



## COMPUTED TOMOGRAPHY (CT) SCAN EVALUATION OF STROKE PATIENTS IN RADIODIAGNOSIS DEPARTMENT OF RIMS, RANCHI

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### ABSTRACT

**INTRODUCTION:** Advances in care in the course of recent years have extraordinarily improved the result for stroke patients with a decrease in mortality and more patients at last accomplishing autonomy.

Computerized Tomographic (CT) scanning is the gold standard when it comes to choosing for the imaging modality in patients coming in emergency department with stroke presenting with some neurologic deficit or other associated features.

**METHODOLOGY:** A cross sectional study of the available CT records for patients coming with stroke in RIMS Ranchi was evaluated from Feb 2018-Aug 2018 after seeking appropriate clearance. Data thus collected were analyzed using SPSS version 16 using standard statistical methods like mean, standard deviation, chi square test of significance etc. P values of <.05 were considered to be of statistical significance.

**RESULTS:** A total 275 patients were included in the evaluation. In this study we found that the average age for male participants were  $55.75 \pm 7.99$  while females were having a mean age  $53.07 \pm 11.85$ . 25% of the patients with Stroke were not diagnosed as hypertension cases while most patients recorded a GCS in mild category (44%), while more stroke incidents were infarct in nature (51%) followed by hemorrhagic incidences (21%). Cerebrovascular accidents were right side (51%) on location while mixed location findings were (21%).

**CONCLUSION:** Our investigation shows that Ischemic stroke is commoner than hemorrhagic in patients and greater part happened in the older patients. Computer Tomography (CT) is an exceptionally valuable instrument in making the analysis of stroke just as separating hemorrhage from ischemia which is useful in treatment of stroke patients.

### KEYWORDS :

#### INTRODUCTION

Stroke has been conventionally defined as a neurological deficit of focal nature persisting for more than 24 hours due to stoppage of cerebral blood supply. This defining timeline boundary is also useful in distinguishing Transient Ischemic attack (TIA) which is not of more than 24 hours duration but can mimic stroke clinically. (1) The problem of Stroke is rampant worldwide but in resource limited settings particularly in third world and developing countries like India it's a major problem as it not only causes morbidity but due to lack of dedicated care also produces mortality and complications compounding the problem. (2,3)

Advances in care in the course of recent years have extraordinarily improved the result for stroke patients with a decrease in mortality and more patients at last accomplishing autonomy. Among a few potential changes, three components are to a great extent liable for this improvement. First was the development of devoted stroke units that offer both intense and rehabilitative consideration for the different and variable needs of stroke patients. Second was the presentation of intravenous thrombolysis, which addressed the principal compelling treatment for intense ischemic stroke. And lastly third which is by no means is the least, is general awareness in the public about the gravity of the situation. (4,5) Various governments are more proactive now as they are now with dedicated programmes to increase the awareness, generate the evidence about the prevalence, and improved surveillance like UK's ACT FAST campaign programme, and in India NPCDCS (6,7).

Despite the advances even in developed countries and in India many patients don't fully recover from Stroke and remain crippled for many years resulting in huge economic losses.

This scenario has been well generalized as the rule of one third which says one third dies after stroke, one third remains long term disabled while rest of the third recover fully to have their dependency removed. (8,9)

Most of strokes are Ischemic (around 80%) and the greater part of these identify with issues with blood vessel blood stream to the cerebrum; ischemic stroke auxiliary to venous inadequacy is substantially less normal. Hemorrhagic stroke represents the rest 20%. (10, 11)

With modern changes and new innovations in technology now a days imaging is an integral part for any case of stroke coming to the emergency of any multi or Superspeciality facility. (12, 13) An early imaging in stroke patients not only helps in excluding hemorrhages in the intracranial area, marking out the ischemia, and ruling out any mimickers. It also helps in better visualization of the intracranial and extracranial vasculature and helps in understanding the status of cerebral perfusion. The imaging also marks out clearly the infarct core and the penumbra which aids in further management of the stroke patients. (13,14)

Computed Tomography (CT) scanning is the gold standard when it comes to choosing for the imaging modality in patients coming in emergency department with stroke presenting as some neurologic deficit or other associated features. CT scans owing to certain advantages over other modalities have been the mainstay as they are more reliable in showing the difference between cerebral hemorrhage and infarction as well as its relative availability. (12, 13)

Owing to these advantages and ease of availability or vice versa CT has remarkably changed the way patients with

Stroke are now managed with reduced mortality and morbidity owing to prompt diagnosis, better guided interventions and followup.

This study is done with an aim to understand the incidence of stroke in patients coming in the Department of Radio diagnosis for CT scan. The study intends to find out the nature of stroke, its occurrence in various age groups, different genders and various types of hemorrhages or infarcts coming up in the hospital . Data regarding these are almost non-existent for Jharkhand , in Ranchi and neighboring districts . This study will give an insight and will aid further research in this area .

**MATERIALS & METHODS**

A cross sectional study was undertaken after clearance from the appropriate authorities. The study consists of data collected from 275 patients undergoing CT scan in the Department of Radiodiagnosis RIMS, Ranchi who presented with clinical features of stroke. Study was done from Feb 2018 to Aug 2018. Questionnaire to collect the data was designed in the Radio Diagnosis Department of RIMS, Ranchi. Patients with history of head injury were excluded from the study. CT scan of patients were done on Siemens Somatom Sensation 16 slices CT scan machine. Records of patients undergoing CT scan for Stroke as primary diagnosis was reviewed in the department. We looked for Age, Gender, and Address, and Above Poverty Line/Below Poverty Line, HTN diagnosed or not, Stroke features, GCS and CT findings. Incomplete entries (if any) and follow up cases, were excluded from our record review. Statistical analysis was done after having the data on MS Office , Microsoft excel sheets on SPSS version 16.0 . Measures of central tendency , mean standard deviation and percentages were used to describe the results . While tests of association like Chi square were used to determine the

relationship between various findings. P value of <.05 was considered to be statistically significant.

**RESULTS**

A total 275 records were included in the evaluation . In our record analysis we found that the average age for male participants were 55.75 with a standard deviation of 7.99 while females were having a mean age 53.07 with a standard deviation of 11.85. We had as per the records 136 males while 139 females . None of the Males were less than 18 years while females were in the age group of 12-70 . We further had a breakdown of various religion , SES , Locality and Employment status of the records of CT available in the department (Table 1, 2) . Study showed that most of the patients seen were Hindu(58.2%) followed by Sarna ( 16.4%) and Sikh(14.5%). (Table 1) . We had more BPL patients but APL patients too were present for CT scanning of their episodes of Stroke or neurological deficit which was close to 40% ( Table 2) . The majority of patients with stroke were in the age group of 45-65 (72%) while for males and females the break up was 76.5% and 67.6% respectively . Age category and sex were associated with statistical significance . (Table 2) . We also evaluated the CT scan records for various features like Location of the injury , type of cerebrovascular compromise , whether Hypertension was prediagnosed or not and Glasgow coma scale scores at the time of admission mentioned . GCS was graded in three categories Mild degree of confusion with scores of 13-15 , while moderate for scores of 9-12 and severe for scores of 3-8 . We found that 25% of the patients with Stroke were not diagnosed as HTN cases while most patients recorded a GCS in mild category 44% , while more stroke incidents were infarct in nature ( 51%) followed by hemorrhagic incidences (21%) . Most of the cerebrovascular incidents were right side (51%) on location while mixed location findings were 21% .(Table 3)

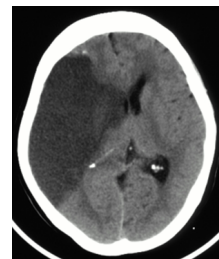
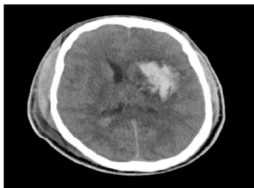
**Table 1 : Socioeconomic Distribution of Records review according to Religion and Gender**

Gender Male = 136, Females 139				Religion				Total
				Hindu	Muslim	Sikh	Sarna	
Total	Age Categorization	12-30	n	2	3	1	1	7
			%	28.6%	42.9%	14.3%	14.3%	100.0%
	30-45	n	23	0	6	2	31	
		%	74.2%	0%	19.4%	6.5%	100.0%	
	45-65	n	114	19	29	36	198	
		%	57.6%	9.6%	14.6%	18.2%	100.0%	
	65-70	n	21	8	4	6	39	
		%	53.8%	20.5%	10.3%	15.4%	100.0%	
	Total	n	160	30	40	45	275	
		%	58.2%	10.9%	14.5%	16.4%	100.0%	

Pvalue<.05

**Figure 2: Right MCA territory infarct in one of the Patients**

**Figure 1: Left Hemispheric Intracerebral hemorrhage in one of the Patients**



**Table 2 : Gender Wise distribution of SES, Residence and Employment Status of Records**

Gender		SES		Residence		Employment		Total	
		APL	BPL	Urban	Rural	Employed	Non Employed		
Male	Age Categorization	30-45	n	7	5	1	11	12	12
			%	58.3%	41.7%	8.3%	91.7%	100.0%	0.0%
	45-65	n	45	59	47	57	55	49	104
		%	43.3%	56.7%	45.2%	54.8%	52.9%	47.1%	100.0%
	65-70	n	3	17	2	18	8	12	20
		%							

			%	15.0%	85.0%	10.0%	90.0%	40.0%	60.0%	100.0%
	Total		n	55	81	50	86	75	61	136
			%	40.4%	59.6%	36.8%	63.2%	55.1%	44.9%	100.0%
Female	Age Categorization	12-30	n	3	4	2	5	1	6	7
			%	42.9%	57.1%	28.6%	71.4%	14.3%	85.7%	100.0%
		30-45	n	3	16	8	11	6	13	19
			%	15.8%	84.2%	42.1%	57.9%	31.6%	68.4%	100.0%
		45-65	n	40	54	40	54	10	84	94
			%	42.6%	57.4%	42.6%	57.4%	10.6%	89.4%	100.0%
		65-70	n	5	14	12	7	5	14	19
			%	26.3%	73.7%	63.2%	36.8%	26.3%	73.7%	100.0%
		Total	n	51	88	62	77	22	117	139
			%	36.7%	63.3%	44.6%	55.4%	15.8%	84.2%	100.0%

**Table 3 : Description of The CT findings and its relationship with HTN Diagnosis**

			Occurrence			Location			Glasgow Coma Scale			Total
			Ischaemic	Hemorrhagic	Mixed	Right	Left	Bilateral	Mild (13-15)	Moderate (9-12)	Severe (3-8)	
HTN Diagnosed	Y	N	111	51	45	121	56	30	102	60	45	207(75%)
		%	53.6	24.6	21.7	58.5	27.1	14.5	49.3	29.0	21.7	100.0
	N	N	31	24	13	33	10	25	21	37	10	68(25%)
		%	45.6	35.3	19.1	48.5	14.7	36.8	30.9	54.4	14.7	100.0
Total	N	142	75	58	154	66	55	123	97	55	275(100%)	
	%	51.6	27.3	21.1	56.0	24.0	20.0	44.7	35.3	20.0	100.0	
			p value > .05			p value < .005			p value < .005			

**DISCUSSION**

As the population increases along with a life style which is conducive to developing the NCDs the number of Stroke patients will increase thus mandating rapid evaluation of such patients . As of now non contrast CT is the primary imaging modality being employed routinely for all stroke cases . CT is all the more normally used owing to its across the board accessibility, reasonableness for the unwell and therapeutically temperamental patient and precision in barring contraindications to intravenous thrombolysis. What's more, when evaluated by competent people, non-contrast CT gives complimentary data on the nearness of early infarct and, now and again, gives a particular proportion of blood vessel rupture when a hyperdense course is recognized. (15,16)

In our study we saw majority of patients were in the age group of 45-60 (72%) . This finding is in accordance to other studies conducted in similar settings . (12,13,17) We found an association of males and their employment status to be of staisitcal significance which is similar to findings from other studies as well (11,12) . The location of the cerebrovascular accident in form of infarcts were almost similar to other studies across different study settings ( 8,9,12)

The relationship of hypertension and its consequences as stroke is well known but as the rule of halves suggest for HTN in our study too we saw almost 25% of Stroke patients not being diagnosed with Hypertension . This findings has been well illustrated in other studies as well ( 8,10,12,13)

**CONCLUSION**

As its record based review with small smaple size more research needs to be done for tangible evidence to suggest and address various aspects of the Stroke incident in patients. In our study infarcts were more common occurrence as has been the trend world wide. Timely CT is an integral component in management of Stroke Patients so that they can recover and morbidity can be lowered.

**REFERENCES**

- Mathers CD, Bernand C, lburg KM, Inoue M, Ma Fat D, Shibuya K, et al. Global burden of disease: data sources, methods and results. World Health Organization; 2004.
- Collaborative systematic review of the randomised trials of organised inpatient (stroke unit) care after stroke. Stroke Unit Trialists' Collaboration. BMJ 1997; 314: 1151-9.

- Mair G, Wardlaw JM. Imaging of acute stroke prior to treatment: current practice and evolving techniques. Br J Radiol. 2014;87(1040):20140216. doi:10.1259/bjr.20140216
- Wardlaw JM, Murray V, Berge E, del Zoppo G, Sandercock P, Lindley RL, Cohen GR. Recombinant tissue plasminogen activator for acute ischaemic stroke: an updated systematic review and meta-analysis. Lancet. 2012 Jun 23; 379(9834):2364-72.
- The International Stroke Trial (IST): a randomised trial of aspirin, subcutaneous heparin, both, or neither among 19435 patients with acute ischaemic stroke. International Stroke Trial Collaborative Group. Lancet 1997; 349: 1569-81.
- Dombrowski SU, Mackintosh JE, Sniehotta FF, et al. The impact of the UK 'Act FAST' stroke awareness campaign: content analysis of patients, witness and primary care clinicians' perceptions. BMC Public Health. 2013;13:915. Published 2013 Oct 2. doi:10.1186/1471-2458-13-915
- DGHS, MoHFW. National Programme on Prevention and Control of Diabetes, Cardiovascular diseases and Stroke. New Delhi: MoHFW; 2008.
- Saka O, McGuire A, Wolfe C. Cost of stroke in the United Kingdom. Age Ageing. 2009;38(1):27-32. doi:10.1093/ageing/afn281
- National Institute for Health and Care Excellence (NICE). Stroke quality standard (QS2). 2010. Available from: http://www.nice.org.uk/guidance/QS2
- Adams HP, Del Zoppo G, Alberts MJ, et al. Guidelines for the early management of adults with ischemic stroke. Circulation. 2007;115(20):e478-e534.
- Srinivasan A, Goyal M, Azri FA, Lum C. State-of-the-art imaging of acute stroke. Radiographics. 2006;26(suppl 1):S75-S95.
- Eze C, Okaro A, Ohagwu C. Pattern of computed tomography findings in cerebrovascular accident patients in south eastern Nigeria—a retrospective study of 480 patients. Eur J Sci Res. 2009;34:104-109.
- Mullins ME. Modern emergent stroke imaging: pearls, protocols, and pitfalls. Radiologic Clinics. 2006;44(1):41-62.
- Watila M, Ibrahim A, Balarabe S, et al. Risk factor profile among black stroke patients in Northeastern Nigeria. Journal of Neuroscience and Behavioral Health. 2012;4(5):50-58.
- Cortijo E, Garcia-Bermejo P, Calleja AI, et al. Intravenous thrombolysis in ischemic stroke with unknown onset using CT perfusion. Acta Neurol Scand. 2014;129(3):178-183. doi:10.1111/ane.12160
- Kane I, Whiteley WN, Sandercock PA, Wardlaw JM. Availability of CT and MR for assessing patients with acute stroke. Cerebrovasc Dis. 2008;2 5(4):3 75-3 77. doi:10.1159/000120688
- Sudlow C, Warlow C. Comparable studies of the incidence of stroke and its pathological types: results from an international collaboration. Stroke. 1997;28(3):491-499.