International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Epidemiological and Clinical Characteristics of Acute Ischemic Stroke in Kanyakumari, Tamil Nadu: A Focus on Age, Gender, and Risk Factors

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Abstract: ***Introduction: India faces an increasing burden of diseases such as coronary artery disease and stroke. Another peculiarity is that the number of stroke cases in young children is higher compared to the west. There are also differences between different states of India in terms of epidemiologic and clinical features of stroke. The aim of this study was to know the status of ischemic stroke burden in Kanyakumari, a district in the state of Tamil Nadu. Materials and Methods: The study included 100 consecutive patients admitted with a diagnosis of ischemic stroke at Kanyakumari Government Medical College, Asaripallam. The study included patients older than 18 years and cases in which the diagnosis was confirmed by brain CT scan. Results: Most patients were older than 65 years (63%) and among the older 34 (54%) belonged to the age group of 65-74 years. There were more women than men in the over 65 age group. Hypertension was the commonest risk factor for stroke. In the over 65 age group, most women had high LDL cholesterol (>100 mg%) p 0.02 OR 4.7 95% CI 1.38-15.9. Conclusion: Older women have a greater predilection for stroke. Hypertension was the commonest risk factor for stroke. Elevated LDL cholesterol is seen more often in older women. Earlier interventions targeting risk factors can prevent stroke.***

Keywords: ischemic stroke, hypertension, diabetes mellitus, dyslipidemia

1. Introduction

Stroke is second leading cause of death worldwide, after acute coronary syndrome[1]. India is facing an increase in the prevalence of atherosclerotic risk factors such as diabetes, hypertension and dyslipidemia, which has contributed to the increasing burden of diseases such as coronary artery disease and stroke. Interestingly, the incidence of stroke in young children is higher compared to the west. This takes a huge toll on the Indian economy as the contribution of the youth is more important in the economy. There are documented differences in the clinical profile of stroke in India compared to other nations, such as an increased incidence of hemorrhagic stroke compared to ischemic stroke. There are also differences between different states of India considering the epidemiological and clinical features of stroke [2]. Therefore, it is important that we have data regarding the clinical profile of stroke from different parts of India.

The aim of this study was to collect information regarding the clinical profile of patients admitted with ischemic stroke at Kanyakumari State Medical College, Tamil Nadu

2. Materials and Methods

The study included 100 consecutive patients admitted with a diagnosis of ischemic stroke at Kanyakumari Government Medical College, Tamilnadu. They were patients older than 18 years included. Only cases in which the diagnosis was confirmed by CT/MRI examination of the brain were included in the study. Patients with transient ischemic attack, intracerebral hemorrhage, metabolic encephalopathy, venous infarction were excluded. The criterion for hypertension as a risk factor was documented evidence of a high blood pressure record. A patient was considered diabetic if they had a history of diabetes or a blood sugar value on admission greater than 200 mg%. A previous history of coronary heart disease was considered only if there was documentation of coronary heart disease or electrocardiographic evidence of previous ischemia or reports of a revascularization procedure. Previous stroke was considered if there was documented evidence or an imaging modality showing infarction. Total cholesterol a level of more than 200 mg%, triglycerides more than 150 mg%, LDL cholesterol more than 100 mg% and HDL cholesterol less than 40 mg% was considered abnormal. A serum creatinine greater than 1.5 mg% in men and more than 1.4 mg% in women was considered abnormal. Hemoglobin less than 12 g% in men and less than 10 g% in women was considered anemic. Statistical analysis was performed using SPSS software. Quantitative data was expressed as mean ± standard deviation. Qualitative data was expressed as percentages. Statistical tests used included the chi-square test. Continuous variables such as blood sugar, cholesterol and others were converted to dichotomous variables and the chi square test was applied to determine the significance of the association. A p value of less than 0.05 was considered significant.

3. Result

Age: The mean age of the patients in this study was 66 ± 13 years. The majority of the patients were above 65 years of age (63%) and among the elderly 34(54%) belonged to the age group of 65-74 years and 21(33 %) were in the 75-84 year agegroup and 8(13 %) were in the age group >85 years.

Table 1: Data showing age and sex wise distribution of cases

Age in years	Number (n)	Percentage (%)
<45	Total 6	6
	Male 5	83
	Female 1	17
45-64	Total 31	31
	Male 20	65
	Female 11	35
65-74	Total 34	34
	Male 14	41
	Female 20	59
75-84	Total 21	21
	Male 10	48
	Female 11	52
>85	Total 8	8
	Male 2	25
	Female 6	75

The mean age of males was 63 ±13 years while that in females was 70 ±11 years. In the age group above 65 years there were more females than males, while in the younger age group it was the males who outnumbered females p 0.02 RR 2.9 95%CI1.3-6.9

Table 2: Data on risk factors for stroke

Risk factors	Number(n)	Percentage (%)
Hypertension	84	84
Diabetes	46	46
Previous stroke	24	24
Previous coronary artery disease	13	13

The commonest risk factor for stroke was hypertension, which was equal in both the sexes and across all age groups. Among the 45 patientswith history of diabetes 19(42%) had blood sugar >200 mg%. Only 3 persons who were previously not diabetic had high blood sugar level on admission.

Table 3: Data on clinical presentation

Mode of presentation	Number(n)	Percentage (%)
Right sided weakness	44	44
Left sided weakness	27	27
Altered level of consciousness	14	14
Vomiting	4	4
Ataxia	3	3
Others (aphasia, seizures)	8	8

Majority of cases presented with right sided weakness and less cases presented with Ataxia

Table 4: Data on infarct location

Location of infarct	Number(n)	Percentage (%)
Cortex	35	35
Capsuloganglionic	40	40
Brainstem	4	4
Cerebellum	5	5
Thalamus	1	1

In 59% of cases there were lesions in multiple sites. In 21% of cases cerebral atrophy was evident on the CT scan.

Table 5: Data on biochemical parameters

Biochemical parameter	Mean value	Standard deviation
Hemoglobin	12.1 g%	2.3
Blood sugar	161 mg%	82
Creatinine	1.2 mg%	.8
Total cholesterol	201 mg%	51
LDL cholesterol	128mg%	43
Triglyceride	135 mg%	52
HDL cholesterol	46 mg%	19

Anemia was more common in females than in males LR 4.2 95% CI 1.06-17. The mean blood sugar level was 161 ± 82 mg%. Among the diabetics 42% had uncontrolled blood sugar levels (>200 mg%). The mean values of total cholesterol, LDL, triglyceride and HDL were 201 ±51 mg%, 128 ±43mg%, 135 ±52 mg% and 46 ± 19 mg% respectively.

In the age group above 65 years, majority of the females had high LDL cholesterol values (>100 mg %) p 0.02 OR 4.7 95% CI 1.38-15.9.There was no significant difference between both sexes in lipid fractions. An interesting observation was that among both sexes in the age group above 65 years more number of subjects had low triglyceride values (<150 mg%). 60% of elderly females had HDL cholesterol values >40 mg%. In the younger age group females also this difference in HDL was observed (75% had high HDL)

4. Discussion

Most of the patients in this study were elderly and most of them were in the age group of 65-74 years. The age of onset of stroke in developing countries is considered to be younger compared to developed countries [3]. According to 2015 heart disease and stroke statistics update [4] there is a decrease in the incidence of ischemic stroke in people over 60 years of age, while the incidence in the 45-59 age group remains the same. In the Bangalore studies, the mean age was 54.5 years. Our data is similar to that of Thiruvananthapuram [5] where the mean age was 67 years.

When it comes to stroke data in young individuals, there is a lack of uniformity in the selection of age criteria. The age accepted as interrupted varies from 30 to 45 years. Worldwide, the incidence of stroke in young people ranges from <5% to 20%. In the Trivandrum study (2009), the incidence of stroke in young people <40 years was 3.8%. Figures from Kolkata in 2007 showed an incidence of 8.8%. In this study, 6 patients were younger than 45 years (6%). In a recent study conducted at AIMS, the incidence in the 18-45 age group was 16.7% [6]. In terms of mean age for both sexes, our data (63 years for males and 70 years for

females) are almost similar to data from the rest of India [7], [8], [9]. Western data say the weighted average age for men was 68.6 years and 72.9 years for women [10]. Thus, overall strokes occur at a younger age in men and women in India compared to the Western world.

With advancing age, more women than men have an ischemic stroke. This observation was also made by the Calcutta study. [11] They attributed this finding to uncontrolled hypertension in women. In the Trivandrum study [5] men had a higher incidence of stroke when standardized for age. Our data on age and gender in ischemic stroke are similar to those in the 2015 US update [4].

The commonest risk factor in this study was hypertension, which was equal in both sexes and across all age groups. This has been observed by other studies from different parts of the country [12]. Hypertension affects approximately 25–40% of the Indian adult population [13].

Greater efforts should be made in the early detection and treatment of risk factors, especially hypertension, in order to reduce the incidence of stroke in our country. Early interventions are known to reduce the risk by 80% [14].

The most common mode of presentation was weakness followed by altered level of consciousness, which is consistent with observations made by other studies conducted in India [12], [9].

The most common site of lesion was the capsuloganglionic region followed by the cerebral cortex. 6% of cases were caused by cerebral infarction. Ischemia at multiple sites was demonstrated in most patients. Anemia was more common in women than men across all age groups. A total cholesterol level > 200 mg/dL and a triglyceride level > 150 mg/dL were present in 57.5% and 23.8% of patients, respectively.

Dyslipidemia as a risk factor for stroke remains controversial, as it can affect differently in various population groups [15]. Among the elderly, more women had LDL cholesterol >100 mg% than men p 0.022 OR 4.69 95% CI 4.69-15.9. In the older group, 60% and in the younger group, 75% of women had HDL cholesterol > 40 mg% p 0.4 Higher LDL levels in older women may be due to less frequent use of statins. There was no difference between men and women in the older age group for total cholesterol or triglycerides or HDL cholesterol.In the younger age group, there was no difference in the lipid profile between the two sexes. An interesting observation was that there was a tendency for high HDL cholesterol among women with ischemic stroke and a greater number of subjects with low triglycerides in older women.

5. Conclusion

Compared to the Western population, stroke occurs at an earlier age in our population. Older women have a higher risk of stroke. The most common risk factor for stroke is hypertension. High LDL cholesterol is seen more often in older women than in men. This highlights that in older people in general and in women in particular, proper control of hypertension and in older women lowering LDL cholesterol can help prevent stroke.

Funding: Nil, **Conflict of interest:** None

Permission from IEC: Yes

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