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Research Article

# Short Term Outcome of Acute Ischemic Stroke Patients

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## Abstract

**Background:** Stroke is a major cause of disability and death. In 2013, a total of 3.3 million individuals died of ischemic stroke worldwide.

**Materials and Methods:** This was an observational study, carried out in department of Medicine of Rangpur Medical College Hospital, from 1st July 2017 to 31st December 2017. Ischemic stroke patients were included in the study.

**Results:** During the study period we have studied over 138 patients, mean age of the patients at the time of stroke were 61.26 years, male were more than male (60.1% vs 39.9%). Mortality within 30 days for patients with ischemic stroke was 18.1% (25), among them 60% were female and 40% male. In this study mean size of infarction was 6.25 mm2 (larger one was 48 mm2). Mortality at 30th day was 45.8% in those who had infarction >10 mm2 and 12.3% who had infarction size < 10 mm2. According to the arterial territory involved lacunar stroke syndrome (LACS) was the maximum 34.8%. Mortality at 30th day was more in total anterior circulation syndrome (TACS) group. Mean Glasgow coma scale (GCS) of the patients at the time of admission was 11.53. There was improvement of GCS from presentation (GCS 11.77) to discharge (13.51) in survived patients. There was no significant improvement occurred from presentation (GCS 6.10) to after 24 hours (6.12) in case of death cases. GCS at presentation and arterial territory involvement was a good predictor of mortality within 30 days. Those who had GCS < 10 at presentation, majority were TACS group (37.5%), among them 77.78% died within 30 days.

**Conclusion:** Short term mortality (30 days) is high in ischemic stroke. GCS at presentation and after 24 hours, size of infarction arterial territory involvement may be good predictor of mortality within 30 days.

***Keywords:*** *Short Term; Ischemic; Mortality; Rangpur*

## Introduction

An assessment of clinical prognosis is useful for prioritizing (and rationalizing) healthcare resources, particularly for costly diseases such as stroke. However, although there have been many studies of the predictors of mortality and functional outcome for stroke using a plethora of outcome measures in Asia [1-3]. Stroke is a major cause of disability and death. Approximately 16 million people worldwide

are affected by stroke each year, and the estimated prevalence of stroke survivors is over 60 million [4]. In 2020, stroke will be the leading cause of death and disabilities after cancer throughout the world [5]. Clinicians are often asked to predict outcome after stroke by the patient, family, nursing staff, therapy team, case managers, and insurance providers. A wide variety of factors influence stroke prognosis, including age, stroke severity, stroke mechanism, infarct location, comorbid conditions, clinical findings, and related complications. In addition, interventions such as thrombolysis, stroke unit care, and rehabilitation can play a major role in the outcome of ischemic stroke. Stroke prognosis models have limited generalizability and have not been adequately validated. However, knowledge of the important factors that affect prognosis is necessary for the clinician to make a reasonable prediction for individual patients, to provide a rational approach to patient management, and to help patient and family understand the course of the disease. As a general rule, large strokes with severe initial clinical deficits have poor outcomes compared with smaller strokes. Stroke severity can be judged clinically, based upon the degree of neurologic impairment (e.g. altered mentation, language, behavior, visual field deficit, motor deficit), and the size of the infarction on MRI or CT [6]. Infarct volume of acute infarction on neuroimaging studies is another gauge of stroke severity that may be used to estimate stroke outcome [7]. A much larger study analyzed data from over 1800 patients who had CT or MRI within 72 hours of ischemic stroke onset and found that initial infarct volume was an independent predictor of stroke outcome at 90 days, along with age and NIHSS score [8].

Therefore, this study was carried out to determine the short term and long term outcome of acute stroke patients.

## Subjects and Methods

This was a cross sectional observational study carried out in department of Medicine, Rangpur Medical College Hospital from 1st July 2017 to 31st December 2017. Convenient purposive method was used to include the study population. Acute ischemic stroke patients admitted in the Rangpur medical college hospital during the study period were included in this study.

### Procedure of data collection

An informed written consent was obtained from each patient or attendant before data collection. Each patient or attendant was interviewed. Besides sociodemographic characteristics GCS (Glasgow coma scale) at the time of admission, after 24 hours and at the time of discharge, blood pressure, neurological deficit, co-morbidity, complications like persistent neurological deficit, bed sore, aspiration pneumonia, UTI, painful shoulder was studied. Short term (30) mortality outcome was recorded over telephone call to the close relative of the patients.

### Procedure of data analysis

After collection of data it was coded and checked manually and then entered into computer. Data analysis was done according to the objectives of the study by using SPSS-17.0 (Statistical Program for Social Science) software program. The result of the clinical study and statistical analysis is presented in the form of text, table, bar and chart.

### Operational definitions

### Stroke

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 [9]. In our study hemorrhagic stroke was defined as 'clinical features of stroke and CT/MRI evidence of intracerebral hemorrhage with or without ventricular extension.

### Short term outcome of acute stroke

In our study out come at 30th day was taken as short term outcome. Survive and death was the two outcomes. The patient who remained alive at 30th day was taken as survived.

### Site of infarction

The main sites of cerebral infarction [10] are cerebral infarction, brainstem infarction, basal ganglia infarction, lacunar infarction, visual cortex infarction, Weber's syndrome, (watershed border zone infarction).

Complication of acute stroke [11]: Chest infection, deep vein thrombosis, pressure sore, painful shoulder, urinary tract infection, epileptic seizure, electrolyte imbalance, constipation.

### Smoker

Those who currently smoke or have smoked tobacco in any form (cigarette, birri etc.) in last 6 months.

### Ex-smoker

Ex-smoker who gave up smoking at least 6 months before.

### Smokeless tobacco (SLT)

SLT are raw tobacco leaves taken other than inhalation route (usually taken with betel nut or use in inner aspect of lower lip).

### Procedure of data collection

An informed written consent was obtained from each patient or attendant. Each patient or attendant was interviewed.

### Statistical analysis

The interested variables are processed, edited and analyzed by SPSS windows version 17.0. The sociodemographic data of the study population were expressed in frequency distribution and their observed difference was tested by one sample 't' test and 'chi square' test. P value < 0.05 was considered as statistically significant with the 95% confidence interval. The results were presented in tables.

### Ethical consideration

The ethical committee of Rangpur Medical College has approved the study protocol and questionnaire on 15th March 2017.

## Results

During the study period we have studied over 138 patients, mean age of the patients at the time of stroke were 61.26 years, male were more than male (60.1% vs 39.9%) (Table 1).

| Variables | Frequency | Percentage (%) |
|---|---|---|
| **Age** | | |
| Mean age (SD) | 61.26 years (SD ± 13.77) | |
| Age range | 22 - 90 years | |
| **Sex** | | |
| Male | 83 | 60.1% |
| Female | 55 | 39.9% |
| **Level of education** | | |
| Illiterate | 54 | 39.1% |
| 5 or less class | 33 | 23.9% |
| >5-10 class | 38 | 27.5% |
| >10-12 class | 9 | 6.5% |
| Graduate and above | 4 | 2.8% |

| | | |
|---|---|---|
| **Occupation** | | |
| Housewife | 49 | 35.5% |
| Agriculture | 45 | 32.6% |
| Business | 11 | 8% |
| Service | 10 | 7.2% |
| Retired | 11 | 8% |
| **Monthly income** | | |
| < 5000 taka* | 11 | 8% |
| 5001 - 10000 taka | 53 | 38.4% |
| 10001 - 15000 taka | 45 | 32.6% |
| > 15000 taka | 29 | 21% |

***Table 1:*** *Socio-demographic characteristics of the victims (n=138).*
**1 USD = 80 taka.*

Among the study people 29% (40) were current smoker, 19.6% (27) were ex-smoker and 51.4% (71) were sedentary worker. Commonest site of infarction was cerebrum 43.5%, followed by thalamus plus basal ganglia 14.49% (Table 2).

| Site of infarction | Percentage |
|---|---|
| Cerebrum | 43.5% (60) |
| Cerebellum | 7.2% (10) |
| Thalamus | 3.6% (5) |
| Basal ganglia | 10.1% (14) |
| Brain stem | 4.3% (6) |
| Thalamsu plus basal ganglia | 14.49% (20) |
| Cerebrum plus basal ganglia | 10.1% (14) |
| Others (combination of other sites) | 6.52% (09) |

***Table 2:*** *Site of infarction (n = 138).*

Among the study population family history of hypertension was present in 38.40% (53) and family history of stroke was present in 21.7% (30). 24.6% (34) of the study people had hypertension and 8% (11) had diabetes mellitus (Table 3).

| Co-morbidity | Frequency | Percentage |
|---|---|---|
| Hypertension | 34 | 24.6% |
| Ischaemic heart disease | 30 | 21.74% |
| Diabetes mellitus | 11 | 8% |
| Hypertension and diabetes mellitus | 12 | 8.7% |
| Hypertension, diabetes mellitus and dyslipidaemia | 7 | 5% |
| Hypertension and dyslipidaemia | 1 | 0.7% |
| Hypertension and CKD | 2 | 1.4% |
| Others | 12 | 8.70% |

***Table 3:*** *Co-morbidity of the study population (n = 110).*

Among the study populations different complications following stroke occurred in 45.65% (63), among the complications seizure occurred in majority of the patients (28.57%) (Table 4).

| Complications | Frequency (n = 63) | Percentage |
|---|---|---|
| Seizure | 18 | 28.57% |
| Electrolyte imbalance with UTI | 15 | 23.80% |
| Seizure and electrolyte imbalance | 11 | 17.46% |
| UTI | 07 | 11.11% |
| Electrolyte imbalance | 4 | 6.34% |
| RTI | 03 | 4.76% |
| UTI and RTI | 03 | 4.76% |
| Electrolyte imbalance with RTI with UTI | 2 | 3.17% |

***Table 4:*** *Complications after infarction.*

Mortality within 30 days for patients with ischemic stroke was 18.1% (25), among them 60% were female and 40% male. Hospital mortality occurred in 32% (11). Mean age of death patient was 65.16 years, among the death patients majority (68%) was ≥ 60 years age. In this study mean size of infarction was 6.25 $mm^2$ (larger one was 48 $mm^2$). Mortality at $30^{th}$ day was 45.8% in those who had infarction >10 $mm^2$ and 12.3% who had infarction size < 10 $mm^2$. According to the arterial territory involved LACS was the maximum 34.8%. Mortality at $30^{th}$ day was more in TACS group (Table 5).

| Arterial territory | Percentage/frequency | Mortality at $30^{th}$ day |
|---|---|---|
| LACS | 34.8% (48) | 14.6% |
| PACS | 29% (40) | 7.5% |
| TACS | 15.2% (21) | 52.4% |
| POCS | 10.9% (15) | 6.7% |
| Combination of above sites | 10.14% (14) | 18.8% |

***Table 5:*** *Site of infarction according to arterial territory and mortality.*
*(*LACS: Lacunar Stroke Syndrome; PACS: Partial Anterior Circulation Stroke Syndrome; TACS: Total Anterior Circulation Stroke Syndrome; POCS: Posterior Circulation Stroke Syndrome).*

Mean GCS of the patients at the time of admission was 11.53, after 24 hours 12.18 and at the time of discharge were 13.32. 37.5% (9) of the patients who had GCS < 10 at presentation died within 30 days, and majority (44.45%) of the death occurred at hospital. On the other hand, only 14% (16) of the patients who had an initial GCS ≥ 10 died within 30 days. There was improvement of GCS from presentation (GCS 11.77) to discharge (13.51) in survived patients. There was no significant improvement occurred from presentation (GCS 6.10) to after 24 hours (6.12) in case of death cases (Figure 1).

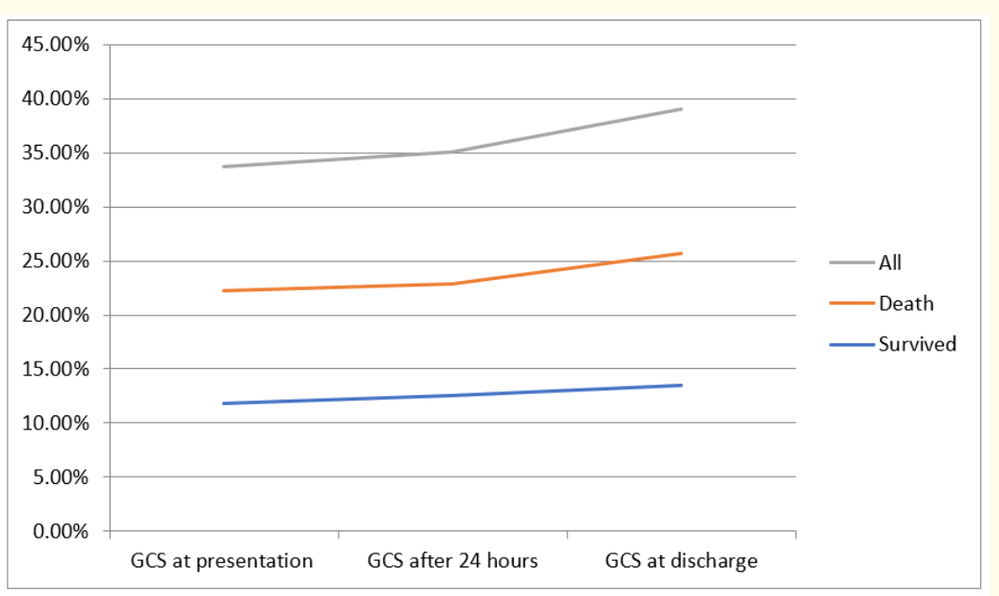


***Figure 1:*** *Line chart of GCS of death, live patients and all patients.*

GCS at presentation and arterial territory involvement was a good predictor of mortality within 30 days. Those who had GCS < 10 at presentation, majority were TACS group (37.5%), among them 77.78% died within 30 days (Table 6).

| GCS | Arterial Territory Involved | Percentage/Frequency (N = 24) | Mortality (N = 9) |
|---|---|---|---|
| <10 | TACS | 37.5% (9) | 77.78% (7) |
| | PACS | 12.5% (3) | 00 |
| | LACS | 12.5% (3) | 33.32% (1) |
| | POCS | 20.8% (5) | 20% (1) |
| | Combination | 16.67%(4) | 00 |

***Table 6:*** *Relation of mortality with GCS and arterial territory involved.*

## Discussion

In the acute phase of stroke, the main predictors of outcome are stroke severity and patient age. Stroke severity is probably the most important factor affecting short- and long-term outcome [12-25]. In agreement with the literature, old age was significantly correlated with unfavorable outcome ($P < 0.001$). Advancing age has a major negative impact on stroke morbidity, mortality and long-term outcome [26,27]. People older than 65 years of age had increased risk of mortality after two months from onset of stroke and admission to a skilled nursing facility [28,29]. Our study found similar findings among the death cases 64% of the patient were ≥65 years age. In our study male was more than the female. Similar male preponderance of stroke was observed in South India [30] and other countries [31,32].

In our study short term mortality (at 30$^{th}$ day) was 18.1%, which was 27% in another study [33] where majority (50%) of the death occurs in between 7-14 days, 23% died within 7 days of stroke. Our study also found similar findings. In contrast to hemorrhagic stroke, where majority (77.35%) of the death occurred by 7 days, with more than half of the death occurred within 2$^{nd}$ and 5$^{th}$ day [34-38]. Size of the infarction may be a good predictor of mortality in ischemic stroke patients, in our study mortality higher (45.8%) in those who had infarction > 10 mm$^2$ and 12.3% who had infarction size < 10 mm$^2$. Hossein., *et al*. [39] has shown that posterior cerebral artery stenosis (POCS) alone was 51.3%, 27.4% of the cases suffered from anterior artery stenosis (ACS), and 21.6% had simultaneous anterior and posterior cerebral artery stenosis. In our study lacunar infarction (LACS) was the maximum 34.8%. Mortality at 30$^{th}$ day was more in TACS group (52.4%). Stroke severity on admission depends on level of consciousness was the main clinical predictor of early mortality in many previous studies [40-44]. Level of consciousness can be easily determined at the bed side by the GCS. Our present study showed that GCS at presentation a good predictor of mortality during hospital stay and within 30 days. Besides GCS after 24 hours is also a good predictor of improvement or deterioration in ischemic stroke patients (Figure 1). GCS at presentation and arterial territory involvement can be a good predictor of short term mortality in ischemic stroke patient. In our study, 77.78% of the patients died who had GCS presentation < 10 and TACS.

## Conclusion

Short term mortality (30 days) is high in ischemic stroke. GCS at presentation and after 24 hours, size of infarction arterial territory involvement may be good predictor of mortality within 30 days.

## Limitation

Sample size was small.

## Recommendation

As prognosis of ischemic stroke is poor, all measures should be taken to it.

## Conflict of Interest

There was no conflict of interest.

## Acknowledgement

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