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## MORTALITY RATE OF STROKE PATIENTS WITHIN FIVE DAYS OF ADMISSION: STUDY AT A TERTIARY HOSPITAL IN NEPAL

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### ABSTRACT

**Introduction** Stroke is one of the most common causes of morbidity and mortality worldwide. Around 50-85 percent of strokes are due to ischemic cerebral infarction and 7-27 percent to intra-cerebral haemorrhage. Since the incidence of stroke is increasing in our country, the study aims to identify various factors associated with stroke and to assess the mortality in acute stroke patient within five days of admission. **Materials and Methods:** This was a retro-spective analysis of data on study of 100 newly diagnosed stroke patients admitted in Neurology unit of a tertiary hospital over a period of one year. Approval for the study was taken from the IRB of the hospital prior to data collection. For data collection, a proforma was filled for each newly diagnosed stroke patient after informed consent from patient or his/her guardian with follow-up and treatment in the hospital. Patient were followed for mortality outcome (survival or death) up to five days in-hospital stay. Those stroke patients who had been already treated or presented to emergency room after 72 hours of stroke episode were excluded. The collected data were analysed using SPSS software. **Results:** Of all consecutive 100 stroke patients; the male to female ratio was 59:41 and the mean age was 63.13 years. Major risk factors found were hypertension, smoking, diabetes, heart diseases. The common presentations were weakness of limbs, dysphagia, impaired-consciousness, gaze disturbances, vomiting, sensory loss and deviation of mouth. Of the 100 stroke patients 44 (44%) were ischaemic and 56 (56%) were haemorrhagic. Among the ischaemic one (2.27%) patient and among haemorrhagic 12 (21.4%) patient died in the hospital. The overall mortality rate was 13% among stroke patients. **Conclusion:** This study showed 13% overall five days in-hospital mortality in new stroke patients. Mortality among haemorrhagic stroke patients is higher than ischaemic ones.

**Keywords:** Cerebrovascular, mortality, proforma, stroke, thromboembolism,

## INTRODUCTION

The World Health Organization defines stroke (a cerebro-vascular disease) as: "rapidly developing clinical symptoms and/or signs of focal, and at times global (applied to patients in deep coma and to those with sub-arachnoid haemorrhage) loss of brain function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin".<sup>1</sup> There is a wide range of severity; from recovery in a few days, through persistent disability to death.

The reduction in early death over the last decade is believed to be due to dedicated Stroke Unit's monitoring and control of abnormal physiological parameters such as hypotension, hyperglycaemia, hypoxia, pyrexia, and hydration in acute phase which may have aggravated cerebral damage. Significant differences in the management of acute physiology during the first 2 weeks of admission included the use of intravenous saline in the first 24 hours, antipyretic and antibiotic medication, and oxygen therapy and insulin infusions.<sup>2,3</sup>

Monitoring of acute physiological parameters with treatments aimed at maintaining physiological homeostasis also reduced early neurological progression in a pilot study.<sup>4</sup> There is now experimental evidence suggesting that control of these abnormal physiological parameters act as a form of neuro-protection, which may potentially improve the viability of ischaemic neuronal tissue.<sup>5</sup> This policy is now recommended by a European review of critical care in stroke.<sup>6</sup>

In 2016; globally, Neurological disorders were the leading cause of DALYs (276

million) and second leading cause of deaths (9 million) which is an increase of 15% and 39% between 1990 and 2016. The four largest contributors of DALYs were stroke (42.2%), migraine (16.3%), Alzheimer's and other dementias (10.4%) and meningitis (7.9%).<sup>7</sup>

About 80 percent of all first episode of stroke are ischaemic, 10 percent due to primary intra-cerebral haemorrhage, about 5 percent are due to sub-arachnoid haemorrhage and in the remainder, there is uncertainty. These proportions are rather similar in community-based incidence studies using CT imaging.<sup>3</sup>

According to a study by Henrik Brønnum-Hansen<sup>8</sup> and team; the estimated cumulative risks for death at 28 days, 1 year, and 5 years after onset were 28%, 41%, and 60%, respectively. An exact burden of stroke in Nepal is not available. The Jaya Stroke Foundation estimated the morbidity and mortality is around 50,000 and 15,000 each year in Nepal.<sup>9</sup>

A retro-spective review from Tribhuvan University, Teaching Hospital by Oli KK et al.<sup>10</sup> showed that out of 683 stroke patients in four years, 434 (63%) were ischaemic and 249 (37%) haemorrhagic. Among the risk factors hypertension was present in 42%, smoking in 28%, alcohol consumption in 18%, DM in 11%. Overall, the mortality was 17%; the worst outcome being 50% in subarachnoid haemorrhage.

Stroke is the common life-threatening neurological disease requiring hospitalization and stands out one of the most important causes of mortality and severe disability. According to a report by Singh DL et al.<sup>11</sup> stroke is among the three most common diseases admitted in

the medical ward and common cause of mortality in Bir Hospital.

Since there is high chance of mortality in early days and such kind of study was not explored in Bir Hospital; we were enthusiastic to find the physiological parameters on stroke and their subsequent management as well as the final outcome of the in-hospital mortality within five days to guide for better outcome in future.

### **MATERIALS AND METHODS:**

This was a retro-spective analysis of data taken from July 2007 to July 2008 of 100 consecutive newly diagnosed stroke patients admitted in Neurology unit of Bir Hospital, a tertiary hospital of Kathmandu, Nepal. Ethical approval was taken from IRB of the hospital prior to data collection. Thorough evaluation and neuro-imaging (with CT head), blood investigations like CBC, RBS, RFT, Serology for VDRL, HBsAg, Anti HCV, HIV were done. For data collection, a proforma was built and pre-tested for validity. Verbal and written informed consent were taken from participating patient or his/her guardian. Demographic information, clinical history and presentations, systemic examination, and investigation findings for each new patient under treatment were collected

in the proforma. Stroke patients who had been already treated or presented to emergency room after 72 hours of stroke episode were excluded. The patients were followed up to a period of five days from onset of stroke to know the mortality status in early period of five days. Patients who expired were marked as 'expired' and the rest as 'survivors.

Collected data was analysed by SPSS software. Frequency tabulations of age and sex distribution, associated risk factors, clinical presentations, lab findings as well as mortality were calculated and analysed on descriptive way.

### **RESULTS:**

All the 100 new stroke patients were followed up in the Neurology and observation wards of the hospital till the end points that is 5<sup>th</sup> day of admission, which found the patient either 'expired' or 'survival.'

In the study majority of the stroke patients were male 59% and females 41%.

The mean age of the study group was 63.13 years with the standard deviation of 15.32 years and with the age range of 50 years.

**Table 1. Diet Habits (n=100)**

Dietary habits	Veg	Non-veg	Alcohol consumers	Non-alcohol consumers
Percentage of pts	46%	54%	40%	60%

**Table 2. The frequency of associated risk factors found in the patients (n=100)**

Risk factors present in cases	No. of risk factors	Percentage of pts with risk factors
Hypertention	52	52%
Smoking	42	42%
Diabetes Mellitus	12	12%
Heart diseases	6	6%
Chronic headache	6	6%
Chronic Liver diseases	5	5%
Tobacco chewer	4	4%
Hx of blood transfusion	3	3%
TIA	3	3%
Head trauma	3	3%
Radiation therapy used	2	2%
Prosthetic valves	1	1%

However, there was no history of peripheral vascular diseases, COPD, polycythaemia, carotid bruits, bleeding disorders, deep-vein thrombosis, hyperlipidaemia, syphilis, cranial operations and OCP use in any of the patients.

The onset of symptoms was sudden in 96% and gradual in 4% of the patients.

Out of 100 cases; haemorrhagic strokes were 56(56%) and infarct were 44(44%) according to CT findings

**Table 3. The presentation of signs and symptoms in the stroke patients (n=100)**

Presenting signs	No (%) of cases
Weakness of limbs	89 (89%)
Dysphasia	58 (58%)
Gaze Disturbances	18 (18%)
Consciousness Impairment	44 (44%)
Vomiting	19 (19%)
Sensory loss	11 (11%)
Deviation of mouth	9 (9%)

**Table 4. Weakness in limbs [ Plegia /Paresis] (n=100)**

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
1=Rt HPLG	26	26.0	26.0	26.0
2=Rt HPR	21	21.0	21.0	47.0
3=Lt HPLG	15	15.0	15.0	62.0
4=Lt HPR	15	15.0	15.0	77.0
5=MonPR	10	10.0	10.0	87.0
6=QPR	1	1.0	1.0	88.0
7=Paraparesis	1	1.0	1.0	89.0
8=none	11	11.0	11.0	100.0
Total	100	100.0	100.0	

Note: HPLG=hemiplegia, HPR=hemiparesis, QPR=quadriparesis, Rt=right, Lt=left

Of the total patients rightsided hemiplegia was found in 26%, right sided hemiparesis in 21%, left sided hemiplegia in 15%, left sided hemiparesis in 15%, monoparesis in 10%, paraparesis in one

percent and quadriparesis in one percent. The right sided sensory loss was in three percent, left sided sensory loss in three percent and undefined in five percent of the patients.

**Table 5. The CT Scan Head findings (n=100)**

Valid	Frequency	Percent	Valid percent	Cumulative percent
1=Lt ICH	28	28.0	28.0	28.0
2=Rt ICH	22	22.0	22.0	50.0
3=Rt ICI	13	13.0	13.0	63.0
4=Lt ICI	11	11.0	11.0	74.0
5=bl ICI	8	8.0	8.0	82.0
6=bl bleed	5	5.0	5.0	87.0
7=Hge	3	3.0	3.0	90.0
8=infarct	2	2.0	2.0	92.0
9=normal	8	8.0	8.0	100.0
Total	100	100.0	100.0	

Note: ICH=intracranial haemorrhage, ICI=intracranial infarction, b/= bilateral

**Table 6. Some Descriptive Statistics of the laboratory findings were found as below: (n=100)**

Parameters	N	Range	Minimum	Maximum	Mean	Std.Deviation
Pulse (Beats PerMin)	88	112	48	160	82.59	14.99
WBC (count/cm <sup>3</sup> )	89	205400	4600	210000	16100	2778.72
Hb (gm/dl)	88	28.1	5.9	34.0	13.38	2.98
ESR (mm over 1 hr)	28	72.0	3.0	75.0	24.29	16.17
Platelets (count/cm <sup>3</sup> )	25	266000	83000	349000	189080	63781.47
Viral markers if +ve	9	0	0	0	0	0
Blood urea (mg/dl)	89	205	6.0	211.0	49.20	35.68
Creatinine (mg/dl)	91	5.9	0.6	6.5	1.39	1.03
Serum potassium (MEq/L)	91	3.1	3.0	6.1	4.36	0.61

BT/CT/PT if abnormal	12	0	0	0	0	0
Valid N (list wise)						

Viral markers HBsAg, Anti HCV, HIV(I&II) were negative in all patients. There was no BT,CT,PT abnormality in any patient.

ANA, RA factor and DsDNA was not abnormal in patients checked for it.

**Table 7. Morality rate table (n=100)**

Type of stroke	No.of pts	No.expired	% mortality
ischaemic	44	1	2.27%
haemorrhagic	56	12	21.4%

The in-hospital stroke mortality within five days was 13(13%).

#### **DISCUSSION:**

In our study; stroke presentation was male predominant (59% Vs 41%) and the mean age was 63.13 yrs. with SD of 15.32 year. The findings showed 56% infarcts and 44% hemorrhagic type. These findings are comparable to a study by Oli KK<sup>10</sup> et al. from Tribhuvan University Teaching Hospital; male to female ratio was 53:47; the mean age was 59 years; where out of 683 stroke patients over a period of four years 434(63%) were ischemic and 249(37%) hemorrhagic. Devkota<sup>12</sup> et al in a study from April 2000 to March 2005 from a teaching hospital in Kathmandu found male to female ratio of 58:42; mean age as 61.7 year; ischemic to hemorrhagic ratio of 68.1% to 31.9%. Pathak<sup>13</sup> et al at Nepal Medical College, Kathmandu; found a mean age of 61 years and ischemic to hemorrhagic ratio 68% vs 32%.

Most common risk factors associated are hypertension in 52 patients (52%), smoking in 42 patients (42%) and diabetes mellitus

in 12 patients(12%). These findings are similar to a prospective cross sectional study in Manipal Teaching Hospital in which associated risk factors are hypertension (61.2%), smoking (59.4%), elevated TG(23.0%), elevated cholesterol(7.5%).<sup>14</sup> In another prospective study in a tertiary hospital of Nepal found hypertension as the most common risk factor and the most common ischaemic stroke groups were MCA stroke (39.4%) and small vessel stroke (17.2%). The most common type of haemorrhage being basal ganglia haemorrhage which was present in 15% of patients.<sup>15</sup> Most common risk factors are hypertension, diabetes, alcohol, smoking and dyslipidaemia among elderly stroke patients.<sup>16,17</sup>

Most common findings were weakness of limbs in 89 patients (89%), dysphagia in 58%, impaired consciousness in 44%, gaze disturbances in 18%, facial deviation in 9% of the stroke patients. Only 23.2% of ischemic stroke patients were

subconscious or unconscious, while of the haemorrhagic stroke patients 26.4% were subconscious and 40.3% were unconscious on admission.

In a study by Yang Wang et al.<sup>18</sup> out of 509 stroke patients ischaemic 47/437(10.8%) and among haemorrhagic 39/72(54.2%) died in the hospital. Out of 390 ischemic and 33 haemorrhagic stroke patients who were discharged alive from the hospital, 65(16.7%) and 7(21.2%) died respectively within 1 year.

Among the 100 new stroke patients; 44 ischaemic one (2.27%) and among 56 haemorrhagic 12(21.4%) patient died in the hospital.

The overall five days in-hospital mortality in newly diagnosed stroke patients in Bir Hospital was 13%.

### CONCLUSION:

Out of 44 ischemic stroke patients one died i.e. mortality is 2.27% and out of 56 haemorrhagic stroke patients, 12 died (mortality is 21.4%). The overall five days in-hospital stroke mortality in this study was 13 percent.

For the control of stroke, it is better to control hypertension, smoking, diabetes, chronic heart and liver diseases. Maintaining homeostasis of physiological parameters in acute comprehensive care is important for reducing early stroke mortality. The sample size of the study was small,

and it was a single site study. It is suggested that a larger sample size with multiple sites be conducted for better validity and reliability.

**Conflict of interest:** Nil

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