

Clinico-etiological Profile of First-time Stroke Patients Presenting to a Tertiary Care Hospital in Navi Mumbai

Madhu Hingorani¹, Sadanand Shetty², Varun Shetty³

¹3rd Year Resident, Department of Internal Medicine, D Y Patil Hospital, Nerul, Navi Mumbai, Maharashtra, India, ²Professor and Head, Department of Internal Medicine, D Y Patil Hospital, Nerul, Navi Mumbai, Maharashtra, India, ³Assistant Professor, Department of Internal Medicine, D Y Patil Hospital, Nerul, Navi Mumbai, Maharashtra, India

Abstract

Introduction: To initiate preventive and curative measures in stroke patients, it is critical that we understand the risk factors and etiological agents involved in stroke. In this study, we aimed to study the clinical profile of the first-time stroke patients presenting to our hospital, analyze possible etiological agents and identify the risk factors of stroke in these patients.

Materials and Methods: We designed a cross-sectional study of stroke patients who presented to the Department of Medicine, D Y Patil Hospital and Research Centre, Navi Mumbai, from May 2010 to December 2012. After obtaining the Approval of the Ethics Committee, we obtained history, clinical examination findings and sent blood and imaging investigations for all patients. Standard clinical definitions were used to assess the presence of clinical risk factors.

Results: During the study period, we included 30 patients in our study. About 47% of the patients were aged more than 35 years, and male predominance was observed in our study population. About 43% of the population was diabetic and 33% were hypertension; the two most important risk factors for stroke. Majority of the population had a normal body mass index (BMI) (37%), with 13% being morbidly obese. Dyslipidemia was found in 60% of the patients. About 30% and 20% of the patients gave a history of smoking and alcohol intake, respectively. The numerical values of various anthropometric and physiological parameters such as height, weight, BMI, pulse, blood pressure, fasting sugar, and homocysteine levels have been expressed as mean and standard deviations.

Conclusions: This study gives us the clinic-etiological profile and risk factors present in stroke patients in our patient population. Large-scale studies surveying stroke patients at multiple centers are needed to support our findings.

Key words: Diabetes, Etiology, Risk factors, Stroke

INTRODUCTION

Stroke is a rising problem in the developing world. With the advancing life expectancy of people in developing countries, the importance of ischemic stroke will grow as a worldwide problem.¹ Worldwide about 20 million people suffer from stroke each year. 5 million will die as a consequence and 15 million will survive, of those who

survive 5 million will be disabled by their stroke.² In India, the first population-based study in rural area was conducted in 1990, in Vellore, and the prevalence rate of stroke was reported to be 51/100,000 in rural population. A number of community survey have shown a crude prevalence rate for hemiplegia in the range of 200 per 100,000 persons, nearly, 1.5% of all urban hospital admission, 4.5% of all medical, and around 20% of all neurological cases.³

The symptoms of brain ischemia may be transient, lasting only a few seconds to minutes, or may persist for longer periods of time. If the brain becomes irreversibly damaged and infarction ensues, symptoms may become permanent in nature. A stroke often precludes patients' abilities to return to work or to regain their role in a family. Thus, by affecting both patients and loved ones, stroke is a family

Access this article online



www.ijss-sn.com

Month of Submission : 08-2017
Month of Peer Review : 09-2017
Month of Acceptance : 10-2017
Month of Publishing : 10-2017

Corresponding Author: Madhu Hingorani, A-102, Neel Paradise, Opp D Y Patil Hospital, Nerul, Navi Mumbai, Maharashtra – 400706, India. Phone: +91-7045144007. E-mail: drmadhuhingorani@gmail.com

illness and family relationships and dynamics are changed irrevocably. Unfortunately, it has been explained that the neurologic symptoms do not accurately reflect the presence or absence of infarction, and the severity of symptoms does not indicate the cause of the ischemia.⁴ Therefore, it is critical that we understand the etiology causing the stroke so that appropriate treatment can be initiated in a timely fashion. Furthermore, understanding the risk factors associated with stroke is important before primary and secondary preventive measures can be prescribed to the patient. In this study, we aimed to study the clinical profile of the first-time stroke patients presenting to our hospital, analyze possible etiological agents and identify the risk factors of stroke in these patients.

MATERIALS AND METHODS

Study Design and Setting

We designed a cross-sectional study of stroke patients who presented to the Department of Medicine, D Y Patil Hospital and Research Centre, Navi Mumbai, from May 2010 to December 2012. D Y Patil Hospital and Research Centre is a tertiary level teaching hospital which caters to the healthcare needs of people in Mumbai and adjoining cities as well.

Sample Population

For this study, we approached all consecutive patients admitted with a diagnosis of stroke for eligibility and consent. All consecutive 30 patients admitted during the study period and with confirmed diagnosis of stroke were included, studied, analyzed, and followed up until discharge or death of patients. Hospital stay of patients was ranging from 1 day to 1 month. We included patients with stroke which was diagnosed if the symptoms and signs were suggestive of acute loss of focal or global cerebral function or evidence of ischemia/infarction/hemorrhage on computerized tomography (CT) head scan or magnetic resonance imaging (MRI) brain. We excluded patients with focal epilepsy, migraine, and structural brain lesions (such as tumors), stroke secondary to infection, and connective tissue disorders and those who refused consent.

Clinical Definitions

For this study, hypertension was defined as blood pressure recording of more than 140/90 mmHg on three separate occasions on 3 different days. Patients who are already on antihypertensive medications were also taken as hypertensive. Dyslipidemia was defined as serum triglycerides higher than 150 mg/dl, low-density lipoprotein cholesterol more than 100 mg/dl and high-density lipoprotein cholesterol <50 mg/dl in females and <40 mg/dl in males. Patients were classified as suffering

from heart diseases if they had a history of ischemic heart disease, congenital heart disease, rheumatic heart disease, atrial fibrillation, or evidence of left ventricular hypertrophy on electrocardiogram (ECG) or echocardiography. In addition, history of smoking, tobacco chewing, and alcohol intake was enquired and noted. Diabetic patients were diagnosed as per the American Diabetic Association guidelines. Patients on antidiabetic medications were also classified as diabetics. A family history of stroke was considered if the first-degree relatives of the patients suffered from stroke. Patients were considered as obese if their body mass index (BMI) was equal to or more than 30.

Data Collection and Data Analysis

After obtaining the Approval of the Institutional Ethics Committee, the patients were consented before being included in the study. We collected clinical and history of the patient from patient himself. Close attendant/family members were interviewed to obtain history if the patient was unconscious or in altered sensorium, in which the consent was obtained from the legal guardian of the patient. We obtained the demographic profile of the patients. History was noted regarding chief complaints, temporal profile of each complaint, history of stroke and ischemic heart disease, personal history, family history of stroke in first-degree relative, and history of drug intake (anticoagulants and contraceptive pills). General examination of the patient was carried out in each patient that included blood pressure, pulse, pallor, icterus, JVP, cyanosis, edema, and the findings were noted. Detailed nervous system examination was performed and noted, which included handedness, level of consciousness, higher functions, cranial nerve examination, pupils, fundoscopy, motor and sensory examination, reflexes, meningeal signs of irritation, involuntary movement, and severity of stroke on admission was assessed according to the National Institute of Health Stroke Scale. Other body systems were examined particularly cardiovascular system to rule cardiac cause of stroke (like valvular/congenital heart disease, atrial fibrillation).

All patients received routine laboratory investigations including fasting and postprandial blood sugar, fasting lipid profile, 12-lead ECG, chest X-ray posterior-anterior view, two-dimensional echocardiogram (if needed). Plain/contrast CT or MRI brain, with/without angiogram was done in the patients. Serum homocysteine level and carotid Doppler study were done as well. Furthermore, we assessed the risk factor profile of each patient. Known risk factors of stroke were evaluated in the patients using the clinical definitions described above.

Based on the history, examination and investigations, patients were broadly classified according to its mechanism

of stroke: Ischemic stroke, hemorrhagic stroke, and subarachnoid hemorrhage. All patients were treated conservatively as neurointensive care is not available in our hospital. Patients were followed until discharge or death, and the prognosis was studied with regard to the fatality during the hospital stay. All data were entered in excel sheets to create a master chart. Using statistical program SPSS version 24, different variables were described as mean (standard deviation) or median (interquartile range). Variables frequencies were calculated as percentages.

RESULTS

During the study period, we included 30 patients in our study. Majority of the patients were aged more than 35 years (Table 1) and male predominance was observed in our study population. About 43% of the population was diabetic and 33% were hypertension; the two most important risk factors for stroke. Majority of the population had a normal BMI (37%), with 13% being morbidly obese. Dyslipidemia was found in 60% of the patients. About 30% and 20% of the patients gave a history of smoking and alcohol intake, respectively. Table 2 described the anthropometric and physiological parameters of the patients included in

the study. The numerical values are expressed as mean and standard deviations.

DISCUSSION

In our study, 47% of the patients were between the age of 35 and 40 years. The incidence of stroke increases with age. This may be direct consequence of prolonged exposure to previously recognized or unrecognized risk factors or development of new risk factors which can arise due to the aging process. Dalal *et al.* in a population-based survey in Mumbai, found the gender distribution similar to ours.⁵ The authors further noted that age and sex distribution pattern of Asian population are remarkably different and not at all comparable to Japanese, European, and American population. Pardiwalla *et al.* reported the incidence of stroke in young to be 10%.⁶ In the present study, 88% of the patients had hemiplegia/hemiparesis, and this was accompanied by cranial nerve involvement in majority of the cases (79%). Unconsciousness at the onset was present in 16% patients and 18% patients experienced headache. Speech disturbance was noted in 61% cases. In the present study, only 5 cases had seizures. As reported by different authors, seizure is not a common finding in stroke patients.⁷

Hypertension is the dominant predisposing factor for stroke and is strongly related to atherothrombotic brain infarction as well as intracranial hemorrhage. Epidemiologic studies have reported that hypertension

Table 1: Clinico-demographic profile of patients included in the study

| Variable | n (%) |
|----------------------------|---------|
| Total patients | 30 |
| Age distribution | |
| <30 years | 4 (13) |
| 31-35 years | 12 (40) |
| More than 35 years | 14 (47) |
| Gender distribution | |
| Males | 23 (77) |
| Females | 7 (23) |
| Medical history | |
| Diabetic | 13 (43) |
| Hypertensive | 10 (33) |
| BMI | |
| <25 | 11 (37) |
| 25-30 | 10 (33) |
| 30-35 | 5 (17) |
| More than 35 | 4 (13) |
| Dyslipidemia | |
| Yes | 18 (60) |
| Increased serum creatinine | |
| Yes | 3 (10) |
| Serum homocysteine levels | |
| Normal | 22 (73) |
| Moderate | 3 (10) |
| Severe | 5 (17) |
| Lifestyle factors | |
| Smokers | 9 (30) |
| Tobacco chewing | 4 (13) |
| Alcoholics | 6 (20) |

BMI: Body mass index

Table 2: Quantitative parameters of patients included in the study

| Variable | Mean±SD |
|----------------------------------|------------|
| Anthropometric measurements | |
| Height (mts) | 1.6±0.1 |
| Weight (kgs) | 73.6±9.6 |
| BMI (kg/m ²) | 28.0±5.8 |
| Waist circumference (cm) | 94.9±4.3 |
| Hip circumference (cm) | 105.4±3.0 |
| Waist-hip ratio | 0.9±0.0 |
| Physiological parameters | |
| Pulse (per min) | 88.7±9.7 |
| Systolic blood pressure (mm Hg) | 140.7±29.0 |
| Diastolic blood pressure (mm Hg) | 84.5±14.6 |
| Respiratory rate (per min) | 19.0±2.2 |
| Hemoglobin (g %) | 11.7±1.7 |
| Fasting blood sugar (g %) | 129.5±30.9 |
| Postprandial blood sugar (g %) | 159.8±36.8 |
| Serum homocysteine | 24.4±32.0 |
| Total cholesterol (mg %) | 221.9±51.7 |
| Low-density lipoprotein (mg %) | 188.0±49.6 |
| High-density lipoprotein (mg %) | 29.7±10.5 |
| Triglyceride (mg %) | 146.3±23.0 |
| Serum creatinine (mg/dL) | 0.9±0.3 |

SD: Standard deviation, BMI: Body mass index

is associated with an increased likelihood of subclinical or silent stroke, which in turn has been linked with increased risk of recurrent stroke.⁸ However, these observations alone do not conclusively prove a causality, as increasing blood pressure could be a marker for other risk factors such as increased body weight, dyslipidemia, glucose intolerance, and the metabolic syndrome. Studies have shown that patients with diabetes mellitus have approximately twice the risk of ischemic stroke compared with those without diabetes.⁹ It has been proposed that dyslipidemia, endothelial dysfunction, and platelet and coagulation abnormalities are among the risk factors that may promote the development of carotid atherosclerosis in diabetics. Numerous studies have shown that dyslipidemia is a major risk factor for stroke. In our patient, population 60% had dyslipidemia. However, the relationship between the serum cholesterol concentration and stroke incidence appears to be more complex, because the level of risk varies with the stroke subtype.¹⁰

Although there have been no randomized controlled trials of smoking cessation for stroke prevention, observational studies have demonstrated that the risk of stroke due to smoking declines after quitting and is eliminated by 5 years later.¹¹ Alcohol may increase or decrease the risk of stroke, depending on the level of consumption, and the type of stroke. A meta-analysis of 19 cohort and 16 case-control studies found that heavy alcohol use of greater than 60 g/day increased the risk for all strokes (relative risk (RR) 1.64, 95% confidence interval (CI) 1.39-1.93), ischemic strokes (RR 1.69, CI 1.34-2.15), and hemorrhagic strokes (RR 2.18, CI 1.48-3.20).¹² Therefore, it is not the type of alcohol that is important but the amount and the pattern of intake. Literature shows that increased serum homocysteine concentrations are associated with an increased risk of cerebrovascular disease, as it results in increased risk of the large artery subtype of ischemic stroke.¹³

Our study has some limitations. Our study, because of time and resource constraints, had a small sample size. Furthermore, the sociodemographic profile of these patients might be different from other geographical locations in India; therefore, the generalizability of the results of our study is a concern.

CONCLUSION

In the present study, we have described the various demographical and clinical characteristics of the first-time stroke patients who presented to our hospital. In addition, we looked at the various risk factors which were present in these patients. Future studies surveying larger number of stroke patients in multiple centers are recommended.

ACKNOWLEDGMENT

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors/editors/publishers of all those articles, journals, and books from where the literature for this article has been reviewed and discussed.

REFERENCES

1. Allen CM. Predicting the outcome of acute stroke: A prognostic score. *J Neurol Neurosurg Psychiatry* 1984;47:475-80.
2. Adams GF. Prospects for patients with strokes, with special reference to the hypertensive hemiplegic. *Br Med J* 1965;2:253-9.
3. Adams RD, Victor M. Cerebrovascular diseases. In: *Principles of Neurology*. 4th ed. New York, NY: McGraw Hill; 1989. p. 617-50.
4. Caplan LR. Terms describing brain ischemia by tempo are no longer useful: A polemic (with apologies to Shakespeare). *Surg Neurol* 1993;40:91-5.
5. Dalal PM, Malik S, Bhattacharjee M, Trivedi ND, Vairale J, Bhat P, *et al.* Population-based stroke survey in Mumbai, India: Incidence and 28-day case fatality. *Neuroepidemiology* 2008;31:254-61.
6. Pardiwalla FK, Yeolekar ME, Bakshi SK. Circadian rhythm in acute stroke. *J Assoc Physicians India* 1993;41:203-4.
7. Dhamija R, Kaintura A, Kumar M. Predictive factors for post stroke seizures. *Epilepsia*. 2007;48:81.
8. Prabhakaran S, Wright CB, Yoshita M, Delapaz R, Brown T, DeCarli C, *et al.* Prevalence and determinants of subclinical brain infarction: The Northern Manhattan study. *Neurology* 2008;70:425-30.
9. Peters SA, Huxley RR, Woodward M. Diabetes as a risk factor for stroke in women compared with men: A systematic review and meta-analysis of 64 cohorts, including 775,385 individuals and 12,539 strokes. *Lancet* 2014;383:1973-80.
10. Yaghi S, Elkind MS. Lipids and cerebrovascular disease: Research and practice. *Stroke* 2015;46:3322-8.
11. Wannamethee SG, Shaper AG, Whincup PH, Walker M. Smoking cessation and the risk of stroke in middle-aged men. *JAMA* 1995;274:155-60.
12. Reynolds K, Lewis B, Nolen JD, Kinney GL, Sathya B, He J. Alcohol consumption and risk of stroke: A meta-analysis. *JAMA* 2003;289:579-88.
13. Iso H, Moriyama Y, Sato S, Kitamura A, Tanigawa T, Yamagishi K, *et al.* Serum total homocysteine concentrations and risk of stroke and its subtypes in Japanese. *Circulation* 2004;109:2766-72.

How to cite this article: Hingorani M, Shetty S, Shetty V. Clinico-etiological Profile of First-time Stroke Patients Presenting to a Tertiary Care Hospital in Navi Mumbai. *Int J Sci Stud* 2017;5(7):86-89.

Source of Support: Nil, **Conflict of Interest:** None declared.