ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 05 | May - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CLINICAL AND CT SCAN ASSOCIATION IN CVA PATIENTS: OBSERVATIONAL STUDY FROM TERTIARY HEALTH CENTRE.

General Medicine

Dr Chandrakant Raibhoge Associate Professor
Dr Amit Varma Junior Resident
Dr Neelima Deshpande Professor and HOD

ABSTRACT

Background: The World Health Organization (WHO) definition of stroke is: "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin". By applying this definition transient ischemic attack (TIA), which is defined to last less than 24 hours, and patients with stroke symptoms caused by subdural hemorrhage, tumors, poisoning, or trauma are excluded. The pathological background for stroke may either be ischemic or haemorhagic disturbances of the cerebral blood circulation. Thrombotic cerebral infarction results from the atherosclerotic obstruction of large cervical and cerebral arteries, with ischemia in all or part of the territory of the occluded artery. This can be due to occlusion at the site of the main atherosclerotic lesion or to embolism from this site to more distal cerebral arteries. Embolic cerebral infarction is due to embolism of a clot in the cerebral arteries coming from other parts of the arterial system, for example, from cardiac lesions, either at the site of the valves or of the heart cardiac cavities, or due to rhythm disturbances with stasis of the blood, which allows clotting within the heart as seen in atrial fribrillation. **Methods :** Study setting: Department of General Medicine at our tertiary care centre Study Population: All cases of CVA admitted to ICU ward Study period: Two years (From January 2021 to June 2022) Study design: Cross sectional Descriptive observational study Sample size: 100 Scoring system for clinical diagnosis: Siriraj stroke score **Conclusion:** The present cross sectional descriptive observational study was caried out at Department of General Medicine at our tertiary care centre including 100 cases of CVA admitted to ICU ward during the study period from January 2021 to June 2022 with simple Random sampling method. The objective of our study was to study the correlation between Clinical profile using Siriraj score and CT scan Profile in cases of CVA patients and also to compare clinical diagnosis with radiological diagnosis using CT scan in identifying type of stroke. Siriraj score in our study revealed ischemic stroke in 50%, heamorrhagic stroke in 45% and equivocal in 5%. We observed statistically significant correlation of clinical diagnosis of haemorrhagic stroke and infarction with CT scan findings. We also observed that there was no significant association of clinical diagnosis with CT scan findings of lacunar stroke and cortical atrophy.

KEYWORDS

INTRODUCTION

The World Health Organization (WHO) definition of stroke is: "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin". By applying this definition transient ischemic attack (TIA), which is defined to last less than 24 hours, and patients with stroke symptoms caused by subdural hemorrhage, tumors, poisoning, or trauma are excluded.[1]

The pathological background for stroke may either be ischemic or haemorhagic disturbances of the cerebral blood circulation. Thrombotic cerebral infarction results from the atherosclerotic obstruction of large cervical and cerebral arteries, with ischemia in all or part of the territory of the occluded artery. This can be due to occlusion at the site of the main atherosclerotic lesion or to embolism from this site to more distal cerebral arteries. Embolic cerebral infarction is due to embolism of a clot in the cerebral arteries coming from other parts of the arterial system, for example, from cardiac lesions, either at the site of the valves or of the heart cardiac cavities, or due to rhythm disturbances with stasis of the blood, which allows clotting within the heart as seen in atrial fribrillation.[2]

Stroke is a global health problem. It is the leading cause of adult disability and the second leading cause of mortality worldwide. Mortality from strokes is the second leading cause worldwide.[3] About 15 million people suffer from non-fatal strokes leading to disability in about a third of patients. It is a leading cause of functional impairments, with 20% of survivors requiring institutional care after three months and 15-30% being permanently disabled.[4]

Ischemic stroke accounts for 50%-85% of all strokes worldwide.[5] Haemorhagic stroke are due to subarachnoid hemorrhage or intracerebral hemorrhage; they account for 1%-7% and 7%-27% respectively of all cases of stroke worldwide.[5]

Due to availability of various modalities of treatment, accuracy in diagnosis of this syndrome has been desirable. Anticoagulant therapy, surgical evacuation of intracerebral hematomas, subdural hematomas and the relief of carotid occlusion in neck, all demands precision in the diagnosis which is unattainable by clinical means alone. In earlier times, the physician did not have wide range of neurodiagnostic procedure; they had to be satisfied with whatever limited information was available through the existent techniques. The traditional procedures were of limited information (skull radiograms and electroencephalogram), hazardous (cerebral angiograms and lumbar puncture) and uncomfortable (pneumoencephalogram), the newer imaging techniques now unfolding have the capability of providing unprecedented, almost limitless information about the brain structure, function and regional chemistry.[6]

Noninvasive techniques, short time required for complete examination and pose no risk to patient renders CT scan the most valuable emergency diagnostic procedure in stroke [7]. In acute stroke, CT scan readily distinguishes hemorrhage from infarct guiding anticoagulant therapy and site, size of lesion provides prognostic value. Other stroke mimicking conditions can also be identified.[6] The development of CT scan and Brain imaging modalities has leaded a milestone that provides a "Living Autopsy" of the brain.[7]

Current guidelines for treatment of acute stroke by intravenous (IV) thrombolysis with recombinant tissue-type plasminogen activator (rt-PA)[8,9] are based on several large trials showing favorable results for this treatment within the 3- or 4.5-hour time window.[10-16] The main limitation has been the diminished benefit of IV-thrombolytic treatment beyond the given time frame. However, in these trials, the diagnosis of acute stroke was made clinically with supplementary nonenhanced computer tomography (NECT) examination to exclude intracranial hemorrhage and extensive early ischemic changes, both considered contraindications for thrombolytic treatment. No perfusion measurements or angiographic studies were carried out, which might have allowed treatment individualization and improved treatment results.[16]

Clinical evaluation and NECT examination are still the most important tools in the workup of acute ischemic stroke. With modern brain CT-

imaging, a supplementary overview of cerebral macro- and microcirculation can be obtained in minutes with CT angiography (CTA) and CT perfusion, providing valuable information before or during treatment initiation.[16]

Distinction between cerebral ischaemia and haemorrhage is necessary for safe administration of thrombolytic and anti-thrombotic for patients with ischemic stroke. Noncontract CT scan is the standard and accurate non-invasive tool to distinguish between cerebral infarction and haemorrhage. [17] It is impossible for all stroke patients to have CT scan of brain immediately after admission because of lack of facilities and limited access due to cost or distance, especially in rural areas in the developing countries such as India. Haemorrhagic and ischemic stroke cannot be distinguished clinically that is why the use of weighted clinical scores has been proposed to differentiate haemorrhagic from ischemic stroke. The two European recognized clinical scores are Allen's or Guys Hospital score and Siriraj Hospital score.[18,19]

Siriraj Stroke Score was developed in Thailand (Siriraj Hospital) by Poungvarin et al. in 1991.[20] Studies comparing the two scores have concluded that the Siriraj score is better than the Guy's hospital score.[21,22,23] Results of the most of the studies has concluded that Siriraj score is better than Allen's score especially in diagnosis of cerebral haemorrhage and has utility of being used within 24 hours of acute stroke.[24,25,26]

The purpose of this study is to compare the accuracy of Siriraj score in comparison with CT scan brain in differentiating between cerebral infarction and cerebral haemorrhage; considering CT scan as standard investigation.

RESULT

The present cross sectional descriptive observational study was caried out at Department of General Medicine at our tertiary care centre including 100 cases of CVA admitted to ICU ward during the study period from January 2021 to June 2022 with simple Random sampling method. The objective of our study was to study the correlation between Clinical profile and CT scan Profile in cases of CVA patients and also to compare clinical diagnosis with radiological diagnosis using CT scan in identifying type of stroke.

We included total 100 patients of stroke in our study. Majority of the cases were from 61-70 years age group i.e. 44% followed by 23% from 71-80 years, 17% from 51-60 years, 12% from above 80 years and 4% from 41-50 years age group. Mean age of the study population was 68.90±9.59 years.

57% were males and 43% were females

Distribution according to occupation revealed that majority i.e. 32% of the patients were housemakers followed by 28% farmers, 17% shopkeepers, 8% drivers,7% barbers and teachers each Prevalence of Tobacco chewing in our study was 45%, Smoking 42%, Alcohol 35%, DM as 38% and Hypertension 55%.

Clinical features of the patients revealed hemiplegia in majority of the cases 58%, altered consciousness 12%, hemiparesis 11%, seizure 8%, slurred speech 6%, facial deviation 2%, giddiness 2% and weakness 1%.

Level of consciousness assessed and we found that majority of the patients were alert 27% and semi coma 27% followed by drowsy in 22%, stuporous in 16% and coma in 8%.

Speech assessment revealed dysarthria in 46%, aphasia in 43%, slurred speech in 7%.

We assessed clinical diagnosis based on Siriraj score that revealed ischemic stroke in 50%, Haemorrhagic stroke in 45% and equivocal in 5%.

CT evaluation of the cases revealed infarction in majority of the cases i.e. 58%, Cortical atrophy in 43%, Haemorrhagic in 42% and Lacunar in 20%.

Duration of hospitalisation was 1 to 5 days in 10%, 5 to 10 days in 51%, 11 to 15 days in 20% and 15 to 20 days in 19%.

Incidence of death in our study was 36%.

Correlation of Clinical diagnosis with CT findings of hemorrhage revealed out of 45 cases with haemorrhagic stroke, majority i.e. 73.3% were correlated with CT findings. So in our study there was significant association of clinical diagnosis of haemorrhagic stroke with CT findings ($p<0.05$).

Correlation of Clinical diagnosis with CT findings of infarction revealed out of 50 cases with haemorrhagic stroke, majority i.e. 88% were correlated with CT findings. So, in our study there was significant association of clinical diagnosis of ischemic stroke with CT findings ($p<0.05$).

Correlation of Clinical diagnosis with CT findings of lacunar stroke revealed that out of 5 cases of equivocal stroke, lacunar was confirmed on CT in one patient i.e. 20%, out of 45 cases of haemorrhagic stroke, lacunar was confirmed on CT in 7 patient i.e. 15.6% and out of 50 cases of ischemic stroke, lacunar was confirmed on CT in 12 patient i.e. 24%. We observed that there was no significant association of clinical diagnosis with CT scan finding of lacunar stroke ($p>0.05$).

Correlation of Clinical diagnosis with CT findings cortical atrophy revealed that out of 5 cases of equivocal stroke, cortical atrophy was confirmed on CT in 2 patients i.e. 40%, out of 45 cases of haemorrhagic stroke, cortical atrophy was confirmed on CT in 25 patient i.e. 55.6% and out of 50 cases of ischemic stroke, cortical atrophy was confirmed on CT in 16 patient i.e. 32%. We observed that there was no significant association of clinical diagnosis with CT scan finding of cortical atrophy ($p>0.05$).

Table 1: Distribution According To Clinical Diagnosis Based On Siriraj Score

		Frequency	Percent
Clinical diagnosis based on Siriraj score	Equivocal	5	5.0
	Haemorrhagic	45	45.0
	Ischaemic	50	50.0
	Total	100	100.0

Table 2: Distribution According To CT Findings

		Frequency	Percent
CT findings	Haemorrhagic	42	42.0
	Infarction	58	58.0
	Lacunar	20	20.0
	Artery occlusion	0	0.0
	Cortical occlusion	0	0.0
	Cortical atrophy	0	0.0
	Cortical atrophy	43	43.0
	space occupying lesion	0	0.0
	Cortical atrophy	0	0.0
	Meningitis	0	0.0

Table 3: Correlation Of Clinical Diagnosis With CT Findings (hemorrhage)

		Clinical diagnosis based on Siriraj score						Total	p
		Equivocal		Haemorrhagic		Ischaemic			
		No	%	No	%	No	%		
Haemorrhagic	Yes	3	60.0	33	73.3	6	12.0	42	0.0001
	No	2	40.0	12	26.7	44	88.0	58	
Total		5	100.0	45	100.0	50	100.0	100	

Table 4: Correlation Of Clinical Diagnosis With CT Findings (infarction)

		Clinical diagnosis based on Siriraj score						Total	p
		Equivocal		Haemorrhagic		Ischaemic			
		No	%	No	%	No	%		
Infarction	Yes	2	40.0	12	26.7	44	88.0	58	0.0001
	No	3	60.0	33	73.3	6	12.0	42	
Total		5	100.0	45	100.0	50	100.0	100	

REFERENCES

1. WHO MONICA Project Investigators. The World Health Organization MONICA Project (Monitoring trends and determinants in cardiovascular disease). J Clin Epidemiol 41, 105-114. 1988
2. World Health Organization 2000 (Available from www.who.int, accessed on 01.08.2019)
3. World Health Organization. The world health report: shaping the future. Geneva: WHO; 2003.

4. Khan NI, Naz L, Mushtaq S, Rukh L, Ali S, Hussain Z. Ischemic stroke: prevalence of modifiable risk factors in male and female patients in Pakistan. Pak J Pharm Sci 2009; 22:62-7.
5. Feigin V, Lawes C, Bennet D, Barker Cello S, Parag V. Worldwide stroke incidence and early case fatality in 56 population-based studies: a systematic review. Lancet Neurol. 2009;8(4):355-369.
6. Rich DQ, Gaziano JM, Kurth T. Geographic patterns in overall and specific cardiovascular disease incidence in apparently healthy men in the United States. Stroke 2007;38:2221.
7. Walton J. Brain's Diseases of the Nervous System, 9th edition Oxford: Oxford University Press, 7985: page 320-55
8. P. A. Ringleb, M. G. Bousser, G. Ford et al., "Guidelines for management of ischaemic stroke and transient ischaemic attack 2008," Cerebrovascular Diseases, 2008; vol. 25, no. 5, pp. 457– 507
9. H. P. Adams Jr., G. Del Zoppo,M. J. Alberts et al., "Guidelines for the early management of adults with ischemic stroke: a guideline from the American heart association/American stroke association stroke council, clinical cardiology council, cardiovascular radiology and intervention council, and the atherosclerotic peripheral vascular disease and quality of care outcomes in research interdisciplinary working groups," Stroke 2007; vol. 38, no. 5, pp. 1655–1711
10. J. R. Marler, "Tissue plasminogen activator for acute ischemic stroke," New England Journal of Medicine 1995 vol. 333, no. 24, pp. 1581–1587
11. W. Hacke,M. Kaste, C. Fieschi et al., "Intravenous thrombolysis with recombinant tissue plasminogen activator for acute hemispheric stroke: the European Cooperative Acute Stroke Study (ECASS)," Journal of the American Medical Association 1995; vol. 274, no. 13, pp. 1017–1025, 1995.
12. W. Hacke, M. Kaste, C. Fieschi et al., "Randomized double-blind placebo-controlled trial of thrombolytic therapy with intravenous alteplase in acute ischaemic stroke (ECASS II)," Lancet 1998; vol. 352, no. 9136, pp. 1245–1251
13. W.M. Clark, S. Wissman, G. W. Albers, J. H. Jhamandas, K. P. Madden, and S. Hamilton, "Recombinant tissue-type plasminogen activator (Alteplase) for ischemic stroke 3 to 5 hours after symptom onset the ATLANTIS study: a randomized controlled trial," Journal of the American Medical Association 1999; vol. 282, no. 21, pp. 2019–2026, 1999.
14. W. Hacke, G. Donnan, C. Fieschi et al., "Association of outcome with early stroke treatment: pooled analysis of ATLANTIS, ECASS, and NINDS rt-PA stroke trials," Lancet 2004; vol. 363, no. 9411, pp. 768–774
15. W. Hacke, M. Kaste, E. Bluhmki et al., "Thrombolysis with alteplase 3 to 4.5 hours after acute ischemic stroke," New England Journal of Medicine 2008; vol. 359, no. 13, pp. 1317–1329
16. N. Wahlgren, N. Ahmed, A. D´avalos et al., "Thrombolysis with alteplase 3-4.5 h after acute ischaemic stroke (SITS-ISTR): an observational study," The Lancet 2008; vol. 372, no. 9646, pp. 1303– 1309
17. Kidwell CS, Chalela JA, Saver JL, et al. Comparison of MRI and CT for detection of acute intracerebral hemorrhage. JAMA 2004;292(15):1823-1830
18. Ozeren A, Bicakci S, Burqut R, Sarica Y, Bozedemir H. Accuracy of bedside diagnosis versus Allen and Siriraj Score in Turkish Patients. Eur J Neurol 2006;13(6):611-615.
19. Allen CM. Clinical diagnosis of the acute stroke syndrome. Q J Med 1983;52(4):515-523
20. Poungvarin N, Viriyavejakul A, Komontri C. Siriraj stroke score and validation study to distinguish supratentoral haemorrhage from infarction. BMJ 1991;302(6792):1565-1567.
21. Wadhwani J, Hussain R, Raman PG. Nature of Lesion in Cerebrovascular Stroke patients: Clinical Stroke Score and Computed Tomography Scan Brain Correlation. J Assoc Physicians India 2002;50:777-781
22. Nouira S, Boukef R, Bouida W, et al. Accuracy of two scores in the diagnosis of stroke subtype in a multicenter cohort study. Ann Emerg Med 2009;53(3):373-378.
23. Connor MD, Modi G, Warlow CP. Accuracy of the Siriraj and Guy's Hospital Stroke Scores in urban South Africans. Stroke 2007;38(1):62-68.
24. Soman A, Joshi SR, Tarvade S, Jayaram S. Greek stroke score, Siriraj score and Allen score in clinical diagnosis of intracerebral hemorrhage and infarct: Validation and comparison study. Indian J Med Sci 2004;58(10):417-422
25. Shah FU, Salih M, Saeed MA, Tariq M. Validity of Siriraj Stroke Scoring. J Coll Physicians Surg Pak 2003;13(7):391-393.
26. Chalela JA, Kidwell CS, Nentwich LM, et al. Magnetic resonance imaging and computed tomography in emergency assessment of patients with suspected acute stroke: a prospective comparison. Lancet 2007;369(9558):293-298.