Role of Dyslipedemia as a Risk Factor in Cerebrovascular Accidents: A Study from Narayana Medical College and Hospital, Nellor

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Abstract: *Background: Aim of the present study was to study the role of dyslipidemia as a risk factor in 100 patients with cerebrovascular accident admitted in Narayana Medical college. Methods: This was a retrospective study, which included 100 patients of both ischemic and haemorrhagic strokes who were admitted in Narayana Medical College ,Nellore . Patients on lipid lowering therapy were excluded from the study. Diagnosis of cerebrovascular Accident (CVA) was made on the basis of history and neurologic examination and with the evidence of CT scan Brain. A serum sample after 12 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 cases with CVA were studied, Out of 100 cases 79 were males and 21 were females. The most common age group who suffered stroke was 50-70 years. Out of 100 patients (67%) were ischemic strokes and (33%) were hemorrhagic strokes. In this study, patients with high LDL were 07, with mean LDL of 93.28 ± 38.26, high total cholesterol were 39, with a mean of 151.73 ± 47.65, low HDL cholesterol in 50, with mean of 35.29 ± 11.26, high triglycerides in 31, with a mean of 119.43 ± 58.09. Dyslipidemia (LDL>130; TC>200; HDL<40) as per ATP III guidelines was present in 70% of the patients. Conclusions: In the present study common risk factors observed were male sex, mean age of 50-70 years . Dyslipidemia as per ATP III guidelines was present in 70% of stroke patients. Most of the patients were having low HDL (<40 mg/dL) which is a risk factor for stroke. This study also enlightens the role of low HDL in development of stroke which is having a protective role in preventing stroke.*

Keywords: Cerebrovascular Accident, Stroke, Lipid profile

1. Introduction

Cerebrovascular diseases include some of the most common and devastating disorders; ischemic stroke, hemorrhagic stroke, and cerebrovascular anomalies such as intracranial aneurysms and arteriovenous malformations (AVMs). They cause 200,000 deaths each year in the United States and are a major cause of disability. The incidence of cerebrovascular diseases increases with age, and the number if strokes are projected to increase as the orderly population grows, with a doubling in stroke deaths in the United States by 2030. A stroke, or cerebrovascular accident, is defined by this abrupt onset of a neurologic deficit that is attributable to a focal vascular cause. Thus, the definition of stroke is clinical, and laboratory studies including brain imaging are used to support the diagnosis (1).

Atheroma lies at the root of the pathogenesis of thromboembolic stroke, extending from the diseased heart, through the athermatous aorta and carotids to the intracranial circulation. It is therefore to be expected that dyslipidaemia should contribute to the constellation of risk factors for this disease. Surprisingly, this relationship is not clear-cut (2).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. (3)

As dyslipedemia is one of the important modifiable risk factor this study aims at defining the role of abnormal lipid profile in stroke.

2. Materials and Methods

This is a retrospective study done from Narayana Medical College and Hospital, Nellore. A total of 100 cases with CVA were included in the study between July 2012 and June 2013.

These 100 cases were divided into two groups.

Group 1:- Patients with ischemic stroke.
Group 2:- Patients with hemorrhagic stroke

Group 1 patients were admitted to the Narayana Medical College and Hospital with a diagnosis of ischemic stroke with focal neurological deficit. The duration of symptoms ranged from 11 days to 22 days.

Group 2 comprised of 33 patients of hemorrhagic stroke who were identified on the basis of focal neurological deficit accompanied by headache, with the evidence of CT scan Brain. The duration of symptoms ranged from 11 days to 14 days. In all cases total cholesterol, serum LDL, Cholesterol, serum HDL cholesterol, serum VLDL cholesterol and Triglycerides were estimated using enzymatic colorimetric method. Blood samples were collected from patients after overnight fast (12 hours) and 10 days after onset of neurologic deficit to cancel out any effect of stroke on lipid profile. ATP III classification was followed for dyslipidemia.(Table 1)

Exclusion criteria: Patients who were previously on lipid lowering drugs, other Cerebrovascular diseases not fulfilling the criteria of stroke were excluded.

Table 1: ATP 111 Classification of Dyslipidemia

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

3. Results

A total of 100 cases with CVA were studied, Out of 100 cases 79 were males and 21 were females. The most common age group who suffered stroke was 50-70 years. Out of 100 patients (67%) were ischemic strokes and (33%) were hemorrhagic strokes. As shown in table 2 and figure 1.

Table 2

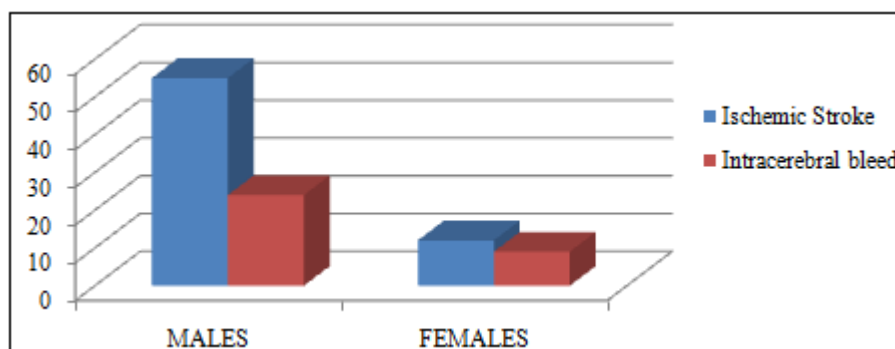| Type of CVA	Males	Females
Ischemic Stroke	55	12
Intracerebral bleed	24	9

Figure 1

Dyslipidemia (LDL>130; TC>200; HDL<40) as per ATP III guidelines was present in 70% of the patients, as shown in table 3 and figure 2.

Table 3

Lipid Profile	Total	Ischemic	Bleed
Normal	30%		
TC (>200mg/dl)	39%	29	10
TGL (>150mg/dl)	31%	21	10
HDL (<40mg/dl)	50%	32	18
LDL	7%	4	3
VLDL	7%	4	3

4. Discussion

According to Indian council of Medical research there were 990, 985 case of stroke in India. (4a) The national commission of macro-economics and health has estimated that there will be 1.67 million stroke cases in India by 2015.(4b) In India, where ischemic stroke accounts for 80% of all strokes, 10% to15% 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.(4c) Stroke is also a leading cause of morbidly with 20% of survivors requiring institutional cater after 3 months and 15-30% remaining permanently disabled.4(d)

Total and other cholesterol fractions have been clinically and pathologically associated with atherosclerotic disease of the internal carotid artery (5,6).Plausible biologic links between cholesterol levels and other stroke are aortic atheromatous disease and atherosclerosis of larger intracranial cerebral arteries. Both of these conditions have been linked to stroke (7, 8).

Higher total cholesterol levels is associated with increased risk of ischemic stroke in present study similar to D.l. Tirschwell et al study (9).

The association found in this study between low total cholesterol levels and increased risk of hemorrhagic stroke has mixed support in the literature (10,11).

Elevated triglycerides levels is association with increased risk of ischemic stroke in present study similar to D.L. Tirschwell et al study (9).

Higher HDL cholesterol levels were associated with decreased risk of ischemic stroke, especially for the atherosclerotic subtype similar to D.L. Tirschwell et al study (9).

Association of HDL cholesterol and stroke was more important in atherosclerotic stroke, (12) which our study confirms. Elevated LDL and VLDL were also associated with increased risk of ischemic stroke in present study.

5. Conclusions

In present study 70% of stroke patients had at least one abnormal value in their serum lipid profile. Most common age group that suffered from stroke was >50 years. Incidence is higher in Males compared to females. Most common type of stroke in my study was ischemic stroke. Prevalence hypercholesteremia in our study is 39%, hypertriglyceridemia is 31% and 50% of patients had HDL>40mg/dl. The most striking feature noted was a low HDL cholesterol concentration, which was presently in 50% of our patients associated with ischemic stroke. In our study 31% of patients had elevated triglycerides level indicating

that elevated triglycerides are independent risk factors for stroke. present study once again proves the importance of life style modification and role of lipid lowering agents in prevention and treatment of stroke.

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