

Prevalence of Seasonal Variation of Haemorrhagic stroke more in winter than summer and its common risk factors.

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Abstract

The present descriptive cross-sectional study was conducted in the department of medicine, Community Based Medical College Hospital Bangladesh over a period of one year during March 2013 to February 2014. The study was conducted to describe Haemorrhagic stroke during summer and winter. An attempt was also made to observe in the frequency of common risk factors of stroke by seasons. A total 146 patients of any age irrespective of sex fulfilling the WHO criteria of acute stroke and confirmed by CT Scan were selected from consecutive admission in the Department of Medicine, Community Based Medical College Hospital Bangladesh. Detail history and through clinical examinations were done. Routine and relevant investigations were carried out. The mean age of the patients was 60.9±14.3 years. A male preponderance was observed in the study. In summer 65.8% of patients and in winter 34.2% patients were presented. Ischemic stroke was present in 52.1% patients and 47.9% patients had haemorrhagic stroke. The study found that the frequency of ischaemic stroke during summer (65.8%) was significantly greater than that during winter (34.2%). The frequency of haemorrhagic stroke during winter (65.8%) was significantly greater than that during summer (39.6%). Hypertension was the most important risk factor and other risk factors were smoking, Diabetes mellitus, tobacco chewing, ischaemic heart disease, dyslipidaemia, oral contraceptive pill, alcohol consumption, atrial fibrillation and past history of stroke. Increasing age was also noted as a risk factor (60.7% >60 years). Most of the risk factors were homogeneously distributed between two seasons and between ischaemic and haemorrhagic group. Hypertension was significantly higher in haemorrhagic stroke patients compared to ischaemic stroke patients.

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Introduction

After coronary artery disease and cancer stroke is the third commonest cause of death in the developed countries¹. It is a common medical emergency. The incidence rises steeply with age, and in many lower and middle income countries. It is rising in association with less healthy lifestyles. About one fifth of patients with an acute stroke die within a month of the event and at least half of those who survive are left with physical disability². In the under developed world, with better control of infectious diseases and with increase in life expectancy. Thus stroke remains as a major cause of mortality, morbidity and great burden to the family members, society and hospital manpower. Non modifiable risk factors of stroke include age, sex, family history, race and ethnicity. Modifiable risk factors are hypertension, diabetes mellitus, cardiac disease (particularly

atrial fibrillation), Hyper lipidaemia, smoking, transient ischemic attacks, asymptomatic carotid artery stenosis, alcohol abuse and physical inactivity³. Prevalence of stroke may

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be related to its risk factors. So, the study was planned to prospectively haemorrhagic stroke more in winter with common risk factors.

Method

This descriptive cross sectional study was conducted in Community Based Medical College Hospital, Bangladesh over a period of one year from March 2013 to February 2014. Patients admitted in medicine wards with acute (<7 days) development of focal or global disturbance of neurological function with or without previous history of stroke and confirmed by CT scan of brain were included in the study. Patients who, could not avail CT scan of brain or who died within 24 hours of hospitalization were excluded from the study. Consecutive purposive sampling technique was followed for selection of cases and total 146 patients were included from the consecutive admission in medicine wards.

Data were collected using semi-structured questionnaire containing all the variables of interest. Data were recorded through face to face interview with nearest relative/attendant physical examination findings recorded by investigator after a thorough clinical examination, CT Scan report collected on the same day or when done. Collected data were compiled, processes and analyzed with the help of computer using SPSS (statistical package for social science version 11.5). Both descriptive and inferential statistics were used. Descriptive statistics were used for grouping and organizing of demographic variable and inferential (chi-square and fisher exact test) statistics were used to see the association between seasons and types of stroke.

The word Health Organizations definition of stroke as the rapidly developing clinical symptoms and or signs of focal (at times global) disturbance of cerebral function with symptoms lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin was applied for selection of cases. According to Bangladesh Meteorological Department, Dhaka, the

season of Bangladesh is broadly divided into summer and winter depending on variation of temperature. The duration of summer is from March to November and that of winter is from December to February⁴. This definition was applied in our study. However, to remain the frequency difference due to duration we convert frequency into a per month rate.

Data were analyzed using chi-square test.

Result

A total 146 stroke patients admitted during March 2013 to February 2014 were included and CT Scan was done to confirm the diagnosis of stroke and its types. The finding of the study obtained from data analysis are shown on table below.

Table-I: Distribution of study subjects by demographic variable (N=146)

Variables	Number	%
Age (Years)		
<40	10	6.8%
40-50	22	15%
50-60	25	17%
60-70	40	27.4%
≥ 70	49	33.6%
Sex		
Male	85	58.2%
Female	61	41.8%

- Mean age (60.9 ± 14.3) years, Range=(20-90)

Table-II: Distribution of subjects by season of occurred and types of stroke (N=146)

Seasons	Total stroke	Ischaemic stroke	Haemorrhage
Summer	96 (65.8%)	58 (60.4%)	38 (39.6%)
Winter	50 (34.2%)	18 (36%)	32 (64%)
Total	146 (100%)	76 (52.1%)	70 (47.9%)

Table- III: Monthly frequency of stroke during summer and winter

Types of stroke			
Season	ischaemic (N=76)	Haemorrhagic (N=70)	P-Value
Summer	11 (14.5%)	8 (11.5%)	0.732
March- 2013	5 (6.6%)	2 (2.9%)	0.098
April- 2013	5 (6.6%)	3 (4.3%)	0.389
May- 2013	4 (3.3%)	3 (4.3%)	0.772
June- 2013	5 (6.6%)	3 (4.3%)	0.389
July- 2013	5 (6.6%)	3 (4.3%)	0.389
August- 2013	11 (14.5%)	7 (10%)	0.640
September- 2013	4 (5.3%)	3 (4.3%)	0.772
October- 2013	8 (10.6%)	6 (8.6%)	0.772
November-2013			
Winter			
December 2013	10 (13.2%)	18 (23.7%)	0.040
January- 2014	4 (5.3%)	7 (10%)	0.030
February-2014	4 (5.3%)	7 (10%)	0.030

Table IV: Frequency of ischemic and haemorrhagic stroke during summer and winter.

Season			
Season	Total stroke	Ischaemic stroke	Haemorrhage
Ischaemic	58	18 (36%)	< 0.001
Haemorrhagic	38	32 (64%)	

Chi- square (X^2) test was employed to analyze the data (chi-square (X^2) Value = 15.9, df=1)

Table V: Distribution of subjects by risk factors (N=146)

Risk factors	Number	%
Hypertension	100	68.5%
Smoking	46	31.5%
Alcohol	02	1.4%
Tobacco chewing	15	10.3%
Oral contraceptive	12	8.2%
Diabets	24	16.4%
IHD	04	2.7%
AF	05	3.4%
Past H/O Smoking	02	1.4%

Table VI: Comparison of risk factors between ischaemic and haemorrhagic stroke.

Group			
Risk factors	Ischemic (N=76)	Haemorrhagic (N=70)	P Value
Hypertension	40 (52.6%)	60 (85.7%)	< 0.001
Smoking	31 (40.8%)	15 (21.4%)	0.163
Alcohol	1 (1.3%)	1 (1.4%)	0.625
Tobacco chewing	8 (10.5%)	7 (10%)	0.757
Oral contraceptive	6 (7.9%)	6 (8.6%)	0.687
Diabetes	16 (21.1%)	8 (11.4%)	0.091
IHD	3 (3.9%)	1 (1.4%)	0.562
AF	4 (3.3%)	1 (1.4%)	0.150
Past H/O Stroke	1 (1.3%)	1 (1.4%)	0.375

Data were analyzed using chi-square test, fisher exact test.

Table VII: Comparison of risk factors between summer and winter

Season			
Risk factors	Summer N= 96	Winter (N=50)	P Value
Hypertension	65 (67.5%)	31 (62%)	0.580
Smoking	31 (32.3%)	12 (24%)	0.221
Alcohol	01 (01%)	01 (2%)	0.483
Tobacco chewing	06 (6.3%)	14 (28%)	< 0.001
Oral contraceptive	07 (7.3%)	04 (8%)	0.772
Diabetes	16 (6.7%)	04 (8%)	0.044
IHD	00 Q	03 (6%)	0.014
AF	01 (01%)	02 (4%)	0.83
Past H/O Smoking	03 (3%)	01 (2%)	0.715

Data was analyzed using chi-square test. Fisher exact test was done to analyze the data.

Table VIII: Distribution of subject by lipid profile (N=146)

Lipid Profile	Number	Percentage
Total cholesterol (mg/dl)		
Normal <200	113	77.4%
Raised ≥ 33	33	22.6%
HDL Cholesterol		
Normal ≥ 40 mg/dl	86	58.9%
Low < 40mg/dl	59	40.4%
LDL Cholestual mg/dl		
Normal <100	74	50.7%
Raised ≥ 100	72	49.3%
Triglycerides (mg/dl)		
Normal < 150	89	60.9%
Raised ≥ 150	56	38.4%

Discussion

The results of the study demonstrated that age range of patients was 20-90 years and mean age of the patients was 60.9 ± 11.3 years which was similar to the present study.

A male preponderance was observed in the study. Male to female ratio in the present study was 1.41:1. Haque, Mannan & Rahman⁶ Anwarullah et al⁷ found male-female ratio as 3.21:1 and 4.5:1 respectively. This disproportionate male preponderance in our country may be due to decreased allocation of female bed in our hospitals and superstitions although the situation is improved during last decade was revealed by this study.

There was 52.1 percent ischemic stroke 47.9 percent haemorrhagic stroke in the present study. Javanovic⁸ found 77.34 percent ischaemic stroke, 20.12 percent intra cerebral haemorrhage and 2.54 percent subarachnoid haemorrhage. The cause of increased haemorrhagic stroke in the present study may be explained by hypertension, which was the principal risk factor.

This study found that the frequency of ischaemic stroke was significantly greater in summer (60.4%) than that in winter (36%). Similarly the frequency of haemorrhagic stroke was significantly greater in winter (64%) than that in summer (59.6%). Masood, maqsood & Qudri⁹ demonstrated a higher number of stroke patients in summer than that in winter bearing consistency with finding of the present study. The seasonal variation of ischaemic and haemorrhagic stroke of the present study is in conformity with that of Rathwell et al¹⁰ who found increased incidence of ischaemic stroke in summer and increased incidence of intra cranial haemorrhage in winter.

Risk factors distribution of the present study showed that Hypertension (68.5%), smoking (31.5%), Diabetes (16.4%), Tobacco chewing (10.3%) oral contraceptive (8.2%) AF (3.4%) IHD (2.7%) lipid profile-raised total cholesterol (22.6%) raised triglyceride (38.4%), LDL

(67.3%) Low HDL (40.4%) In a study Sang Pil Yun et al⁵ reported that hypertension was the most common (50%) among the risk factors of stroke followed by diabetes (27.9%), IHD (5.3%), Hyperlipidaemia (3.5%) and AF (0.9%) Goldstein et al¹¹ also addressed that the stroke incidence is affected by risk factors such as hypertension, diabetes mellitus, cigarette smoking and alcohol intake. Results were similar with those of the present study.

Hypertension was the most principal risk factor for both ischaemic and haemorrhagic stroke. The prevalence of common risk factors of stroke was homogeneously distributed between the two sub types of stroke except hypertension which was significantly higher in haemorrhagic stroke patients.

Hamman et al⁴ reported that hypertension was significantly more associated with haemorrhagic stroke than with ischaemic stroke irrespective of season. This is also in conformity with the statement of Liu and Chia¹² and Thrift¹³. This finding is similar with that of present study comparison of risk factors between summer and winter shows homogenous distribution of hypertension, smoking habit, alcohol, OCP, AF, Past history of stroke but habit of tobacco chewing, Diabetes mellitus and IHD were significantly different. This was similar to Miah AH¹⁴ study.

Conclusion

Frequency of ischaemic stroke during summer was significantly greater than that during winter. The frequency of haemorrhagic stroke during winter was significantly greater than that during summer. Hypertension was the most important risk factor both type of stroke and other risk factors were smoking, diabetes mellitus, tobacco chewing, ischemic heart disease, dyslipidemia, oral contraceptive pill, alcohol consumption, atrial fibrillation and past history of stroke. The prevalence of common risk factors of stroke was homogeneously distributed between two seasons and between the two sub types of stroke except hypertension which was significantly higher in haemorrhagic patients.

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