

A study of clinical presentation and radiological features of stroke patients in a tertiary care center at Karwar Institute of Medical Sciences, Karwar, Uttar Kannada District, Karnataka

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Abstract

Background: Acute stroke is one of the major cause of disability and death in India. Imaging plays an important role in identification of cause and decision making in appropriate treatment plan. The management of stroke differs in different types of stroke. Early diagnosis aid in the effective management and thus reducing the disability and death. Hence the study was undertaken to study the clinical and radiological features on the stroke patient at KRIMS Hospital. Karwar Karnataka.

Methodology: This is a retrospective hospital based study of 250 stroke patients admitted in a tertiary care hospital, at Karwar institute of medical sciences Karwar during a period of one year from 1st January 2020 to 31st December. A sample size of 250 stroke patients records found in the record section analysed, considering clinical presentations and radiological features as entered in the case records.

Results: Stroke incidence increased with increasing age after 50 years. Hemiplegia was the most common clinical feature found in 132(52.8%) patients and males were predominant (74.8%). 207(82.8%) had ischemic stroke and 43 (17.2%) had hemorrhagic stroke. Frontal and parietal areas of brain were affected in both types.

Conclusion: Early identification of clinical features and radiologic features play an important role in decision making for appropriate management protocol of stroke patients.

Key words: Clinical features of CVA, hemorrhagic type stroke, ischemic type stroke. CT findings in CVA.

Introduction

WHO defined stroke (CVA) as rapidly developing clinical sign of focal (or global) disturbance of cerebral function, lasting more than 24 hrs. or leading to death with no apparent cause other than that of vascular origin. Advances in science especially neuroimaging have enabled better understanding of stroke types and pathophysiology^[1].

Imaging plays an important role in treatment planning as it detects stroke neurology, interventional neuroradiology and surgery as well. Computerized Tomographic (CT) scanning is the main stay of emergency stroke imaging. It allows rapid identification of intracranial bleeds and stroke mimics (i.e. pathologies other than stroke, having similar presentations) such as tumour [2]. Because of the growing older population, stroke is becoming one of the common neuro-vascular condition with 105.5 million people worldwide [3].

In developing countries like India, clinical diagnosis is still proven to be of significant value in the diagnosis and CT helps in the planning of appropriate therapy, at the same time ruling out different pathologies of stroke, thus reducing the morbidity and mortality in stroke patients.

Hence the present study was done to study the clinico radiological correlations in stroke patients in a tertiary care hospital in KRIMS Karwar, Karnataka.

Materials and Methods

Sources of data

Data of patients collected from the Medical Record Section of Karwar Institute of Medical sciences, Karwar after obtaining consent from the concerned authority.

Study design

Retrospective study.

Study population

Patients admitted in medical ward and medical intensive care unit of General Medicine Dept. of KRIMS from 1st January-2020 to December 31st 2020, fulfilling the WHO criteria of stroke and undergone CT scanning.

Sample size

250 patients records found in record section considered as per inclusion and exclusion criteria in the proforma.

Method of data collection

An Institutional ethical committee approval was taken to conduct a retrospective hospital based study in the medical ward and medical intensive care unit of General medicine department of a tertiary care hospital, at Karwar Institute of Medical Sciences Karwar during a period of one year from 1st January 2020 to 31st December.

After obtaining appropriate consent from the Dean and Medical Superintendent, Medical records retrieved. Patient's clinical features and the radiological features as documented in the case records entered in the proforma. Confidentiality of patient's records was maintained.

Inclusion criteria

- 1) Age >18 years.
- 2) Patients with stroke fulfilling the WHO criteria of stroke.
- 3) Clinical and radiological evidence of stroke.

Exclusion criteria

- 1) Age < 18 years.
- 2) Traumatic etiology.

Statistical analysis

Data was analysed using SPSS VERSION 16. The data was represented using descriptive statistics and expressed in terms of mean, standard deviation, proportions and percentages wherever needed.

Results

Incidence of age: Age range was from 23 to 94 years. Mean age 62.2 +/- 13 years.

Sex distribution: Out of 250, 187 were males and 63 females. Clinical presentations among the 250 stroke patients studied were: Hemiplegia, giddiness and vomiting, unconsciousness, seizures, altered sensorium, headache, speech involvement and gait disturbances. Hemiplegia was the most common feature with male predominance. (Table no 1). Incidence of stroke increased with age. (Table no 2).

Radiological findings

207(82.8%) had ischemic stroke and 43 (17.2%) had hemorrhagic stroke.

Gender wise distribution of stroke patients

34(13.6%) males 9(3.6%) females in haemorrhagic stroke. 153(61.2%) males and 54(21.6%) females in ischemic stroke.

Age wise distribution of Stroke patients. (Table no 3-5)

In Haemorrhagic stroke: 6% in 65 to 80 years. 5.2% in 50 to 65 age groups. 3.6% in 35 to 50 years. In ischemic stroke: 32.4% in 65 to 80 years. 30% in 50 to 65 years. 13.2% in 35 to 50 years.

Radiological features of stroke patients. (Table no 6-7)

In hemorrhagic stroke, areas affected were frontal 37.2%, Parietal 37.2%, occipital 18.6%, thalamus 18.6%, 23.3% basal ganglia, temporal 11.6%. (4.7%) pons and midbrain. 14% periventricular, 7% internal capsule, 2.3% external capsule. 7% corona radiata. 2.3% medulla oblongata. 23.3% cerebral atrophy and 4.7% gliosis was found. Table no 6.

In ischemic stroke affected areas were 50.2% frontal, 45.9% parietal, 15% temporal, 10.6% occipital, 14% basal ganglia, 19% periventricular, 16.4% corona radiata, 1.9% Pons and midbrain, 1.9% external caps 1.9% Lentiform nucleus, 7.7% thalamus, 3.9% cerebellum, 1% Internal capsule 1%, 0.5% medulla oblongata. 53.1% cerebral atrophy and 5.3% gliosis was found. Table no 7.

Table 1: Gender wise Clinical features of Stroke patients

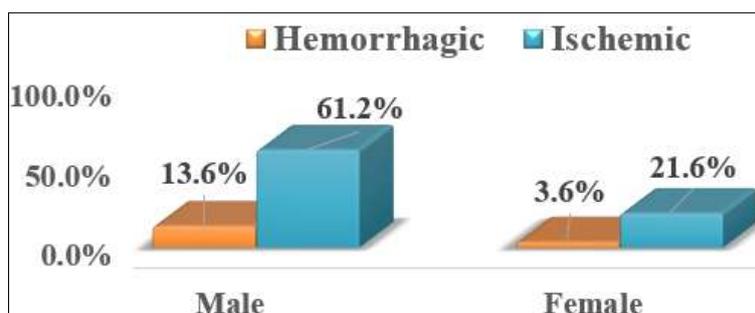
Clinical features	Gender		
	Female N (%)	Male N (%)	Total N (%)
Altered Sensorium	3 (1.2%)	9 (3.6%)	12 (4.8%)
Giddiness & Vomiting	14 (5.6%)	33 (13.2%)	47 (18.8%)
Gait Disturbances	0 (0%)	3 (1.2%)	3 (1.2%)
Headache	1 (0.4%)	8 (3.2%)	9 (3.6%)
Hemiplegia	32 (12.8%)	100 (40%)	132 (52.8%)
Seizures	4 (1.6%)	8 (3.2%)	12 (4.8%)
Unconscious	8 (3.2%)	21 (8.4%)	29 (11.6%)
Speech Involvement	1 (0.4%)	5 (2%)	6 (2.4%)

Chi-Square = 3.288 with $p = 0.857$ [No significant association was found between Clinical features & gender]

Table 2: Age wise Clinical features of Stroke patients

Clinical features	Age Group					Total N (%)
	20-35 N (%)	35-50 N (%)	50-65 N (%)	65-80 N (%)	> 80 N (%)	
Altered Sensorium	0 (0%)	3 (1.2%)	6 (2.4%)	2 (0.8%)	1 (0.4%)	12 (4.8%)
Giddiness & Vomiting	0 (0%)	9 (3.6%)	17 (6.8%)	16 (6.4%)	5 (2.0%)	47 (18.8%)
Gait Disturbances	1 (0.4%)	0 (0%)	1 (0.4%)	1 (0.4%)	0 (0%)	3 (1.2%)
Headache	0 (0%)	1 (0.4%)	5 (2.0%)	3 (1.2%)	0 (0%)	9 (3.6%)
Hemiplegia	2 (0.8%)	17 (6.8%)	44 (17.6%)	56 (22.4%)	13 (5.2%)	132 (52.8%)
Seizures	0 (0%)	3 (1.2%)	6 (2.4%)	2 (0.8%)	1 (0.4%)	12 (4.8%)
Unconscious	0 (0%)	8 (3.2%)	8 (3.2%)	12 (4.8%)	1 (0.4%)	29 (11.6%)
Speech Involvement	0 (0%)	1 (0.4%)	1 (0.4%)	4 (1.6%)	0 (0%)	6 (2.4%)
Total	3 (1.2%)	42 (16.8%)	88 (35.2%)	96 (38.4%)	21 (8.4%)	250 (100%)

Chi-Square = 44.18 with $p = 0.027^*$ [Significant association was found between Clinical features & Age]

**Fig 1:** Gender wise distributions of stroke patients**Table 3:** Age wise distribution of stroke patients

		Type of Stroke					
		Hemorrhagic (43)		Ischemic (207)		Total (250)	
		N	%	N	%	N	%
Age (Years)	20 - 35	0	0	3	1.2	3	1.2
	35 - 50	9	3.6	33	13.2	42	16.8
	50 - 65	13	5.2	75	30	88	35.2
	65 - 80	15	6	81	32.4	96	38.4
	> 80	6	2.4	15	6	21	8.4

Table 4: Clinical and radiological features correlation.

Clinical features	Type Stroke		z-value	p-value
	Hemorrhagic (43) N (%)	Ischemic (207) N (%)		
Altered Sensorium	5 (11.6%)	7 (3.4%)	2.6	0.01*
Giddiness & Vomiting	4 (9.3%)	43 (20.8%)	1.8	0.068
Gait Disturbances	0 (0%)	3 (1.4%)	0.8	0.435
Headache	2 (4.7%)	7 (3.4%)	0.4	0.678
Hemiplegia	9 (20.9%)	123 (59.4%)	4.6	<0.0001*
Seizures	4 (9.3%)	8 (3.9%)	1.5	0.133
Unconscious	19 (44.2%)	10 (4.8%)	7.3	<0.0001*
Speech Involvement	0 (0%)	6 (2.9%)	1.1	0.258

- Proportion of stroke patients with Altered Sensorium were significantly more ($p=0.01$) among hemorrhagic (11.6%) as compared to Ischemic stroke patients (3.4%).
- Proportion of stroke patients with Hemiplegia were significantly more ($p<0.0001$) among Ischemic (59.4%) as compared to Hemorrhagic stroke patients (20.9%).
- Proportion of stroke patients who were Unconscious was significantly more ($p<0.0001$) among hemorrhagic (44.2%) as compared to Ischemic stroke patients (4.8%).

Table 5: Age wise distribution of stroke patients.

		Type of Stroke					
		Hemorrhagic (43)		Ischemic (207)		Total (250)	
		n	%	n	%	n	%
Age (Years)	20 - 35	0	0	3	1.2	3	1.2
	35 - 50	9	3.6	33	13.2	42	16.8
	50 - 65	13	5.2	75	30	88	35.2
	65 - 80	15	6	81	32.4	96	38.4
	> 80	6	2.4	15	6	21	8.4

Table 6: Topographical distribution of the Hemorrhagic stroke patients

Affected areas of brain on the basis of CT Scan	Hemorrhagic (43)	
	N	%
Frontal	16	37.2
Parietal	16	37.2
Occipital	8	18.6
Temporal	5	11.6
Pons	2	4.7
Midbrain	2	4.7
Medulla oblongata	1	2.3
Basal ganglia	10	23.3
Periventricular	6	14.0
Internal capsule	3	7.0
External capsule	1	2.3
Centrum semiovale	4	9.3
Caudate nucleus	2	4.7
CBL	0	0.0
Lentiform nucleus	3	7.0
Thalamus	8	18.6
Corona radiata	3	7.0
Cerebral atrophy	10	23.3
Gliososis	2	4.7

Table 7: Topographical distribution of the Ischemic stroke patients

Affected areas of brain on the basis of CT Scan	Ischemic (207)	
	N	%
Frontal	104	50.2
Parietal	95	45.9
Occipital	22	10.6
Temporal	31	15.0
Pons	4	1.9
Midbrain	4	1.9
Medulla oblongata	1	0.5
Basal ganglia	29	14.0
Periventricular	40	19.3
Internal capsule	2	1.0
External capsule	4	1.9
Centrum semiovale	17	8.2
Caudate nucleus	1	0.5
CBL	8	3.9
Lentiform nucleus	4	1.9
Thalamus	16	7.7
Corona radiata	34	16.4
Cerebral atrophy	110	53.1
Gliosis	11	5.3

Discussion

Stroke is still the leading cause of morbidity and mortality in countries like India. Clinical diagnosis is very important to suspect stroke type, to refer for further investigations and interventions at the right time to save the life and to prevent disabilities. Early diagnosis help to manage the patient effectively, which will prevent the morbidity and mortality.

In our study significant association of clinical features was found with age of the patients and type of stroke. Age group of stroke patients in both ischemic type and haemorrhagic type was 50-80 years, which is similar to the study done by Dr N Radha *et al.* [4] and Sindu punna *et al.*, [5]

Male gender was predominant in our study both in ischemic and hemorrhagic type stroke similar to study done by lokesh Kumar T *et al.* [6] and Sharad M Malvadkar *et al.* [7]

In hemorrhagic stroke female preponderance was noted by Sindu punna *et al.*, [5] unlike in our study where there is male preponderance in hemorrhagic stroke. The sex differences in the incidence of strokes could be because of the various risk factors and the lifestyle in different communities, also influenced by the sample size and methodology of study [8].

Most common type of stroke was ischemic and hemiplegia was the most frequent clinical presentation. Hemiplegia is the most common clinical presentation in our study in ischemic type of stroke which is similar to the study done by Muhammad khan, *et al.* [9]

There was significant association between unconsciousness and altered sensorium in hemorrhagic type of stroke. Various clinical features depend on the areas of brain involved. Hence by studying radiological features in stroke patients we can correlate clinical features.

In our study the radiological areas involved reveals MCA territory involvement most common in the ischemic type of stroke which is similar to the studies done by Chirayu v. *et al.* [10] In hemorrhagic type of stroke radiological areas distribution reveals the multiple areas of involvement in the brain similar to study done by, Bibhu P. *et al.*, [11].

Conclusion

Stroke is on the increasing trend even in India, despite the availability of better medical amenities, in remote areas. Hence there is urgent need to diagnose stroke type, with the help of initial clinical features, as there is vast difference in the management of different types of strokes. Our study concludes that, proper clinical strategy to prevent and treat stroke is the need of hour in countries like India.

Limitation of this study

As this is a retrospective hospital based study, data depends on availability of the medical records and follow up was not possible.

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Conflict of interest: None declared.

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Ethical approval: Taken by the institutional ethical committee.

Note: Data are compiled from stroke study on risk factors.

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