

International Journal of Biomedical Research

ISSN: 0976-9633 (Online); 2455-0566 (Print)

Journal DOI: <https://doi.org/10.7439/ijbr>

CODEN: IJBRFA

Original Research Article

Risk factors for ischaemic and intracerebral haemorrhagic stroke: A study from north eastern IndiaPatrick SR Marak¹, Bhagyabati Devi², Monaliza Lyngdoh^{*1}, Th. Suraj Singh², Preeti Jane Picardo¹ and Akash Roy¹¹Department of General Medicine, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Shillong, Meghalaya, India²Department of General Medicine, Regional Institute of Medical Science (RIMS), Imphal, Manipur 795004, India

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North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Shillong, Meghalaya, India***Article History:****Received:** 27/06/2017**Revised:** 29/06/2017**Accepted:** 29/06/2017**DOI:** <https://doi.org/10.7439/ijbr.v8i6.4255>**Abstract****Background:** Several risk factors like age, sex, hypertension, diabetes, hyperlipidaemia, smoking and alcohol intake have been previously been associated with stroke. However, differences have been postulated between the risk factors and the type of stroke**Materials and Methods:** Prospective observational study in 200 patients with stroke aged ≥ 18 years of age. Patients with meningitis, head trauma, intracranial abscess and tumour were excluded. Routine biochemical, haematological and radiological investigations were done in all cases. The qualitative variables were analysed by chi-square tests. The quantitative variables were analysed by using paired t test and a p value of less than 0.05 was taken as significant.**Results:** The mean age was 60.9 ± 12.9 years with a male to female ratio of 3.16:1. 52% of the stroke patients were haemorrhagic stroke while the rest 48 % were ischaemic stroke. The overall mean age of infarct cases was more than that of cases with haemorrhage (62.7 ± 11.8 vs 59 ± 13.6). Hypertension was found to be associated significantly higher in haemorrhagic stroke than ischaemic stroke ($p < 0.01$). Diabetes mellitus and hyperlipidaemia was significantly more common among infarct cases than haemorrhagic cases ($p < 0.01$)**Conclusion:** Overall mean age is higher in ischaemic stroke than haemorrhagic stroke. Hypertension was more commonly associated with haemorrhagic stroke while diabetes mellitus and dyslipidaemia were more commonly associated ischaemic strokes.**Keywords:** Cerebrovascular accident, risk factors, ischaemia, haemorrhage.**1. Introduction**

Cerebrovascular accidents constitute the second most common cause of death worldwide, and also the foremost cause of acquired disability in adults in most regions of the world [1]. Studies have reported that low to middle income countries account for more than 85% of stroke mortality globally, but data are to identify the risk factors for stroke in most of these regions is limited [1,2]

The risk factors of stroke are multi-factorial and several risk factors like age, sex, hypertension, diabetes,

hyperlipidaemia, smoking and alcohol intake have been previously studied and linked to the causation of stroke [3,4] However, their relative contribution in the development and outcome of stroke has been variably reported in different studies [4]. Furthermore, previous studies have noted differences between the risk factors and the type of stroke [5].

In this background this study was conducted in a tertiary care centre in north eastern India to evaluate the risk

factors of stroke and to determine its relation with different types of stroke.

2. Materials and Methods

Hospital based prospective observational study in 200 patients aged ≥ 18 years of age admitted to a tertiary centre in north eastern India between October 2013 to September 2015.

2.1 Inclusion criteria

All patients aged ≥ 18 years with the diagnosis of stroke were considered as cases

2.2 Exclusion criteria

Patients with meningitis, head trauma, intracranial abscess and tumour.

Through history was taken for each patient and systemic examination was done. All patients who presented with sudden onset focal neurological deficit were subjected to routine investigation that included complete blood count, blood sugar, renal function, liver function test, routine urine examination, coagulogram, viral markers, VDRL test, lipid profile ECG, echocardiography and CT scan brain. The Modified Rankin Scale (mRS) was used for the grading of disability after stroke. Informed consent and institutional ethical clearance was obtained prior to commencement of the study.

2.3 Statistical analysis

The statistical analysis was performed using SPSS version 20. The qualitative variables were analysed by chi-square tests. The quantitative variables were analysed by using paired t test and a p value of less than 0.05 was taken as significant.

3. Results

Stroke cases occur mostly in age above 60 years (49%) there was an increased in the number of stroke cases with age. The mean age of the patients with stroke was 60.9 ± 12.9 years. Of the cases with stroke there were 152 males and 48 females with a male to female ratio of 3.16:1. The age distribution of the subjects is shown in Table 1. 52% of the stroke patients were haemorrhagic stroke while the rest 48 % were ischaemic stroke.

Commonest age for those with infarct was above 60 years of age while for those with haemorrhage it was lower (41-50 and 51-60) years with a statistically significant difference. ($p < 0.05$). The overall mean age of infarct cases was more than that of cases with haemorrhage (62.7 ± 11.8 vs 59 ± 13.6) (Table 2)

On analysing the risk of stroke with history of smoking and alcohol consumption with the type of stroke we did not find any statistically significant difference between the two types of stroke (Table 3 and 4).

Hypertension was found to be associated significantly higher in haemorrhagic stroke than ischaemic stroke ($p < 0.01$) stroke (Table 5). Diabetes mellitus was significantly more common among infarct cases than haemorrhagic cases ($p < 0.01$) (Table 6) Hyperlipidemia was more common in patients with infarct in comparison to those with haemorrhagic stroke ($p < 0.05$) (Table 7). All deaths were in patients with haemorrhagic stroke thus giving a statistically significant difference in mortality between haemorrhagic and ischaemic stroke ($p < 0.05$) (Table 8).

Table 1: Showing age distributions of patients with stroke

Age in years	Cases
21-30*	0 (0.0)
31-40*	14 (7.0)
41-50	30 (15.0)
51-60	58 (29.0)
>60	98 (49.0)
Total	200 (100.0)

Table 2: Relation between age and type of stroke

Age in years	Type of stroke		Total	Chi-square test
	Infarct	Haemorrhage		
30-40	4 (28.6)	10 (71.4)	14 (100.0)	Value=10.25 p-0.001
41-50	12 (40.0)	18 (60.0)	30 (100.0)	
51-60	22 (37.9)	36 (62.1)	58 (100.0)	
>60	58 (59.2)	40 (40.8)	98 (100.0)	
Total	96 (48.0)	104 (52.0)	200 (100.0)	
Mean \pm SD	62.7\pm11.8	59 \pm 13.6		t-test t=3.569 p-0.049

Table 3: Relation between smoking and type of stroke

Smoking	Type of stroke		Total	Chi-square test
	Infarct	Haemorrhage		
Non-smoker	48 (48.9)	50 (51.1)	98 (100.0)	Value=3.1 p-0.377
Smoker	48 (47.0)	54 (53.0)	102 (100.0)	
Remote	26 (56.5)	20 (43.5)	46 (100.0)	
Recent	22 (39.3)	34 (60.7)	56 (100.0)	

Table 4: Relation between alcohol consumption and type of stroke

Alcohol	Type of stroke		Total	Chi-square test
	Infarct	Haemorrhage		
Never drank	56 (53.8)	48 (46.2)	104 (100.0)	Value=3.40 p-0.18
Ex-drinker	26 (39.4)	40 (60.6)	66 (100.0)	
Current drinker	14 (46.6)	16 (53.3)	30 (100.0)	
Light	8 (66.7)	4 (33.3)	12 (100.0)	
Moderate	4 (50.0)	4 (50.0)	8 (100.0)	
Heavy	2 (20.0)	8 (80.0)	10 (100.0)	

Table 5: Relation between hypertension and type of stroke

Hypertension	Type of stroke		Total	Chi-square test
	Infarct	Haemorrhage		
Normotensive	48 (70.6)	20 (29.4)	58 (100.0)	Value=22.7 P=<0.01
Hypertensive	48 (36.4)	84 (63.6)	132 (100.0)	
Untreated	44 (38.6)	70 (61.4)	114 (100.0)	
Treated	4 (22.4)	14 (77.8)	18 (100.0)	

Table 6: Relation between diabetes mellitus and type of stroke

Diabetes mellitus	Type of stroke		Total	Chi-square test
	Infarct	Haemorrhage		
Yes	30(78.9)	8 (21.1)	38 (100.0)	Value=18.0 P<0.01
No	66(40.7)	96 (59.3)	162(100.0)	

Table 7: Relation between presence of hyperlipidemia and type of stroke

Hyperlipidemia	Type of stroke		Total	Chi-square test
	Infarct	Haemorrhage		
Yes	32 (69.6)	14 (30.4)	46 (100.0)	Value=11.4 p=0.001
No	63 (41.2)	90 (58.8)	153 (100.0)	

Table 8: Relation between mortality and type of stroke

Mortality	Type of stroke		Total	Fisher exact test
	Infarct	Haemorrhage		
Yes	0 (0.0)	14 (100.0)	14 (100.0)	Value=14.19 p=0.000
No	96(52.3)	90 (47.7)	186(100.0)	

4. Discussion

Most of the cases of stroke in our study were above 60 years (49%) there was an increased in the number of stroke cases with age as well as a male preponderance. Commonest age for those with infarct was above 60 years of age while for those with haemorrhage it was comparatively lower (41-50 and 51-60). Previous studies have shown similar results as our findings [6]. Recently, it has been reported there is a progressive decline in the incidence of ischemic stroke in people who are above 60 years while incidence remains static in the age group of 45-59 [7].

In our study we did not find any significant differences between the type of stroke and alcohol consumption and smoking. However observations from previous studies have noted associations between alcohol intake and type of stroke though they were not of statistical significance [8].

Hypertension was more commonly associated with haemorrhagic stroke in our study. Our findings validate previous studies which have proposed that of the risk factors that are common to both types of stroke, hypertension is much more important contributing factor in haemorrhagic stroke [3].

On the other hand diabetes mellitus and dyslipidaemia were more commonly associated ischaemic strokes. Previous studies have also shown established significantly higher association of diabetes mellitus with ischaemic stroke [9]. With regard to hypercholesterolemia and association between ischaemic and haemorrhagic stroke previous studies have recorded inconsistent results [10,11]

5. Conclusion

Stroke is more common in the elderly population with the overall mean age being higher in ischaemic stroke than haemorrhagic stroke. Hypertension was more

commonly associated with haemorrhagic stroke. Diabetes mellitus and dyslipidaemia were more commonly associated ischaemic strokes comparison to haemorrhagic stroke.

Conflict of Interest: Nil

Acknowledgment: Nil

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