ORIGINAL ARTICLE

Ischemic Stroke: A Cross Sectional Observation on Hypertensive Patients in a Tertiary Care Hospital

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Abstract:

Background: Stroke is the clinical syndrome of rapid onset of cerebral deficit (usually focal) lasting more than 24 hours or leading to death, with no apparent cause other than a vascular one1. Stroke is a common medical emergency with an annual incidence of between 180 and 300 per 100000. The incidence rises steeply with age, and in many developing countries, the incidence is rising because of the adoption of less healthy lifestyle. This observational prospective study was carried out to assess the relationship of hypertension among the ischemic stroke patients. The study also revealed the biochemical parameters, associated risk factors and socio-demographic scenario stroke victims. Different risk factors were recorded and analyzed for their association with Ischemic stroke. Among the non-modifiable risk factors age and sex distribution were studied. Methodology: The study was carried out on 171 patients of stroke in medicine unit of Holy Family Red Crescent Medical College with a view to assess the relationship between hypertension and ischemic stroke patients and it also provides simple health education on management of stroke victims and measures for its recurrence. Data collected in prescribed protocol were analyzed in simple statistical percentage, and cases were selected irrespective of age and sex. Results: Elderly people are the most vulnerable group for developing stroke. In the present study, 59.9 years was found to be the mean age of the Ischemic stroke patients and the maximum patients were between the age group of 61 to 70 years. Maximum (36.0%) of Ischemic stroke was between the age group of 61 to 70 years. The male female ratio was 3:1. Most of the patients were housewife (24.0%) and unemployed (42.0%). Hypertension was found in 66.0% cases and 10.0% cases had DM. More than half (60.0%) of the Ischemic patients had left sided abnormality, 40.0% had right sided, and 10.0% had both sided abnormality. Almost 44.0% of the study patients had family history of stroke and 40.0% were smoker, 34.0% had cardiac problems and 10.0% found as obese. Regarding the life style of the study patients, 68.0% lead moderate stressful life, 12.0% of the respondents had hyperlipildaemia, 10.0% had H/O alcohol intake. Among 50 Ischemic stroke patients, 76.0% were improved, 18.0% were static during discharge and 6.0% died. Conclusion: Stroke affects the people at the prime of their lives at the age of more than 60 years. This has a devastating effect on the individual, the family, the community and the nation as a whole. Perception of the problem is probably low in our country. This problem cannot be solved by the medical profession or the government alone. Community participation is essential for solving this huge problem.

Key words: hypertension, stroke, ischemia, comorbidity

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Background:

Stroke is the clinical syndrome of rapid onset of cerebral deficit (usually focal) lasting more than 24 hours or leading to death, with no apparent cause other than a vascular one[1]. Stroke is a common medical emergency with an annual incidence of between 180 and 300 per 100000. The incidence rises steeply with age, and in many developing countries, the incidence is rising because of the adoption of less healthy lifestyle[2]. Stroke is the third commonest cause of death in developed countries. Stroke is uncommon below the age of 40 and is more common in males. Death rate following stroke is around 25 % 1. There are two types of stroke; infarctive stroke and haemorrhagic stroke. There are several risk factors of stroke, some are non modifiable and some are modifiable. Hypertension is common in patients admitted for acute ischemic stroke, and a transient blood pressure (BP) rise can be found also in previously normotensive patients[3]. The mechanism that raises BP at stroke onset is unknown and questions remain as to its appropriate management. Blood pressure may decline spontaneously and unpredictably, without intervening medications. The incorrect use of antihypertensive drugs in acute stroke may reduce the pressure dependent cerebral perfusion to the ischemic penumbra and worsen cerebral damage[4].

The incidence of stroke rises steeply with age; it is more common in men and can occur at any age, including in infancy and childhood. The incidence in Bangladesh is 2.55/1000 population/year in both sex[5].

Stroke incidence rises rapidly with age; about a quarter occur below the age of 65, and about a half below the age of 75. Stroke prevalence is not a particularly interesting statistic because incidence and even mortality data provide more information about aetiology, geographical and time trends, and the influence of various risk factors. A typical estimate of prevalence is about 5/1000, but clearly this depends on the population age structure.

A risk factor for stroke is a characteristic for an individual or for a population, indication that the individual or population has an increased risk of stroke compared with an individual or a population, without that characteristic like Age, Hypertension, Gender, Heart disease, Race, Diabetes, Heredity, Hyperlipidemia, Smoking, excessive alcohol consumption, Polycythemia, Oral contraceptives etc.

Cerebral infarction is mostly due to thrombo-embolic disease secondary to atherosclerosis in the major extracranial arteries (carotid artery and aortic arch). About 20% of infarction are consequent upon embolism from the heart and a further 20% are due to occlusion of the small lenticulostriate perforating vessels by intrinsic disease (lipohyalinosis), producing so called 'lacunar' infarctions. The risk factors for these are underlying vascular diseases.

Of the 15% of acute cerebrovascular disease, that is caused by haemorrhage, about half occurs through the rupture of a blood vessel within the brain parenchyma (primary intracerebral haemorrhage), resulting in an acute focal stroke. In addition, a patient with a subarachnoid haemorrhage may present with an acute focal stroke if the artery ruptures into an area of brain infarction and such haemorrhagic infarction may be difficult to distinguish from primary intracerebral haemorrhage.

Subarachnoid haemorrhage:

Of all subarachnoid haemorrhage, 85% are caused by 'berry' aneurysms bulging out from the bifurcations of the cerebral arteries. These develop during life from defects in the media of the arterial wall and rarely presents before the age of 20. There is an increased risk in association with polycystic kidney disease and congenital collagen defects. Of the remainder 5% are due to arteriovenous malformations and 10% are non-aneurysmal haemorrhage.

Aims and Objectives:

General Objective: To assess the relationship of hypertension among the ischemic stroke patients.

Specific Objective:

- To identify the incidence of ischemic stroke among the hypertensive patients.
- To assess baseline knowledge about warning

sign-symptoms of stroke in hypertension.

- To assess the prevalence of newly detected hypertensive patients presenting with ischemic stroke.

Methodology:

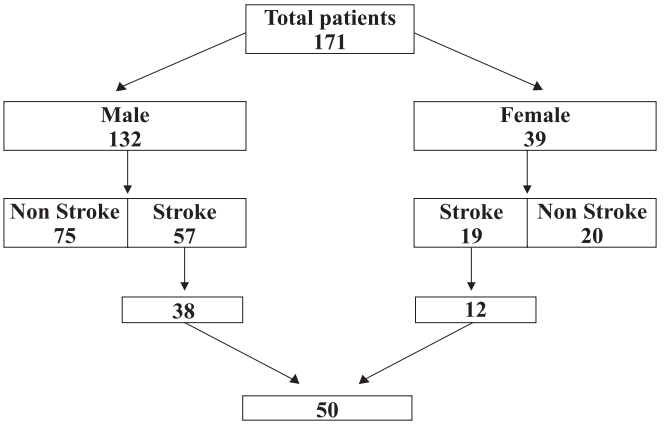
It was a cross sectional observational study carried out on 171 hypertensive patients among whom 50 diagnosed as ischemic stroke admitted in Medicine Unit of Holy Family Red Crescent Medical College Hospital, Dhaka. The duration of study was six months. All cases of ischemic stroke were examined for presence of hypertension and relevant history was taken regarding duration of hypertension, whether any antihypertensive medicine is being taken or not and presence of complications of hypertension. Other risk factors of stroke were assessed by relevant clinical, laboratory and imaging investigations. Evaluation by computerized tomography (CT) of the brain was made to differentiate infarction from haemorrhage. The clinical and investigation profile between haemorrhagic and ischemic stroke was compared with hypertension.

Routine investigation such as CBC, Urine R/E, Random blood glucose, lipid profile, serum electrolytes, renal function test, CXR, EGG were done and their correlation with hypertension were made.

All data were collected by investigator and recorded in a predesigned bile or case record form (CRF).

During the study period a total of 171 patients were admitted in medicine unit, among them 132 were male and 39 were female and the male female ratio was 3.4:1. Among the male 57 were stroke and among the female 19 stroke. Therefore the total number of stroke was 76. Fifty patients were enrolled in the present study by CT findings and the rest were excluded from the study due to death before taking history, some refused to sign consent form, some could not afford the investigation cost and some remained unrecorded due to holidays.

Flow chart of study population:



Results:

During the study period a total of 171 patients were admitted in medicine unit, among them 132 were male and 39 were female and the male female ratio was 3.4:1. Among the male, 57 cases and among the female, 19 cases of stroke was evaluated by CT scan, therefore the total number reached to 76. Fifty patients were enrolled in the present study by simple random sampling and the rest were excluded from the study due to death before taking history, some refused to sign consent form, some could not afford the investigation cost and some remained unrecorded due to holidays.

Table-1: Distribution of patients according to their age group, (n=50)

Above table shows that maximum number

Age group	Number	Percentage
21-30	1	2.0
31-40	5	10.0
41-50	7	14.0
51-60	13	26.0
61-70	18	36.0
>70	5	10.0

18(36.0%) of Ischemic stroke was in 61-70 years age group. The mean age of the Ischemic stroke patients was 59.9 years with standard deviation 13.9 years.

Table-2: Distribution of stroke patients by occupation (n=50)

Most of the Ischemic stroke patients were

Occupation	Number	Percentage
Business	2	4.0
Labor	1	2.0
Farmer	5	10.0
Housewife	12	24.0
Unemployed	21	42
Service	5	10.0
Other	2	4.0

unemployed (42.0%), 24.0% were housewife, 10.0% were farmer & service holder, 4.0% were businessman & others 2.0% were laborer.

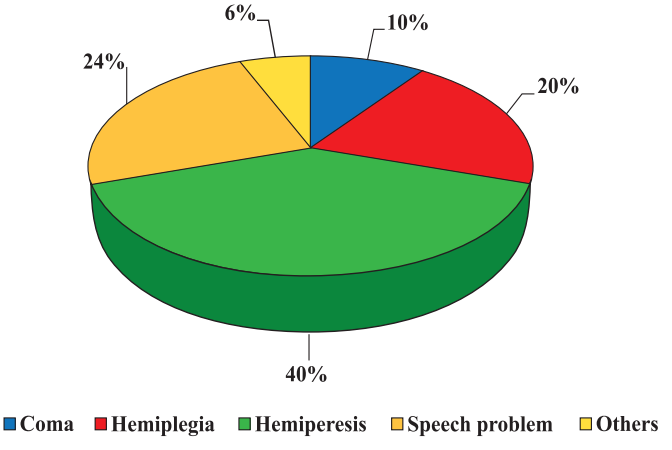
Table-3: Status of blood urea and serum creatinine of the patients (n=50)

The above table shows 49(98.0%) and 47(94.0%)

	Number	Percentage
Blood urea		
Normal	49	98.0%
High	01	02.0%
Serum creatinine		
Normal	47	94.0%
High	3	06.0%

had normal blood urea and serum creatinine level respectively.

Figure-1: Reasons of admission related to stroke



The above shows most of ischemic patients were in hemiperesis 20 (40.0%) followed by 24.0% were speech problem 20.0% were hemiplegia , 10.0% were coma respectively and 6.0% were other problems.

Table-4: Clinical findings of stroke patients after admission (n=50)

Out of ischemic patients 12 (24.0%) had vomiting

Clinical findings	Number	Percentage
Seizure	05	10.0%
Vomitting	12	24.0%
Pulse		
Regular	42	84.0%
Irregular	8	16.0%
Blood pressure		
Normal	35	70.0%
High	15	30.0%
Fundoscopy		
Normal	31	62.0%
Abnormal	19	38.0%
Anemia		
Absent	18	36.0%
Mild	20	40.0%
Moderate	12	24.%
Lung condition		
Normal	40	80.0%
Abnormal	10	20.0%
Carotid bruit	00	00

following stroke after admission, 5(10.0%) had seizure, 42(84.0%) had regular pulse, 35 (70.0%) had normal BP, 31(62.0%) had normal fundoscopy and none had carotid bruit. Most 20(40.0%) of the study patients had mild anaemia and normal lungs function found in 40(80.0%) of the patients.

Table-5: Status of Serum electrolytes of the patients (n=50)

Electrolytes	Number	Percentage
Sodium (Na^+)		
Hyponatremia	09	18.0%
Normal	40	80.0%
Hypernatremia	01	02.0%

Electrolytes	Number	Percentage
Potassium (K^+)		
Hypokalemia	11	22.0%
Normal	38	76.0%
Heperkalemia	01	02.0%
Chloride (Cl^-)		
Hypochloremia	10	20.0%

The mean total cholesterol of the Ischemic stroke patients was 204.7+54.4 mg/dl, HDL 40.6+16.5 mg/dl. LDL 139.0 + 36.8 mg/dl, TG was 156.9+63.2 mg/dl.

Table-6: Distribution of patients by risk factors (n=50)

Risk factors	Number	Percentage
Family H/O stroke	22	44.0%
Present smoker	20	40.0%
Past smoker	16	32.0%
Cardiac problem	17	34.0%
Obesity	05	10.0%
Hyperlipidaemia	06	12.0%
Life style		
Sedentary	22	44.0%
Moderate	34	68.0%
H/O alcohol intake	06	12.0%

The above table shows distribution of the study patients according to different risk factors. About 22 (44.0%) of the study patients had family history of stroke and 20(40.0%) were present smoker, 16 (32.0%) past smoker, 17 (34.0%) had cardiac problems and 5 (10.0%) found obese. Regarding the life style of the study patients most 34 (68.0%) lead moderate stressful life, 6 (12.0%) of the respondents had hyperlipildaemia, 5(10.0%) had H/O alcohol intake. No one was found H/O OCP use.

A half of the study patients were in the medicine unit for 1 to 7 days following by 15 (30.0%) of the study patients stayed there between 8 to 14 days and 10 (20.0%) of the study patients stayed there between 8 to 14 days. The mean duration of stay in hospital was 7.0 days with a standard deviation 3.1 days.

Discussion:

This prospective study was carried out with an aim to assess the relationship of hypertension among the ischemic stroke patients. The study is done to find out associated risk factors and to provide simple health education on management of stroke victims.

Different risk factors were recorded and analyzed for their association with Ischemic stroke. Among the non-modifiable risk factors age and sex distribution were studied. Elderly people are the most vulnerable group for developing stroke. In the present study, 59.9 years was found to be the mean age of the Ischemic stroke patients with a standard deviation of 13.9 years and the maximum patients were between the age group of 61 to 70 years. Alam et al. (1999) found in their study that 36.2% developed stroke in more than 60 years of age group, which is similar with the present study4. In another study Rahman et al (2001) observed in 32 patient and found mean age was 55.56 years with standard deviation 13.14 years[5], which is lower than the current study.

The incidence of Ischemic stroke was found 76.0% and 24.0% in male and female respectively. The male female ratio was 3:1 in this present study. This study correlates with that of Chowdhury et al[6].

In the current study most of the patients were housewife and unemployed, which was 24.0% and 42.0% the cases of Ischemic stroke respectively.

In the present study the clinical features and complications were observed that included coma, hemiplegia, hemiperesis, speech problem. The various grades of weakness were not brought into consideration in this study. Mannan and Haque study in IPGMR and found hemiplegia in 100% cases[7]. In the previous studies, it is seen that incidence of both right and left sided hemiplegia is almost equal which is also found in this study.

Among the patients with hypertension, 66.0% had hypertension, out of which 36.0% received drug regularly and 52.0% patients were poorly

controlled. The study correlates with that of a study in the urban population of Calcutta in 2001, where hypertension was found to be the most important risk factor[8]. Arif SM et al (2003) found 67.0% hypertension[9], which is

closely resemble with the present study. In the Western European centers, it was less than 50.0%. A study at BIRDEM by Latif et al.[10] showed 50.3% of NIDDM patients with stroke had associated hypertension, which is less than the present study. This may be due to the increased consciousness and awareness regarding health and early detection of hypertension prior to complication which was 50.3%, in BIRDEM hospital done by Latif et al.[10] but it was much higher in the present study.

In this present study 10.0% had DM and 6.0% had well controlled DM which correlates with Rahman KM et al (2001)[3-4]. A study done on 165 cases of diabetic patients showed that all of them developed stroke within 10 years duration of DM.

The present study found that 50.0% of the Ischemic patients presented with left sided abnormality, 40.0% had right sided and the rest 10:0% had both sided abnormality. Report from Akbar and Mushtaq showed that the bilateral stroke was 15.5% in the 103 study patients[11], whereas this current study it was only 9.9%, which is lower than the above mentioned study.

In the current study the blood glucose level was normal in 64.0% cases and 36.0% cases had DM in Ischemic stroke patients. The meanSD random blood sugar was 8.25±2.9 mmol/L ranging form 5.30 mmol/L. to 12.80 mmol/L. Regarding blood urea and serum creatinine 98.0% and 94.0% were normal in Ischemic stroke patients.

This study found that in ischemic stroke patients the Na+, K+ and Cl level was normal in 80.0%, 76.0% and 80.0% cases respectively. CO2 was found normal in all of the patients.

The mean total cholesterol was 204.7+54.4 mg/dl, HDL 40.6±16:5 mg/dl, LDL 139.0±36.8 mg/dl and TG 156.9±63.2 mg/dl in Ischemic stroke patients.

Regarding the risk factors it was observed that 44.0% of the study patients had family history of stroke and 40.0% were present smoker, 32.0% past smoker, 34.0% had cardiac problems and 10.0% found as obese. Regarding the life style of these patients, 68.0% lead moderate stressful life, 12.0% of the respondents had hyperlipildaemia, 10.0% had H/O alcohol intake. Abnormality was found in 66.0% and 34.0% of the study patients in the right and left side respectively.

In the present study it was found that 76.0% required NG feeding, 90.0% had indwelling catheter and 22.0% discharged with indwelling catheter in ischemic stroke patients.

In the current study it was found that 76.0% were improved, 18.0% bas eg were static during discharge and 6.0% died.

Conclusion:

Stroke is a leading cause of mortality and morbidity in both developed and developing countries. There are many risk factors for stroke, some are modifiable and some are not. In this study a number of modifiable risk factors were identified of which hypertension remains the most important factor. In developing countries the best policy for combating stroke is primary prevention. By controlling hypertension we can significantly lower the incidence of stroke. For this awareness about the danger of hypertension should be increased among the community. Stroke affects the people at the prime of their lives at the age of more than 60 years. This has a devastating effect on the individual, the family, the community and the nation as a whole. Perception of the problem is probably low in our country. This problem cannot be solved by the medical profession or the government alone. Community participation is essential for solving this huge problem.

References:

1. Parveen Kumar & Michael Clark, editors Medicine, 6th ed 2005 pp. 1209-1227.

2. Nicholas A. Boon, Nicki R. Colledge, Brian R. Walker, editors Davidson's Principles & Practice

of Medicine 20th ed. Edinburgh; Churchill Livingstone; 2006 p. 1200-1209.

3. Wallace JD. Levy LL, Blood presure after stroke. JAMA. 1981; 246:2177-2180.

4. Alam B, Habib M, Qurashi FA, Haque B, Hoque A, Mohammad QD 'Stroke Evaluation of risk factors' Bangladesh Journal of Neuroscience 1999;15(1/2): pp 14-18

5. Rahman KM, Haque A, Ullah AKMA, Khan RK, Alam MB 'Study of modifiable risk factors for ischemic stroke' Bangladesh Journal of Neuroscience 2001;17(1): pp 6-9.

6. Chowdhury SGM. Stroke in patients having inadequate or irregular antihypertensive therapy. Bangladesh Med Res Coun Bull 1990; 16: 52-7.

7. Haque A., Mannan MA. Study on Cerebrovascular disease in: Proceedings of Japan Bangladesh Conference on Cardiology 1984; 46-65.

8. Banerjee TK, Mukharjee CS, SArkhel A. Stroke in urban population of Calcutta, an epidemiological study. Neuroepidemiology 2001; 20(3): 201-07.

9. Arif SM, Khan MA, Khan NI, Mohammad QD, 'Relation of hypertension with stroke - A study of 100 cases' Bangladesh Journal of Neuroscience 2003;19(2): pp 59-64.

10. Latif ZA, Zaman SM, Barma A, Ahad A, Rahim SA. Study of strokes between normotensive and hypertensive NIDDM cases in BIRDEM, Dhaka, Bangladesh J Nerrosci 1990; 6: 52-9.

11. Akbar DH and Mushtaq M, 'Clinical profile of stroke: The experience at King Abdulaziz University' SQU Journal for scientific research, 2001;1: pp 35-38.