International Journal of Multidisciplinary Research and Growth Evaluation.

A comparative study between ischemic and hemorrhagic stroke severity on patients in Jalgaon by NIH and mRS scale

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Article Info

Abstract
Aim: To comparative study between ischemic and hemorrhagic stroke severity on patients in Jalgaon by NIH and mRS scale.
Relevance of Study: The stroke is one of the leading cause of impairments and disability. Due to long term impairments and disabilities the activity of daily livings in the individuals of stroke is limited and dependent. For that prior discharge checking or assessing of impairments and disabilities in patients is crucial. So that we can understand about the level of recovery in patients. Which is helpful in rehabilitation of patients. So the present study will be carried out.
Methodology: In this comparative observational study 108 patients are included according to inclusion and exclusion criteria. Evaluation of impairments was assessed by using National Institute of Health Stroke Scale (NIHSS) and evaluation of disabilities are calculated by using Modified Rankin Scale (mRS).
Result: Among 108, 54 patients are suffered from ischemic stroke and another 54 patients are suffered from hemorrhagic stroke. The independent paired t- tests were used to compare ischemic and hemorrhagic stroke patients in NIH and mRS Scales. The study resulted that the mean deviation of NIH stroke scale score at time of discharge in ischemic stroke (MD=6.56) i.e. 85.3% and the mean deviation of NIH Stroke scale score at time of discharge in hemorrhagic stroke (MD= 7.50) i.e. 97.52%. The mean deviation of mRS score at time of discharge in ischemic stroke (MD= 2.63) i.e. 85.66% and the mean deviation mRS score at time of discharge in hemorrhagic stroke (MD= 3.00) i.e. 97.71%.
Conclusion: The hemorrhagic stroke showed more impairments and disabilities than ischemic stroke at time of discharge from hospitals in acute stroke patients.

Keywords: Stroke, NIHSS, mRS, Impairments, Disabilities

Introduction

Stroke is a cerebrovascular accident [CVA]. In stroke there is sudden loss of neurological function caused by an interruption of oxygen and blood supply to the brain [1, 2]. Stroke is ranked as the second leading cause of death worldwide with an annual mortality rate of about 5.5 million [3, 4]. According to the current global burden of disease data on stroke, in 2013 there were almost 25.7 million stroke survivors, 6.5 million deaths, 113 million Disability- adjusted life years (DALYs) due to stroke, and 10.3 million new strokes [5]. The burden of stroke seems to be shifting to the developing world where currently, there are 4.85 million stroke deaths and 91.4 million Disability- adjusted life years (DALYs).Stroke is the fifth leading cause of death and the leading cause of long term disability among adults in the United States. Stroke is the fifth leading cause of disability adjusted life years in India [6]. There were 6.5 million stroke cases in India, accounting for 7.1% of total deaths in 2016 [7].

In Maharastra stroke was found to be the leading cause mortality in a rural tribal area called Gadchiroli. The incidence of stroke in Gadchiroli from 105 to 152/100000 person per year, and the crude prevalence of stroke ranged from 442 to 559/100000 persons in different parts of country during past decade [8]. In Mumbai men had a higher stroke incidence rate than did women [9].

The stroke is mainly differentiated into two main types ischemic stroke and hemorrahagic stroke [10]. In ischemic stroke the reduced blood flow towards the brain is caused by emboli and it accounts for 87% of all strokes [11, 12]. In hemorrhagic stroke the reduced blood flow towards the brain is caused by the rupture of concerned artery and it accounts for about 13% all stroke [13]. Despite of these two stroke the Transient ischemic attack (TIA) is a temporary period of symptoms similar to those of a stroke. A TIA is usually lasts only a few minutes and doesn't cause permanent damage. It is caused by a blood clots that is formed elsewhere in your body and travelled to the blood vessels supplying the brain.

Stroke is the leading cause of serious long-term impairments and disabilities in patients. In which loss of consciousness, Sudden numbness or weakness of the face, arm or leg especially on the one side of the body, Sudden confusion, Speech difficulty, sudden trouble seeing in one or both eyes, Sudden trouble in walking, Dizziness, loss of balance or co-ordination. Early warning signs identified by the American Heart Associations and National Stroke Associations, known as FAST [14]. In the FAST, F is for face drooping; A is for arm weakness; S is for speech difficulty and T for time to call.

Major risk factors of stroke are hypertension, diabetes mellitus, high blood cholesterol and other lipids, smoking/tobacco use, and heart disease. Blood pressure is a powerful determinant of risk for both ischemic stroke and intracranial hemorrhage. Individuals with BP less than 120/80 mm Hg have approximately half the lifetime risk of stroke of those with hypertension [15]. Cardiac disorder and cardiac surgery increase the risk of embolic stroke. Modifiable risk factors include cigarette smoking, physical inactivity, obesity, and diet. Physical activity (moderate to vigorous exercise) is associated with an overall 35% reduction in stroke risk, whereas light exercise (walking) does not appear to have the same benefit. Stroke risk factors considered non-modifiable include family history, age, gender, and race (African American). Lifestyle changes can greatly reduce the risk of stroke. Achieving the greatest ideal cardiovascular health metrics, including avoiding smoking and tobacco products; engaging in daily physical activity; eating a healthy diet; maintaining a healthy weight; and keeping cholesterol, BP, and glucose at healthy levels, is associated with a lower risk of stroke [15, 16].

Twenty-six countries have been reported to have nation-wide standardized data sets for acute stroke [17].Some of these reported long term changes in stroke severity; the Austrian Stroke Unit involving 53126 patients with intracerebral haemorrhage between 2008 and 2016 [18], and the national acute stroke registry Israel registry, involving 6693 patients with ischemic stroke and ICH between 2004 and 2013 [19], showed a decrease in severity assessed by National Institutes of Health Stroke Scale (NIHSS). The functional outcome assessed by the modified Rankin Scale (mRS). In the present study, secular changes in initial neurological severity and short term outcomes of patients with stroke assessed using NIHSS and mRS sco res were determined in hospitals in Jalgaon.

The aim of the study was the comparison between ischemic and haemorrhagic stroke severity on patients in Jalgaon by NIH and mRS scale. The stroke is one of the leading cause of impairments and disabilities. Due to the long term impairments and disabilities the activity of daily living in the individuals of stroke is limited and dependent. For that prior discharge checking or assessing impairments and disabilities in patients is crucial. As a result shows that there will be improvements in both strokes i.e. ischemic and hemorrhagic from admission to discharge from hospitals.

Materials and Methods
Study Design: Comparative study.
Study Set Up: Hospitals in Jalgaon.
Sample Size- $n = \dfrac{Z1^2 (p_1q_1 + p_2q_2)}{D^2}$

Where, $p_1 = 0.57$ $q_1 = 0.43$
       $P_2 = 0.43$ $q_2 = 0.57$
P= average of p_1 and $p_2 = 0.50$
$Z_1 = 1.64$ at $\alpha = 5\%$ level of significance
D= absolute precision $= \pm 0.13$
$n_1 = 54$ and $n_2 = 54$

Study duration- 6 months
Participants
A comparative study was conducted on sudden onset of 108 acute stroke-patients in Jalgaon district hospitals. Criteria for inclusion were 1) GCS score ≥ 7 was to participated in study. 2) Conscious patients are included in this study. Patients was excluded were 1) Ventilator dependent patients. 2) Surgical procedure performed patients i.e. craniotomy. Outcome measures were 1) National Institute of Health Stroke Scale (NIHSS) 2) modified Rankin Scale (mRS).

Procedure
Ethical clearance was taken from the institutional ethical committee of Dr. Ulhas Patil College of Physiotherapy. Patients were included by convenient sampling based on inclusion and exclusion criteria as mentioned earlier and written consent of patients was obtained. The study was explained thoroughly to them and demographic details were taken.

A detailed assessment of impairments and disabilities was taken of all patients by using National Institute of Health Stroke Scale (NIHSS) and modified Rankin Scale (mRS) respectively.

Patients were screened for consciousness using Glasgow Coma Scale (GCS) scale to assess the impact of consciousness on patient's quality of life. The score was noted and was classified according to the interpretation:

3-8:- Severe injury
9-12:- Moderate injury
13-15:- Mild injury

Patients having GCS score ≥ 7 were included in the study.

**Fig 1:** Shows the Assessment of patient

Results

A total 108 patients were included in the study. According to the demographics the 69 males (64%) and 39 females (36%) included in the following study. Independent paired t-tests were used to compare the NIH and mRS score between the two types of stroke. In The data was obtained from the participants and statistically analysed in MS Excel.
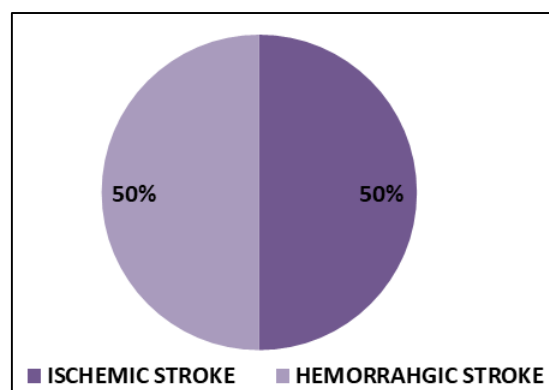
Table 1: Gender Wise Distribution

Gender	Total no. of patients
Male	69
Female	39
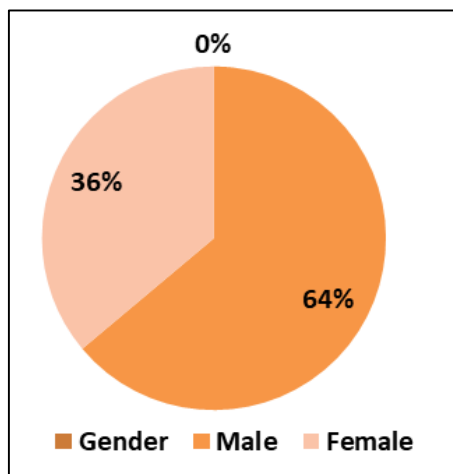
Graph 1: Gender wise Distribution

Table 2: Type wise distribution

Type of stroke	Type of stroke patients
Ischemic stroke	54
Haemorrhagic stroke	54

Graph 2: Type of Stroke Patients

Table 3: NIH Score distribution in Ischemic Stroke

NIH	MD	SD
NIH at admission in ischemic	9.76	5.36
NIH at discharge in ischemic	6.56	5.21
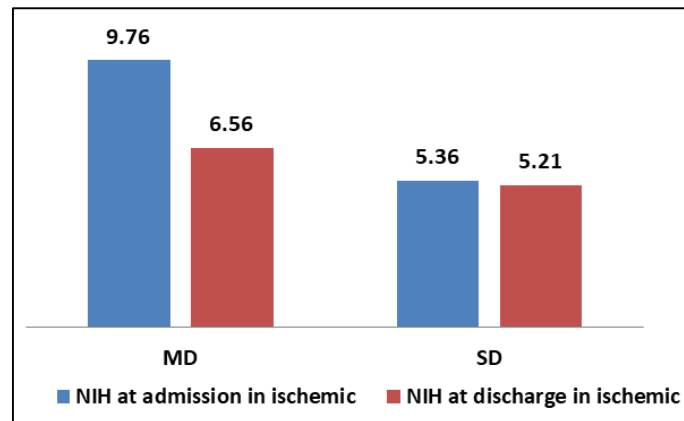
Graph 3: NIH Score Distribution in Ischemic Stroke Patients

Table 4: NIH Score distribution in haemorrhagic stroke

NIH	MD	SD
NIH at admission in haemorrhagic	10.5	5.36
NIH at discharge in haemorrhagic	7.50	5.35
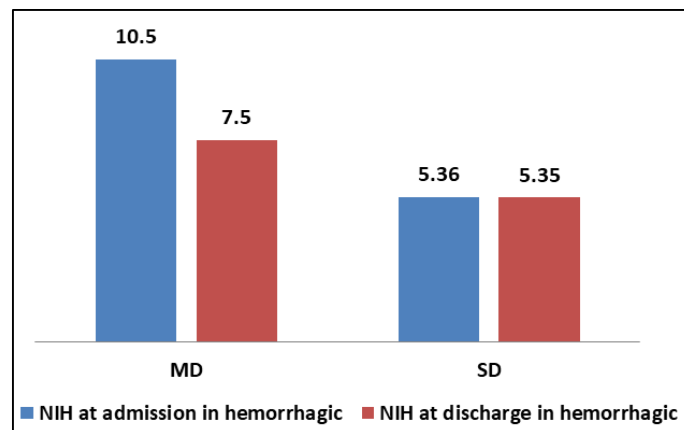
Graph 4: NIH Score Distribution in Hemorrhagic Stroke Patients

Table 5: NIH score distribution at time of discharge in ischemic and haemorrhagic stroke

NIH	MD	SD
NIH at discharge in ischemic	6.56	5.21
NIH at discharge in heamorrhagic	7.50	5.35

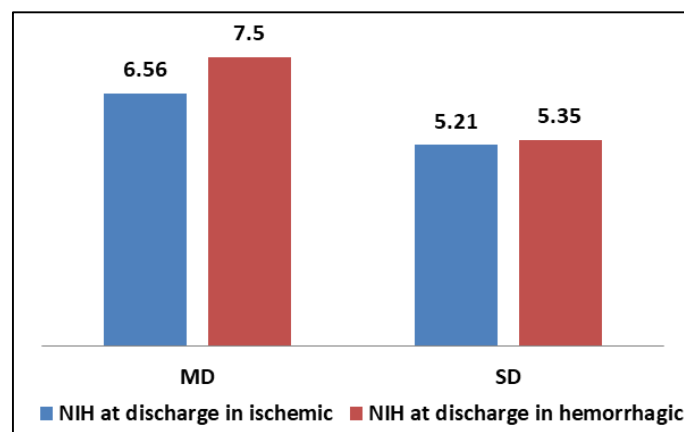
Graph 5: NIH Distribution in both type of Strokes

Table 6: mRS score distribution in ischemic stroke

mRS	MD	SD
mRS at admission in ischemic	3.43	1.27
mRS at discharge in ischemic	2.63	1.45
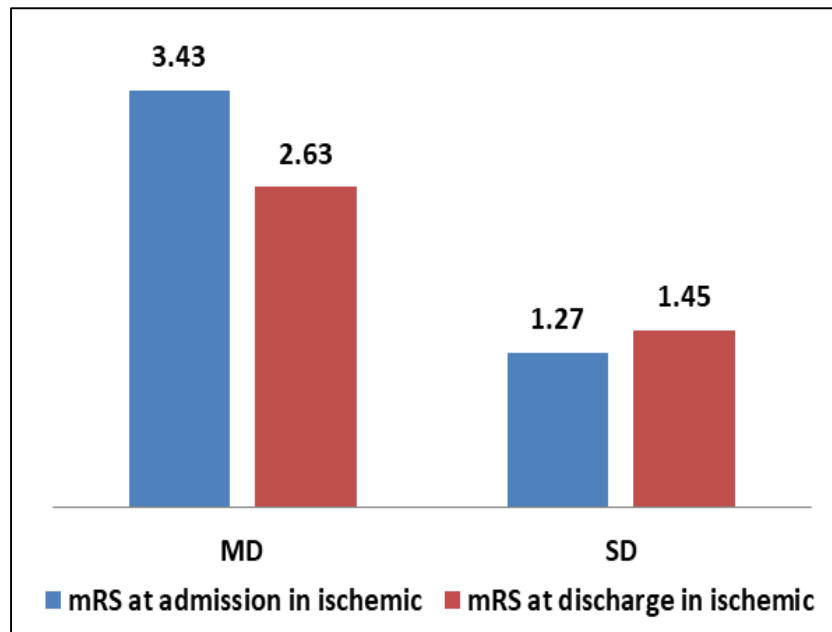
Graph 6: mRS Distribution in Ischemic Stroke

Table 7: mRS score distribution in haemorrhagic stroke

mRS	MD	SD
mRS at admission in haemorrhagic	3.66	0.95
mRS at discharge in haemorrhagic	3.00	1.49
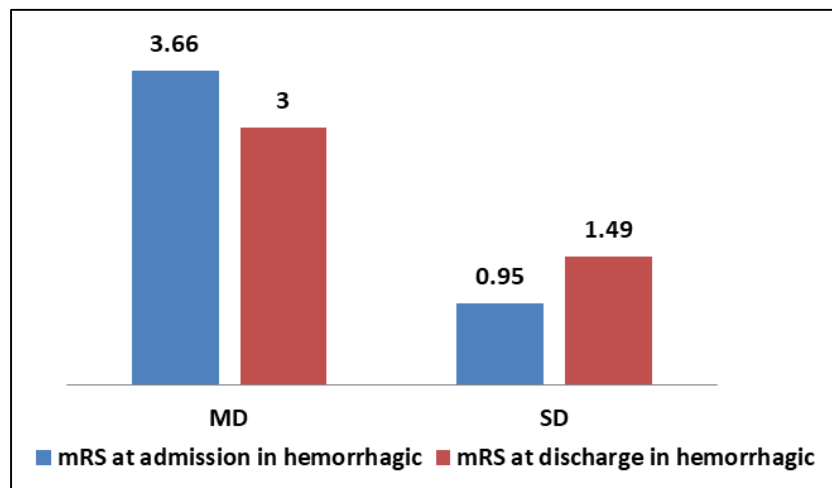
Graph 7: mRS Distribution in Hemorrhagic Stroke

Table 8: mRS score distribution at time of discharge in ischemic and haemorrhagic stroke

mRS	MD	SD
mRS at discharge in ischemic	2.63	1.45
mRS at discharge in haemorrhagic	3.00	1.49
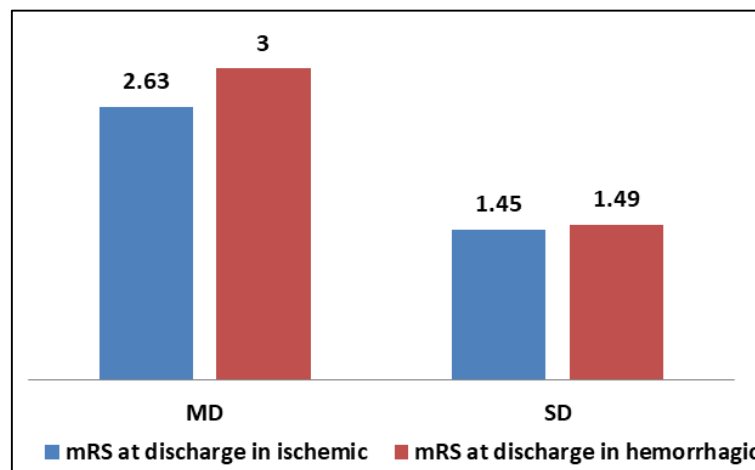
Graph 8: mRS Distribution in both type of stroke patients

Discussion

The present study aimed to compare the type of stroke and its severity on patients in Jalgaon.

The study revealed that the hemorrhagic stroke presented more impairments and disability than the ischemic stroke in acute stroke patients at the time of discharge.

In the present study two types of strokes were considered and its severity was assessed by using Modified Rankin Scale (mRs) which showed disability and National Institute of Health Stroke Scale (NIH) which shows impairments in stroke patients.

Previous researchers stated that the hemorrhagic strokes shows more impairments and disability due to advanced age, vascular risk factors, size of lesion and area of brain affected. As hemorrhagic stroke not only damages brain cells but also lead to increase pressure on brain and spasms in blood vessels.

It is stated that there are three main processes implicated in neurorecovery:- angiogenesis, neurogenesis, and synaptic plasticity. These processes are naturally produced in adult brains subsequent to intensive rehabilitation, which could promote an endogen neurorepair phenomenon.

A study conducted by Emilia Salvadori and Gioele Papi *et al.* in 2020 to evaluate the comparison between ischemic stroke and hemorrhagic stroke in functional outcome at discharge from an intensive rehabilitation hospital resulted that the hemorrhagic stroke presented a worse functional and clinical status compared to ischemic stroke which coincides with the present study [20].

Previous researchers stated that the hemorrhagic strokes have wide spectrum of clinical manifestation, due to vascular injury, increases in blood pressure and rate of blood flow.

The study conducted by Seyedhossein Ojaghihaghighi, Samad Shams Vahadati and Ali Ramouz *et al.* in 2017 to evaluate the comparison of neurological clinical manifestation in patients with hemorrhagic and ischemic stroke resulted the occurrence of acute manifestations most likely profound the probability of hemorrhagic stroke which coincide with present study [21].

In the previous research by Seyedhossein *et al* in 2017 stated that NIHSS score decreased in both stroke type, functional outcomes more improved in ischemic stroke and more deaths, disability in hemorrhagic stroke due to blood pressure enable to control.

And development of brain imaging modalities such as weighted imaging that accurately differentiates minor stroke from mimics and would increase registration of more stroke. Which supports the current study.

The study conducted by Kazunori Toyoda *et al* in 2022 to evaluate the Twenty year change in severity and outcome of Ischemic and Hemorrhagic strokes resulted that the functional outcomes improved in patients with ischemic stroke but outcomes of hemorrhagic stroke did not clearly improve in the same period which coincide with present study [22].

Stroke severity appears to be influential factor in predicting outcome. As the present study revealed that there was more impairment and disability in hemorrhagic stroke patients than ischemic patients even though the there were more number of ischemic patients seen. Study considered retrospective data for the same and prognosti ally compared ischemic and hemorrhagic with severity. Despite the methodological limitations study represents a contribution in field of Neurorehabilitation.

Conclusion

The Haemorrhagic Stroke showed more impairments and disabilities than the ischemic stroke at time of discharge from hospitals in acute stroke patients.

Limitation

Age criteria was not mentioned

Routinely follow of the patients was not taken. Do not explain properly about follow up of patients from time of admission to the time of discharge from hospitals.

Stable stroke cases are taken only.

Retrospective data considered (patients stats of type of stroke.)

Future Scope

Further study can be done considering first day of admission irrespective of condition of patients.

Effect of physiotherapy intervention on type of stroke patients.

Follow up study can done with large sample size.

Clinical Implication

NIH and mRS are useful in finding out impairments and disabilities in acute stroke patients.

By using these scales at early stages or at time of discharge the physiotherapy can plan rehabilitation protocol for the stroke patients. So that it will be easy to keep follow up of

patients and can modulate treatments accordingly.

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