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Predictors of Mortality in Stroke - An Observation at Tertiary Care Centre

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Abstract

Background: Stroke, ischemic or hemorrhagic has been continued to be one of the major causes of in-hospital mortality. To reduce the overall burden of stroke in the society an organized approach in needed to predict mortality and morbidity in stroke especially aggressive management for complications of stroke.

Aims and objectives: To study mortality predictors in indoor patients of stroke.

Material and Methods: The present study was a prospective observational study done in the department of General Medicine, Jawaharlal Nehru Hospital & Research Centre Bhilai, Chhattisgarh during the period of December 2017 to December 2018.

Results: Mean age of stroke patients in our study was 65.73±8.16 years. Males were more affected by stroke than females (67% vs 33%). Mortality among ischemic stroke was 10.71% and among hemorrhagic stroke, it was 37.5%. Mean NIHSS score was 21.6±5.08 among expired and mean GCS score was 4.53±1.64 among expired. Among presenting complaints highest mortality was associated with complaint of total loss of consciousness (36.33%). Atrial fibrillation among risk factors had highest mortality (54.55%). Mean random blood glucose among expired was 175±97.36 mg/dl. Mean creatinine was 2.5±1.14 mg/dl among expired. Out of total 100 patients, 13 had history of kerosene ingestion among those 8 patients died (61.54%).

Conclusion: Ischemic strokes were more common than hemorrhagic strokes, but the latter had higher mortality. Total loss of consciousness was associated with highest mortality among subjects. Along with hyperglycemia, renal dysfunction, High NIHSS, low GCS score, local malpractices like feeding kerosene oil to the patient had unpredictable adverse effect over prognosis of stroke.

Keywords: Stroke, Mortality, Hyperglycemia, Renal Dysfunction, NIHSS, Kerosene oil

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Introduction

Stroke is one of the most historical diseases ever known to mankind, yet it has maintained its decorum to puzzle a meticulous human mind from its etiology to pathophysiology, area of affection to clinical presentation and diagnosis and the most important its prognosis and treatment. Even after advent of highly accurate and precise neuro-oriented radiodiagnostics, we still lack uniformity in predicting mortality in stroke patients. A stroke or cerebrovascular accident is defined as an abrupt onset of a neurological deficit that is attributable to a focal vascular cause.[1] It is the second leading cause of death worldwide with 6.2 million dying from stroke in 2015, an increase of 830,000 since the year 2000.[2] In 2020 stroke will be leading cause of death and disabilities after cancer throughout the world.[3] Numerous studies have been going on for the past 25-30 years, yet there is no uniform consensus regarding the most important predicting factors for mortality. To reduce the overall burden of stroke in the society an organized approach in needed to predict mortality and morbidity in stroke especially aggressive management for complications of stroke.[4,5]

Material and methods: Present study was a prospective observational study done in department of Medicine, Jawaharlal Nehru Hospital and Research Centre, Bhilai, Chhattisgarh. The sample was collected from the cases admitted in department of Medicine during the period of December 2017- December 2018. Data was collected by means of history, clinical examination, laboratory, and radiological investigations. 100 cases were taken satisfying the inclusion and exclusion criteria. Continuous data was summarized as Mean ± SD (standard deviation) while discrete (categorical) in number and percentage. Quantitative data was analyzed by mean, SD, T TEST. Qualitative data was analyzed by percentage, Chi square test, fisher exact test. Statistics software used SPSS 16.0. Randomization by computer generated random numbers. Institutional ethical and scientific approval was taken forehand.

Results:

TABLE 01: DISTRIBUTION OF MORTALITY IN RELATION TO TYPE OF STROKE

Stroke	Expired	Survived	Total	P value
ISCHEMIC	9(10.71%)	75(89.29%)	84(100%)	0.006 HS
HEMORRAGIC	6(37.5%)	10(62.5%)	16(100%)	

In our study, mortality among ischemic stroke was 10.71 %(n=9) and among hemorrhagic stroke, it was 37.5% (n=6). This value was statistically significant.

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TABLE 02: DISTRIBUTION OF MORTALITY IN RELATION TO NIHSS SCALE AND GCS SCORE

SCORE	Expired	Survived	P value
NIHSS	21.6±5.08	9.66±4.59	<0.001 HS
GCS	4.53±1.64	11.51±2.39	<0.001 HS

This table showing the mean NIHSS score was 21.6±5.08 among expired and 9.66±4.59 among survived patients. GCS score was 4.53±1.64 among expired and 11.51±2.39 among survived in the study. Values were statistically significant.

TABLE 03: DISTRIBUTION OF MORTALITY IN RELATION TO PRESENTING COMPLAINTS

Presenting Complaints N(%)	Expired	Survived	Total	P value
Loss of consciousness	4(36.36%)	7(63.64%)	11(100%)	**0.035 S**
Altered sensorium	5(21.74%)	18(78.26%)	23(100%)	0.30 NS
Motor symptoms-	9(14.29%)	54(85.71%)	63(100%)	0.79 NS
Sensory symptoms	3(27.27%)	8(72.73%)	11(100%)	0.22 NS
CN dysfunction	0(0%)	7(100%)	7(100%)	0.25 NS
Language disturbances	4(12.5%)	28(87.5%)	32(100%)	0.63 NS

In our study, highest mortality was associated with presenting complaint of loss of consciousness, which was 36.36% (n=4), it was statistically significant. There was no associated mortality was found in patients with cranial nerve dysfunction.

TABLE 04: DISTRIBUTION OF MORTALITY IN RELATION TO RISK FACTORS

Risk Factors	Expired	Survived	Total	P value
HTN	11(15.94%)	58(84.06%)	69(100%)	**0.69 NS**
DM	4(18.18%)	18(81.82%)	22(100%)	**0.63 NS**
Smoking	4(13.79%)	25(86.21%)	29(100%)	**0.83 NS**
Tobacco chewing	4(9.52%)	38(90.48%)	42(100%)	0.19 NS
Alcohol	1(6.67%)	14(93.33%)	15(100%)	0.32 NS
H/O CAD	2(22.22%)	7(77.78%)	9(100%)	0.52 NS
AF	6(54.55%)	5(45.45%)	11(100%)	**<0.001 HS**
TIA	0(0%)	7(100%)	7(100%)	0.25 NS
H/o Stroke	7(33.33%)	14(66.67%)	21(100%)	**0.008 HS**
Family H/o Stroke	0(0%)	6(100%)	6(100%)	0.28 NS

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In our study, among the various risk factors highest mortality was associated with Atrial fibrillation that is 54.55%, which was statistically significant, followed by past history of stroke-33.33% which was also highly significant.

TABLE 05: DISTRIBUTION OF MORTALITY IN RELATION TO RANDOM BLOOD GLUCOSE AT THE TIME OF ADMISSION AND RENAL FUNCTION

Laboratory Test	Expired	Survived	P value
RBG {mg/dl}	175.6±97.36	106.14±27.29	<0.0001 HS
CREATININE {mg/dl}	2.5±1.14	1.18±0.63	<0.001 HS

In our study, mean random blood glucose among expired was 175±97.36 and among survivors was 106±27.29. These values were statistically highly significant. Mean creatinine was 2.5±1.14 among expired and 1.18±0.63 among survivors, it was statistically significant.

TABLE 06: DISTRIBUTION OF MORTALITY IN RELATION TO KEROSENE OIL INGESTION

Kerosene	Expired	Survived	Total	P value
Yes	8(61.54%)	5(38.46%)	13(100%)	<0.001 HS
No	7(8.05%)	80(91.95%)	87(100%)	

In our study, 13 patients out of 100 had history of kerosene oil ingestion and among them 8 patients (61.54 %) died. Values were statistically significant.

Discussion

Prediction of mortality is must in every case of stroke and a highly organised approach is needed to overcome all the reversible factors. Along with old age, uncontrolled blood pressure, various other factors to be look into. Anderson et al found that, the major finding of their study was that hemorrhagic stroke per se is associated with a higher risk of death than ischemic stroke, even after adjustment for age, sex, initial stroke severity, and relevant cardiovascular risk factors.[6] In our study also it was seen that hemorrhagic stroke had mortality of 37.5% compared to 10.7% of that of ischemic stroke patients. Shamshirgaran et al said Advanced age, stroke subtype and high NIHSS score are the independent predictors of early mortality in this study. This provides important implications for the clinicians to target the high-risk patients for the specific therapies and management strategies.[7] We found that in expired patients, mean NIHSS score was 21.6 ± 5.08 which was remarkably high and statistically significant.

Heuschmann et al found that Stroke severity and atrial fibrillation were found to be independent predictors for in-hospital mortality after ischemic stroke in routine clinical care. Diabetes and previous stroke demonstrated a significant impact on in-hospital mortality only in men.[8] In our study, atrial fibrillation came out as most significant risk factor associated with mortality (n=6,

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54.55%) followed by previous history of stroke. Mean random blood glucose was 175.6±97.36 among expired patients. Tsagalis et al said that in patients with acute stroke, reduced estimated GFR appears to be a significant independent risk factor for short- as well as long-term mortality and new cardiovascular morbidity.[9] We found that mean creatinine values were much more deranged in those who expired rather who survived. Glassgow coma scale which was designed to assess the conscious level in head injury patients was also taken for prognostic values and it came out as statistically significant factor in predicting mortality as total loss of consciousness was associated with highest mortality among the presenting complaints although a study done by Weir et al found a strong relationship between the verbal and eye GCS scores and outcome in the acute stroke population. However, the positive predictive values for 2-week mortality and negative predictive values for 3-month placement range from 0.42 to 0.70 and are not sufficiently high to be used as the sole basis for clinical decision-making on the individual patient. It would thus be preferable to combine GCS data in a model with other stroke prognostic factors if they were to be used in patient management.[10]

During the study period, a handful of stroke patients(n=13) were admitted with history of kerosene oil fed by others before coming to the hospital, among them 61.54% faced mortality. We rigorously investigate the literature available regarding such illogical malpractices and their effect but were not able to find any such although our results were statistically significant (<0.001).

Conclusion

Our study concluded that subtype of stroke has significant prognostic impact in the patients of stroke. Presence of risk factors like atrial fibrillation, previous history of stroke adds up to graver prognosis. Mortality also depends on presenting complaints along with high blood glucose level and decreased renal function. Higher the NIHSS and lower GCS would negatively impact the prognosis. Local malpractices like feeding kerosene oil to stroke patients also play a role in predicting the mortality in stroke patients yet more research needs to be done to establish exact cause-factor-disease relationship in this regard.

Conflict of interest: Nil

Source of support: Nil

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Abbreviations:

AF- ATRIAL FIBRILLATION

CAD- CORONARY ARTERY DISEASE

CN DYSFUNCTION- CRANIAL NERVE DYSFUNCTION

DM- DIABETES MELLITUS

GCS- GLASSGOW COMA SCALE

HTN- HYPERTENSION

H/O- HISTORY OF

NIHSS- NATIONAL INSTITUTE OF HEALTH STROKE SCALE

TIA- TRANSIENT ISCHEMIC ATTACK