

## Original Research Article

# Types and clinical presentation of stroke

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### ABSTRACT

**Background:** Stroke is one of the leading causes of mortality and morbidity worldwide. In this study, authors worked on clinical presentation and types of stroke. The two main types of strokes are ischemic and haemorrhagic. Brain infarction is caused by decrease blood flow due to either narrowing of artery or complete obstruction to blood flow owing to embolism. While haemorrhage is caused by rupture of artery or aneurysms leading to accumulation of blood in the brain parenchyma.

**Methods:** Cross sectional study of group of patients in Nishtar hospital Multan, Pakistan who presented with variety of neurological symptoms who were subsequently diagnosed as non-traumatic stroke. All patients were subjected to a detailed history and thorough clinical examination and investigations after obtaining informed consent.

**Results:** Of 122 patient, 66 patients were male and 56 were female. Ischemic stroke was more common: present in 76 patients as compared to 46 patients with hemorrhagic stroke. Hypertension was present in 40.9% of ischemic stroke and 27.8% of hemorrhagic strokes. Most of the patients (67.2%) had altered sensorium at presentation followed by hemiplegia in 39.3 % of patients.

**Conclusions:** Prevalence of ischemic strokes is higher than that of haemorrhagic stroke. Hypertension is associated with both types of these strokes. Moreover, hyperglycaemia and high blood pressure are common in early phase of stroke. Vomiting in stroke favors haemorrhagic stroke.

**Keywords:** Diabetes mellitus, Embolism, Hemiplegia, Hypertension, Stroke

### INTRODUCTION

Cerebrovascular disease is caused by one of several pathophysiologic processes involving the blood vessels of the brain. The process may be intrinsic to the vessel, as in atherosclerosis, lipohyalinosis, inflammation, amyloid deposition, arterial dissection, developmental malformation, aneurysmal dilation, or venous thrombosis.<sup>1</sup> The process may originate remotely, as occurs when an embolus from the heart or extra cranial circulation lodges in an intracranial vessel.<sup>2</sup> The process may result from inadequate cerebral blood flow due to decreased perfusion pressure or increased blood viscosity.<sup>3</sup>

The process may result from rupture of a vessel in the subarachnoid space or intracerebral tissue. The first three processes can lead to transient brain ischemia (transient ischemic attack [TIA]) or permanent brain infarction (ischemic stroke), while the fourth results in either subarachnoid haemorrhage or an intracerebral haemorrhage (primary haemorrhagic stroke).<sup>4,5</sup>

The most important historical item for differentiating stroke subtypes is the pace and course of the symptoms and signs and their clearing. Each subtype has a characteristic course. Intracerebral haemorrhage (ICH) does not improve during the early period; it progresses gradually during minutes or a few hours. Embolic strokes

most often occur suddenly.<sup>6</sup> The deficits indicate focal loss of brain function that is usually maximal at onset. Rapid recovery also favors embolism. Thrombosis-related symptoms often fluctuate, varying between normal and abnormal or progressing in a stepwise or stuttering fashion with some periods of improvement.<sup>1</sup>

Penetrating artery occlusions usually cause symptoms that develop during a short period of time, hours or at most a few days, compared with large artery-related brain ischemia, which can evolve over a longer period.

**METHODS**

This was cross sectional study performed on patients of Department of medicine, Nishtar Hospital Multan, Pakistan. This study was carried on patients of stroke admitted in above mentioned hospital from July 2019 to September 2019. Data was collected from patients after getting their consents.

**Inclusion criteria**

- A case of non-traumatic stroke.

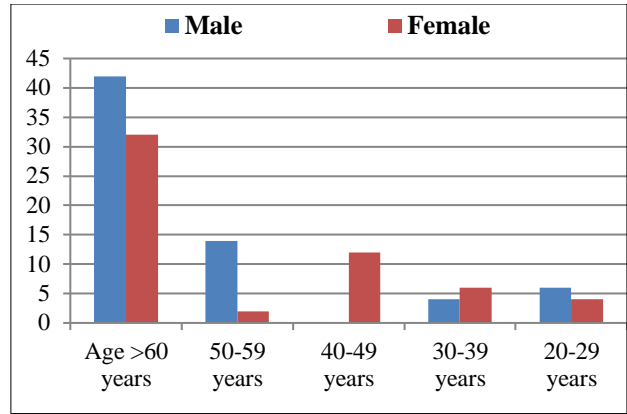
**Exclusion criteria**

- Patients of traumatic brain injury.
- Patients with CNS infection such as meningitis.

Total of 122 participants were involved in this study- 66 Male and 56 Female. All patients satisfying inclusion and exclusion criteria were included in study. This was a Cross-sectional study. All patients were subjected to a detailed history and thorough clinical examination after obtaining his/her informed consent. Investigations of CT head, Random blood sugar was done.

**RESULTS**

There were 66(54.1%) Male and 56(55.9%) Female. There were 74(60.6%) patients who were over the age of 60 years, 16(13.1%) patients were between 50-59 years of age, 12(9.8%) patients were between 40-49 years of age, 10(8.15%) patients were in the age of 30-39 years while 10(8.15%) were between 20-29 years of age (Figure 1).



**Figure 1: Distribution of patients according to age (vertical axis shows number of people).**

**Table 1: Distribution of types of stroke according to the age of patient.**

Sex	Ischemic stroke n (%)	Haemorrhagic stroke n (%)	Total n (%)
Male	44(36.6)	22(18)	66(54.1)
Female	42(34.2)	14(11.5)	56(55.9)
Total	76(62.3)	46(37.7)	122(100)

Out of 66 Males, 44(66%) and 22(18%) had ischemic and haemorrhagic stroke respectively and out of 56 females, 42(34.2) had ischemic stroke while 14(11.5) had haemorrhagic stroke (Table 1). 110(90%) patients suffered stroke in the anterior circulation of brain while posterior circulation was involved in only 12(10%) patients.

Of all the patients (n=76) with ischemic stroke, 50(66%) had history of hypertension and 36(47.4%) had history of Diabetes Mellitus. In patients with haemorrhagic stroke (n=46), 14(30.4%) had diabetes and 34(74%) had history of hypertension (Table 2).

In this study, altered sensorium was present in 45.9% of ischemic stroke patients and 21.3% of haemorrhagic stroke. Vomiting was present only in patients of Haemorrhagic stroke. Hemiplegia (left sided more than right sided) was presented more in patients of ischemic stroke than in haemorrhagic stroke (Table 3).

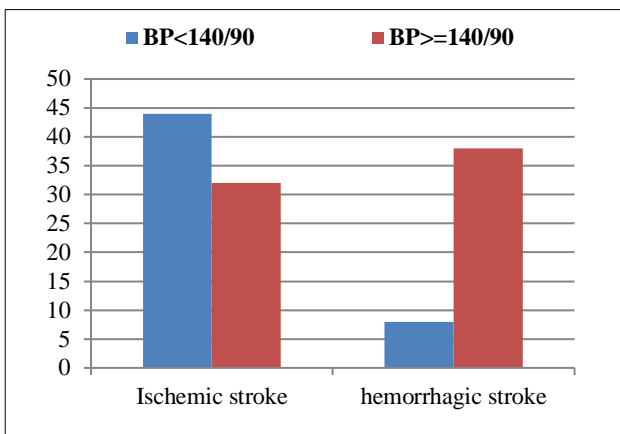
**Table 2: Risk factors and comorbidity.**

Risk factors and comorbidities	Ischemic stroke n(%)	Haemorrhagic stroke	Total n(%)
Hypertension	50(40.9)	34(27.8)	74(60.6)
Diabetes Mellitus	36(29.5)	14(11.5)	50(41)
Smoking	14	12	26(21.3)
Ischemic heart disease	4(3.2)	2(1.6)	6(4.9)
Chronic kidney disease	2(1.6)	0	2(1.6)
Atrial fibrillation	2(1.6)	0	2(1.6)

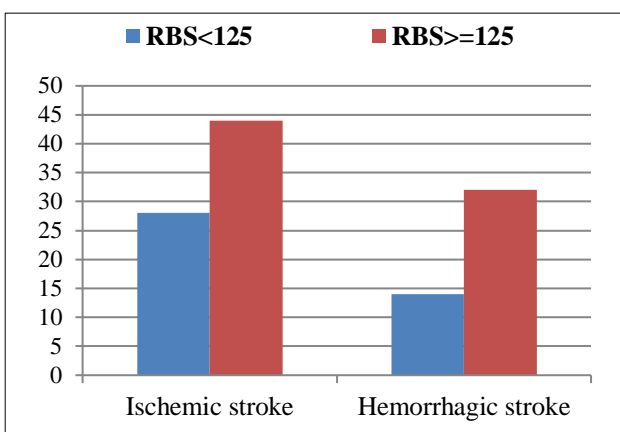
**Table 3: Clinical presentation of stroke.**

Symptoms at presentation	Ischemic stroke n(%)	Hemorrhagic Stroke n(%)	Total n(%)
Altered sensorium	56(45.9)	26(21.3)	82(67.2)
Left sided hemiplegia/hemiparesis	36(29.5)	12(9.8)	48(39.3)
Right sided hemiplegia/hemiparesis	22(18%)	12(9.8)	34(27.8)
Headache	2(1.6)	6(4.9)	8(6.5)
Vomiting	0	6(4.9)	6(4.9)
Aphasia	14(11.5)	2(1.6)	16(13.3)
Vertigo	2(1.6)	2(1.6)	4(3.2)
Facial palsy	2(1.6)	0	2(1.6)

Of all the patients (n=46) with haemorrhagic stroke, 38(82.6%) had high blood pressure at presentation while there were 32(42%) patients with ischemic stroke (n=76) had high BP. Total of 70(57.4) patients had high BP at presentation (Figure 2).



**Figure 2: Blood pressure at presentation (vertical axis shows no. of people).**



**Figure 3: Random blood sugar at presentation (vertical axis shows no. of people).**

Hyperglycaemia was present in 44 of ischemic stroke patients and 32 of haemorrhagic patients (Figure 3).

**DISCUSSION**

Stroke is the second leading cause of death worldwide, and the leading cause of acquired disability in adults in most regions.<sup>7</sup> Countries of low and middle income have the largest burden of stroke, accounting for more than 85% of stroke mortality worldwide.<sup>7</sup> Men have a higher prevalence of stroke than women. Prevalence of ischemic stroke is higher than that of haemorrhagic stroke. Early CT scan is necessary to differentiate the two types of stroke that will help guide therapy. The treatment of ischemic stroke is anticoagulants which are contraindicated in haemorrhage that's why distinction between the two types of stroke is important.

Hypertension is the most prevalent risk factor for stroke, based on data from 30 studies, has been reported in about 64% of patients with stroke.<sup>7,8</sup> Hypertension is associated with both types of these stroke. Consistent with previous studies, this findings showed that hypertension was the most important risk factor for all stroke subtypes. This leads us to believe that hypertension is underdiagnosed and less treated in this study community due to lack of an active screening program, failure to take routine blood pressure measurement, poor medical history taking and poor follow up of the patients.<sup>7</sup>

According to study by Alemayehu et al, infarction is the most common type of stroke events in diabetic individuals (57.7%).<sup>9</sup> In this study the prevalence of DM was 41%.

Smoking was seen more in patients with ischemic stroke than in hemorrhagic which is consistent with other studies.<sup>7</sup> The majority of smokers develop stroke due to atherosclerosis and smoking may predispose blood vessels to thrombosis and facilitates platelets aggregation possibly by causing an imbalance between brain vascular coagulation and abnormal fibrinolysis. This might alter the function of blood brain barrier and disrupt normal endothelial cell.

Similar to this finding, study by Kuriakose et al, reported that vomiting favors hemorrhagic stroke. This may be

one indicator of stroke diagnosis based on clinical where brain imaging is not available.<sup>10</sup>

Hemiplegia was one of the common presentation in this study which is consistent with.<sup>11</sup> where patients that suffered from hemiplegic deficit are 58.8%, and those suffered from asphyxia are 16%. Aphasia was one common presentation in this study compared to other previous studies.<sup>8</sup>

Majority of the patients had high blood sugar at presentation. Careful management of hyperglycemia is important in this phase as studies found that hyperglycaemia and diabetes may be associated with an increased incidence of haemorrhagic transformation of ischemic infarcts.<sup>11,12</sup> Other studies, which did not confirm these findings, suggested that admission hyperglycaemia is a marker of extensive brain damage leading to a greater increase in stress hormones resulting in hyperglycemia.<sup>13-15</sup> This hyperglycaemia may be mediated partly by the release of cortisol and norepinephrine.

High blood pressure is common at the onset of stroke. Most of the studies, although not all, have found that high BP in the acute phase of stroke, whether measured as casual or 24 hours ambulatory readings, is associated with a poor outcome,<sup>16-18</sup> and an increased risk of death and dependency.<sup>19-22</sup>

The acute hypertensive response seen in stroke has numerous potential causes including: fluctuations in, or elevation of, pre-existing hypertension; infection; pain, for example, due to urinary retention; stress related to hospitalization; activation of cortisol, natriuretic peptide, renin-angiotensin-aldosterone and sympathetic neuroendocrine systems; impaired cardiac baroreceptor sensitivity; and raised intracranial pressure (Cushing's reflex).

## CONCLUSION

Stroke is a disabling disease. Two major types of stroke are Ischemic stroke and Haemorrhagic stroke. Ischemic stroke is more common than haemorrhagic stroke. Early symptoms of stroke are hemiparesis/hemiplegia, aphasia and altered sensorium, facial palsy, vertigo and headache. Vomiting favors haemorrhagic stroke. High blood pressure at onset is more common in haemorrhagic stroke. Hyperglycaemia in early phase is a common finding, however further studies should be conducted to assess the effects of high blood glucose on neurons in patients with stroke as it is associated with worse outcomes. Common risk factors associated with stroke are Hypertension, DM and smoking.

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