Original Research Article

Study of cerebrovascular accidents in relation to clinical profile and risk factors with special reference to CT brain for aetiopathological diagnosis

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Abstract

Background: Cerebrovascular accident or stroke is one among the three leading causes of death, surpassed only by ischemic heart disease and malignancy. Stroke is also a common cause of physical disability, which imposes a substantial burden to the community in the foreseeable future. Present study was aimed to evaluate patients with cerebrovascular accident in relation to clinical profile and risk factors with special reference to CT scan finding of brain for aetiopathological diagnosis. **Material and Methods:** Present stud y was a hospital based retrospective observational study which was conducted in patients of Age more than 12 years, either sex with cerebrovascular accident with symptoms and signs suggestive of acute loss of focal or global cerebral function and evidence of ischaemia or haemorrhage on CT scan. **Results:** The maximum incidence of stroke in this study was observed in the age group above 60 yrs i.e. 25.27% each for 61-70 and >70 years of age, followed by 51-60 years (17.58%). Though stroke in the young (<40yrs age) is comparatively less common, it is not to be ignored. Male to female ratio in this study was 1.68:1. Males constituted 62.64% of stroke patients. Systemic Hypertension was the commonest predisposing factor in this study (57.14%), followed by smoking (45.05%), alcohol consumption (32.97%), Diabetes Mellitus (26.37%), and heart disease (20.88%). Hemiparesis was the commonest presentation in this study, present in 90.11% of patients. **Conclusion:** Stroke was most commonly seen in patients above 60yrs of age with a male preponderance. Though stroke in the young (<40yrs age) is comparatively less common, it is not to be ignored. Hypertension, diabetes mellitus, smoking, alcohol consumption, cardiac diseases and dyslipidemia are the key risk factors associated with stroke, emphasizing that aggressive risk factor management is an epitome in the prevention of stroke. Hemiparesis is the commonest presentation of stroke followed by cranial nerve palsies. CT Scan showed that ischeamic stroke are more common than haemorrhagic stroke. Ischeamic stroke mostly involve subcortical and cortical areas followed by brainstem or cerebellum. Haemorrhagic stroke is most commonly seen in putamen, but it can as well be seen in thalamus, pons, cerebellum or subarachnoid space.

Keywords: Hypertension, Diabetes mellitus, Smoking, Alcohol consumption, cardiac disease, stroke, CT scan.

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INTRODUCTION

Cerebrovascular accident or stroke is one among the three leading causes of death, surpassed only by ischemic heart disease and malignancy. Stroke is also a common cause of physical disability, which imposes a substantial burden to the community in the foreseeable future.[1] It is estimated that the incidence of stroke is likely to increase by about 20% in the next 20 years.[2] In a developing nation like India, rheumatic heart disease forms a

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significant risk factor for stroke. The advent of imaging procedures such as Computerized Tomography, Magnetic Resonance Imaging, Carotid Doppler and Magnetic Resonance Angiography have led to better evaluation of stroke and its risk factors. The prevalence rate of stroke in India is about 1.54 per thousand and death rate about 0.6 per 1000.[3] Advanced age is one of the most significant stroke risk factors. 95% of strokes occur in people age 45 and older. [4] There are factors (risk factors) which precede stroke by several years. These are hypertension (the main risk factor for cerebral thrombosis as well as cerebral hemorrhage) and factors contributing to cardiac abnormalities (i.e., left ventricular mural thrombosis following large infarctions, left ventricular dilatation or congestive heart failure; cardiac rhythm abnormalities; rheumatic heart disease), diabetes, dyslipidemia, obesity, smoking, alcohol consumption, glucose intolerance, hypercoagulability and hyperviscosity of blood, oral contraceptives, etc.[5,6] Present study was aimed to evaluate patients with the cerebrovascular accident in relation to clinical profile and risk factors with special reference to CT scan finding of brain for aetiopathological diagnosis

MATERIAL AND METHODS

Present study was a hospital based prospective observational study which was conducted in the Department of General Medicine in a tertiary care centre and teaching hospital in Maharashtra. Study duration was of 2 years (2019 to 2021). Study was approved by institutional ethical committee.

Inclusion criteria: Patients of Age more than 12 years, either sex with cerebrovascular accident with symptoms and signs suggestive of acute loss of focal or global cerebral function and evidence of ischaemia or haemorrhage on CT scan.

Exclusion criteria: Patients with history of epilepsy. Patients presented with transient ischaemic attack. Age less than 12 years. Patients with bleeding diathesis. Patient not willing to give consent. Patients with history of head injury. Patients in whom CT Scan of brain could not be performed.

A detailed history in each case regarding onset, predisposing factors and nature of stroke was recorded, followed by a thorough clinical examination. During history taking, major risk factors (such as hypertension, diabetes mellitus, dyslipidemia, history of cardiac disease, history of transient ischaemic attack, habituations to smoking, alcohol) were noted. Special clinical evaluation of cardiovascular system giving importance to rhythm disturbances, cardiac failure, valvular heart disease, prosthetic valve was made. Clinical neurological examination was done and the patients were grouped into those having cortical involvement, subcortical involvement, internal capsular involvement or brainstem involvement delineating the major blood vessels involved in the process. Ophthalmoscopic examination of the fundus was done. Baseline investigations included complete blood count, blood sugar level, blood urea, serum creatinine, serum electrolytes, serum lipid profile, urine analysis and chest x-ray. ECG was taken at admission, after 3 days and at discharge. CT Brain was done for all patients. CSF analysis was done in relevant cases.

Data was collected and compiled using Microsoft Excel, statistical analysis was done using descriptive statistics.

RESULTS

The maximum incidence of stroke in this study was observed in the age group of above 60 yrs i.e. 25.27% each for 61-70 and >70 years of age, followed by 51-60 years (17.58%). There were 17.58% of young stroke cases in this study. Male to female ratio in this study was 1.68:1. Males constituted 62.64% of stroke patients. Systemic Hypertension was the commonest predisposing factor in this study (57.14%), followed by smoking (45.05%), alcohol consumption (32.97%), diabetes Mellitus (26.37%), heart disease (20.88%) and dyslipidemia (10.99%). Among the patients with cardiac disease, coronary artery disease was present in 10 patients (52.63%), rheumatic heart disease was seen in 6 patients (31.57%) and nonvalvular atrial fibrillation seen in 3 patients (15.78%).

Table 1: General characteristics

General characteristics	Number (n=91)	Percentage
Age in Years		
13 - 30	6	6.59
31 - 40	10	10.99
41 - 50	13	14.29
51 - 60	16	17.58
61 - 70	23	25.27
≥71	23	25.27
Sex		
Male	57	62.64
Female	34	37.36
Risk Factors		
Age > 60	46	50.54
Systemic Hypertension	52	57.14
Diabetes Mellitus	24	26.37
Smoking	41	45.05
Alcohol	30	32.97
Heart Disease	19	20.88
Abnormal lipid profile	10	10.99

Hemiparesis was the commonest presentation in this study, present in 90.11% of patients. 26.37% of patients presented with loss of or altered consciousness. Headache and vomiting were present in 13 and 21 patients respectively.

Table 2: Clinical presentation

Factors	Number	Percentage
Hemiparesis	82	90.11
Cranial nerve Involvement	81	89.01
Aphasia	29	31.87
Altered/Loss of consciousness	24	26.37
Sensory symptoms	7	7.69
Cerebellar	3	3.30
Headache	13	14.29
Vomiting	21	23.08

Language disturbances were observed in 31.87% patients. 20 had global aphasia, 7 had motor aphasia and 2 patients had sensory aphasia. These presentations correlated well with involvement of cortical territory.

Table 3: Aphasias

Factors	Number (n=29)	Percentage
Global	20	68.97
Motor	7	24.13
Sensory	2	6.9

In this study, out of the 91 patients studied, CT Scan showed ischemic stroke in 86.81% and hemorrhage in 13.19%. With respect to the area of the brain involved in ischemic stroke, 42.85 % had subcortical and 29.67% cortical infarcts. Brainstem and cerebellar lesions found in 14.29%. While in hemorrhagic stroke common locations were putamen (41.67%), thalamus (25 %) and pons (16.67 %).

Table 4: Nature of stroke

Factors	No	Percentage
Ischemic	79	86.81
Subcortical	39	42.85
Cortical	27	29.67
Brainstem /Cerebellar	13	14.29
Hemorrhagic	12	13.19
Putamen	5	41.67
Thalamus	3	25
Pons	2	16.67
Cerebellum	1	8.33
SubarachnoidHemorrhage	1	8.33

DISCUSSION

The maximum incidence of stroke in this study was observed in the age group of above 60 years as 25.27% each for 61-70 and >70 years of age. According to Banford and Sandercock*et al.*,[7] maximum incidence of stroke was in the above 70 years age group. The Framingham study[8] showed that 80% of patients, were above 65 years of age. Compared to Framingham study, a lower incidence of stroke in this study could be explained by many cases of old stroke not being brought to the hospital, high mortality rate in cases of old stroke, higher prevalence of rheumatic heart disease in India than in western population and majority of young strokes being hospitalized. Though stroke in the young (<40yrs age) is comparatively less common, it is not to be ignored. Young stroke requires a different approach to investigation and management than stroke in the elderly given the differences in the relative frequencies of possible underlying causes. Atherosclerosis remains an important risk factor[9] and cardioembolic stroke is more common among younger patients[10]. An epidemiological study by K.R. Dhamija *et al.*,[11] recorded a male to female ratio of 1.7: 1, which is very similar in accordance with this study. In a study by Das Gupta *et al.*,[12] male to female ratio was 1.3: 1, which is closer to this study. Hypertension was the commonest predisposing factor in this study, present in 57.14% of the patients. The Framingham 18 years follow up study shows that hypertension was the most powerful precursor of stroke in both infarction and hemorrhage, which tallies with this study.[8] In a population study of stroke patients in Richmond by Williams CA *et al.*,[13] 58.3% of patients were hypertensives, which corelates well with this study. In Oxford Shire community stroke project[14], hypertension was present in 52% patients and Review of stroke studies by Dalal gives a figure of 51%, which is lower to this study.[6] Diabetes mellitus was present in 26.37% of stroke patients in this study. In the Oxford Shire community stroke project,[14] the incidence of diabetes mellitus in stroke was 28% which correlates well with this study. The incidence and severity of stroke are increased by the presence of diabetes and the outcome from stroke are poorer, according to a study by Baird TA *et al.*[15] Study by Wannamathe*et al.*,[16] confirms diabetes mellitus as an independent risk factor for stroke. Smoking was a risk factor in 45.05% of patients in this study. None of the females were smokers. According to a study by Williams CA *et al.*,[13] 33.3% of ischemic stroke patients and 26.3% of hemorrhagic stroke patients were smokers. Alcohol consumption was present in 32.97% of patients in this study. Study done by William CA *et al.*,[13] concluded that 41.6% of ischemic stroke patients and 21.1% of hemorrhagic stroke patients were alcoholics. A study on multiple cerebral infarcts done by B Reddy *et al.*,[17] showed 30% of stroke patients were alcoholics. 20.88% of patients in this study had cardiac disease associated with stroke. Studies by B Reddy *et al.*,[17] documented an incidence of 36% cardiac disease associated with stroke. In this study 10.99% of patients had deranged lipid profile, indicating that similar observations were also made by Shridharan[18], Iso H *et al.*,[19] and Prospective studies collaboration- Lancet 1995.[20] Studies by Nair M, Radhakrishnan *et al.*,[21] also suggested that hyperlipidemia is an important risk factor for stroke. Hemiparesis was the commonest presentation in this study, present in 90.11% of patients. This is in accordance with the study by Rahman KM *et al.*,[22] where hemiplegia was present in

89.01%. 26.37% of patients presented with loss of or altered consciousness. In this study, out of the 91 patients studied, CT Scan showed ischemic stroke in 86.81% and hemorrhage in 13.19%. Studies by K.R.Dhamija *et al.*,[11]. observed cerebral infarction in 82.6%, which is closer with this study. Important modifiable risk factors such as smoking and alcohol consumption were found to be significantly associated with ischemic stroke in our study. High alcohol consumption is associated with ischemic stroke, due to the reversal of beneficial effect of light consumption on lipid metabolism, and increases the risk of acute ventricular and supraventricular cardiac arrhythmias, marked blood pressure elevation, platelet activation, and humoral hypercoagulability.[23]

CONCLUSION

Stroke was most commonly seen in patients above 60yrs of age with a male preponderance. While stroke in the young (<40yrs age) is not to be ignored. Hypertension, diabetes mellitus, smoking, alcohol consumption, cardiac diseases and dyslipidemia are key the risk factors associated with stroke, emphasizing that aggressive management of these risk factors is an epitome in the prevention of stroke. Hemiparesis is the commonest presentation of stroke followed by cranial nerve palsies. CT Scan showed that ischeamic stroke is more common than haemorrhagic stroke. Ischeamic stroke mostly involve subcortical and cortical areas followed by brainstem or cerebellum. Haemorrhagic stroke is most commonly seen in putamen, but it can as well be seen in thalamus, pons, cerebellum or subarachnoid space.

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