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Original Research Article

The Clinical Profile and Outcome of Haemorrhagic Stroke Patients Admitted at a Tertiary Care Center in Western Rajasthan

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Abstract:

Introduction: Stroke is the second leading cause of mortality and the fourth leading cause of impairments worldwide. Each year, more than 20 million people have a stroke, and five million of them pass away as a result of their condition. The incidence of stroke has, however, quickly decreased in industrialised nations, with up to 85.5% of all stroke deaths occurring in underdeveloped nations, according to recent data.

Objectives: To study NIH stroke scale at admission and MRS (disability scale) at discharge and follow up of haemorrhagic stroke patient.

Methodology: Hospital based retrospective cohort study (with an internal comparison group) was conducted in 100 haemorrhagic stroke patients admitted in the PBM and attached group of hospitals, Bikaner, Rajasthan.

Results: All cases had one or more risk factors, with dysphagia being the most common seen in 38% cases, followed by right hemiparesis in 33% cases, left hemiparesis in 25% cases, unconsciousness in 26% cases, dysarthria in 20% cases, paraparesis, and altered sensorium each in 4% cases. Most cases had multiple risk factors, with a combination of dysphagia and hemiparesis being the most common. The NIHSS score of cases ranged between 5-40, with 58% having a score of 21-40.

Discussion: The majority of our patients were older adults, with hypertension being the most common risk factor. Our study also found significant differences in laboratory parameters between survivors and non-survivors, specifically in terms of RBS level, cholesterol level, and triglyceride level. Furthermore, our study found a strong correlation between baseline NIHSS score and long-term functional outcomes, highlighting the importance of NIHSS score as a marker for prognosis and potential for recovery in haemorrhagic stroke patients.

Conclusion: Further research is needed to confirm our findings and to determine the clinical utility of laboratory markers in the management of haemorrhagic stroke in India.

Keywords: Hemorrhagic stroke, hemisparesis, RBS level, RBS level, cholesterol level, triglyceride level, NIHSS score,

Introduction

Stroke is the second leading cause of mortality and the fourth leading cause of impairments worldwide. Each year, more than 20 million people have a stroke, and five million of them pass away as a result of their condition. The incidence of stroke has, however, quickly decreased in industrialised nations, with up to 85.5% of all stroke deaths occurring in underdeveloped nations, according to recent data. In fact, stroke-related morbidity is seven times higher in underdeveloped nations than it is in industrialised nations. A drop in stroke rates was significantly linked to both social and economic changes, as some of the declines happened even before contemporary therapeutic options were available. [1]

In India, stroke is one of the main causes of mortality and disability. Stroke prevalence rates are expected to range from 84 to 262/100,000 person in rural areas to 334 to 424/100,000 person in metropolitan areas. According to recent population-based studies, the incidence rate ranges from 119 to 145/100,000. [2]

Vascular changes including stenosis, occlusion, and rupture of the arteries, can impair cerebral function. Any brain malfunction, or "neurological deficiency," shows up as a variety of neurological signs and symptoms that are correlated with the size and location of the affected area as well as the underlying reasons. These include a coma, numerous paralyses, hemiplegia, paraplegia, and monoplegia, as well as speech difficulties, nerve paresis, sensory impairment, and others. A range of syndromes with various etiology, epidemiology, prognoses, and treatments are included in the category of strokes.

Haemorrhagic stroke is caused by bleeding into the brain brought on by a blood vessel rupture. Intracerebral haemorrhage (ICH) and subarachnoid haemorrhage (SAH) are sub categories for haemorrhagic stroke. The brain parenchyma bleeding forms ICH, while the subarachnoid space bleeding forms SAH. Significant morbidity and significant mortality are linked to haemorrhagic stroke. There is a link between worse outcomes and haemorrhagic stroke progression. Due to the haemorrhage's typical rapid growth, which results in a precipitous decline in consciousness and neurological dysfunction, early detection and treatment are crucial. [3]

Examples of haemorrhagic stroke include epidural, subdural, subarachnoid, intraventricular, haemorrhagic transformation of ischemic stroke (HT), venous haemorrhage from cortical vein or sinus thrombosis, and intracerebral haemorrhage.

Objectives:

- To study sociodemographic and clinical data/pattern of haemorrhagic stroke patient.
- To study NIH stroke scale at admission and MRS (disability scale) at discharge and follow up of haemorrhagic stroke patient.
- To study outcome of haemorrhagic stroke patient.

Methodology:

Hospital based retrospective cohort study (with an internal comparison group) was conducted in 100 haemorrhagic stroke patients admitted in the PBM and attached group of hospitals, Bikaner, Rajasthan. All patients of haemorrhagic stroke (on CT or MRI) were included in the study. After

reviewing the previous hospital records of haemorrhagic stroke patients at our institute, a sample size of 100 was taken number of patients to be included in the study between the courses of 12 months. After obtaining informed consent, detailed history, clinical examination, lab investigation reports were entered in a predesigned structured proforma.

Random blood sugar, CBC, Urea and Creatinine, Serum electrolyte, Lipid profile, ECG, Echocardiogram, CT brain/MRI brain investigations were done.

Haemorrhagic Stroke was defined as focal neurological deficit due to intracerebral bleeding which can be confirmed on neuro images and resulting in partial or complete loss of motor and sensory activities. Patients meeting the criteria for stroke irrespective of sex were included.

The following patterns of haemorrhagic stroke were identified by imaging:

a) Intracerebral haemorrhage (ICH)

b) Subarachnoid haemorrhage (SAH)

The presence or absence of the following data was recorded for all the patients

1. Age and sex of the patient

2. Clinical features

a) Weakness- right or left hemiparesis or hemiplegia,

b) Cranial nerve involvement

c) Speech involvement dysarthria or aphasia

d) Altered sensorium

e) Other features-seizures, gait disturbances

3. Hypertension

4. Diabetes mellitus

5. History of smoking

6. Presence of dyslipidaemia

7. Obesity

8. Presence of heart diseases or atrial fibrillation

9. Alcoholism

10. Family income

11. Past history of TIA or stroke

12. Family history of stroke

Hypertension was defined as per the JNC-7 criteria: [4]

1. Stage I hypertension- systolic BP between 140-159 mmHg and diastolic BP between 90-99 mmHg
2. Stage II hypertension as systolic BP >160 mmHg and diastolic BP 100 mmHg or more Diabetes mellitus was diagnosed according to American diabetes association. Patients were considered diabetic if: [5]

The random blood sugar is above 200

Or

The glycosylated haemoglobin is greater than 6.5

Or

Fasting blood sugar more than 126 and postprandial blood sugar is more than 200.

Smoking: A person who has smoked 100 or more cigarettes during his lifetime was considered as a smoker. A "current smoker" was defined as a patient who smokes 1 cigarette/bedi per day for at least 3 months or if he/she consumes tobacco in a different form.51

Dyslipidaemia: Dyslipidaemia was considered according to the CDC criteria if total cholesterol level is ≥200 mg/dl, triglyceride level is ≥150 ng/dl, LDL-cholesterol level is ≥100 mg/dl, and if HDL-cholesterol level is ≤60 mg/dl. [4]

Method of Analysis

The patient's clinical presentation and detail physical examination were done.

Clinical history was obtained from the relatives in order to inquire about any

speech disturbance, altered sensorium and loss of consciousness.

An analytical approach was adopted to assess the risk factors profile and the outcome in patients with ischemic stroke.

The vessel involvement, risk factors and their respective percentages were calculated.

The data was compared with the studies carried out previously in order to note for any differences in the risk factor association.

The NIHSS score of patient at baseline was compared with the mRS at discharge, end of 1 month and 3 month in order to understand whether there is any correlation between the two.

The National Institutes of Health Stroke Scale Score (NIHSS) at baseline: [6]

The NIHSS is made up of 11 different elements which evaluate the specific ability of a patient. The score for each ability ranges between 0 and 4, with 0 being the normal functioning and maximum number being a completely impaired of function. The patient's NIHSS score can be calculated by adding the number for each element of the scale. The scores range from 0 to 42. Higher the score, greater the impairment. (Figure 1)

The Modified Rankin Scale (mRS) at discharge, 1 months' and 3 months' follow up: [7]

The Modified Rankin Scale (mRS) is used to measure the degree of disability in patients who have had a stroke. The scale ranges between 0 to 6 as follows.

Score	Interpretation
0	No symptoms at all
1	No significant disability: despite symptoms, able to carry out all usual duties and activities
2	Slight disability: unable to perform all previous activities but able to look after own affairs without assistance
3	Moderate disability: requiring some help but able to walk without assistance
4	Moderately severe disability: unable to walk without assistance and unable to attend to own bodily needs without assistance
5	Severe disability: bedridden, incontinent and requiring constant nursing care and attention
6	Dead

Ethical Issues

1. The objectives and procedure of the study was explained to all patients.
2. Informed consent was taken from all patients willing to participate in the study.
3. The option to opt out of the study was kept open without any clause.
4. Complete confidentiality regarding patient information was maintained through all stages of the study.

Statistical Analysis:

Statistical analysis was performed by using SPSS Statistical Software version 22.0 and R.3.2.0 and results were tabulated in Microsoft Office Excel worksheet. Clinical Parameters were presented in terms of range (minimum and maximum), Mean ± SD for quantitative variable and frequency (%) for qualitative variables. T-test/Wilcoxon Rank Sum Test was used to compare the continuous parameters. Z-test of proportion was used for comparison of proportions of clinical parameters of patients grouped by Age, Sex etc. Level of statistical significance was taken as

$p<0.05$.

Figure 1: Age and gender distribution of cases

Age (In years)	Males		Females		Total	
	No.	%	No.	%	No.	%
30-39	1	1%	0	0%	1	1%
40-49	9	9%	2	2%	11	11%
50-59	17	17%	11	11%	28	28%
60-69	17	17%	14	14%	31	31%
70-79	15	15%	13	13%	28	28%
80-89	1	1%	0	0%	1	1%
Total	60	60%	40	40%	100	100%
Mean age	60.6±10.2 years		63.5±7.9 years		60.6±10.2 years	
P value- 0.56 Unpaired T test						

Results:

1a—Level of consciousness	0 = Alert; keenly responsive 1 = Not alert, but arousable by minor stimulation 2 = Not alert; requires repeated stimulation 3 = Unresponsive or responds only with reflex
1b—Level of consciousness questions: What is your age? What is the month?	0 = Answers two questions correctly 1 = Answers one question correctly 2 = Answers neither questions correctly
1c—Level of consciousness commands: Open and close your eyes Grip and release your hand	0 = Performs both tasks correctly 1 = Performs one task correctly 2 = Performs neither task correctly
2—Best gaze	0 = Normal 1 = Partial gaze palsy 2 = Forced deviation
3—Visual	0 = No visual lost 1 = Partial hemianopia 2 = Complete hemianopia 3 = Bilateral hemianopia
4—Facial palsy	0 = Normal symmetric movements 1 = Minor paralysis 2 = Partial paralysis 3 = Complete paralysis of one or both sides
5—Motor arm Left arm Right arm	0 = No drift 1 = Drift 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement
6—Motor leg Left leg Right leg	0 = No drift 1 = Drift 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement
7—Limb ataxia	0 = Absent 1 = Present in one limb 2 = Present in two limbs
8—Sensory	0 = Normal; no sensory loss 1 = Mild-to-moderate sensory loss 2 = Severe-to-total sensory loss
9—Best language	0 = No aphasia; normal 1 = Mild-to-moderate aphasia 2 = Severe aphasia 3 = Mute; global aphasia
10—Dysarthria	0 = Normal 1 = Mild-to-moderate dysarthria 2 = Severe dysarthria
11—Extinction and inattention	0 = No abnormality 1 = Visual, tactile, auditory, spatial, or personal inattention 2 = Profound hemi-inattention or extinction
Score = 0–42	

Our study found that the most commonly involved age group in haemorrhagic stroke was between 60-69 years, with a higher percentage of males (60%) compared to females (40%). The mean age of our cases was 61.8 ± 9.5 years. In our study's finding of the most commonly affected age group being between 60-69 years is consistent with previous studies in India, however, the mean age of 61.8 ± 9.5 years is higher than the mean age found in other studies. (Figure 2).

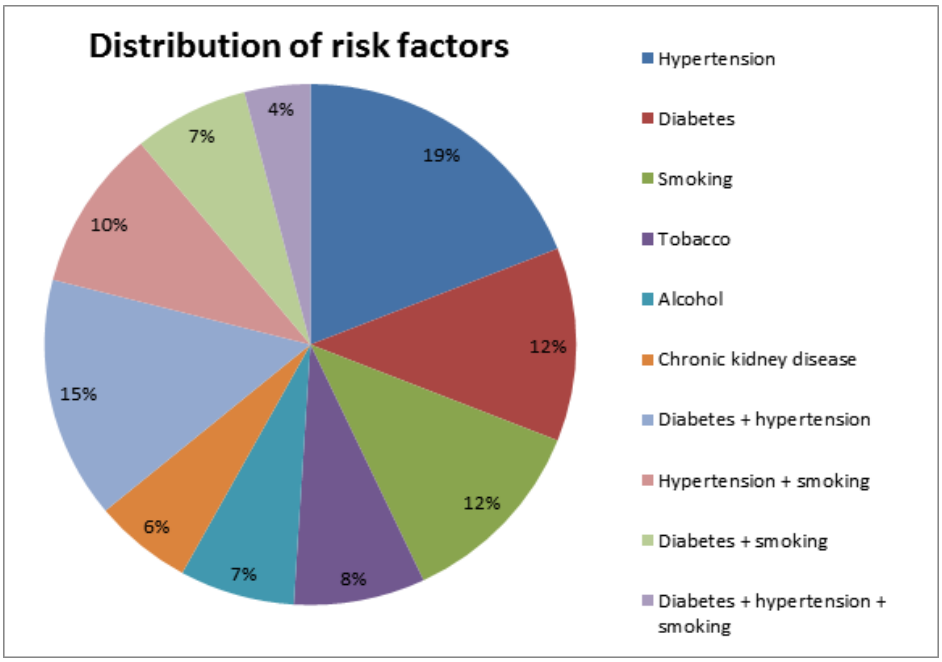

Figure 2: Risk Factors

In terms of risk factors, our study found that the most common risk factor identified was hypertension, present in 19% of cases. Additionally, Diabetes with hypertension was present in 15% cases, hypertension with smoking in 10%, and diabetes with hypertension with smoking in 4% cases, respectively. So, overall, 48% were hypertensive. (Figure 3)

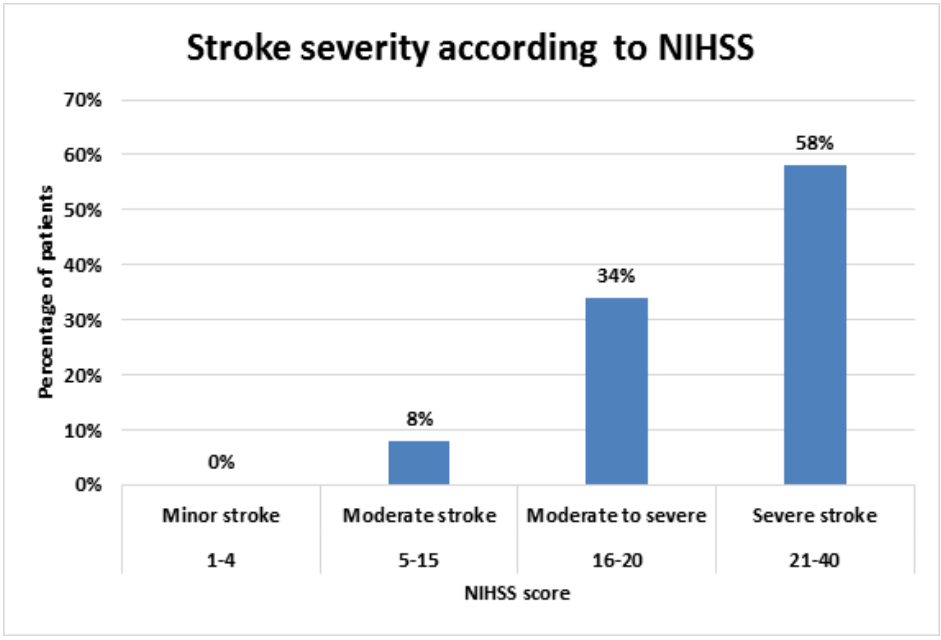

Figure 3: Severity of stroke according to NIHSS

Our study's finding of hypertension being a significant risk factor for haemorrhagic stroke in India highlights the importance of hypertension control and management in preventing this type of stroke. This finding is also consistent with the study by Pathak et al. , which found that hypertension was present in 65% of stroke patients and that there has been an increase in the percentage of first-time stroke patients with hypertension in recent years.51 In Hegde et al. 's study 57.8% had hypertension. [8]

Other common risk factors included diabetes in 12% cases, smoking in 12% cases, tobacco in 8% cases and alcohol in 7% and chronic kidney disease in 6% cases. A combination of risk factors were present in our cases. Diabetes with hypertension was present in 15% cases, hypertension with smoking in 10%, diabetes with smoking in 7% and diabetes with hypertension with smoking in 4% cases, respectively. These findings are consistent with the studies by Fekadu et al. and CVS Ram et al., which also found hypertension to be the most prevalent risk factor for haemorrhagic stroke. [9]

Our study's finding of diabetes being a significant risk factor for haemorrhagic stroke is also consistent with the study by CVS Ram et al., which found diabetes mellitus to be a common co morbidity in haemorrhagic stroke patients. [10]

In terms of clinical presentation, our study found that dysphagia was the most common presentation seen in 38% cases, followed by right hemiparesis in 33% cases, left hemiparesis in 25% cases, unconsciousness in 26% cases, dysarthria in 20% cases, paraparesis, and altered sensorium each in 4% cases.

In terms of treatment, our study found that 42% patients required aspiration for their haemorrhagic stroke, while the remaining 58% patients were not subjected to aspiration. This finding is different from Pathak et al.'s study, which did not report on the use of aspiration as a treatment for haemorrhagic stroke in most patients.51This difference could be due to differences in the medical practices or guidelines in the two study settings.

In terms of laboratory results, our study found that non-survivors had a significantly higher RBS level than survivors and a significantly higher triglyceride level than survivors, while non-survivors and survivors had comparable Na, K, creatinine and HDL level. Specifically, our study found that non-survivors had a significantly higher RBS level than survivors, with a statistically significant p-value of 0.04. Additionally, non-survivors had a significantly higher cholesterol level than survivors, with a statistically significant p-value of 0.04. Finally, non-survivors had a significantly higher triglyceride level than survivors, with a highly significant p-value of 0.002.

Our findings of higher RBS and triglyceride levels in non-survivors suggest that these markers may be useful in predicting outcomes in patients with haemorrhagic stroke.

These findings also suggest that management of these parameters may be beneficial in reducing the mortality and morbidity of stroke patients. Therefore, these findings have important implications for the management and treatment of haemorrhagic stroke patients, as they suggest that early identification and management of these laboratory parameters may improve outcomes in these patients.

In terms of systolic BP, our study found that most cases had systolic BP between 140-179 mmHg. This was followed by cases having BP over 180 mmHg with 26% cases, while the remaining 8% had systolic BP between 120-139 mmHg and only 2% had systolic BP less than 120 mmHg. (Figure____)

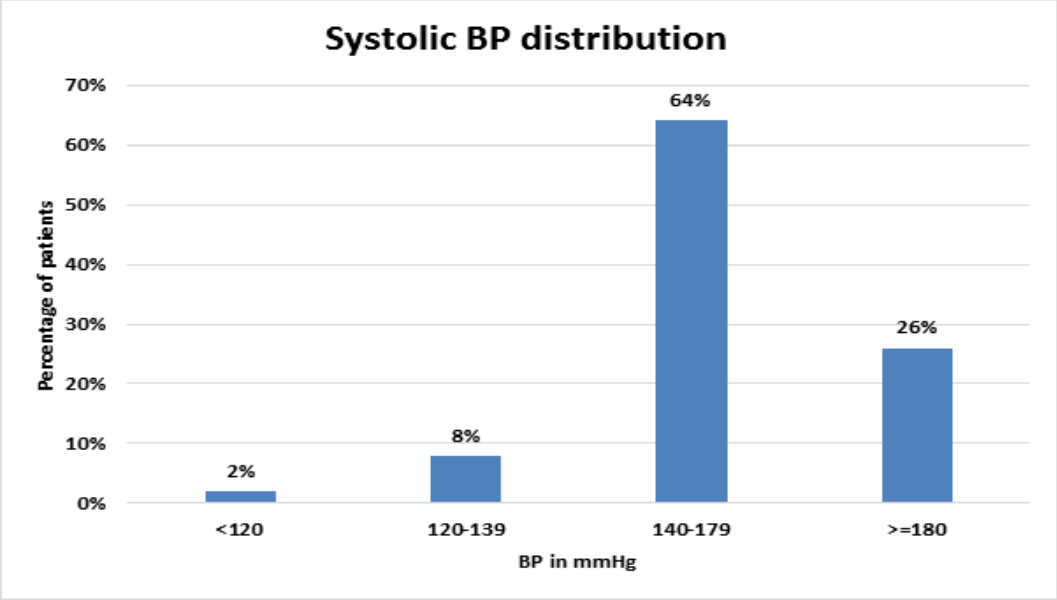

Figure 4: Systolic BP of cases

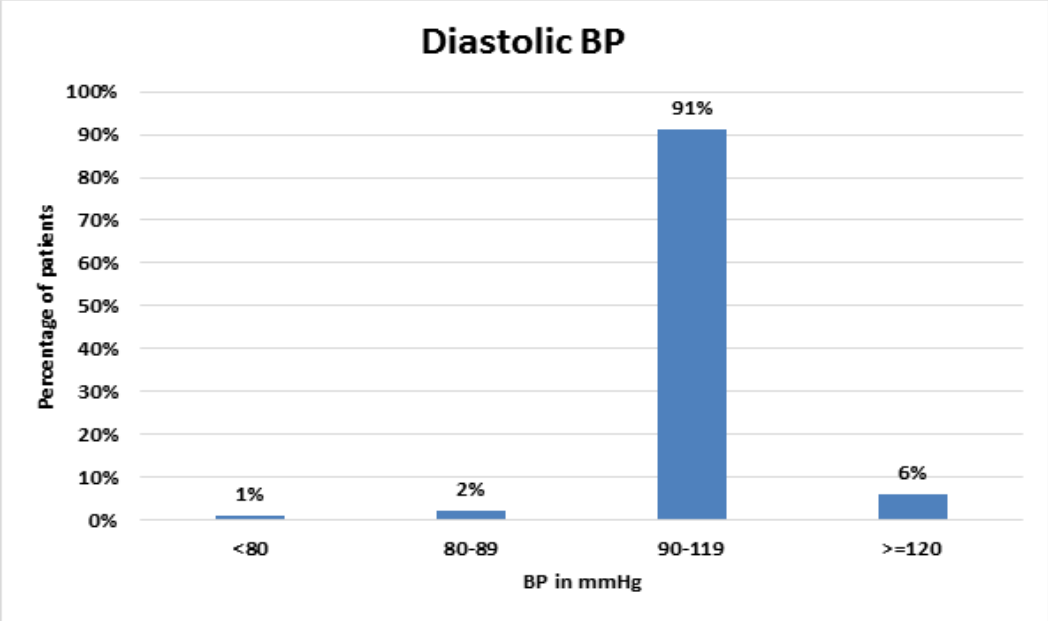

Figure 5: Diastolic BP

Figure 6. MRS of cases

MRS score	MRS at Discharge		MRS after 1m		MRS after 3m	
	No.	%	No.	%	No.	%
0	0	0%	1	1%	9	9.0%
1	1	1.00%	1	1%	9	9.0%
2	0	0.00%	4	4%	10	10.0%
3	3	3.00%	22	22%	9	9.0%
4	34	34.00%	13	13%	1	1.0%
5	33	33.00%	2	2%	2	2.0%
6 (death)	29	29.00%	57	57%	60	60.0%

In terms of diastolic BP, our study found that most cases had diastolic BP between 90-119 mmHg with 91% cases, followed by 6% had diastolic BP over 120 mmHg. 2% cases also had diastolic BP between 80-89 mmHg and only 1% had diastolic BP less than 80 mmHg. However, Fekadu et al.'s study also found 90% cases with diastolic BP over diastolic BP of patients with haemorrhagic stroke. [9]

In terms of the correlation between NIHSS score and functional outcomes, our study found that the NHISS score of cases ranged between 5-40. While 8% cases had NIHSS score between 5-15, 24% had score between 16-20 and the remaining 58% had NIHSS score 21-40. Furthermore, our study also found a strong correlation between baseline NIHSS score and long-term functional outcomes as measured by mRS score at 3 months follow-up. This correlation between baseline NIHSS score and long-term functional outcomes highlights the importance of NIHSS score as a marker for prognosis and potential for recovery in haemorrhagic stroke patients.

Discussion:

Haemorrhagic stroke, is a serious condition that can lead to permanent disability or death. Haemorrhagic stroke is a major public health concern in India, where the incidence of stroke is on the rise.49,51 The aim of our study was to investigate the demographic and risk factor distribution, as well as the clinical outcome of patients with haemorrhagic stroke in India.

Our study included 100 patients between the ages of 30-89 years. In brief, the results of our study showed that the majority of our patients were older adults, with hypertension being the most common risk factor. Our study also found significant differences in laboratory parameters between survivors and non-survivors, specifically in terms of RBS level, cholesterol level, and triglyceride level. Furthermore, our study found a strong correlation between baseline NIHSS score and long-term functional outcomes, highlighting the importance of NIHSS score as a marker for prognosis and potential for recovery in haemorrhagic stroke patients.

These findings have important implications for the management and treatment of haemorrhagic stroke patients in India, as they suggest that early identification and management of hypertension and other risk factors, as well as early monitoring and management of laboratory parameters, may improve outcomes in these patients. Additionally, the strong correlation between baseline NIHSS score and long-term functional outcomes highlights the importance of NIHSS score in the management of haemorrhagic stroke patients.

Conclusion:

Our study provides valuable insights into the demographic and risk factor distribution, as well as the clinical outcome of patients with haemorrhagic stroke in India. Our findings are consistent with previous studies in India, but some differences were also observed. These differences may be due to the different patient populations or medical practices in the two studies. Further research is needed to confirm our findings and to determine the clinical utility of laboratory markers in the management of haemorrhagic stroke in India.

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