Profile of Stroke Patients Admitted to the Medicine Unit of Dhaka Medical College Hospital

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ABSTRACT

Background & objective: Stroke is a leading cause of death and a serious disability for adults. However, it is preventable and manageable, provided a complete updated profile (incidence, prevalence, and long-term outcome) of the disease is in our hands. The present study was therefore undertaken to assess the demographic, clinical characteristics, and outcome of the stroke patients admitted to the Dhaka Medical College Hospital.

Methods: This descriptive cross-sectional study was conducted in the Department of Medicine, over a period of 12 months between January 2004 and December 2004 at the Dhaka Medical College Hospital (DMCH), Dhaka. The study sample consisted of 101 stroke patients who were admitted to the Green Medicine Unit of DMCH. However, stroke patients who were too severely debilitated or in a state of stupor were not allowed to participate in the study. Through pertinent clinical laboratory and imaging tests, stroke risk variables were evaluated. The outcome was evaluated in terms of the number of patients cured, died, or remained static.

Result: There was no significant difference between ischemic and haemorrhagic stroke patients in terms of age (p = 0.658), sex (p = 0.276) and diurnal variation of its occurrence (p = 0.490). While diabetes mellitus and ischaemnic heart diseases were generally associated with haemorrhagic stroke (p = 0.039 and p = 0.056 respectively), hypertension was more or less common in ischemic stroke (p = 0.176). In both groups, hemiplegia was the most frequent cause of admission, after coma. While seizures were more common in the ischemia group, vomiting was a more common manifestation in the hemorrhagic group. The majority of patients in both groups maintained a steady pulse and normal blood pressure. The total cholesterol level was relatively greater in the ischemic group than in the hemorrhagic group. The mean HDL level in the hemorrhagic group was significantly higher than in the ischemic cohort. However, there was no appreciable difference in serum LDL and Tg levels across the groups. A substantial proportion of patients in both groups had to stay in the hospital for a brief period (10 or < 10 days). After receiving treatment, nearly 85% of the patients in the hemorrhagic group and 76.3% of the patients in the ischemic group were cured; some 5.5% in the ischemic group and 4.3% in the haemorrhagic group died of the disease.

Conclusion: The study concluded that smoking, uncontrolled hypertension, and diabetes mellitus are the three main risk factors for stroke. After a median treatment of 7 days, most patients in both the hemorrhagic and ischemic groups recovered, leaving a few to die of the disease. The risk of stroke can significantly be reduced by lowering blood pressure, treating diabetes, and giving up smoking.

Keywords: Stroke patients, ischaemic and haemorrhagic strokes, demographics, clinical characteristics, outcome etc.

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INTRODUCTION:

Stroke is a clinical syndrome of rapidly developing symptoms and signs of focal or global loss of cerebral functions due to causes of vascular origin.[1] It is a major cause of hospitalization, prolonged disability, and mortality in many populations. It imposes an enormous burden on the health care resources and economic well-being of the affected persons and their respective families.[2] The incidence of stroke in developed countries is about 2 per 1000 population per year. The incidence rises steeply with age and it is more common in men than in women. In the UK, stroke causes 12% of all deaths and is the most common cause of adult physical disability.[3]

Types of stroke include ischaemic infarction and intracranial haemorrhage. Many arterial and cardiac disorders underlying this syndrome are preventable.[3] The syndrome is highly heterogeneous with the etiologic factors influencing its prognosis. There are significant difficulties in defining the epidemiology of stroke in any given community or geographic area. However, the comparison of stroke incidence and more importantly its subtypes in different ages, racial or ethnic groups, and in different parts of the world may help identify differences that may provide etiological clues as well as its trend in a community.[2] Lack of adequate control of blood pressure is an important risk factor for stroke. Poverty, ignorance, and lack of awareness may contribute to poor compliance with the treatment of hypertension. Other risk factors include diabetes mellitus, hyperlipidaemia, smoking, obesity, ischaemic heart diseases, and valvular heart diseases.

The burden of stroke in a developing country like Bangladesh may be measured from data on its incidence, prevalence, and long-term outcome including mortality and cost of care. In Bangladesh, though the exact incidence of stroke is not known, it is reported to be 2.55/1000 population per year in both sexes.[4] It is an important cause of emergency admission in tertiary care hospitals like Dhaka Medical College Hospital (DMCH), Dhaka. A complete profile of stroke in Bangladesh is essential to formulate a policy and a plan of management to tackle this ever-increasing notorious disease. The present study was therefore designed to compare the demographic, clinical characteristics, & outcome (complications including mortality) of the stroke patients between ishemic and hemorrhagic admitted to the Dhaka Medical College Hospital.

METHODS:

This descriptive cross-sectional study was conducted in the Department of Medicine, Dhaka Medical College Hospital (DMCH), Dhaka over a period of 12 months from January 2004 to December 2004. Stroke patients admitted to one of the Medicine Units (Medicine Unit Green) of DMCH were the study population. A total of 101 stroke patients were included. However, stroke patients in the stupor stage or too debilitated conditions were excluded from the study. On obtaining ethical clearance from the Ethical Committee of Dhaka Medical College Hospital, Dhaka, all the study subjects on other attendents were informed verbally about the study design, the purpose of the study and potential benefits derived from and risks involved in the study.

Data were collected from the patients/attendents by face-to-face interview & anthropometric examination (weight, height) using a semi-structured questionnaire containing the variables of interest. Evaluation by computerized tomography (CT) of the brain was made to differentiate ischemic from hemorrhagic stroke. Risk factors of stroke were assessed by relevant clinical laboratory & imaging investigations. The clinical and lab profiles between hemorrhagic and ischaemic strokes were compared. The outcome of the patients was evaluated in terms of the number of patients cured, died, or static and in terms of their hospital stay. Data were processed and analyzed using SPSS (Statistical Package for Social Sciences) Inc., Chicago, Illinois USA, version 25.0. The test statistics used to analyze the data were Chi-square (χ^2) Test and Student's t-Test. Data presented on a categorical scale were expressed as frequency and corresponding percentage and were compared between groups using the Chi-square (χ^2) Test, while the data presented on a continuous scale were expressed as

mean ± SD and were compared between groups using Student's t-Tests. For all analytical tests, the level of significance was set at 0.05 and a p-value <0.05 was considered significant.

RESULTS:

There was no significant difference between ischemic and haemorrhagic stroke patients in terms of age with the mean age of the patients being around 60 years (p=0.658). Although male-female distribution in ischemic stroke was almost equal, a male preponderance was observed in haemorrhagic group (p=0.276). The study subjects were generally Muslim with no significant intergroup difference (p=0.151) (Table I). There was no difference between ischaemic and haemorrhagic stroke in terms of its diurnal variation in occurrence (p=0.490). The majority of the strokes in either group was of newly attacked (p=0.331). While a history of diabetes mellitus was significantly higher in the haemorrhagic stroke group than in ischemic stroke (p=0.039), the presence of hypertension was more frequent in the ischemic stroke than in the haemorrhagic stroke group (p=0.176). Cardiac problem was reported to be much higher in the haemorrhagic cohort than in the ischemic cohort (p=0.056) (Table II).

The predominant mode of presentation in either group was coma followed by hemiplegia. Over 30% of the patients of ischaemic group had seizures at presentation as compared to 17.4% of the haemorrhagic group (p=0.117). A higher incidence of vomiting was noted in the haemorrhagic group than in the ischaemic group (p=0.082). The majority of the patients in both groups exhibited regular pulse (p=0.925) and around two-thirds of the patients maintained normal blood pressure (p=0.530). A few patients in both groups had cardiomegaly. About 15% of the patients in either group exhibited abnormal fundoscopic findings (p=0.995) (Table III).

While both hypo and hypernatremia were significantly common in the haemorrhagic group (p=0.047), hypokalemia was to some extent higher in the ischaemic group (p=0.517). The incidence of hypochloremia was much higher in the haemorrhagic

group (p=0.094). The bicarbonate (HCO3-) level was normal in all the patients of both groups. The total cholesterol was relatively elevated in the Ischemic group than in the haemorrhagic group (p=0.102). The mean HDL level was significantly higher in the haemorrhagic stroke patients compared to their ischaemic counterparts (p<0.001). However, no significant difference was observed between the groups concerning serum LDL & Tg (p=0.635 and p=0.715 respectively) (Table V).

Over 40% of the patients in the haemorrhagic group and 30% of the patients in the Ischaemic group had abnormal ECG findings. Twenty percent of the patients in both cohorts exhibited abnormal chest skiagrams. No significant difference was found between the two cohorts concerning ECG and abnormal chest findings (p=0.227 and p=0.830 respectively) (Table VI). Majorities of the patients in either group had short hospital stays (10 or<10 days). Almost 85% of the patients in the haemorrhagic group and 76.3% in the ischaemic group improved with treatment and 4.3% in the former and 5.5% in the latter group died of the disease. The remaining patients in the respective groups did not exhibit any discernible change (p=0.553) (Table VII).

Table I. Comparison of demographic characteristics between groups

Demographic characteristics	Group		p-value
	Ischemic (n = 55)	Haemorrhagic (n = 46)	
Age			
≤ 40	7(12.7)	2(4.4)	
41-50	8(14.5)	9(19.5)	
51-60	14(25.5)	15(32.6)	
>60	26(47.3)	20(43.5)	
Mean ± SD	59.9 ± 13.9	61.0 ± 11.2	0.658#
Sex			
Male	27(49.1)	27(60.0)	0.276*
Female	28(50.9)	18(40.0)	
Religion			
Muslim	53(96.4)	41(89.1)	0.151**
Hinduism	2(3.6)	5(10.9)	

Figures in the parentheses indicate the corresponding **%; *Chi-squared Test** (χ^2) was done to analyze the data. **Fisher's Exact Test** was done to analyze the data. # Data were analysed using **Unpaired t-Test** and were presented as **mean ± SD.**

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Table II. Comparison of stroke profile between groups

Stroke profile	Group		p-value
	Ischemic (n = 55)	Haemorrhagic (n = 46)	
Diurnal variation in stroke occurrence			
12.01 to 12.00 AM	30(53.6)	21(46.7)	0.490*
12.01 to 24.00 PM	26(46.4)	24(53.3)	
Stroke status during admission			
First-time stroke	44(80.0)	33(71.7)	0.331*
Recurrent stroke	11(20.0)	13(28.3)	
Presence of risk factors for stroke			
Hypertension	36(65.5)	24(52.2)	0.176*
DM	5(9.1)	11(23.9)	0.039**
Family H/O of stroke	11(20.0)	6(13.0)	0.352*
Smoking habit	21(38.2)	16(34.8)	0.724*
Cardiac problem	9(16.4)	15(32.6)	0.056*
Obesity	4(7.3)	2(4.3)	0.428**

Figures in the parentheses indicate the corresponding %; *Chi-squared Test (χ^2) was done to analyze the data. **Fisher's Exact Test was done to analyze the data.

Table III. Comparison of clinical features after admission between groups

Clinical features	Group		p-value
	Ischemic (n = 55)	Haemorrhagic (n = 46)	
Mode of presentation			
Seizure	17(30.9)	8(17.4)	0.117*
Vomiting	6(10.9)	11(23.9)	0.082*
Coma	30(54.5)	21(45.7)	0.373*
Hemiplegia	19(34.5)	20(43.5)	0.358*
Hemiparesis	4(7.3)	1(2.2)	0.242**
Speech problem	1(1.8)	3(6.5)	0.244**
Others	1(1.8)	1(2.2)	0.706**
Pulse			
Regular	47(85.5)	39(84.8)	0.925*
Irregular	8(14.5)	7(15.2)	
BP			
Normal	35(63.6)	32(69.6)	0.530*
High	20(36.4)	14(30.4)	
Cardiomegaly	4(7.3)	5(10.9)	0.387**
Fundoscopy			
Normal	30(54.5)	25(54.3)	
Abnormal	8(14.6)	7(15.2)	0.995*
Cannot be performed	17(30.9)	14(30.4)	

Figures in the parentheses indicate the corresponding %; *Chi-squared Test (χ^2) was done to analyze the data. **Fisher's Exact Test was done to analyze the data.

Table IV. Comparison of status of serum electrolytes between groups

Serum electrolytes	Group		p-value
	Ischemic (n = 55)	Haemorrhagic (n = 46)	
Na+			
Hyponatraemia	10(18.2)	15(32.6)	
Normal	44(80.0)	27(58.7)	0.047*
Hypernatraemia	1(1.8)	4(8.7)	
K+			
Hypokalemia	12(21.8)	6(13.0)	
Normal	42(76.4)	39(84.8)	0.517*
Hyperkalemia	1(1.8)	1(2.2)	
Cl-			
Hypochloremia	10(18.2)	15(32.6)	0.094*
Normal	45(81.8)	31(67.4)	
HCO3-			
Normal	55(100.0)	46(100.0)	----

Figures in the parentheses indicate the corresponding %; *Chi-squared Test (χ^2) was done to analyze the data.

Table V. Association between types of strokes and lipid profile

Lipid profile# (mg/dl)	Group		p-value
	Ischemic (n = 55)	Haemorrhagic (n = 46)	
Total cholesterol	204.7 ± 54.4	192.3 ± 54.8	0.102
HDL	40.6 ± 16.5	51.5 ± 54.8	< 0.001
LDL	139.0 ± 36.8	134.7 ± 41.6	0.635
Tg	156.9 ± 63.2	163.8 ± 88.7	0.715

Data were analysed using **Unpaired t-Test** and were presented as **mean ± SD.**

Table VI. Comparison of ECG and X-ray findings between groups

ECG & X-ray findings	Group		p-value
	Ischemic (n = 55)	Haemorrhagic (n = 46)	
ECG findings			
Normal	38(69.1)	27(58.7)	0.227*
Abnormal	17(30.9)	19(41.3)	
X-ray chest P/A view			
Normal	44(80.0)	36(78.3)	0.830*
Abnormal	11(20.0)	10(21.7)	

Figures in the parentheses indicate the corresponding %; *Chi-squared Test (χ^2) was done to analyze the data.

Table VII. Comparison of outcome between groups

Outcome	Group		p-value
	Ischemic (n = 55)	Haemorrhagic (n = 46)	
Duration of hospital stay (days)			
≤ 10	49(89.1)	40(87.0)	0.741*
> 10	6(10.9)	6(13.0)	
Treatment outcome			
Improved	42(76.3)	39(84.8)	
Static	10(18.2)	5(10.9)	0.553*
Died	3(5.5)	2(4.3)	

Figures in the parentheses indicate the corresponding %;
Chi-squared Test (χ^2) was done to analyze the data.

DISCUSSION:

In the present study, all enrolled cases were subjected to a CT scan of the brain to confirm the clinical diagnosis of stroke. The study analyzed different risk factors to see their association with ischemic and haemorrhagic strokes. The study showed that the mean age of the patients was about 60 years with the male-to-female ratio in both types of strokes being roughly 1:1 which correlates well with Haque et al's study.[5] Alam and associates[6] in a similar study reported that over one-third (36.2%) of the stroke patients were > 60 years old, which in the present study was around 45%. In another study Rahman et al[7] found the mean age of stroke patients to be 55.5 years, which is somewhat lower than that found in the current study. The analyses also revealed that neither age nor sex was found to be associated with either type of stroke. There was no significant difference between ischaemic and haemorrhagic stroke in terms of diurnal variation of its occurrence and the majority was admitted for the first-time due stroke.

Hemiplegia was the second most common reason for admission in both groups, after coma. While vomiting was a more prevalent manifestation in the hemorrhagic group, seizures were more common in the ischemic group. Most of the patients in both groups continued to have normal blood pressure and a steady pulse. Arif and associates[8] found two-thirds (67.0%) of the stroke patients to be hypertensive, which is higher than that found in the present study. Contrasting with the findings of the present study, Mannan and Haque in a study in IPGMR found hemiplegia in 100% of cases.[5] In the Westem European centers,[9] it was less than 50%. Smoking habit was reported to be an important risk factor in both ischemic and haemorrhagic stroke in this study. This study correlates well with Brendan et al[10], who found smoking to be a strong risk factor for SAH and cerebral haemorrhage. Ex-cigarette smokers may have a sustained risk of stroke for several years and there is even some excess risk in passive smokers. Donnan et al[11] and Macfarlane[12] et al also found smoking as an important risk factor for stroke.

Compared to the hemorrhagic group, the ischemic group had a relatively higher total cholesterol level. In comparison to the ischemic cohort, the haemorrhagic cohort's mean HDL level was considerably greater. Nevertheless, there was no discernible variation between the groups in terms of serum LDL and Tg. The findings bear consistency with those of Ayobanji et al.[2] An aberrant ECG was seen in over 40% of the patients in the hemorrhagic group and 30% of the patients in the ischemic group. In each of the two cohorts, 20% of patients had aberrant chest skiagrams. There was no discernible difference between the two groups in terms of aberrant chest skiagrams or ECG readings. In the current study, the CT scan of the brain revealed 55(54.5%) infarction, 41(40.6%) primary intracerebral haemorrhage (PICH), and 5(5.0%) subarachnoid haemorrhage (SAH), which were fairly comparable with the study of Akbar and Mushtaq.[13]

According to the current study, patients with ischemic stroke spent an average of 7.0 ± 3.1 days in the hospital, while those with hemorrhagic stroke spent 5.9 ± 3.1 days. There was no significant intergroup difference with majority of patients in either group had brief hospital stays (10 or less than 10 days). After receiving treatment, nearly 85% of the patients in the hemorrhagic group and 76.3% of the patients in the ischemic group recovered; 4.3% of the former group and 5.5% of the latter group passed away from the illness. The remaining patients in each group did not show any appreciable change.

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CONCLUSION:

The study findings indicate that smoking, uncontrolled hypertension, and diabetes mellitus are significant risk factors for stroke. After a median of 7 days of treatment, most patients in both the hemorrhagic and ischemic groups recovered, with a small number succumbing to the illness. The best way to prevent a stroke is to prevent it altogether. The risk of stroke can be significantly decreased by lowering blood pressure, treating diabetes, and giving up smoking.

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