

Prospective-Observational Study: Clinical and Demographic Profile of Acute Stroke Patients

Dr. Rakesh Kumar¹, Dr. Rashmi², Dr. Kunal³, Dr. Sagar Rajak⁴, Dr. Sushant Kumar⁵

¹Senior Resident, General Medicine, Vardhman institute of medical sciences, Pawapuri, Nalanda, Bihar, India

²Associate professor, General Medicine, Vardhman institute of medical sciences, Pawapuri, Nalanda, Bihar, India

³Senior Resident, General Medicine, Vardhman institute of medical sciences, Pawapuri, Nalanda, Bihar, India

⁴Professor, General Medicine,, Vardhman institute of medical sciences, Pawapuri, Nalanda, Bihar, India

⁵Senior Resident, Paediatrics, Vardhman institute of medical sciences, Pawapuri, Nalanda, Bihar, India

Corresponding Author: Dr. Anil Kumar Gupta

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Abstract

Aim: The aim of this study to determine the clinical profile of acute stroke patients.

Methods: This prospective, observational study was conducted in the Department of General Medicine, Vardhman institute of medical sciences, Pawapuri, Nalanda, Bihar, India A total of 100consecutive patients with brain stroke who attended the emergency within 24 hours of stroke were studied. **Results:** Most of the patients were aged between 60 to 70 years (29%) and the mean age was 59.39±12.87 years. Majority of the patients (72%) were males and the male female ratio was 2.57:1. Investigations revealed anemia, raised total WBC count, hyperglycemia and raised BUN in 43%, 23%, 54% and 16% of the patients respectively. The most common comorbid condition was hypertension (36%) followed by hypertension with diabetes mellitus (17%). The other risk factors include dilated cardiomyopathy (DCM), ischemic heart disease (IHD), hypertension with IHD, hypertensionwith DCM, Diabetes with atrial fibrillation, diabetes with IHD. Most of the patients were conscious (55%), 20% were stuporous, drowsy, 15% were arousable, 6% were comatose, 3%were disoriented and 1% were drowsy. Tachycardia was noted in 5% of the patient, bilateral conducted sounds were noted in 15% of the patients and bilateral crept in 2% of the patients. Most of the patients had ischemic stroke (82%) while hemorrhagic stroke was noted in 18% of the patients.

Conclusion: Ischemic stroke constitutes a larger percentage of stroke subtypes on this part of the country. Proper strategy to prevent and treat stroke is the need of the hour.

Keywords: stroke, hypertension, hemorrhage

Introduction

Stroke is one of the leading causes of morbidity and mortality worldwide.¹ Ischemic strokes account for 50-85% of all strokes worldwide.² Stroke case - fatality defined as the proportion of events that are fatal within 28 days post stroke averages 30%.³ Stroke is also a leading cause of disability in adults. Among the stroke survivor each year, 30% requires assistance with activities of daily living, 20% requires assistance with ambulation, and 16% requires institutional care leading to serious long-term physical and mental disabilities among survivors.⁴ Thus, it is apparent that stroke is a major public health problem and has high mortality and morbidity rate.

Stroke was defined by the world health organization (WHO) more than 40 years ago as “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin.” Stroke is one of the leading causes of death and disability in India. The estimated adjusted prevalence rate of stroke range from 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population based studies.⁵ Stroke is becoming an important cause of premature death and disability in low-income and middle-income countries like India, largely driven by demographic changes and enhanced by the increasing prevalence of the key modifiable risk factors. As a result developing countries are exposed to a double burden of both communicable and non-communicable diseases. The poor are increasingly affected by stroke, because of both the changing population exposures to risk factors and, most tragically, not being able to afford the high cost for stroke care. Majority of stroke survivors continue to live with disabilities, and the costs of on-going rehabilitation and long term-care are largely undertaken by family members, which impoverish their families.⁵

Studying the burden of stroke and the availability of health services will help the policy makers to tackle the rising burden of stroke. Recently there has been an increase in the epidemiology data on stroke from India. This review will address the changing burden of stroke. Without coordinated effort on the part of the international public health community; stroke will claim the lives of up to 6.5 million people each year by 2015, according to the World Stroke Organization.⁶

Materials and Methods

This prospective, observational study was conducted in the Department of General Medicine, Vardhman institute of medical sciences, Pawapuri, Nalanda, Bihar, India . A total of 100 consecutive patients with brain stroke who attended the emergency within 24 hours of stroke were studied. Adult patients with stroke who attended the emergency department within 24 hours of attack and willing to participate in the study by giving written informed consent for the study were enrolled. Patients with known chronic liver or kidney diseases, TIA, active infections, history of neoplasia and alcoholic patients were excluded from the study. Patients were screened for the eligibility and those fulfilling the selection criteria were briefed about the nature of the study. In case of comatose patients, the relatives/caretakers were informed about the study. The patients/caregivers expressing their willingness to participate in the study were enrolled after obtaining a written informed consent. Patients were interviewed and demographic data like gender and age were noted. Demographic data such as age and sex were recorded. History of other co-morbid conditions such as, hypertension, diabetes mellitus, personal history such as habits of alcohol consumption, smoking, were noted. A thorough physical examination was conducted for vitals (pulse rate, blood pressure and respiratory rate)

followed by systemic examination. The diagnosis of stroke was entertained after fulfilling WHO definition of stroke by the patient. The ischemic nature of stroke was established by CT/MRI scan. These findings were recorded on a predesigned and pretested proforma. Further, Blood sample was collected for laboratory investigations. Blood samples were collected under all aseptic precautions; blood samples were collected by venepuncture and collected in vacutainer. The sample was collected within 6 hours of admission in order to investigate hemoglobin, platelet count, white blood cell count, random blood sugar and serum creatinine. Also, imaging studies i.e. MRI or CT scan of brain was done. All cases were provided treatment according to the diagnosis and routine hospital protocols. All cases were followed up till the hospital stay to assess outcomes, mortality, morbidity and complications.

Statistical analysis

The data obtained was coded and entered into Microsoft excel worksheet. The data was analyzed using SPSS statistics software version 21.0. The categorical data was expressed in terms of rates, ratios and proportions. The continuous data was expressed as mean \pm standard deviation (SD).

Results

Most of the patients were aged between 60 to 70 years (29%) as shown in (Table 1) and the mean age was 59.39 ± 12.87 years as shown in (Table 2). Majority of the patients (72%) were males and the male female ratio was 2.57:1. Investigations revealed anemia, raised total WBC count, hyperglycemia and raised BUN in 43%, 23%, 54% and 16% of the patients respectively and their distribution is depicted in (Table 2). The most common comorbid condition was hypertension (36%) followed by hypertension with diabetes mellitus (17%). The other risk factors include dilated cardiomyopathy (DCM), ischemic heart disease (IHD), hypertension with IHD, hypertension with DCM, Diabetes with atrial fibrillation, diabetes with IHD with frequency as shown in (Table 3). Most of the patients were conscious (55%), 20% were stuporous, drowsy, 15% were arousable, 6% were comatose, 3% were disoriented and 1% were drowsy. Tachycardia was noted in 5% of the patient, bilateral conducted sounds were noted in 15% of the patients and bilateral crept in 2% of the patients as shown in (Table 4). Most of the patients had ischemic stroke (82%) while hemorrhagic stroke was noted in 18% of the patients.

Table 1: Distribution of patients according to the age

Age group (years)	Total (n=100)	
	Number	Percentage (%)
Below 30	2	2
30 to 40	6	6
40 to 50	24	24
50 to 60	22	22
60 to 70	29	29
70 to 80	11	11
80 to 90	4	4
Above 90	2	2
Total	100	100

Table 2: Clinical and biochemical profile of the study population

Variables	Mean (n=100)		Median
	Mean	SD	
Age (years)	59.39	12.87	59
Pulse rate (min)	85.14	13.40	86
Systolic blood pressure (mmHg)	152.22	22.69	151
Diastolic blood pressure (mmHg)	91.12	9.83	91
Hemoglobin (g/dl)	14.25	1.91	14.50
Total WBC count (Cumm)	9761.44	2634.50	9862.87
RBS (mg/dl)	166.65	61.83	154
Blood urea nitrogen (mg/dl)	26.87	10.58	24
Serum creatinine (mg/dl)	0.96	0.35	0.81

Table 3: Distribution of patients according to the past history

Past history	Distribution (n=100)	
	Number	Percentage (%)
Hypertension	36	36
Hypertension with diabetes mellitus	17	17
Diabetes mellitus	9	9
Hypertension with diabetes mellitus with IHD	4	4
IHD	3	3
Hypertension with IHD	3	3
DCM	2	2
Diabetes mellitus with atrial fibrillation	2	2
Diabetes mellitus with IHD	1	1
Hypertension with DCM	1	1
No past history	22	22
Total	100	100

Table 4: Distribution of patients according to systemic examination

Systemic examination	Findings	Distribution (n=100)	
		Number	Percentage (%)
CVS system	No abnormality detected	95	95
	Tachycardia	5	5
Respiratory system	Bilateral basal crept	2	2
	Bilateral conducted sounds	15	15
	No abnormality Detected	83	83
	Total	100	100

Discussion

Stroke is major public health problem which has a significant morbidities and mortalities. Worldwide, it is the third most common cause of death in adults. Stroke occurs predominantly in males at late years of life. Several studies documented that systemic hypertension, diabetes mellitus, hyperlipidemia, IHD, atrial fibrillation smoking and long-standing alcohol intake are contributing factors for stroke. The prevalence of risk factors varies in different population. Despite numerous prior studies of stroke, risk factors much remains unknown and several inconsistencies continue to exist. However, the minor differences in the prevalence of stroke risk factors in different communities are probably due to differences in culture, disease patterns, living habits and distribution of various ethnic groups. Stroke or CVA is a frequent cause of death and disability and is a major problem in most part of the world.⁷ After heart disease and carcinoma, stroke is the third leading cause of death in developed countries.⁷ Of patients with first-ever stroke captured in the Mumbai registry, CT imaging was done in 89.2 and 80.2% were ischemic strokes and 17.7% hemorrhagic strokes.⁸ In the Trivandrum registry, 69.7% of patients underwent imaging. Of those, 83.6% were ischemic strokes, 11.6% intracerebral hemorrhages, and 4.8% subarachnoid hemorrhages, respectively.⁹

It is reported that, the male sex has been listed as a risk factor for stroke. In the present study also, male preponderance was noted as 72% of the patients were males and 28% of the patients were females. The male female ratio was 2.57:1. Mehndiratta et al showed a ratio of 1:08 in North India where as Zunni et al demonstrated a similar ratio of 1.2:1 in Africa.^{10,11} Study by Kay et al found male to female ratio of 1.9 to 1 and this male predominance was consistent with many previous studies of cerebral infarction in Asia and elsewhere.¹² Male predominance was observed to be highest in Asia with a lower male/female ratio has been noted in European and North American studies.¹² In this study age ranged between 27 to 95 years. Most of the patients were aged between 60 to 70 years (29%) as shown in (Table 1) and the mean age was 59.39±12.87 years. These findings were comparable with epidemiological data in the literature which states that, age is an important non-modifiable risk factor for stroke. The mean age of stroke onset in the South Asian region (for example, 63 years in India and 59 years in Pakistan) is lower than in Western countries (for example, 68 years in the USA and 71 years in Italy).

In this study the most risk factor was hypertension (36%) followed by hypertension with diabetes mellitus (17%). Hypertension was documented in 47.2% of the entire cohort of patients in study by Kay et al and was the most common risk factor.¹² The risk factors in descending order in their study were dyslipidemia, smoking, diabetes and alcohol excess. These risk factors were observed in 42.6%, 38.9%, 24.3% and 15.1% of the entire cohort of patients respectively. Hypertension was a frequent risk factor with 32 to 65% of the young ischemic stroke patients. This risk factor was also noted more commonly in Asian studies among young black patients in the United States (55%) and in recent European studies (39.1%). Cigarette smoking is a known risk factor for ischemic stroke, increasing its relative risk three-fold.¹² In a hospital based retrospective study done in Kolkata reported approximately equal no of hemorrhagic (399) and ischemic stroke (393) in 792 patients of strokes who underwent CT scan. Hypertension was observed in 77.3% of ICH cases.¹³

Diabetes mellitus is one well known, studied risk factor causing macrovascular complications. When compared with non-diabetic patient stroke risk doubles in diabetes.¹⁴ In Framingham study 10 to 14% person with stroke had diabetes. The higher prevalence seen in our study may be due to higher prevalence of diabetes in southern India from where most of the population under study hails. The data is in agreement with several other Indian studies.¹⁵ 16% of patients

had both hypertension and diabetes. From various studies it was concluded that strict control of blood pressure in diabetic patients will definitely reduce the incidence of stroke.¹⁶

Most of the patients were conscious (55%), 20% were stuporous, drowsy, 15% were arousable, 6% were comatose, 3% were disoriented and 1% was drowsy. Tachycardia was noted in 5% of the patient, bilateral conducted sounds were noted in 15% of the patients and bilateral crept in 2% of the patients.

In the present study most of the patients had ischemic stroke (82%) while hemorrhagic stroke was noted in 18% of the patients. The frequency of ischemic stroke observed in the present study was consistent with epidemiological studies in the literature which states that, in India, frequency of ischemic stroke is between 60 to 80%.¹⁷⁻²⁰ Chandana et al reported 60% cases and 22% hemorrhagic stroke which is similar to present study.²¹ Ischemic strokes are most common type of strokes and they are caused by either cerebral thrombosis or embolism. They account for 80-85% of cerebrovascular accidents worldwide. One of the most common causes leading to ischemic stroke is narrowing of blood vessels of head or neck. Narrowing of vessels is mainly due to atherosclerosis and cholesterol deposition. Non modifiable risk factors for stroke include age, sex and genetic factors. The modifiable risk factors for ischemic stroke include systemic hypertension, alcoholism, smoking, hyperlipidemia, diabetes etc. By targeting various modifiable risk factors, we can reduce the incidence of stroke. Study of Non-modifiable risk factors also help in identifying high risk population. Hemorrhagic stroke may be due to subarachnoid hemorrhage or intracerebral hemorrhage. Sub arachnoid hemorrhage accounts for 1-7% of all strokes and intracerebral hemorrhage constitutes 7-27% of all strokes worldwide. Indian government, launched national program for prevention and control of cancer, diabetes, cardiovascular diseases and stroke (NPCDCS) to address high prevalence of non-communicable diseases (NCDs).²² Risk factor control requires, multidisciplinary approach, which includes approaching social determinants of health, health-care financing, improving medical education, and health system strengthening.

Conclusion

Ischemic stroke constitutes a larger percentage of stroke subtypes on this part of the country. Proper strategy to prevent and treat stroke is the need of the hour. Control of risk factors require multidisciplinary approach, which include approaching social determinants of health, health-care financing, improving medical education, and health system strengthening.

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