# CLINICAL PRESENTATION AND EPIDEMIOLOGY OF STROKE –A STUDY OF 100 CASES

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**Abstract**

*The stroke patients comprise a large number of hospital admissions and stroke is one of leading cause of significant mortality and morbidity. This prospective observational study was carried out among 100 hospitalized stroke patients admitted into different medicine units of Chittagong Medical College Hospital (CMCH), with a view to study clinical presentation and epidemiology of stroke. Data, collected in prescribed protocol, were analyzed in simple statistical percentage and cases were selected irrespective of age and sex. Stroke was found most commonly in 51-60 age group (45%in hemorrhagic and 51.75% in ischemic stroke).Most of the patients were male with male, female ratio 3:1 in hemorrhagic stroke and 1.35:1 in ischemic stroke. Most of the patients were from rural area (60% in hemorrhagic stroke and 57.5 in ischemic stroke). Ischemic stroke was found in 80% cases and hemorrhagic stroke was found in 20% cases. The commonest presentation in both ischemic and hemorrhagic stroke was hemiplegia or hemiparesis. Right-sided hemiparesis was the predominant finding in both types. Headache (60%) and vomiting (75%) were found to be more common accompaniment of hemorrhagic stroke. In case of ischemic stroke the association with these clinical features was less marked where headache was present in 46.25% and vomiting in 40% cases. 50% of patients of hemorrhagic stroke presented with Glasgow Coma Scale (GCS) level 9-12(grade2) and 5% with GCS level 4 – 8(Grade 3). Whereas, 52.5% of patients of ischemic stroke presents with GCS 9-12 and also 46.25% with GCS13-14 (grade 1). Hypertension was the commonest risk factor associated with both types of stroke. In hemorrhagic stroke it was 80% and in ischemic stroke it was found in 56.25% eases. Smoking was associated with 50% of hemorrhagic and 55% of ischemic stroke. Diabetes mellitus was associated with 26.25% of ischemic stroke.*

## Introduction

Stroke is a leading cause of mortality and morbidity in both developed as well as developing countries like ours. The clinical picture and epidemiology is variable depending on the site and extent of lesions.[1] In developed countries various endeavors are in the way for early diagnosis and appropriate management to reduce stroke related mortality and morbidity. But the scenario in our country is different. In many cases, we have to depend largely on clinical diagnosis. With this background this hospital based study on 100 hospitalized stroke patients, might have some limitations that it does not represent the actual picture of stroke scenario in this population. But the detailed analysis of clinical picture, epidemiology and CT scan correlation of clinical diagnosis will help us to take appropriate measures accordingly.

## Materials and Methods

It is a prospective observational study carried out among 100 hospitalized patients of stroke admitted into different medicine units of Chittagong Medical College Hospital (CMCH) for a period November 2003 to May 2004. A total of 100 patients of stroke, in whom CT scan of brain was done, were included in the study. Inclusion criteria were patients having WHO definition criteria for stroke "Rapidly developing clinical signs of focal neurological dysfunction with symptoms lasting more than 24 hours or longer or leading to death with no history of trauma and no apparent causes other than that of vascular origin" admitted into medicine units of CMCH. Exclusion criteria were patients dying before recording the information, patients refusing to give consent to take part under

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the study. A standard protocol was prepared to collect the necessary information. Cases were recorded irrespective of age and sex and data was analyzed in simple statistical percentage.

**Results:**
The incidence of hemorrhagic stroke was found 20% whereas that of ischemic was 80%. Table I shows that maximum number of hemorrhagic stroke was in age group 61-70 (25%). In case of ischemic stroke maximum number were in 51-60 age group (53.75%) followed by 61-70 (25%) age group.

**Table-I**
*Age distribution of patients (n=100)*

| Age (year) | Hemorrhagic Stroke | Ischemic Stroke |
|---|---|---|
| 0-20 | 0 | 0 |
| 21-30 | 1 (5%) | 0 |
| 31-40 | 0 | 2 (2.5%) |
| 41-50 | 4 (20%) | 12 (15%) |
| 51-60 | 9 (45%) | 13 (53.75) |
| 61-70 | 5 (25%) | 20 (25%) |
| >-70 | 1 (5%) | 3 (3.75%) |

In case of hemorrhagic stroke incidence was more in male (15.75%) with male female ratio 3:1. In case of ischemic stroke incidence in male was 57.5% (46) with male female ratio 1.35.1. In case of hemorrhagic stroke number of patients from rural area was 12 (60%) and in case of ischemic stroke it was 46 (57.5%). Middle class group comprised the largest group both in hemorrhagic and ischemic stroke 80% (16) and 70% (56) respectively. In case of hemorrhagic stroke most of the patients were housewife in occupation. 2nd, 3rd ,4th and 5th common occupation in hemorrhagic stroke patients are medium to large businessman (5, 25%)small businessman (4, 20%) service holder (3, 15%) and retired person (2, 10%) respectively. In ischemic stroke most of the patients (36, 45%) were housewife in occupation. 2nd, 3rd ,4th and 5th common occupation in ischemic stroke patients were service holder(11, 13.75%), medium to large businessman(9, 11.25%), small businessman (8, 10%)and agricultural worker(5, 6.25%)respectively.

Analysis of risk factors revealed that hypertension was the common risk factor of stroke (80% in hemorrhagic

stroke and 86.25% with ischemic stroke). Other important risk factors were smoking (50% and 55%) and diabetes mellitus (15% and 26.25%) (Table II).

**Table-II**
*Association of stroke with different risk factors (n=100)*

| Risk factors | Hemorrhage | Infarction |
|---|---|---|
| HIN | 18 (80%) | 69 (86.25%) |
| Smoking | 10 (50%) | 44 (55%) |
| DM | 3 (15%) | 11(11.25%) |
| Previous H/OCVD/TIA | 1 (5%) | 0 |
| Oral pills | 0 | 3 (6.25%) |

Table III shows that hemiparesis was the most common presentation in both

hemorrhagic (17, 85%) and ischemic (64, 80%) stroke. Second and third common presentations in hemorrhagic stroke were impaired consciousness (80%) and vomiting (75%) and in

ischemic stroke were diarrhea (60%) and motor dysphasia (58.75%).

**Table-III**
*Various clinical presentation of stroke (n=100)*

| Presentation | Hemorrhage | Infarction |
|---|---|---|
| Hemiparesis/ Hemiplegia | 17(85%) | 64(80%) |
| Dysarthia | 5(25%) | 48(60%) |
| Motor dysphasia | 5(25%) | 47(58.75%) |
| Sensory dysphasia | 2( 1 0%) | 1(1.25%) |
| Impaired covetousness | 16(80%) | 43(53.75% ) |
| Headache | 12(60%) | 35(43.75%) |
| Vomiting | 15(75%) | 32(40%) |
| Nystagmus | 1(5%) | 3(3.75%) |

Most of the patients presented with right sided hemiparesis (11, 55% and 41, 51.25% in case of hemorrhage and infarction respectively). Headache was present in 60% (12) patient of hemorrhagic stroke and 43.75% (35) patient of ischemic stroke. Vomiting was present in 75% (15) cases of hemorrhagic stroke and 40% (32) cases of ischemic stroke.

Table IV shows impaired consciousness in many of the cases. In case of ischemic stroke majority (52.5%) were in grade 2 level of unconsciousness at presentation In ease of hemorrhagic stroke most common (50%) presentation was on grade 3 level of unconsciousness.

**Table-IV**

*Level of consciousness at presentation (n=100)*

| Type of stroke | Grade 1 (GCS 13-15) | Grade 2 (GCS9-12) | Grade 3 (G'CS 4-8) | Grade 4 (GCS 3) |
|---|---|---|---|---|
| Infarctive | 37(46.25%) | 42(52.5%) | 1(1.25%) | 0 |
| Hemorrhagic | 3(15%) | 6(30%) | 10(50%) | 1(5%) |

Table V shows that cortical area of cerebrum is the most affected area in both hemorrhagic (65%) and ischemic (58.75%) stroke.

**Table-V**

*Area of brain involved in stroke*

| Site | Hemorrhagic stroke | Ischemic stroke |
|---|---|---|
| Cortical | 13 (65%) | 47 (58.75%) |
| Internal capsule | 0 | 10 (12.25%) |
| Basal ganglia | 5 (25%) | 5(6.25%) |
| Insula | 0 | 4(5%) |
| Thalamus | 1(5%) | 6(7.5% |
| Cerebellum | 1 (5%) | 6 (7.75) |
| Multifocal | 1 (5%) | 2 (2.5%) |

**Discussions :**

In the current study, commonest neurological deficit was found hemiparesis in both hemorrhagic (85%) and ischemic (80%) stroke. The various grades of weakness were not brought into consideration in this study. This result correlates with Davidson and Framingham study and study of department of Neurology, Nizams institute of medical science, Hyderabad where hemiplegia was also found to be the commonest presentation.[2,3] Mannan and Haque study in IPGMR found hemiplegia in 100% cases. In the previous studies, incidence of both right and left sided hemiparesis is almost equal which is also found in this study.

Among the other clinical presentations of stroke, motor dysphasia was found in 12 (66.25%) cases of hemorrhagic and 47 (58.75%) cases of ischemic stroke. Among the associated features of stroke, headache (found in 60% cases) and vomiting (found in 75% eases) are more marked in cases of hemorrhagic stroke. Headache in most cases preceded the onset of stroke and sometimes followed the incident. It is apparent from this study that headache and vomiting has got greater association with hemorrhagic stroke. This study correlates well with that of Scott and Miller, showing marked association of headache and vomiting with hemorrhagic stroke.[4]

Impaired consciousness was found in many cases of stroke. This study correlates with that of Scot and Miller.[4]

Different risk factors were recorded and analyzed for their association with haemorrhagic and ischemic stroke. Among the non-modifiable risk factors age and sex  were studied. Elderly people are the most vulnerable group for developing stroke. In this study it is seen that in both hemorrhagic and ischemic stroke most of the sufferers were in the 51-60 group. The next group suffered mostly was 61-70. No case was recorded below the age of 20 years. So it clear from this study that both hemorrhagic and ischemic stroke occurs more commonly in elderly. In this study there was a small male predominance among stroke patients, which is in agreement with other studies including western ones. [4-6] This study also correlates with that of Chowdhury et al.[7] The higher male preponderance in this study may be due to the fact, that women are neglected part of the society and they are not brought to hospital, if not otherwise seriously ill. The actual ratio may be slightly different with only slight male excess.

 In this study rural people outnumbered urban people in stroke in incidence. But incidence should be still higher, as two third of our population lives in village and all of the patients of stroke hailing from village could not afford to do CT scan of brain. With this limitation this requires further evaluation as most of our people are out of screening for risk factors (hypertension, diabetes mellitus, smoking) of stroke.

Socioeconomic basis of stroke was also studied. It showed that in hemorrhagic (16cases, 80%) and ischemic stroke (56cases, 70%) middle class people are the most sufferer. This study correlates with that

of Chapman et al.[8] From this study we get the impression that poor and rich are less sufferer of stroke. But this may not be true in case of poor, as many of the patients are not brought to hospital or could not   afford to do C'T scan, whereas in case of rich people they might have got better options for taking these medicare, than to be admitted to CMCH. So the actual trend of incidence might be different.

In this study hypertension emerges as the most important and common risk factor in both hemorrhagic and ischemic stroke. The association is more with hemorrhagic stroke.  The result correlates with that of a study in the urban population of Calcutta in 2001, where hypertension was found to be the most important risk factor.[5]

In this study, association of stroke with underlying heart disease is analyzed. Out of 80 cases of infarction 11 eases (1.25%) had underlying heart disease, which acted as the potential source of cerebral embolism. So it is obvious from this study that any finding suggestive of underlying heart disease in a patient of stroke should raise the suspicion of ischemic stroke.

Smoking appears as an important risk factor in both hemorrhagic and ischemia stroke in this study. 10 patients (50%)of hemorrhagic stroke and 44 patients (55%) of ischemic stroke were smokers. This study correlates with Donnan et al, who found smoking as a strong risk factor for SAH and cerebral infarction.[9]

Diabetes mellitus has long been recognized as a risk factor for vascular disease as well. It doubles the risk of stroke compared with non-diabetics.[1] In this study diabetes appears to be associated with stroke. 10-14%cases of stroke are attributable to diabetes was found in Framingham study.[2]

Eight patients (10%) of cerebral infarction and one case (5%) of cerebral hemorrhage had previous history of stroke or TIA. It is seen in this study that previous history of stroke or TIA is more common in case of infarction. Actually TIA is a major risk factor for disabling stroke, implying a 13 fold increased risk of stroke in the next l year.[10]

## Conclusion:

Stroke, being one of the most common cerebrovascular diseases, has drawn attention of researchers all over the world. As our knowledge continues to evolve about pathogenesis and therapeutic options, epidemiological aspects and risk factors associated with stroke remain as important as ever. Targeting these risk factors for preventing cerebrovascular accidents in the first place will help reducing the burden of this often disabling disease.

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