



CORRELATION OF NIHSS WITH SHORT TERM COMPLICATIONS OF ACUTE ISCHEMIC CVA PATIENT RECEIVING THROMBOLYSIS

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ABSTRACT

Stroke is characterized as a neurological deficit attributed to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intracerebral haemorrhage (ICH) and subarachnoid hemorrhage. Thrombolysis is associated with its own complication and side effects and also have its own contraindication which should be kept in mind when thrombolysis is planned for the patient. Of all thrombolysis-related complications, intracerebral haemorrhage causes the most significant morbidity and mortality. A prospective, longitudinal observational study was done, in which 47 consecutive cases of ischemic CVA, were included from march 2020 to October 2021. The demographics, risk factors, biochemical parameters and outcomes (mortality and complications) were assessed, until discharge or in-hospital death. After 24 hours of thrombolysis, 7 patients had NIHSS between 0-4 (1 patient on arrival), 19 patient had NIHSS of 5-15 (15 patients on arrival), 6 patients had NIHSS of 16-20 (11 patients on arrival) and 15 patients had NIHSS of 21-42 (20 patients on arrival). Intra cranial bleed was significantly more among subjects with NIHSS score (after 24 hours) of 21-42 with 4 out of 7 patients in that group followed by 2 patients with NIHSS of 16-20. Deterioration of power was seen in 3 patients with 2 patients of NIHSS of 21-42. Seizure occurred in 2 patients with single patient in NIHSS of 16-20 and 21-42 group respectively. NIHSS at admission and 24hrs after admission is clinical score which could be assessed bedside and helps in assessing prognosis for the patients.

KEYWORDS :

INTRODUCTION

The phenomenon of sudden paralysis that is often associated with ischemia was first described by none other than father of medicine Hippocrates (460 to 370 BC), over 2,400 years ago.

Stroke is a medical emergency and its characteristic signs and symptoms indicating focal neurological deficit must be identified immediately as we can initiate our treatment in timely manner as it is rightly said that: "TIME IS BRAIN". Delay in the treatment can lead to permanent disability or mortality.

Stroke is characterized as a neurological deficit attributed to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intracerebral haemorrhage (ICH), and subarachnoid haemorrhage.¹ The most common symptom of a stroke is sudden weakness or numbness of the face, arm, or leg, most often on one side of the body, occurring in 90% of the strokes. The symptoms of a stroke caused by an embolism usually appear suddenly while with thrombosis, symptoms may appear more slowly.

Transient ischemic attack (TIA) is defined as "a transient episode of neurologic dysfunction caused by focal cerebral, spinal cord, or retinal ischemia, without acute infarction."^{2,3} The crude prevalence rate of stroke (according to epidemiological studies from 1971 to 1999) was reported to be between 44 and 842 strokes per 100,000 persons, and the annual incidence rate was between 13 and 124 strokes per 100,000 persons. While the estimated adjusted prevalence rates of stroke are between 84 and 262 strokes per 100,000 persons in rural areas and between 334 and 424 strokes per 100,000 persons in urban areas.

As per the National Vital Statistics Report, cerebrovascular disease (stroke) in the United States has now dropped down to the fifth leading cause of death after chronic lower respiratory diseases and accidents, whereas in India it is the second leading cause of death. More than 7,95,000 people suffer from

stroke and almost 1,30,000 patients die because of stroke each year in the United States, whereas in India over 1.5 million strokes occur every year.

Drugs to break the blood clots or thrombolytics are the drugs used in breaking the clot and to restore blood supply to the affected part of the brain and they should be administered within 3 hours (ideally) to 4 1/2 (extended) of symptom onset. Intravenous (IV) thrombolysis with recombinant tissue-type plasminogen activator (r-tPA) has been approved in United States in 1996 for reperfusion therapy of acute ischemic strokes within window period, and one option of thrombectomy which is ideally done within 6 hours of symptom onset in case of large vessel occlusion. Thrombolysis is associated with its own complication and side effects and also have its own contraindication which should be kept in mind when thrombolysis is planned for the patient. Of all thrombolysis related complications, intracerebral haemorrhage causes the most significant morbidity and mortality.

Most common complication of thrombolysis is intracranial haemorrhage, which can be symptomatic or asymptomatic whereas other complications are ineffective thrombolysis (worsening of ischemia), thromboembolism, allergy to r-tPA-causing angioedema, cerebral herniation, reperfusion injury with cerebral edema and seizures.

METHODS

A prospective, longitudinal observational study was conducted in the Department of Medicine, MGM Medical College and Hospital, Navi Mumbai, with 47 consecutive cases of ischemic CVA. Estimated sample size (n = 47) calculated using the Cochran formula: $n = [z^2 P(1-p)] / d^2$ with a low margin of error ($d \sim 2.4\%$) and confidence interval of 95%, after written informed consent, from March 2020 to October 2021.

Detailed history of present illness along with personal and past history were taken from all the patients of ≥ 18 years of age and recorded in previously structured case pro forma. General and systemic examinations were carried out. Weight was measured by the standard weighing machine if patient was able to stand. Blood HGT was measured. The left arm supine blood pressure was recorded using sphygmomanometer. It was repeated after 5 minutes. The average of the two readings was recorded as the patient's blood pressure. Patient NCCT brain was performed as soon as possible. If shows no evidence of bleed (except frank hypodensity in more than 1/3rd of middle cerebral artery territory) patient was thrombolysed. NIHSS scoring was done at arrival, repeated at 1 hour and 24 hours. According to NIHSS patients were divided as minor stroke (0-4), moderate stroke (5-15), moderate to severe stroke (16-20) and severe stroke (21-42). After 24 hours of thrombolysis MRI brain was performed for all patients except 6 patients (4 had metallic implants while 2 had pacemaker) for whom CT brain and angiography was performed. Patient were then followed up and mRS scoring 35 was done at 7th day and 14th day and their degree of disability was measured accordingly.

Statistical Analysis:

The data was analyzed using statistical software (IBM SPSS, IBM Corporation, Armonk, NY, USA). Descriptive statistics: The Numerical/ Continuous data were expressed as Mean # Standard Deviation and the Categorical data were expressed as Percentages. The Categorical data were analyzed by the %Chi square test, Bar charts and Pie diagrams were used for the presentation of the data as applicable. P value of less than 0.05 was considered as "statistically significant" and indicated by "*" in the Tables. Odds ratio along with 95% CI was calculated wherever required.

RESULTS AND DISCUSSION:

In our study male preponderance (85.1%) was noted. Out 40 male patients, 3 (7.5%) died whereas no female death occurred during the study. 3 (7.5%) male patients showed neurological worsening in study while no female patient showed neurological worsening. Male patients had comparative poorer outcome than their female counterpart. Most common complication was Intra-cranial bleed that occurred in 7 (14.9%) patients following which was deterioration of power in 3 (6.4%) patients. Seizure and sepsis were reported in 2 (4.3%) patients each. Systemic haemorrhage was reported in 1 (2.1%) case. No patient reported thromboembolism. (Table 1)

Maximum number of patients had NIHSS score of 21-42 (severe stroke) on arrival i.e., 20 while only 1 patient was present in 0-4 group (minor stroke). After 24 hours maximum patients i.e., 19 were of NIHSS 5-15 (moderate stroke). 1 patient had on arrival NIHSS of 3 which decreased to score of 1 at 24-hour post thrombolysis. Total of 7 patients had NIHSS of 0-4, 24-hour post thrombolysis in which 1 patient had on arrival NIHSS of 0-4 only while 6 patients were in 5-15 category.

Improvement was more among patients with NIHSS at 24 hours of 0-4. Death was more among subjects with NIHSS at 24 hours of 21-42. After 24 hours of thrombolysis, 7 patients had NIHSS between 0-4 (1 patient on arrival), 19 patient had NIHSS of 5-15 (15 patients on arrival), 6 patients had NIHSS of 16-20 (11 patients on arrival) and 15 patients had NIHSS of 21-42 (20 patients on arrival). Indicating majority of patients were belonging to moderate category of stroke post thrombolysis followed by severe category of stroke.

Number of patients with mild category was only 1 on arrival while number increased to 7 at 24 hours post thrombolysis. Out of 15 patients of severe category of stroke, 7 patients

showed improvement in power while 3 had same neurological deficit. All these patients got discharged from hospital. (table 2)

The distribution of complications was compared between NIHSS at 24 hours using the chi-square test. Intra cranial bleed was significantly more among subjects with NIHSS score (after 24 hours) of 21-42 with 4 out of 7 patients in that group followed by 2 patients with NIHSS of 16-20. Deterioration of power was seen in 3 patients with 2 patients of NIHSS of 21-42. Seizure occurred in 2 patients with single patient in NIHSS of 16-20 and 21-42 group respectively. (Table 3)

Table 1: Post thrombolysis complication in study group

Complications	FREQUENCY	Percentage
Intra-cranial bleed	7	14.9%
Seizure	2	4.3%
Deterioration of	3	6.4%
Systemic	1	2.1%
Thromboembolism	0	0.0%
Sepsis	2	4.3%

Table 2: Correlation of outcome with NIHSS at 24 hours post thrombolysis

Outcome	NIHSS 24 HOURS					p-value
	0-4	5-15	16-20	21-42	Total	
Death	0	0	0	3	3	0.047
	0.0%	0.0%	0.0%	20.0%	6.4 %	*
Worsening in Neurological Status	0	0	1	2	3	0.041
	0.0%	0.0%	16.7%	13.3%	6.4 %	*
Improvement in Neurological Status	7	18	5	7	37	0.003
	100.0 %	94.7%	83.3%	46.7%	78.7 %	*
No change in Neurological Status	0	1	0	3	4	0.012
	0.0%	5.3%	0.0%	20.0%	8.5 %	*
Total	7	19	6	15	47	
	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	
K value = 16.853, p-value = 0.045*						

Table 3 : Correlation of complications with NIHSS at 24-hour post thrombolysis

Complications	NIHSS 24 HOURS				Chi-square value	p-value
	0-4	5-15	16-20	21-42		
IC bleed	0	1	2	4	5.865	0.048*
	0.0%	5.3%	33.3%	26.7%		
Seizure	0	0	1	1		0.368
	0.0%	0.0%	16.7%	6.7%		
Deterioration of power	0	0	1	2	11.358	0.078
	0.0%	0.0%	16.7%	13.3%		
Systemic haemorrhages	0	1	0	0	1.506	0.681
	0.0%	5.3%	0.0%	0.0%		
Sepsis	0	2	0	0	3.078	0.380
	0.0%	10.5 %	0.0%	0.0%		

CONCLUSIONS

CVA is a significant cause of worldwide morbidity and mortality. Intra cranial bleed was significantly more among subjects with NIHSS score (after 24 hours) of 21-42 with 4 out of 7 patients in that group followed by 2 patients with NIHSS of 16-20. Deterioration of power was seen in 3 patients with 2 patients of NIHSS of 21-42. Seizure occurred in 2 patients with

single patient in NIHSS of 16-20 and 21-42 group respectively. This signifies that patients with high NIHSS score will have poor outcomes when compared to patients in low NIHSS category.

LIMITATIONS

This was a prospective observational study with a short follow up period and long term outcomes were unknown. With sample size of 100 extrapolating these results to general population is not feasible.

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