic stroke & 18 had hemorrhagic stroke. In this study, patients with high LDL were 21, with mean LDL of 93.28 ± 38.26 , high total cholesterol were 20, with a mean of 151.73 ± 47.65 , low HDL cholesterol in 66, with mean of 35.29 ± 11.26 , high triglycerides in 8, with a mean of 119.43 ± 58.09 . Dyslipidemia (LDL>130; TC>200; HDL<40) as per ATP III guidelines was present in 14 patients. Among 100 patients 65 had hypertension, 23 had diabetes, 15 had both diabetics and hypertension, 39 were smokers, 39 consumed alcohol and >2 risk factors were found in 23. There were 6 deaths.

Conclusions: In the present study common risk factors observed were male sex, mean age of 40-60 years and hypertension. Dyslipidemia as per ATP III guidelines was present in 14% of stroke patients. Most of the patients were having low HDL (<40 mg/dL) which is a risk factor for stroke. This study enlightens the role of HDL in development of stroke which is having a protective role in preventing stroke.

Keywords: Stroke, Risk factors, Lipid profile

INTRODUCTION

Stroke represents third most common cause of death in developed nations. For India, community surveys have shown a crude prevalence rate for 'hemiplegia' in the range of 200 per 100000 persons, nearly 1.5% of all

urban hospital admissions, 4.5% of all medical and around 20% of neurological cases

Stroke is defined as rapid onset of focal neurological deficit, resulting from diseases of the cerebral vasculature and its contents. The term 'Transient Ischemic Attacks' (TIA) implies complete recovery of such a deficit within 24 hours. Cerebral or subarachnoid haemorrhage is

consequent to rupture through some acquired or inherent weakness of the vessel wall.¹

Older age, family history of thrombotic stroke, diabetes mellitus, hypertension, tobacco smoking, abnormal blood cholesterol [particularly, low High-Density Lipoprotein (HDL) and/or high Low-Density Lipoprotein (LDL)], and other factors are either proven or probable risk factors for ischemic stroke, largely by their link to atherosclerosis.

Intra cerebral haemorrhage is the most common type of intracranial haemorrhage. It accounts for 10% of all strokes and is associated with a 50% case fatality rate. Incidence rates are particularly high in Asians and blacks. Hypertension, trauma, and cerebral amyloid angiopathy cause the majority of these haemorrhages. Advanced age and heavy alcohol consumption increase the risk, and cocaine and methamphetamine use is one of the most important causes in the young.

Identification and control of modifiable risk factors is the best strategy to reduce the burden of stroke, and the total number of strokes could be reduced substantially by these means.²

METHODS

This is a retrospective study of 100 patients who were admitted in Osmania General Hospital during last two years with stroke. All the patients who were admitted with both ischemic and hemorrhagic stroke were included in the study. A detailed history of risk factors like hypertension, diabetes, alcohol and smoking were taken. To determine the subtype of stroke, clinical examination followed by Computed Tomography scan of brain was done. A serum sample was taken after 8 hours of fasting on the next day of admission. Total serum cholesterol, triglycerides, LDL-cholesterol, VLDL cholesterol and HDL cholesterol was determined using enzymatic colorimetric method. ATP III classification was followed for dyslipidemia (Table 1).

Exclusion criteria: Patients who had Brain tumor, head trauma, previously on lipid lowering drugs, transient ischemic attack, other Cerebrovascular diseases, syncopal attacks and presumptive diagnosis of stroke with no evidence on CT.

Table 1: ATP III classification of dyslipidemia.

LDL cholesterol	Total cholesterol	HDL cholesterol
<100, Optimal		
100-129, Near optimal or above optimal	<200, Desirable	
130-159, Border line high	200-239, Border line high	Low <40
160-189, High	>200, High	High >60
>190, Very high		

RESULTS

A total of 100 patients were studied among them males were 72 and 28 were females. Patients with age <40 were 4, between 40-60 were 63 and >60 were 33 with mean age of 57.6 ± 12.15 (Table 2).

Out of 100 patients ischemic stroke was present in 82; hemorrhagic strokes in 18 (Figure 1).

The lipid abnormalities are shown in Figure 2-4. In the present study High LDL was found in 21 patients with Mean LDL: 93.28 ± 38.26 mg/dl.

High total cholesterol in 20 with a Mean (\bar{x}): 151.73 ± 47.65 mg/dl. Low HDL cholesterol in 66: Mean (\bar{x}): 35.29 ± 11.26 mg/dl. High triglycerides in 8: Mean (\bar{x}): 119.43 ± 58.095 .

Dyslipidemia (LDL >130; TC>200; HDL<40) as per ATP III guidelines was present in 14. Among 100 patients 65 had hypertension, 23 had diabetes, 15 had both diabetics and hypertension, 39 were smokers, 39 consumed alcohol and >2 risk factors were found in 23 (Table 2). There were 6 deaths.

Table 2: Showing risk factor profile.

Variable	Number (%)
Age in years	
<40	4 (4%)
40-60	63 (63%)
>60	33 (33%)
Sex	
Male	72 (72%)
Female	28 (28%)
Risk factors	
Hypertension	65 (65%)
Diabetes	23 (23%)
Both HTN and DM	15 (15%)
Smoking	39 (39%)
Alcoholism	39 (39%)
Dyslipidemia	14 (14%)

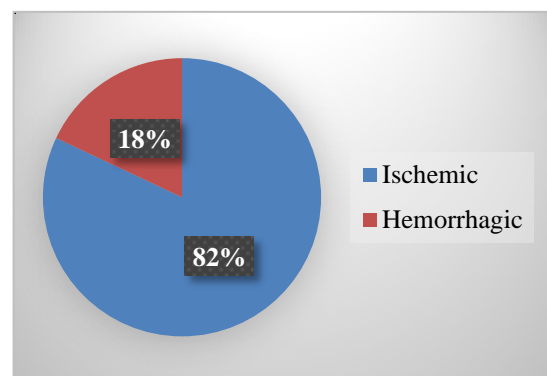


Figure 1: Types of stroke.

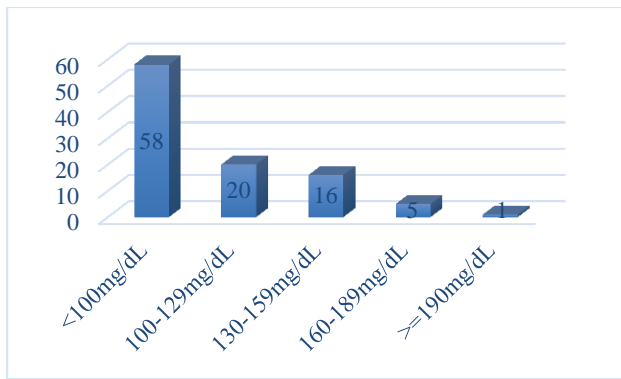


Figure 2: LDLc.

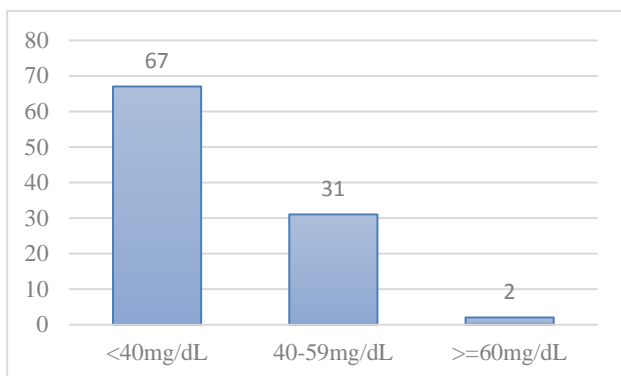


Figure 3: HDLc.

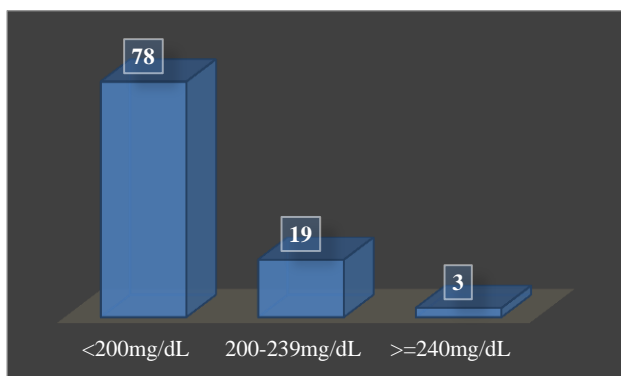


Figure 4: Total cholesterol.

DISCUSSION

In India, where ischemic stroke accounts for 80% of all strokes, 10% to 15% of strokes occur in people younger than 40 years and are mostly related to intracranial atherosclerosis. Atherosclerosis involving the large intracranial vessels causes about 8 percent of ischemic strokes.^{3,4} According to Indian council of Medical research there were 990, 985 case of stroke in India.⁵ The national commission of macro-economics and health has estimated that there will be 1.67 million stroke cases in India by 2015.⁶ Stroke is also a leading cause of morbidity with 20% of survivors requiring institutional cater after 3 months and 15-30% remaining permanently disabled.⁷

Ischemic strokes are classified by the underlying cause of the vascular occlusion. One of three main processes is usually operative: (i) atherosclerosis with superimposed thrombosis affecting large cerebral or extracerebral blood vessels, (ii) cerebral embolism, and (iii) occlusion of small cerebral vessels within the parenchyma of the brain.⁸

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,⁹ stroke, and CAD.¹⁴ Serum HDL-cholesterol has anti-atherogenic properties with ability to trigger the flux of cholesterol from peripheral cells to the liver and thus having a protective effect.^{10,11}

The second broad category consists of hemorrhage, which occurs either within the substance of the brain, intracerebral hemorrhage, or contained within the subarachnoidspaces and ventricular system, subarachnoid hemorrhage. The causes of the first category are numerous and include chronic hypertension, coagulopathies that arise endogenously or as a result of anticoagulant medications, vascular malformations of the brain, cranial trauma, and hemorrhage that occurs within the area of an ischemic stroke. Despite these valuable imaging and therapeutic advances in stroke neurology, three points should be made. First, all physicians have a role to play in the prevention of stroke by encouraging the reduction of risk factors, such as hypertension, smoking, and hyperlipidemia and the identification of signs of potential impending stroke, such as transient ischemic attacks, atrial fibrillation, and carotid artery stenosis. Second, careful clinical evaluation integrated with the newer testing methods still provides the most powerful approach to this category of disease. Finally, there has been a departure from the methodical clinicopathologic studies that have been the foundation of our understanding of cerebrovascular disease.⁸ There is a higher risk of disease in those with a history of hypertension.¹² Smoking may be the most important risk factor, with a 50 percent increase in odds of disease for every 10 years of smoking. Diabetics have about three times the risk of developing intracranial atherosclerosis. Hypercholesterolemia also increases risk, but probably to a lesser degree. Hypertension contributes to each of the major intermediate causes of both ischemic and hemorrhagic stroke including carotid stenosis, intracranial atherosclerosis, small-vessel arteriosclerosis, and both macroscopic and microscopic aneurysms.¹³ Of all the identified modifiable risk factors for stroke, hypertension appears to be the most important, owing to its high prevalence and its associated three- to fivefold increase in stroke risk.¹⁴

Lipid-modifying therapy with statins has definitively established that reduction of LDL cholesterol reduces

cardiovascular risk. Statins benefit stroke survivors as well. Lipid lowering agents may slow progression of atherosclerotic plaque growth and may possibly cause a regression in plaque formation. Current guidelines of the American Heart Association and proposed modifications of the NCEP-III guidelines would therefore 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}

In present study number of patients with age group >60 years were 33%, dyslipidemia including high TC high LDL low HDL and high TG was 14%, Hypertensives in our study were 65% diabetes was present in 38% compared to study done, by Urooj Taheed Baluch et al., Department of Medicine Pakistan Institute of Medical Sciences, Islamabad where no of patients increased as the age group increased and it was 28% in the age group of 61-70 years. 42% were hypertensive, 35% were diabetic, 19% were dyslipidemic.¹⁷

In present study number of patients with dyslipidemia including high TC high LDL low HDL and high TG was 14%, while in a study done in Denmark it was 26% and 205 in a Yugoslavian and Iranian study hypertension was present in 65% in present study compared to 30% in Denmark study, 47.9% Yugoslavia and 54% in Iran study respectively. In present study diabetes was present in 23% compared to 5.5% in Yugoslavia study, 45% in Iranian study.¹⁸

CONCLUSIONS

In our study dyslipidemia in stroke patients was 14%. Most of the patients were having low HDL (<40) which is a risk factor for stroke. Even though high LDL is a significant risk factor for stroke, this study enlightens the role of HDL in development of stroke which is having a protective role. Our study upholds the importance of life style modification to cut down the risk of development of stroke.

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Ethical approval: The study was approved by the institutional ethics committee

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