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A Comparative Study on Clinical Features and Severity of Ischemic Stroke at Various Areas of Brain Using Neuro-Imaging Techniques.

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ABSTRACT

The present study was undertaken to compare the clinical features and severity of ischemic stroke affecting various areas of brain using neuro-imaging techniques. Based on our results, we conclude that there is no association between aphasia and area of brain affected and no significant association between brain area and facial palsy however the association between type of hemiplegia and brain area involved and association between severities of stroke with hemisphere affected is significant. However small sample size constrains the significance of the results. Hence we recommend further study with higher sample size and long term follow up.

Keywords: Ischeamic stroke, Neuro-imaging techniques.

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INTRODUCTION

Cerebrovascular accident or stroke is defined as an acute loss of focal and at times global (applied to patients in deep coma and those with subarachnoid haemorrhage), cerebral function the symptoms lasting for more than 24 hours or leading to death with no apparent cause other than that of vascular origin. (WHO) [1]. Stroke is a medical emergency and can cause permanent neurological damage, complications and death. A stroke, sometimes referred to as cerebrovascular accident (CVA), is the rapid loss of brain function due to disturbance in the blood supply to the brain. This can be due to ischemia (lack of blood flow) caused by blockage (thrombosis, arterial embolism), or a hemorrhage [2]. The prevalence of stroke in India was estimated at 203 for 10,000 above 20 years amounting to atotal of about 1 million cases. The male female ratio 1.7.Around 12% of all stroke occurred in population below 40 years.Upto 85% of all strokes are of ischemic origin. Cerebrovascular accident is one of the leading causes of death after heart disease and cancer in the developed countries and one of the leading causes of death in India. The exact prevalence rate of this disease in the Indian population is not known, although it accounts for about one percent of admissions to general hospital. The incidence rate and death rate from stroke increases dramatically with age. About 15 to 30% of patients die with each episode of cerebral infarction and 60 to 80 % with cerebral haemorrhage. Those who survive are usually left with permanent disability.Thus; stroke becomes a medical and social problem. Accurate and early diagnosis may improve the morbidity and mortality rates in the future are newer and more effective therapies are currently being instituted [3]. The present study was undertaken to compare the clinical features and severity of ischemic stroke affecting various areas of brain using neuro-imaging techniques.

MATERIALS AND METHODS

The present study has been approved by institute ethics committee for human studies. A total of 50 patients admitted in Stroke ICU, Little Flower Hospital, Angamaly, were included in the study, after explaining the study to the participants, written informed assent from the participants was obtained.

Inclusion criteria

- Ischemic stroke patients admitted to stroke ICU.

Exclusion criteria

- Patients who are not undergoing neuroimaging.
- Negative scan in spite of stroke.
- Patients with Transient Ischemic Attack (TIA) and cerebral haemorrhage

TOOL

Tool 1: Sociodemographic proforma include age, sex, clinical features of the patients admitted in stroke ICU Little Flower hospital Angamaly.

Tool 2:The National Institute of Health Stroke Scale (NIHSS) is a 42 point clinical Examination system that has become the standard clinical severity scale in most clinical trials.

Tool 3: MRS(The Modified Ranking Scale) is the stroke outcome measuring scale, which is a6 point scale measuring the level of disability after stroke.

Data analysis

The collected data was coded and processed by using the statistical packages for social sciencessoftware 20.0. Descriptive analysis using standard statistical methods was performed. The tests used are frequencies, percentage and chisquare test.

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RESULTS

Table 1: Frequency distribution and percentage of patients admitted to stroke ICU based on their age and sex (n=50)

Sociodemographic characteristics	frequency	Percentage
AGE		
Young adults	5	10
Older adults	11	22
Elderly	34	68
Sex		
Male	30	60
Female	20	40

Figure 1: Percentage distribution of patients admitted to stroke ICU based on their type of stroke.

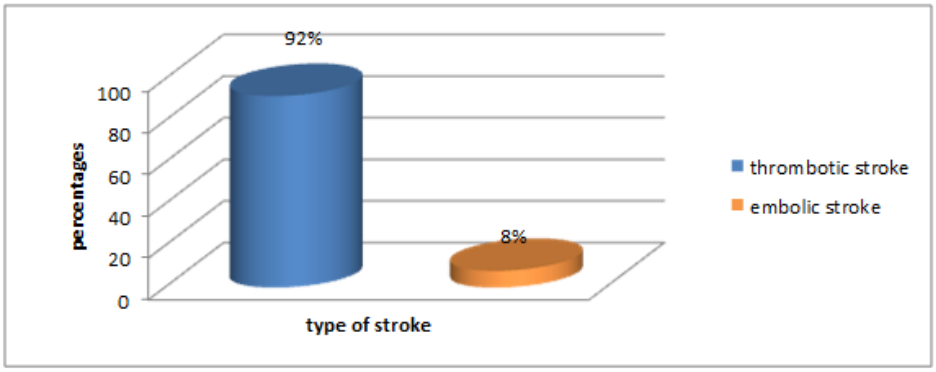

Figure 2: Percentage distribution of patients admitted to stroke ICU based on their brain area involved

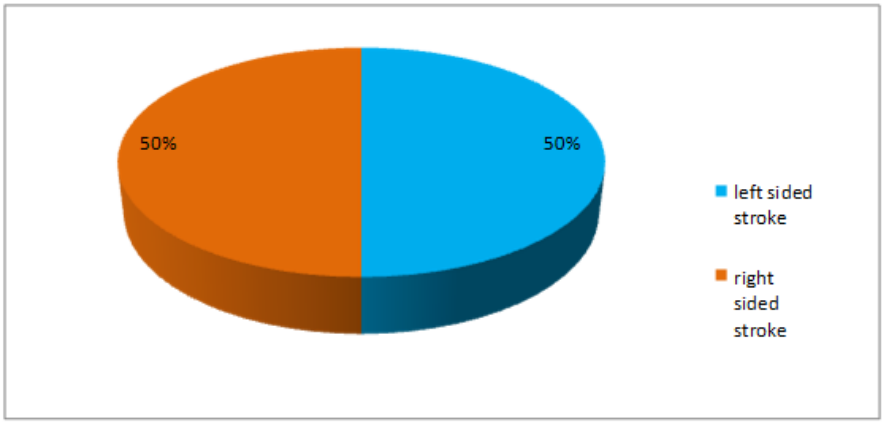

Table 3: Frequency distribution and percentages of patients admitted to stroke ICU based on their higher mental function problems such as aphasia, dysarthria, agraphia and anosognosia. (n=50)

Higher mental function problems	frequency	Percentage
Aphasia		
Present	22	44
Absent	28	56
Dysarthria		
Present	25	50
Absent	25	50
Agraphia		
Present	2	4
Absent	48	96
Anosognosia		
Present	1	2
Absent	49	98

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Table 4: Frequency distribution and percentages of patients admitted to stroke ICU based on their higher mental function problems such as neglect, memory loss and confusion. (n=50)

Higher mental function problems	frequency	Percentage
Neglect		
Present	6	12
Absent	44	88
Memory loss		
Present	1	2
Absent	49	98
Confusion		
Present	7	14
Absent	43	86

Figure 3: Percentage distribution of patients admitted to stroke ICU based on their clinical features associated with cranial nerve deficits. **(n=50)**

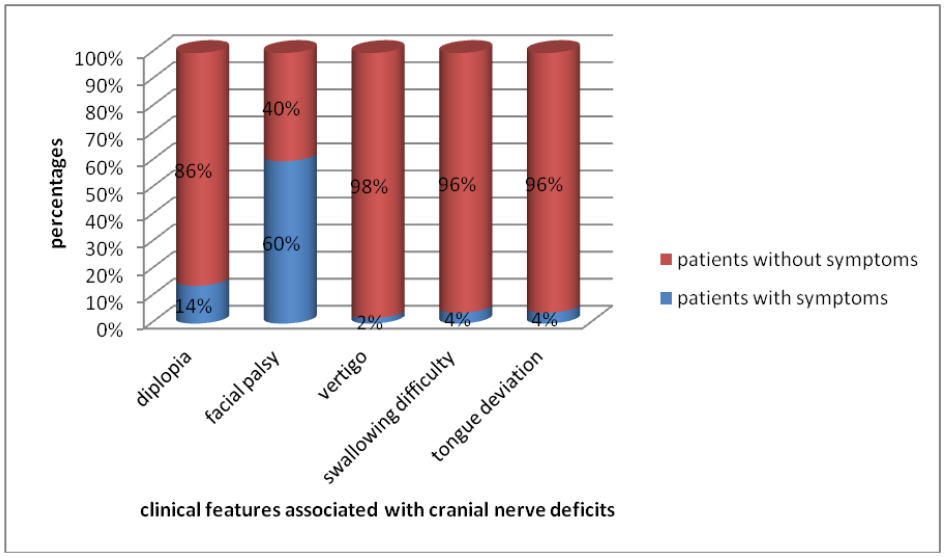

Figure 4: Percentage distribution of patients admitted to stroke ICU based on their body weakness.

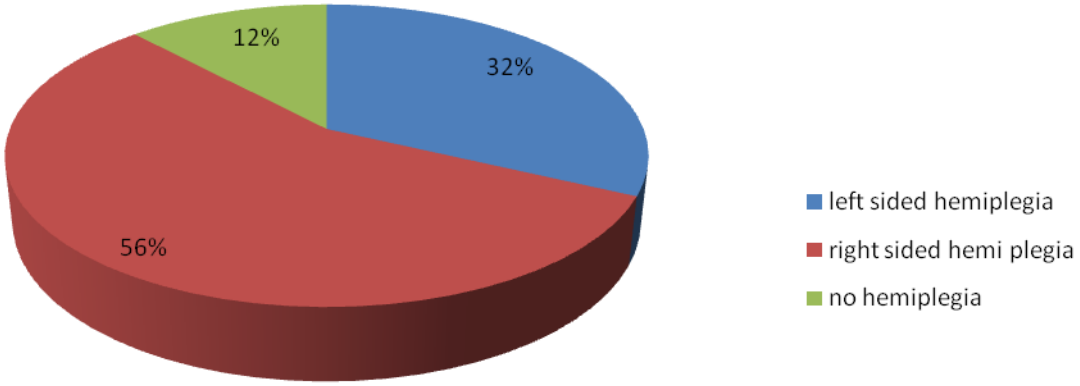

Table 5 : Frequency distribution and percentage of patients admitted to stroke ICU based on their reflexes on affected side. (n=50)

Reflexes on affected side	Frequency	Percentage
Normal	36	72
Hyper reflexia	7	14
Hyporeflexia	4	8
Areflexia	3	6

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Table 6: Frequency distribution and percentage of patients admitted to stroke ICU based on their sensory manifestations. (n=50)

Sensory manifestations	Frequency	Percentage
Focal	3	6
Hemi anaesthesia	1	2
Cortical	1	2
Absent	45	90

Figure 5 : Percentage distribution of patients admitted to stroke ICU based on their gait manifestations.

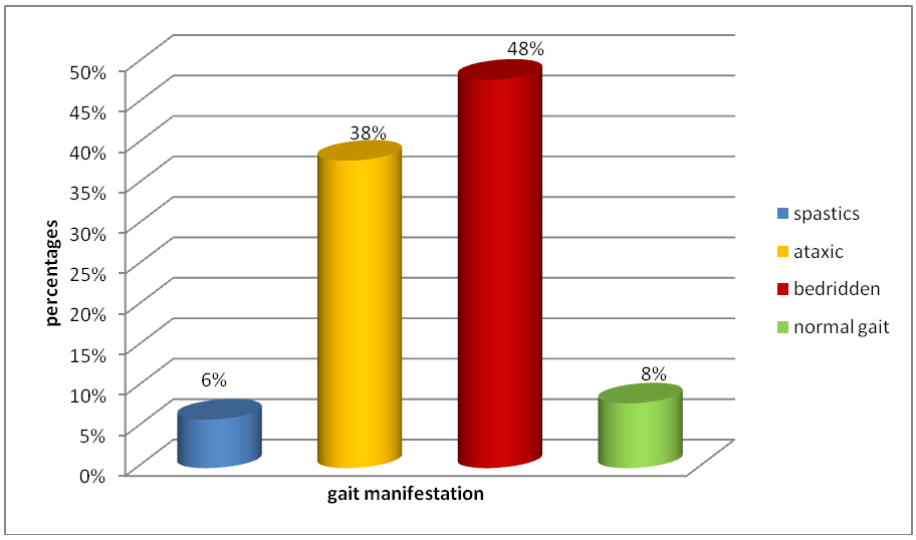

Table 7: Frequency distribution and percentage of patients admitted to stroke ICU based on their abnormal movements. (n=50)

Abnormal movement's	Frequency	Percentage
Seizure	5	10
Parkinsonisan movements	1	2
Without abnormal movements	44	88

Table 8: Frequency distribution of patients admitted to stroke ICU based on the severity of stroke using NIHSS. (n=50)

Severity of stroke	Frequency	Percentage
Minor	12	24
Moderate	31	62
Moderate-severe	3	6
Severe	4	8

Table 9: Association of brain areas of patients admitted to stroke ICU with aphasia. (n=50)

Aphasia	Left Hemi sphere affected	Right Hemi sphere affected	χ^2
Present	14	8	2.92
Absent	11	17	

Table 10: Association of brain areas of patients admitted to stroke ICU with facial palsy. (n=50)

Facial palsy	Left Hemi sphere affected	Right Hemi sphere affected	χ^2
Present	15	15	0.00
Absent	10	10	

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Figure 6 : Percentage distribution of patients admitted to stroke ICU based on their stroke severity using MRS.

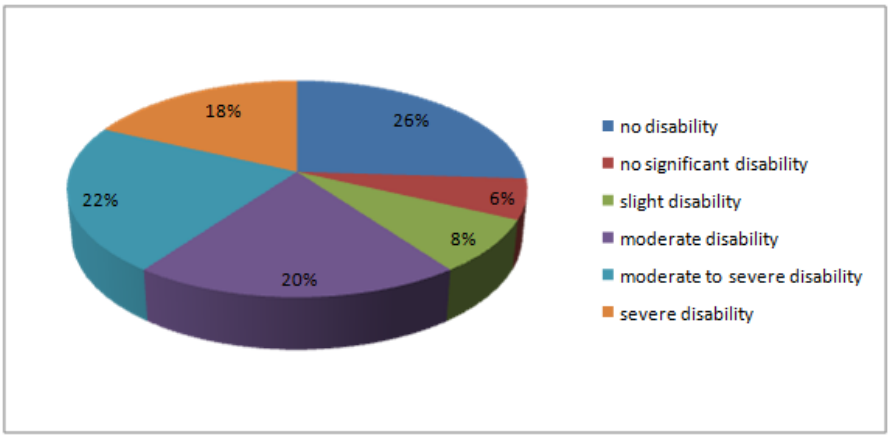

Figure 7 : Percentage distribution of patients admitted to stroke ICU based on the severity of stroke using GCS

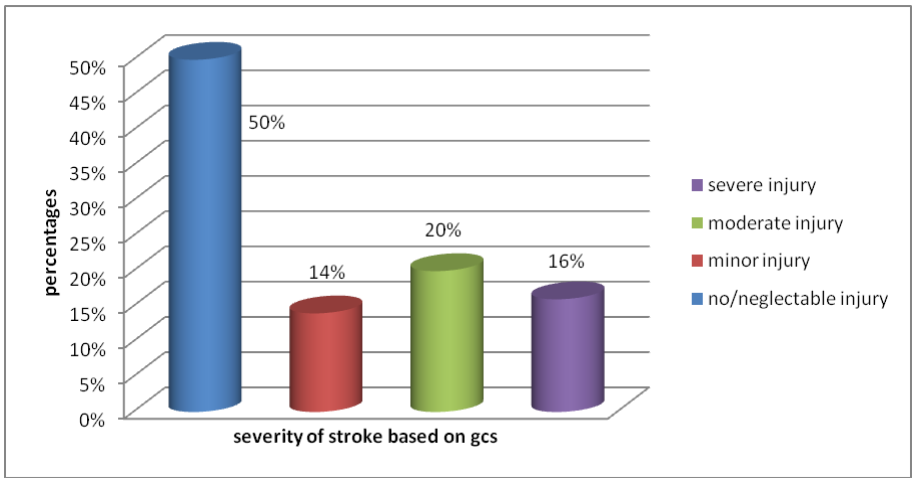

Table 11: Association of brain area of patients admitted to stroke ICU with type of hemiplegia. (n=50)

Facial palsy	Left Hemi sphere affected	Right Hemi sphere affected	χ^2
Left sided	3	13	9.8
Right sided	19	9	
Absent	3	3	

Table 12: Association of brain areas affected with severity of stroke based on NIHSS. (n=50)

Severity	Left Hemi sphere affected	Right Hemi sphere affected	χ^2
Minor	9	3	7.81
Moderate	13	18	
Moderate-severe	0	3	
Severe	3	1	

Table 13: Association of brain areas affected with severity of stroke based on MRS. (n=50)

Severity	Left Hemi sphere affected	Right Hemi sphere affected	χ^2
No disability	7	6	5.9
No significant disability	2	1	
Slight disability	0	4	
Moderate	4	6	
Moderate to severe	6	5	
Severe	6	3	

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Table 14: **Association of brain areas affected with stroke among patients admitted to stroke ICU with their age. (n=50)**

Age	Left Hemi sphere affected	Right Hemi sphere affected	χ^2
65 and below	7	9	0.36
Above 65	18	16	

Table 15: Association of brain areas affected with stroke among patients admitted to stroke ICU with their sex. (n=50)

Sex	Left Hemi sphere affected	Right Hemi sphere affected	χ^2
Male	15	15	0.00
Female	10	10	

Table 16: Association of brain areas affected with stroke among patients admitted to stroke ICU with their type of stroke. (n=50)

Type of stroke	Left Hemi sphere affected	Right Hemi sphere affected	χ^2
Thrombotic	24	22	1.08
Embolic	1	3	

DISCUSSION

According to different stroke studies acute ischemic stroke refers to stroke caused by thrombosis or embolism and is more common than hemorrhagic stroke.[2] Ischemic strokes are by far the more common type, causing nearly 90% of all strokes. In the present study, 68% of the patients admitted to stroke ICU belongs to elderly group, while only 10% belongs to young adults. Half of the patients admitted to the stroke ICU with left sided stroke the other half with right sided stroke. Approximately half (44%) of the patients had aphasia as a problem, 50% had dysarthria, only 4% had agraphia and 2% had anosognosia. 14% of the patients had diplopia, 60% had facial palsy, 2% had vertigo, 4% had swallowing difficulty and 4% had tongue deviation. 56% of the patients had right sided hemiplegia, 32% had left sided hemiplegia and only 12% no hemiplegia. 88% of the patients admitted to stroke ICU had no abnormal movements, while 10% had seizures, 2% had parkinsonisan movements. 62% of the patients admitted to stroke ICU had moderate stroke, 24% had minor stroke, 6% had moderate to severe stroke and 8% had severe stroke.

CONCLUSION

Based on our results, we conclude that there is no association between aphasia and area of brain affected and no significant association between brain area and facial palsy however the association between type of hemiplegia and brain area involved and association between severities of stroke with hemisphere affected is significant. However small sample size constrains the significance of the results. Hence we recommend further study with higher sample size and long term follow up.

Conflicts of interest: nil.

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