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ORIGINAL ARTICLE

Presenting Features of Ischaemic Stroke Patients with Type 2 Diabetes during Hospital Admission at BIRDEM

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ABSTRACT

Background & objective: Stroke is the third major cause of morbidity and mortality in the world immediately following ischemic heart disease and malignancy. Diabetes mellitus increases risk of ischemic stroke and mortality and morbidity after stroke. This cross sectional study was carried out to observe clinical profile of ischemic stroke in Type 2 diabetic patient.

Materials & Methods: This cross-sectional study was done in the Department of Neurology, Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine, and Metabolic Disorders (BIRDEM) Hospital, from April to September 2010. A total of 50 ischemic stroke patients with type-2 diabetes were consecutively recruited. Ischemic stroke was confirmed by clinical examination and CT imaging. Data were analysed using SPSS (Statistical Package for Social Sciences) and were presented as mean ± SD and frequencies with corresponding percentages as appropriate.

Results: Of the 50 ischemic patients, over one-third (36%) was in their 6th decades of life. A male preponderance (1.5:1) in the series. Most of the patients presented with weakness on either side of the body (90%) followed by difficulties in speech (80%), altered consciousness (24%) and facial weakness (4%). On examination 76% were conscious and oriented. Other examination findings were hemiparesis (60%), hemiplegia (30%), dysarthria (72%) and dysphagia (4%). The major co-morbid condition was hypertension (86%) with mean systolic and diastolic blood pressures being 153 ± 5 and 97 ± 4 mmHg respectively. On admission 94% had normal pulse and 40% abnormal fundoscopic examination in the form of hypertensive and diabetic retinopathy. Only 2% had carotid bruit.

Conclusion: Elderly males are more prone to develop ischemic stroke. Hemiparesis and dysarthria are the major clinical presentation and hypertension might be an important risk factor for ischemic stroke. Further study is recommended to conclusively comment on the clinical features of diabetic ischemic stroke patients and also to compare the clinical profile between diabetic stroke patients.

Key words: Ischemic stroke, type 2 diabetes, risk factors, presenting features.

INTRODUCTION

The traditional definition of stroke,[1] devised by the World Health Organization in the 1970s, is a "neurological deficit of cerebrovascular cause that persists beyond 24 hours or is interrupted by death within 24 hours". It is the major cause of hospitalization, prolonged disability and mortality throughout the world which imposes an

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enormous burden on the health care resources and economic well-being of the affected persons and their families.[2]

Diabetes increases the risk of ischemic cerebrovascular disease 2-4 folds compared to those without diabetes.[1] Diabetes increases the risk of stroke with Type 2 diabetic (T2DM) patients are at increased risk for stroke than type 1 diabetics.[4] Evidence obtained from large clinical trial involving patients with diabetes supports the need for aggressive and early intervention to prevent the onset, recurrence and progression of acute stroke.[3] Patient with hyperglycemia at acute stroke onset have shown to have higher mortality and poorer stroke outcome.[5] Although atherosclerosis is the leading cause of cerebral ischemia in diabetes, additional factors, such as chronic impairment of cerebral blood flow and cerebral autoregulation, reduced red cell deformability, hyperviscosity, endothelial dysfunction and impaired prostaglandin synthesis may play a role.[6] Incidence of stroke found to increase dramatically with advancing age and increasing age is the most powerful risk factor for stroke. The incidence of stroke doubles each decade past 55 years of age. Males are more prone to suffer from stroke than women up to the age 75 years. Heredity also assumed to play a minor role in the pathogenesis of stroke among the first degree relatives.[7]

Systemic hypertension predisposes ischemic stroke by aggravating atherosclerosis and accelerating heart disease. Diabetes associated with hypertension adds significantly to stroke risk.[8] Smoking found to be independent risk factor for ischemic stroke in men and women of all ages with risk of stroke in smoker being 2-3 times greater than that in nonsmoker.[8] Obesity is another risk factor for stroke in men and women alike. It is uncommon in women of reproductive age. A diurnal and seasonal variation of ischemic stroke events also occurs.[8]

Clinical presentation of stroke depends upon which arterial territory is involved and the size of the lesion. The neurological deficit can be identified from the history and through neurological examinations. Presence of unilateral motor and higher cerebral functional deficit such as aphasia or visual field defect usually places the lesion in the cerebral hemisphere. Ataxia, diplopia, vertigo and or bilateral weakness usually indicate a lesion in the brainstem or cerebellum. Different combinations of these deficits define several stroke syndrome, which reflect the size of the lesion and may provide clues to underlying pathology.[9]

The burden of stroke in a developing country like Bangladesh may be measured from data on mortality, incidence, prevalence, long-term outcome. Data are lacking regarding clinical presentation of ischemic patients with T2DM of Bangladeshi origin. The present study was aimed to explore the clinical profile of the stroke patients with type 2 diabetes mellitus.

MATERIALS AND METHODS

This cross sectional observational study was conducted in the Dept of Neurology, BIRDEM Hospital between April–September 2010. A total of 50 patients of ischemic stroke (confirmed CT-Scan) with type 2 diabetes mellitus, irrespective of age were consecutively included in the study. Consent from the legal guardians of the patients was obtained after addressing all ethical issues properly. Patients with type 1 diabetes or comorbid diseases were excluded. Weight, uncontrolled diabetes, use of tobacco, alcohol abuse and sedentary lifestyle were considered as risk factors for stroke. Additional variables were age, gender, onset of stroke, pulse, blood pressure, retinal and carotid artery status and neurological symptoms. Statistical analyses were performed using Statistical Package for Social Science (SPSS), versions 11.5. Continuous data were expressed as mean ± SD and categorical data as frequency (percentage). Unpaired student's t-Test, Chi-square test, proportion tests were performed as applicable. Level of significance was set at 0.05 and $p < 0.05$ was taken as significant.

RESULTS

Of the total patients, 30(60%) were male and 20(40%) female giving a male-to-female ratio of 1.5:1. The mean (SD) age of the patients was 59.9 ± 13.9 years. Over one-third (36%) was 60-70 years old, 28% 41-50 and 20% 51-60 (Table I). Onset of stroke was highest (50%) in the late morning (6 am – 12 noon) (Table II). Overweight, uncontrolled diabetes, hypertension, tobacco use and sedentary lifestyle were found in 40, 70, 84, 60 and 70% cases respectively. (Table III). Over half (52%) of the patients had uncontrolled blood pressure (Figure 1).

TABLE I : Age distribution of patients (n=50).

Age groups (yrs)	Ischemic Stroke	
	Number	Percentage
41-50	10	20.0
51-60	14	28.0
61-70	18	36.0
>70	8	16.0

TABLE II: Time of onset of stroke of the study subjects (n=50).

Onset of stroke	Number	Percentage
00 am - 6 am	10	20.0
6.1 am - 12.00 noon	25	50.0
12 noon - 6 pm	8	16.0
6.1 pm - 11.59 pm	7	14.0

TABLE III : Stratification of patients by risk factors of ischemic stroke (n=50).

Risk factors	Number	Percentage
Overweight	20	40
Uncontrolled DM	35	70
Tobacco use	30	60
Alcohol abuse	5	10
Sedentary lifestyle	35	70

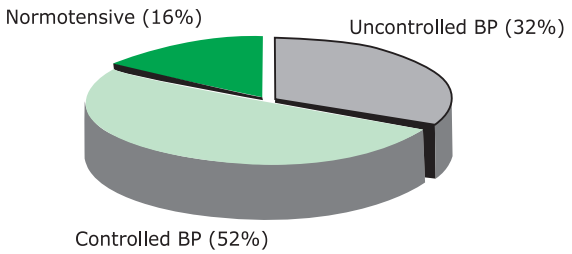

FIGURE 1: Distribution of subjects on the basis of their blood pressure status.

In terms of clinical presentation, 90% had limb weakness along with other features. Next common features were difficulty to speak (80%) and altered consciousness (24%) (Table IV). Facial palsy with difficulty in swallowing were present in 4% cases each (Table 4). On admission the mean systolic and diastolic blood pressures were 153.4 ± 5.2 and 97.5 ± 4.5 mmHg respectively. Eighty percent of the subjects had hypertension and 6% had irregular pulse rate. Carotid bruit was found in 2% cases. Abnormal fundoscopic finding was found in 40% cases. In 34% cases fundoscopy could not be performed due to cataract (Table V).

TABLE IV : Clinical presentation of the study subjects (n=50).

Clinical presentations	Number	Percentage
Limb Weakness	45	90.0
Facial weakness	2	4.0
Difficulties to speak	40	80.0
Difficulties in swallowing	2	4.0
Altered consciousness	12	24.0
Others	2	4.0

TABLE V : Clinical features of ischemic stroke patients on admission (n=50).

Variables	Number	Percentage
Pulse		
Regular	47	94.0
Irregular	3	6.0
Systolic BP (mmHg)		
< 90	8	16.0
140-159	16	32.0
>160	26	52.0
Diastolic BP (mmHg)		
90-100	15	30.0
>100	25	50.0
< 90	10	20.0
Carotid bruit	1	2.0
Fundoscopy		
Normal	13	26.0
Abnormal	20	40.0
Failed (due to cataract)	17	34.0

All the subjects were conscious on admission. Of them 38(76%) were oriented and 12(24%) were disoriented. Hemiparesis was found in 60% cases. Dysarthria and dysphasis were observed in 38 (76%) and 2(4%) cases respectively. Cerebellar and hemisensory loss grouped as other were 16% (Table VI).

TABLE VI : Neurological features of the ischemic stroke subjects (n=50).

Neurological findings	Number	Percentage
Conscious and oriented	38	76.0
Conscious but disoriented	12	24.0
Hemiparesis	30	60.0
Hemiplegia	15	30.0
Dysarthria	38	76.0
Dysphasia	2	4.0
Others	8	16.0

DISCUSSION

This is by far, the first study on ischemic stroke in type 2 diabetics in Bangladeshi people. Fifty patients of ischemic stroke with T2DM were finally enrolled in the study. Ischemic stroke was confirmed by initial history, clinical examination and CT scan of brain. It is usually seen that elderly people are the most vulnerable for developing ischemic stroke[10] In the present study over one-third (36%) of the patients ranged between 61 to 70 years with mean age being 59.9±13.9 years. These findings are consistent with study conducted by Ebtesam *et al.*[11] on pattern of ischemic stroke in type 2 diabetic which showed a substantial proportion of patients in age group 63-67 years. Among unmodifiable risk factors for stroke increasing age is a single most important risk in general population. Mulnier *et al.*[12] earlier demonstrated that diabetes dramatically increases the risk of stroke in younger subject which is not consistent with our result. Our study revealed a male preponderance (1.5:1) which is consistent with of Ebtesam *et al.*[11]

The diurnal variability of stroke[8] correlates with present study as half of stroke onset occurred at morning and in most occasions when getting up from night sleep. Most (72%) patients were admitted for limb weakness. Next common presentation was difficulty in speaking (52%). Other less common presentations were facial weakness (8%), altered consciousness (8%) and difficulties in swallowing. None had history of convulsion. The cause of altered consciousness was not evaluated but may be due to raised intracranial pressure, massive cerebral infarct or associated metabolic encephalopathy. The mean systolic and diastolic blood pressures were 153.4 ± 5.2 and was 97.5 ± 4.5 mmHg. Only small number of patients had irregular pulse, and only one patient had carotid bruit. None had sign of hyperlipidemia. Diabetic retinopathy is an indicator of microvascular complication. Diabetic patients with retinopathy are at particular risk for developing ischemic stroke.[13] In this study diabetic and hypertensive retinopathy had positive correlation with ischemic stroke.

Most patients (72%) were conscious and oriented. Rest of the patient had altered consciousness, hemiparesis or hemiplegia with dysarthria being the predominant neurological sign. The various grades of weakness were not brought into consideration in this study. Mannan and Haque in their study demonstrated hemiplegia in 100% of cases but the study was not done on diabetic patients.[14] Hypertension is the strongest risk factor and incidence of hypertension in diabetes is close to 40% and this constitutes a major aggravating factor.[15] In this study most of the patients was hypertensive and half of them did not have control over the disease which bears consistency with David & Nathan.[15] The findings further strengthen the fact that hypertension in presence with diabetes incur additional risk for ischemic stroke both in male and female. In our study 60% of the patients had positive history of tobacco use or smoking which, however, is relatively higher than the Yemeni population (42%).[16]

CONCLUSION

Elderly and male people are more prone to develop ischemic stroke. Hemiparesis or hemiplegia,

dysarthria are the major clinical presentations and high blood pressure is an important risk factor for ischemic stroke in diabetics. Further study may be undertaken to conclusively comment on the clinical features of ischemic stroke patients with diabetes and also to compare the clinical profile between diabetic and non diabetic stroke patients.

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