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Clinical profile of patients with acute ischemic stroke

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Abstract
Stroke remains a major cause of human mortality and morbidity. Cardiovascular and cerebrovascular diseases appear to be very frequently encountered now and responsible for a great deal of morbidity. In spite of our increasing understanding of pathophysiology and epidemiology of cardiovascular diseases and stroke and continuing advances in prevention and treatment, the burden of these diseases is high. All patients with ischemic stroke admitted within 24 hours of onset in Department of Medicine, during the study period were taken for study considering the inclusion and exclusion criteria and will not be overlapped with the study of other post graduate students, and patients will be followed up for a period of three months. In the present study among 71 patients 50 patients had moderate stroke constituting 70.4% of total study group, 11 patients had severe stroke and 10 patients had mild stroke. The mean NIHS at admission was 12.6±6.7.

Keywords: stroke, hypertension, smoking

Introduction
Stroke is defined, according to the World Health Organization as "rapidly developing clinical signs of focal/global disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin" [1, 2].

Stroke is the second commonest cause of death and the fourth leading cause of disability worldwide. Approximately 20 million people will suffer each year from stroke and of these 5 million will not survive [3].

Stroke remains a major cause of human mortality and morbidity. Cardiovascular and cerebrovascular diseases appear to be very frequently encountered now and responsible for a great deal of morbidity. Inspite of our increasing understanding of pathophysiology and epidemiology of cardiovascular diseases and stroke and continuing advances in prevention and treatment, the burden of these diseases is high [4].

Stroke is regarded not only as the most devastating neurological disease, often resulting in death or physical impairment and disability, but it also is the second most common cause of death and the leading cause of adult disability in worldwide. Ischemic stroke (IS), also called cerebral infarction, is the most common type of stroke and accounts for about 80%–85% of all stroke cases [4, 5].

Furthermore traditional atherogenic risk factors such as hypertension, smoking, hyperlipidemia, and diabetes mellitus do not fully account for the clinical occurrence of CVD and stroke in different populations. There is no surprise that extensive research/ study is necessary to identify the potential risk factors.

The brain normally derives its energy from the oxidative metabolism of glucose. Because there are negligible stores of glucose in the brain, when CBF falls and the brain becomes ischemic, a series of neurophysiological and functional changes, which are dependent on the oxidative metabolism of the glucose to provide energy in the form of ATP occur at various thresholds of flow before cell death (infarction).

Different mechanisms are responsible for reversible loss of cellular function and for irreversible cell death, and there are also differences between the mechanisms that cause death of neurons, glial and endothelial cells and perhaps white and grey matter [6].

When CBF falls below about 20ml/100g brain/min, the oxygen extraction fraction becomes maximal. The EEG halters, evoked responses disappear and neurological signs appear. If it is restored, functional recovery is still possible. With increasing ischemia, impaired protein synthesis is the earliest detectable metabolic change; followed by the inefficient anaerobic metabolism of the glucose, which causes a rise in lactate production, fall in intra and extracellular pH, impaired phosphocreatine and ATP synthesis and so energy failure.

As flow falls further, energy-dependent functions of the cell membranes, including ion pumps, becomes progressively affected; water, sodium and chloride enters cell, calcium also enters and is cytotoxic and potassium leaks out. Cellular transport mechanisms and neurotransmitter systems fails, potentially neurotoxic excitatory transmitters, such as glutamate and aspartate, are released from neurons into extracellular space, free oxygen radicals, nitric oxide and lipid peroxides are formed, so damaging cells further proteases are activated and lyse structural proteins, and neurons release platelet activating factor, which may be neurotoxic [7].

At flows below about 10ml/100gbrain /min infarction occurs, and even if flow restored, functions does not recover. Later on apoptosis rather than necrosis may be responsible for neuronal death [8].

The consequences of the fall in CBF depend not just on depth of ischemia, but also on its duration. When ischemia is due to occluded artery, flow is almost never reduced to zero, because of availability of some sort of collateral blood supply, which is therefore, a further factor determining the metabolic consequences.

The local CBF may also be influenced by the development of cerebral edema and raised intracranial pressure, acid metabolites and increasing extracellular potassium concentration, which causes vasodilation, the release of vasoconstrictor prostaglandins from aggregating platelets and damaged cell membranes and of other vasoconstrictors such as endothelin-I, whole blood viscosity, accumulation of leucocytes, aggregation of formed elements of the blood in the sluggish microcirculation and eventually thrombosis and the local ability of the ischemic tissue to auto regulate, which will probably be impaired.

Methodology

All patients with ischemic stroke admitted within 24 hours of onset in Department of Medicine, during the study period were taken for study considering the inclusion and exclusion criteria and will not be overlapped with the study of other post graduate students, and patients will be followed up for a period of three months.

Inclusion Criteria

- The study population who presented to the hospital within 24 hours of stroke symptom onset.
- Confirmed cerebral infarct with either a CT scan or MRI.
- Age more than 18 years.
- First ischemic stroke

Exclusion Criteria

- Patients aged less than 18 years.
- Patients with haemorrhagic stroke.
- Patients with TIA (Transient ischemic attack).
- Patients with active infections.
- Patients with hypoglycaemia, migraine, electrolyte disturbances.
- Recurrent stroke or second stroke.
- Patients with prior history of inflammatory diseases like Rheumatoid arthritis and SLE
- Those patients on steroids and immunomodulatory
- Patients with cortical venous thrombosis
- Pregnant patients.

Sample Size

71 patients fulfilling the inclusion and exclusion criteria admitted under the department of General Medicine.

Results

Table 1: Age distribution of study group (N =71)

Age group	Number	Percentage
<40 years	8	11.3
40-60 years	32	45.1
>60 years	31	43.6
Total	71	100

Table one shows age distribution of the study group, where the maximum ischemic stroke patients are in the age group of 40-60 years constituting 45.1% of total study population. Stroke in young with age of less than 40 years constituting 11.3% Mean(SD) age of the study participants: 58.01 (13.24).

Table 2: Gender distribution of study group (N=71)

Gender	Number	Percentage
Female	32	45.1
Male	39	54.9
Total	71	100

Table 2 shows Gender distribution of study group where 54.9% were males and 45.1% were females.

Table 3: Level of consciousness of participants

Level of consciousness	Number	Percentage
Alert	35	49.3
Drowsy	32	45.1
Comatose	4	5.6
Total	71	100

Table 3 shows clinical presentation of the study group at the time of admission among 71 patients 35 patients were conscious and alert, 32 patients were drowsy and only 4 patients were comatose.

Table 4: Distribution based on NIHS Categories (NIHSS at baseline/admission)

NIHS categories at admission	Number	Percentage
Mild stroke(0-7)	10	14.1
Moderate(8-14)	50	70.4
Severe(>14)	11	15.5
Total	71	100

Table 4 shows classification of stroke into mild, moderate, and severe by using National Institute of Health Stroke Scale (NIHSS). Maximum score is 30. If the score is between 0-7 it is classified into Mild stroke, score between 8-14 classified as Moderate stroke and score of more than 14 classified as severe stroke.

In the present study among 71 patients 50 patients had moderate stroke constituting 70.4% of total study group, 11 patients had severe stroke and 10 patients had mild stroke.

The mean NIHS at admission was 12.6±6.7.

Table 5: Distribution based on NIHS Categories at the end of third month

NIHS categories at 3rd month	Number	Percentage
Mild stroke (0-7)	46	64.8
Moderate (8-14)	18	25.4
Severe (>14)	7	9.9
Total	71	100

Table 5 shows assessment of severity of stroke in patients with acute ischemic stroke after follow-up for a period of three months. Among 71 patients 46 patient has shown a significant improvement with only mild impairment in daily activity constituting 64.8% whereas only 7 patients had

significant impairment at the end of three months. Whereas at the time of admission out of 71 patients 50 patients had moderate stroke. The mean of NIH at 3rd month is 4±3.1.

Discussion

Like in all developing countries, stroke is fast emerging as a major public health problem in India too. The age standardized average annual incidence rate to world standard population of first-ever-in-a-lifetime stroke is 145.30 (95% CI, 120.39 to 174.74) per 100000 persons per year. Stroke is the third most common cause of death in the developed countries.

Kristensen B *et al*., [9] documented that ischemic strokes occurring in patients younger than 45 years old was rare and less than 5 percent of all cerebral infarctions. A recent stroke registry study by T. Song-Hai Lee *et al*., [10] revealed that the incidence of young stroke was 6.8 percent of all strokes.

Anuradha Bharosay *et al*., [11] also documented that incidence of stroke in age less than 45 years is 6.5% and highest incidence of stroke was present in age group of 56-65 years that is 54.3%.

Anuradha Bharosay *et al*. [11] observed in their study that among their study group 28.3% were smokers and explained the association between smoking and ischemic stroke.

Anuradha Bharosay *et al*. [11] studied 46 Patients admitted in neurology department SAIMS, Indore with first ever ischemic stroke within 72 h of onset and correlated serum Interleukin 6, high sensitivity C reactive protein at the time of admission with neurological worsening assessed by NIHSS at the time of admission and 7 days after admission and they observed that disability was associated with higher concentrations of IL-6 and hsCRP in plasma and early neurological deterioration was too observed in cases with high levels of hsCRP and IL-6.

Age-specific stroke rates are higher in men, but, because of their longer life expectancy and much higher incidence at older ages, women have more stroke events than men. Moreover, stroke-related outcomes, including disability and quality of life (QOL), are consistently poorer in women than in men, yet the reasons for these are not well understood. Below the age of 45 years, stroke mortality for women and men is similar, but women aged 45–74 years have a substantially lower risk of stroke mortality than men (about 25–35% lower for black women and 20% lower for white women). This benefit for women declines in older age groups, such that black and white women aged 85 years and older have 12% and 14% higher mortality than men, respectively [12].

Some stroke risk factors are specific to women of reproductive age. A recent meta-analysis concluded that oral contraceptive use increases ischaemic stroke risk by almost three times (RR 2.75, 95% CI 2.24–3.38), although the absolute risk is still small (one stroke per 24,000 women per year). Pregnancy results in haemostatic changes, including increase in clotting factors and decrease in anticoagulants and fibrinolytic activity, which increase the risk of thrombosis. Overall, women do not seem to have more severe strokes than men, especially after taking into account stroke subtype and age, although the evidence is somewhat contradictory. In two studies that measured stroke severity with the Canadian neurological scale, one found that women had greater severity on presentation, whereas the other found no sex difference [12].

Conclusion

- Stroke incidence increases with advancing age and is more in males when compared to females.
- Incidence of stroke is more common in hypertensive then when compared to diabetics or patients with both diabetes and hypertension.

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