Abstract:

A hospital based cross sectional study was carried out to analyze diurnal variation of stroke and their association to sleep awake cycle. Four hundred and two patients of stroke admitted in different Medicine Units of Faridpur Medical College and Dhaka Medical College Hospitals from July 2012 to June 2013 were chosen using purposive sampling technique. Enrolled patients were with their first stroke, subsequently proved by CT scan of brain. The initial clinical diagnosis of stroke was made from history and examination obtained from the patient himself or from his/her attendant. The time of onset of stroke was recorded by attending doctor at the time of assessment and recorded on a fixed proforma. Patient who could not give history properly or had no responsible attendant and who had history of head injury, intracranial space occupying lesion or bleeding disorder were excluded from the study. Age ranged from 25 years to 98 years with mean age of 62.02 years (± SD 11.75 years). Out of 402 patients 59.7% suffered from ischemic stroke. Highest incidence of stroke (26.9%) occurred between 4:01am to 8:00 am and lowest (7.5%) between 8:01 pm to 12:00 am. Among the subtypes, ischaemic stroke has shown a single peak incidence at 4:01 to 8:00 am and lowest between 8:01 pm to 12:00 am. 50% of ischaemic stroke cases developed between 0:01 am to 8:00 am. In this study, maximum number of patients developed hemorrhagic stroke between 4:01 am to 8:00 am (25.9%) and lowest number developed hemorrhagic stroke between 12:01 pm to 4:00 pm (9.3%). This study confirms the diurnal variation of both hemorrhagic and ischaemic stroke in Bangladesh and most of them occurs in early morning after wakening.

Key words: stroke, circadian variation, hospitalized patients, Bangladesh.

Introduction:

Stroke is one of the leading causes of morbidity and mortality and third most common cause of death worldwide standing next to coronary artery disease and cancer. World Health Organization defined stroke as a rapidly developing clinical signs of focal disturbance of cerebral function, lasting for more than 24 hours or leading to death with no apparent cause other than vascular origin. Several data have indicated that incidence of stroke have chronobiological variation such as circadian variation, circaseptan variation and circannual variation. Several studies regarding circadian variation of stroke have produced conflicting results. Some suggested that strokes occur most often during the night, and others suggested a morning peak.

No study could be found among Bangladeshi population on circadian variation in frequency of ischaemic and haemorrhagic stroke. The aim of the present study was to investigate whether such type of circadian variation is present among the Bangladeshi population. Proof of a circadian rhythm in the occurrence of stroke might lead to further investigation providing clues for any triggering or risk factors in context of our country which have precipitate these events, which in turn might lead to more rational treatment and reduce the burden of treatment cost.

Materials and Method:

This cross sectional study was carried out among inpatients of stroke admitted in different Medicine Units of Faridpur Medical College Hospital and Dhaka Medical college Hospital from July 2012 to June 2013. Patients with their first stroke, subsequently proved by CT scan of brain were included in the study. The initial clinical diagnosis of stroke was made from
history obtained from the patient him/her self or from his/her attendant(s). Detail clinical examination, thorough general physical examination (specially cardiovascular and neurological examination) were carried out and recorded.

Following patients were excluded from the study:
1. Patients who could not give history properly or no responsible attendant was found.
2. Patients with history of head injury, intracranial space occupying lesion (ICSOL) or bleeding disorder.

After having informed verbal consent, a total of 402 patients were recruited for the current study.

The data were collected in a standardized pretested questionnaire and checklist and analyzed and presented in simple statistical percentage. Stroke type was classified as cerebral infarction and primary intracerebral haemorrhage.

The time of onset of stroke was recorded by attending doctor at the time of assessment. Exact time was noted for patients who were awake at the time of onset of stroke. Information about onset of stroke in patients, who were asleep, was collected from their attendants.

Some patients were able to state that onset was first noted on waking from sleep but could not recall the exact time of waking. For patients who first noted symptoms on waking from sleep, the time of waking was initially used as the time of onset of stroke. Details of whether the patient was at sleep, rest or active when the stroke occurred were also recorded.

Each day was divided into six sections of four hours duration each. Time calculation was started from 0001 hrs (12:01 am midnight). Time of stroke onset was noted and each patient was bracketed in a particular four hour time period.

Result:

Among 402 enrolled patients, most of them were male (61.9%). Age of the enrolled patients ranged from 25 years to 98 years with mean age of 62.02 years (± SD 11.75 years). More than sixty percent (61.2%) of them were within the age group of 51 to 70 years.

Among types of stroke, highest number of ischemic stroke (59.7%) and hemorrhagic stroke (40.2%) occurred between 4:01 am to 8:00 am. On contrary, lowest number of ischemic stroke (5.0%) occurred between 8:01 pm to 12:00 am and lowest number of hemorrhagic stroke (9.3%) occurred between 12:01 pm to 4:00 pm.

When considered age group of the patients, highest percentage of patients aged up to 50 years had their incidence of stroke between 0:01 am to 4:00 am (25.0%), among age group 51-60 years highest incidence was between 4:01 am to 8:00 am (28.9%), among age group 61-70 years highest incidence was either between 4:01 am to 8:00 am or 8:01 am to 12:00 pm (27.3%) and among patients aged above 70 years highest incidence of stroke was between 4:01 am to 8:00 am (37.5%).
Fig. 2: Circadian variation of stroke according to age of the patients (n=402)

Several studies had reported that ICB have double peaks with respect to time of onset. In this study, maximum number of patients developed hemorrhagic stroke between 4:01 am to 8:00 am (25.9%). The number gradually declined till 9 pm to 10 pm where it shows another small peak between 04:01 pm to 08:00 pm. A study among the Japanese population by Omama et al among 12957 cases, peak was observed in the morning in patients less than 65 years of age. Whereas in late afternoon another peak was seen in all age groups. Arterial blood pressure has been noted to be the trigger for hemorrhagic and ischemic stroke. Physical activity, low external temperature and other triggerers of sympathetic tone raises the arterial blood pressure which has been strongly correlated with hemorrhagic stroke. In this study 248 (74.3%) cases of hemorrhagic stroke occurred during the day time when blood pressure is high following its circadian variation. Increase incidence of haemorragic stroke during early morning hours in waken state could be explained by rise of blood pressure due to increase sympathetic tone which is parallel to pulse rate and physical activity. On the other hand lower blood pressure in night could explain the lower incidence of haemorrhagic stroke at night15.

Conclusion:

This study confirms the diurnal variation both in hemorrhagic and ischemic stroke in Bangladesh. But the exact precipitating cause yet to be determined in the context of our country due different cultural, religious and food habit. Further study to identify this or theses causes and by taking appropriate measure may reduce the incidence of stroke in our community where coast of health care is a burden among the people of our country. This study is only concerned with hospitalized patient, not including those who never reached the hospital.

References:


