

International Journal of Radiology and Diagnostic Imaging



E-ISSN: 2664-4444
P-ISSN: 2664-4436
IJRDI 2020; 3(1): 188-191
Received: 10-12-2019
Accepted: 13-01-2020

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Study to ascertain the diagnostic value of computed tomography in patients diagnosed as acute cerebro-vascular accidents attending tertiary care centre, Siddipet District, Telangana state

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DOI: <http://dx.doi.org/10.33545/26644436.2020.v3.i1c.71>

Abstract

Introduction: Cerebrovascular accidents are one of the leading causes of death after heart disease and cancer in the developed countries and also in India. Incidence rate and the death rate of stroke increases as age advances. About 15 to 30% of patients die with each episode of cerebral infarction and 16 to 80% with cerebral haemorrhage.

Methodology : Hospital based cross-sectional observational study. 40 cases admitted RVM Institute of medical sciences and Research Centre with the diagnosis of acute stroke was taken up for the study. The present study was carried out for 10 months period in the year 2019. Data for the study is collected from the referred cases with clinical history of stroke to the department of radiology for CT scan in the above mentioned study period.

Results: In this study it was observed that the mean age of the study population was 54.6 ± 8.2 , Male: Female ratio was 1:0.8. There was a male preponderance in the study. In the present study it was observed that 45% patients had infarct followed by 38% patients haemorrhage and (5%) 2 patients had SOL (tumours mimicking stroke), (12%) 5 patients were normal. In the present study it was observed that incidence of diabetes was seen in 10 participants (25%), and incidence of hypertension was seen in 18 participants (45%). It was also observed that 67% males had infarct when compared to 33% in females. 53% males were having haemorrhagic stroke when compared to 47% females. There is increased incidence observed in males with infarcts as well as haemorrhagic stroke.

Conclusion: CT scanning should be the first line of investigation for diagnosis of acute stroke as it is widely available and cost effective than MRI.

Keywords: Cerebrovascular accidents (CVA), stroke, Computed tomography, Ischemia, Haemorrhage

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 more than 24 hours or leading to death with no apparent cause other than that of vascular origin”^[1]. It accounts for about one percent of admissions to general hospitals. As age advances the incidence rate and death rate of stroke increases. About 15 to 30% of patients die with due to a cerebral infarct and 16 to 80% with cerebral haemorrhage. Those who survive may be left with permanent disability. Hence stroke became a great medical and social concern. Early and accurate diagnosis decreases the morbidity and mortality rates, as newer and effective treatment modalities are in practice^[2]. With CT it is possible to non-invasively and reliably diagnose and distinguishes between the types of stroke. (Cerebral infarction or haemorrhage). Facilitated the diagnosis and management of stroke and added significantly to our understanding of the Pathophysiological alterations in case of humans and to detect bone involvement. These are the reasons for performing Brain CT on patients with cerebrovascular accidents^[3]. Currently high spatial resolution of CT, is one of the most accurate and rapid diagnostic technique available for identifying and localizing the lesion along with staging and differentiation of lesion^[2]. CT scan should be the first line of investigation for diagnosing acute stroke as it is widely available and cost effective than MRI and the rational management of stroke depends

on accurate and early diagnosis and should be ideally done in all cases. Aim and Objectives of this study are to determine the diagnostic value of Computed tomographic in the assessment of different types of cerebrovascular accidents and to know the incidence of stroke in different age groups and their associated risk factors like hypertension, diabetes mellitus.

Methodology

Hospital based cross-sectional observational study.40 cases admitted RVM Institute of medical sciences and Research Centre with the diagnosis of acute stroke was taken up for the study. The present study was carried out for 10 months period in the year 2019.Data for the study is collected from the referred cases with clinical history of stroke to the department of radiology for CT scan in the above mentioned study period. Patients were subjected to Computed Tomography scan of the head. Inclusion Criteria: All patients with clinical diagnosis of acute stroke admitted in RVM Hospital and referred to radiology department. Exclusion Criteria: Patients with neurological deficiency due to the cause other than vascular origin, such as diabetic keto acidosis, hypoglycaemia and trauma are excluded. Those who not given consent for the study also excluded. Ethical clearance was obtained prior to the study from RVM institute Ethical committee. The data was analysed using SPSS version 20, Variables were expressed as mean ± SD values. Probability value (p value) was used to determine the level of significance, p value < 0.05 was considered as significant.

Results

Table 1: Age Distribution of study participants

Age(Years)	Frequency	Percentage
30 - 39	3	8
40 - 49	5	13
50 - 59	9	23
60 - 69	15	38
70 - 80	8	20
Total	40	100
Mean ± SD	54.6 ± 8.2	

In this study it was observed that the mean age of the study population was 54.6 ± 8.2, majority of patients 38% were in the age group of 60 - 69 yrs. followed by 23% patients in the age group of 50 – 59 yrs. and least among 30-39 years age group (8%).In this study 55% patients were males and 45% were females, Male: Female ratio was 1:0.8. There was a male preponderance in the study.

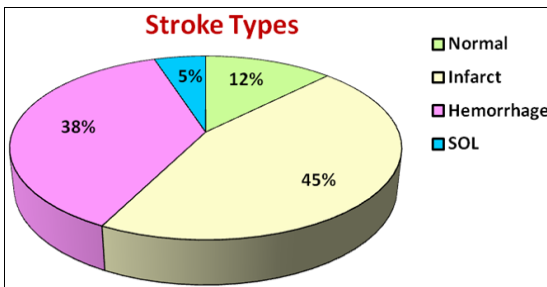


Fig 1: Types of CVA/Stroke observed in the study participants

In the present study it was observed that 45% patients had infarct followed by 38% patients haemorrhage and (5%) 2 patients had SOL(tumours mimicking stroke),(12%) 5 patients were normal.

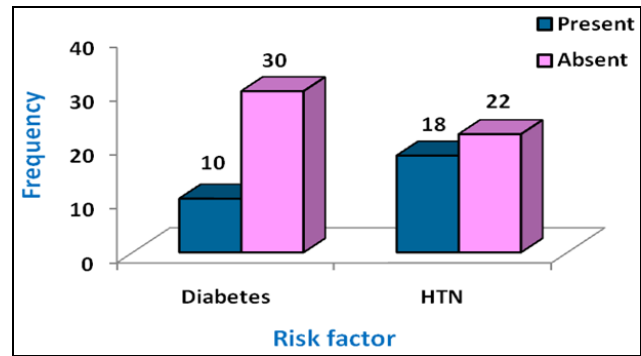


Fig 2: Distribution of risk factors among the study participants

In the present study it was observed that incidence of diabetes was seen in 10 participants (25%), and incidence of hypertension was seen in 18 participants (45%).

Table 2: Showing age vs stroke relationship among the study participants

Age vs Stroke subtypes	Normal		Infarct		Hemorrhage		SOL		(χ ² , P < 0.05) *
	Present	%	Present	%	Present	%	Present	%	
30 - 39	1	20	0	0	2	13	0	0	(9.88, 0.6267)
40 - 49	0	0	2	11	2	13	1	50	
50 - 59	2	40	4	22	3	20	0	0	
60 - 69	2	40	8	44	4	27	1	50	
70 - 80	0	0	4	22	4	27	0	0	
Total	5	100	18	100	15	100	2	100	

*- P < 0.05 there is no significant association between Age group and Stroke types by using chi-square test

In this study it was observed that in patients with infarct 44% were in the age group of 60 – 69 followed by 22% in the age group of 50 – 59 and 22% in the age group of 70-80. Patients with haemorrhagic stroke were 27% each in the age group of 60 – 69, 70 – 80 respectively; Patients with SOL were 50% each in the age group of 40 – 49 and 60 - 69. The above observed results are statistically insignificant.

In this study it was observed that 67% males had infarct when compared to 33% in females. 53% males were having haemorrhagic stroke when compared to 47% females. There is increased incidence observed in males with infarcts as well as haemorrhagic stroke.

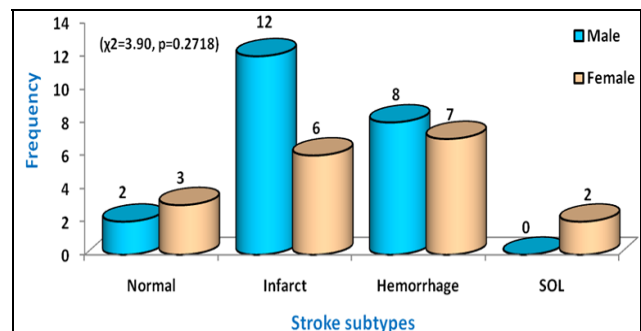


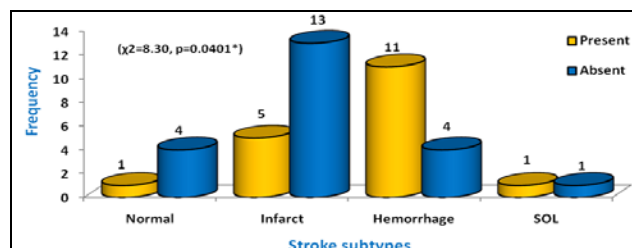
Fig 3: Association between gender vs stroke among the study participants

Table 3: Risk factor (DM) vs stroke among the study participants

Diabetes V/s Stroke subtypes	Normal		Infarct		Hemorrhage		SOL		$(\chi^2, P < 0.05) *$
	Yes	%	yes	%	yes	%	yes	%	
Present	0	0	7	39	3	20	0	0	(4.38, 0.2227)
Absent	5	100	11	61	12	80	2	100	
Total	5	100	18	100	15	100	2	100	

*- $P < 0.05$ there is no significant association between Diabetes and Stroke sub- types by using chi-square test.

In this study it was observed that, out of 10 diabetic patients 39% patients had infarcts and 3 (20%) patients had haemorrhagic stroke.

**Fig 4:** Risk factor (HTN) vs stroke among the study participants

Chi square 8.30 p value = 0.0401*** (Significant)

In this study it was observed that 18 were suffering with hypertension, 5 (28%) patients had infarcts and 11 (73%) patients presented with haemorrhagic stroke. Occurrence of haemorrhagic subtype of stroke was higher in participants with hypertension. Occurrence of haemorrhagic stroke is significant $p < 0.05$.

Discussion

The present study was conducted to determine the role of CT scan in patients presenting with Acute Cerebrovascular Accidents and how to differentiate with CT between haemorrhage, infarct and other types along with association of risk factors leading to stroke. Allen, *et al.* [28] studied 174 cases of acute stroke and the clinical features of these patients were compared with their subsequent CT scan and were able to make an accurate diagnosis in 90% of cases Oxfordshire Community Stroke project³ that assessed 325 consecutive patients of acute stroke highlighting the role of usefulness of CT scan. R.H Rosenwasser *et al.* [74], emphasized the need for CT Scanning as a tool in the early diagnosis of cerebrovascular accidents in providing therapy via intra-arterial or intravenous pathway.

In this study 40 patients who were clinically diagnosed as stroke were analysed in a period of 10 months and out of them 45% patients had infarct, 38% patients had haemorrhage, 5% patients had SOL (tumours mimicking stroke), 12% patients were normal. This study findings were near similar to the studies reported by, Jacob *et al.* [67]. In his study 60% were infarcts, 30% haemorrhage and study conducted by Kumar *et al.* from Karnataka, In his study 69% patients had infarct, 21% patients had haemorrhage. These results correlate with other studies made by Sinha R *et al.* where 63.33% had infarct and 25% had haemorrhage. In this study stroke mimics – tumours were detected in 2 cases out of 40 suspected CVA cases, which accounts for 5% of the total study. Signs and symptomatology of tumours were mimicking a stroke, hence patients sent for CT study, which turned out to be of tumor. In the present study 55% patients were males and 45% were females, Male: Female ratio was 1:0.8. This finding of the study

revealed that there is a male preponderance over female in the incidence of infarction and haemorrhage. This study was near similar to study conducted in South- West Nigeria reported a male to female ratio 1.3:1 [75]. Also, a retrospective study of medical admissions at the University of Nigeria Teaching Hospital, Enugu reported a male gender preponderance [76]. In the present study it was observed that the mean age of the study population was 54.6 ± 8.2 , majority of patients 38% were in the age group of 60 - 69 yrs. followed by 23% patients in the age group of 50 - 59 yrs. This findings are nearly related to the study by, R P Eapen, J H Parikh, N T Patel from government medical college Gujarat in which mean age was 57 years 69 and also closely related to study by Naik M, Rauniyar R.K., Sharma U.K. *et al.* [77] who found mean age to be 58.27yrs. In the present study it was observed that among the infarcts 67% were males when compared to 33% females. Among the haemorrhagic stroke, 53% were males as compared to 47% females. There was an increased incidence of males with infarcts and haemorrhages. This is nearly comparable with the study made by, R P Eapen, J H Parikh, N T Patel [69] from government medical college Gujarat, where 68% had cerebral infarction, out of these affected - 73% were males and 27% were females, 32% had a haemorrhagic stroke out of which 56% are males and 44% are females. The risk factors like hypertension and diabetes in CVA patients were considered in the study and given importance. In this study it was observed that hypertension was 45% and incidence of diabetes was 25%. It was observed that out of 10 diabetic patients 39% patients had infarcts and 20% patients presented with haemorrhage. Among 18 hypertension patients, 28% patients had infarcts and 73% patients presented with haemorrhage. Occurrence of haemorrhage was higher with hypertension in this study which was in contrast with the results reported by R P Eapen, J H Parikh, N T Patel [69] from government medical college Gujarat, it found that 40% had hypertension, among them 37% patients had a haemorrhage while 63% patients had infarct. 8% patients had diabetes mellitus and 75% among them had infarct and 25% had haemorrhages, In another study made by Kumar *et al.* [67] from Karnataka 36% had HTN and 25% had DM and among the diabetics 76% had infarction and 24% had haemorrhages. Among hypertensives 47% had infarction and 52% had haemorrhages these results are near similar to current study.

Conclusion

From this study, we want to ascertain that CT scan is the “Gold standard” technique for diagnosing the cases of acute CVA. Early and appropriate diagnosis is done in all cases with clinical history of stroke by CT scan. Risk factors such as hypertension, diabetes plays a vital role in the evolution of cerebrovascular accidents. CT scanning should be the first line of investigation for diagnosis of acute stroke as it is widely available and cost effective than MRI. In addition, early detection and treatment reduces morbidity and

mortality rates can be considerably reduced.

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