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Original Article

Winter – the Increment of Spontaneous ICH

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Abstract:

Background: *Spontaneous intracranial haemorrhage (ICH) is defined as intraparenchymal bleeding in the absence of trauma or surgery. Spontaneous ICH is most disabling and deadly type of stroke. Meteorologic factors and seasons on the incidence of spontaneous ICH with ambiguous results.*

Objectives:

To determine whether different seasons had any relationship with the rate of primary intracerebral hemorrhage.

Methods: *Total of 209 patients were diagnosed as spontaneous ICH and they have been first time reported & admitted in Combined Military Hospital (CMH) Dhaka, between Jan 2017 and December 2018. Males were 146(69.85%), females were 63(30.15%) and were aged between 18 and 95 years old. Diagnosis was based on history, clinical examination and non-contrast Computed Tomography(CT) scan of brain.*

Results: *209 admitted patients in CMH Dhaka from Jan 2017- Dec 2018 are included in our study who full-fill the criteria. Intracerebral haemorrhage rate among age group less than 55years old being 55(26.31%) and 55 years and above 154(73.69%).There were a significant relationship between different seasons and intracerebral haemorrhage. Intracerebral haemorrhage incidence in winter season 61(29.18%) and late autumn 19(9.09%), out of 209 patients. Among them hypertensive patients were 137(65.55%) and non-hypertensive patient 72(34.45%), 170 (81.33%) were non-diabetic & 39(18.66%) diabetic of total 209 patients.Out of 61 patients in winter; 54 (88.52%) hypertensive patients had large sized haemorrhage.*

Conclusion: *The highest rate of intracerebral haemorrhage during December-January. There is a seasonal variation in patient's age, incidence among hypertensive patients, size of hemorrhage and more in number in winter season.*

Keywards: *Seasonal variation (SV), Intracerebral hemorrhage (ICH).*

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Introduction:

Cerebrovascular disease (CVD) that is stroke though mainly ischemic but haemorrhagic stroke also common in hypertensive patients. CVD increases with age and number of stroke also increases as expectancy of life goes up, with doubling in stroke death[1].

Spontaneous intracerebral haemorrhage is explicated as intraparenchymal bleeding in the absence of trauma or surgery. It may extent to ventricle. Regarding

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prevalence & incidence of stroke is estimated to lie between 84-262/100,000 in rural and between 334-424/100,000 in urban areas[2]. Spontaneous ICH is most disabling and deadly type of stroke. It has already been reported that sudden submersion in cold water may provoke myocardial infarction. Furthermore, some neurological disorders such as transient global amnesia (TGA) have been reported after swimming in cold water. It was found that a drop of 5°C temperature was associated with a 7% increase for stroke[3].

Pathogenesis:

Spontaneous ICH in winter season is more as in cold, peripheral resistance & heart rate increase. Pathophysiologically, activation of the sympathetic nervous system and secretion of catecholamine are increased in response to cold temperature, which could result in increase in blood pressure through increased heart rate and peripheral vascular resistance. The hyperdynamic circulation during short-term cold water immersion further increases in blood pressure. Moreover as a part of triad of death, hypothermia-coagulopathy (expansion of volume)-acidosis and cyclic disorder; augment HTN-hemorrhagic stroke.

Regarding meteorological factors and seasons on the incidence of spontaneous ICH has no previous report which published with significant relation with cold weather and haemorrhagic stroke. And the results are ambiguous. The inconsistency may be due to small size of sample and most of them not analyzed the sub-type of strokes.

Lower temperature in winter is associated with more mortality than in the summer mostly due to cardiovascular and cerebrovascular events related to blood pressure (BP) fluctuation in the elderly population[4, 5].

In this background to come into conclusion we tried to see the seasonal variation; evolving haemorrhagic stroke in CMH Dhaka, Bangladesh.

Materials and methods:

This is a prospective study. All patients of haemorrhagic stroke who were admitted in the Neurosurgery Centre, CMH, Dhaka, during the period from Jan 2017 to Dec 2018 were enrolled for the study.

Maximum patients having history of hypertension and some patients have DM. Patients having symptoms of headache, vomiting, and hemiparesis, hemiplegia, irrelevant talk, aphasia, seizure, unconsciousness.

Total of 209 cases in either sex & age variables from 18 years to 95 years were randomly selected and divided into six groups depending on the seasons in Bangladesh.

All patients were analyzed and evaluated by their hospital; clinical and radiological data of computerized patient record from hospital recorded, picture archive and communication system.

Patients with spontaneous ICH with any volume on computed tomography (CT) scan were sorted and included in this study. Patients of age 18 years to 95 years but irrespective of gender, co-morbidities such as diabetes, hypertension, MI; on anticoagulant, coagulopathy etc. were included in this study.

Evaluation of incidence of spontaneous ICH was done in six seasons separately then compared.

Severe haemorrhage may extend into ventricle. Non-contrast CT scan of head showing < 30 cc, 30-60 cc, >60 cc haematoma; in figure 1,2,3 respectively,

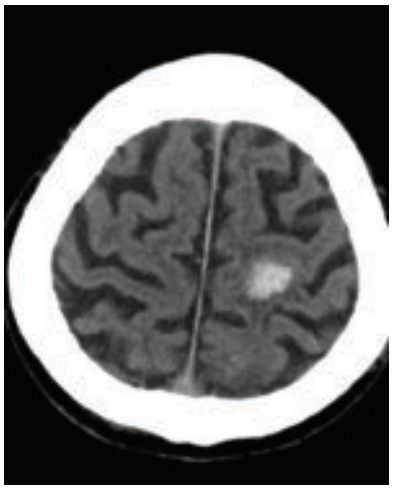

Fig.-1: *Non-contrast CT scan head ICH < 30 cc.*

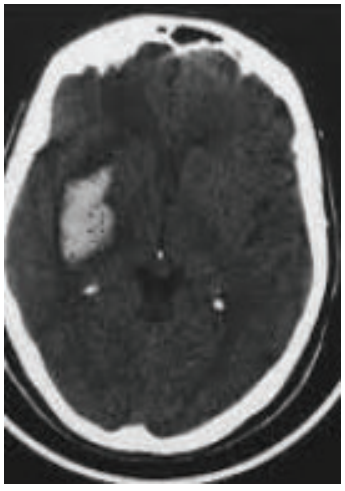

Fig.-2: *ICH, 30-60 cc*

Fig.-3: *ICH >60 cc.*

Results:

Total 209 patients of spontaneous ICH were admitted in CMH Dhaka from Jan 2017-Dec 2018. They were evaluated by details history, through clinical examination & relevant investigation.

Regarding gender, males were affected 146(69.85%) & females were 63(30.15%) with male predominenance (Fig-4).

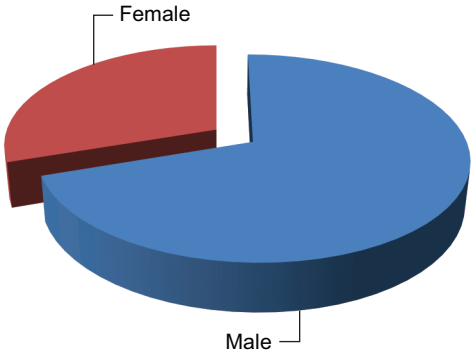

Fig 4. *Spontaneous ICH ; MÃF.*

Regarding spontaneous ICH in age group Â 55 years were 55(26.31%) and >55 years that is upto 95 years were 154(73.69%) and older age group is significant (Fig-5).

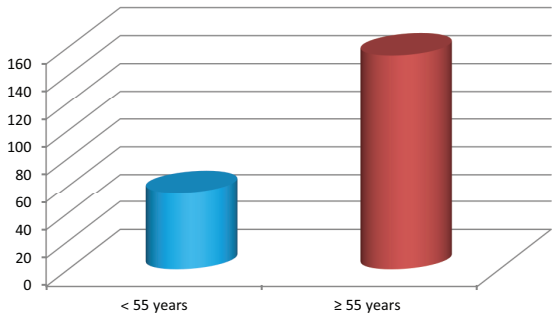

Fig 5. *Spontaneous ICH ; Age group; ≥55 years greater than Â 55 years.*

Concern with co-morbidity of patients; out of 209, hypertensive 137(65.55%), diabetic 39(18.66%),coagulopathy 18(8.61%), none 15(7.18%) and hypertension is most association. Out of 61 patients in winter; 54 (88.52%) hypertensive patients had large size hematoma (Fig-6).

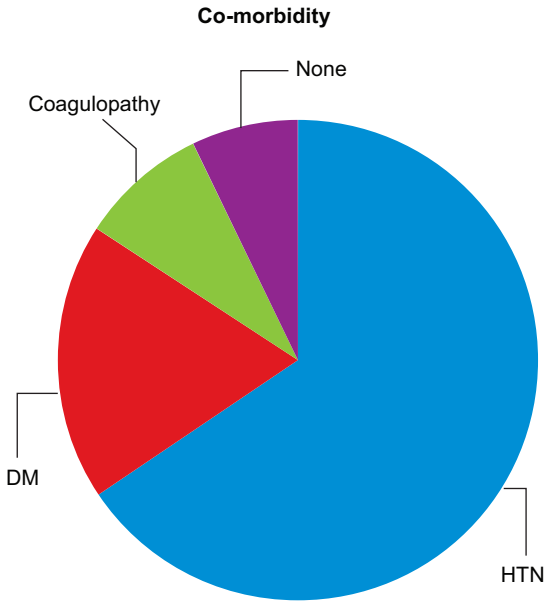

Fig.-6: *Spontaneous ICH ; Co-morbidity; HTNÃ DM, Coagulopathy.*

Regarding seasonal variation of ICH, in winter 61(29.18%), spring 30(14.36%), summer 43(20.58%), rainy season 33(15.79%), autumn 23(11%) & late autumn 19(9.09%), so in winter incidence of most spontaneous ICH (Fig-7).

Concern about haematoma volume; Ã60 cc haematoma more in hypertensive patients 68(32.53%) about one third of total 209 patients; less in non-hypertensive patients & Â30 cc more in non-hypertensive patients (Table-1). Ã60 cc haematoma more in winter season 54 (25.83%), about one third of total 209 patients; less in other seasons & Â30 cc more in other seasons (Table-2).

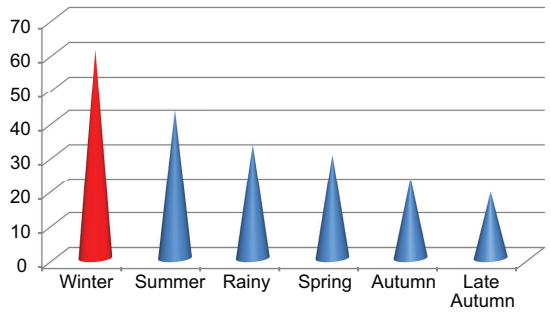

Fig 7. *Spontaneous ICH ; Seasonal variation ; Winter Ã others single season.*

Table-I

Spontaneous ICH ; Ã60 cc volume, more in hypertensive patients.

Haematoma volume	Â30 CC	30-60 CC	Ã60 CC	TOTALn=209
Hypertensive	23(11%)	46(22%)	68(32.53%)	137
Non-hypertensive	42(20%)	19(9.09%)		
		11(5.26%0)	72	

Table-II

Spontaneous ICH ; Ã60 cc volume, more in hypertensive patients & in winter season.

Haematoma volume	Â30 CC	30-60 CC	Ã60 CC	TOTALn=209
Winter	2(.95%)	5(2.39%)	54(25.83%)	61

Discussion:

Regarding ICH, some studies showed a seasonal variation in incidence of ICH cases; data from these studies are inconsistent and conflicting. Moreover, studies indicating seasonal occurrence of stroke, the identified season of highest occurrence has varied including winter, autumn and spring.

Our present study demonstrated that there is significant circus-annual variability. Tsementzis et al., 1991, shows seasonal differences in the occurrences of ICH, which is similar to our study[6].

The occurrence of ICH with a peak in winter than rest of the seasons. Men were affected more with spontaneous ICH in winter season which expressed in our study.

A community- based stroke analysis in Italy showed during autumn more frequent ICH and in winter more cerebral infarction[7].

One study in the Finmonica area of Finnish population, revealed significantly higher incidence of ischemic stroke and ICH in winter than Summer[8].

Inconsistency of these results may reflection of problems in the study design. These problems including use of an inappropriate analytic model, small sample

size and insufficient length of time. Finally, in some studies, the examination of

seasonality was without respect to specific stroke type: haemorrhagic versus ischemic.

Rothwell et al., 1993 showed that incidence of primary ICH is increased in low temperature; which is similar to our study population[9].

Pathophysiologically, activation of the sympathetic nervous system and secretion of catecholamine are increased in response to cold temperature, which could result in increase of blood pressure through increased heart rate and peripheral vascular resistance.

Total cholesterol and triglycerides level tends to higher in winter than summer[10].

Most of the affected population having history of HTN in our study, some of also suffering from DM and next coagulopathy.

Woodhouse et al., 1993 showed that more seasonal BP variation and this may explains partly the greater cardiovascular disease – ICH mortality of elderly subjects during the winter[11]., which is similar to our study.

The limitation of this study is, it was done in single centre but as our patients both serving, retired soilders and parents of our soilders live in different parts of the country and reported to CMH Dhaka , it can reflects some overall scenario of at least Bangladesh.

Conclusion:

Meteorological variation of spontaneous ICH is associated with temperature change, preexisting HTN and seasonal dissimilitude. The highest rate of intracerebral hemorrhage during winter season, (December-January) that is in low temperature and among the hypertensive patients.

Recommandation:

Protection of cold and consumption of maximum therapeutic dose of anti-hypertensive drug in winter can save own-self along with the nation by reducing the incidence of spontaneous ICH.

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