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Original Research Article

Study of risk factors among stroke patients in a tertiary hospital of Northern India

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ABSTRACT

Background: Stroke is one of the leading causes of death and disability worldwide. The aim of the study was to find out the incidence of different types of strokes and the associated risk factors and to establish the role of different investigations in patients of stroke.
Methods: The study dealt with 100 patients of stroke who were admitted to B. R. D. Medical College, Gorakhpur, India. Each patient was analyzed in detail about clinical presentation and the investigations were aimed to establish the pathologic type of stroke and estimation of risk factors.
Results: Stroke incidence was more in males (Male: Female= 1.43:1). Maximum incidence of stroke was in 6th decade (32%) followed by 7th decade (30%). Among modifiable risk factors, history of hypertension was the commonest (51%) followed by smoking (36% patients) exclusively, found in males. Hemiparesis was the most common presentation (95%) followed by altered sensorium (55%). Chest X-ray was abnormal in 16% patients, abnormal ECG was found in 27% patients and abnormal lipid values were found in 54 patients.
Conclusions: Apart from control of hypertension and diabetes, abnormal lipid profile remains an important modifiable risk factor for stroke.

Keywords: Stroke, Risk factors

INTRODUCTION

Stroke is an important cause of disability among adults and is one of the leading causes of death worldwide.[1] A stroke, or cerebrovascular accident, is defined by the abrupt onset of a neurologic deficit that is attributable to a focal vascular cause.[2] The common risk factors, that is, hypertension, diabetes, smoking, and dyslipidemia are quite prevalent and inadequately controlled; mainly because of poor public awareness and inadequate infrastructure. Presently, prevention of stroke is the best option considering the Indian scenario through control and/or avoiding risk factors of stroke.[3] There is paucity of information on stroke especially in this part of India. Therefore this study was undertaken to find out the incidence of different types of strokes and the associated risk factors and to establish the role of different investigations in patients of stroke.

METHODS

This one year observational study involved all the patients with a definite diagnosis of stroke (acute cerebrovascular disease) admitted to the medical ward of the Nehru Hospital attached to BRD Medical College, Gorakhpur. Prior permission from the Institutional

Ethical committee was taken. Acute cerebrovascular disease was defined as "A stroke or cerebrovascular accident with rapidly developing clinical symptoms and signs of focal, and at the global loss of cerebral function with symptoms or leading to death, with no apparent cause other than that of vascular origin". Patients with head injury, primary or secondary brain tumor were excluded from the study.

The patients were classified as having ischemic or hemorrhagic stroke definitive on the basis of CT scan head. Each patient was studied in detail on the basis of a preplanned proforma with special references to assess the risk factor associated with the cerebrovascular accident. A detailed clinical history was recorded. All the patients were asked about past history of hypertension, TIA, previous stroke, diabetes mellitus, heart disease, smoking and alcoholism, migraine, consumption of OCP. A through general and systemic examination was done.

Hematological investigations such as Hemoglobin(Hb), total leucocyte count (TLC), random blood sugar, blood urea, serum creatinine, serum sodium, ESR, PCV, VDRL and coagulation study was done. Lipid Profile Estimation was also done. ECG, Chest X-Ray and echocardiography were also done to assess cardiovascular status. Imaging Studies –CT scan of Head (Plain and contrast) was done. The data were analyzed using SPSS software. Statistical significance by calculating the probability by using the percentage difference between the data and the standard error.

RESULTS

The study involved a total of 100 patients of stroke.

Table 1: Prevalence of risk factors in cases of stroke.

Risk factors	Male (%)	Female (%)	Total (%)
Non-modifiable			
Age (above 50 years)	47 (47.0)	37 (37.0)	84 (84.0)
Sex	59 (59.0)	41 (41.0)	100 (100)
Family history	07 (07.0)	04 (04.0)	11 (11.0)
Modifiable			
Hypertension	32 (32.0)	19 (19.0)	51 (51.0)
Diabetes mellitus	08 (08.0)	04 (04.0)	12 (12.0)
Smoking	36 (36.0)	00 (00.0)	36 (36.0)
Heart disease RHD CHD	 00 (00.0) 02 (02.0)	 03 (03.0) 02 (02.0)	 03 (03.0) 04 (04.0)
Atrial fibrillation	00 (00.0)	04 (04.0)	04 (04.0)
Previous stroke	10 (10.0)	07 (07.0)	17 (17.0)
TIA	04 (04.0)	04 (04.0)	08 (08.0)
Alcoholism	04 (04.0)	00 (00.0)	04 (04.0)
Migraine	00 (00.0)	03 (03.0)	03 (03.0)
OCP	00 (00.0)	03 (03.0)	03 (03.0)

Prevalence of stroke was more common among the males (59.0%) and those aged above 50 years of age (84%). Family history of stroke was present in 7.0% males and 4 4.0% females. Among modifiable risk factors, history of hypertension (51.0%) was the commonest risk factors found followed by smoking (36.0%), exclusively found in males. History of previous stroke was observed in 17.0% patients being more common in males (10.0%). Diabetes mellitus was present in 12.0% patients (Table 1).

Table 2: Clinical features of stroke.

Clinical features	Male (%)	Female (%)	Total (%)
Sensorium			
Conscious	26 (26.0)	19 (19.0)	45 (45%)
Drowsy	31 (31.0)	21 (21.0)	52 (52%)
Coma	02 (02.0)	01 (01.0)	3 (3%)
Glasgow coma scale			
≤ 5	04 (04.0)	02 (02.0)	06 (06.0)
6-10	28 (28.0)	21 (21.0)	49 (49.0)
11-15	27 (27.0)	18 (18.0)	45 (45.0)
Hemiparesis			
Right	26 (26.0)	18 (18.0)	44 (44.0)
Left	28 (28.0)	23 (23.0)	51 (51.0)
Facial weakness			
Right	05 (05.0)	02 (02.0)	07 (07.0)
Left	06 (06.0)	04 (04.0)	10 (51.0)
Speech defect	26 (26.0)	20 (20.0)	46 (46.0)
Respiration			
Gasping	01 (01.0)	00 (00.0)	01 (01.0)
Rapid	08 (08.0)	08 (08.0)	16 (16.0)
Hyperventilation	05 (05.0)	02 (02.0)	07 (07.0)
Pupil size			
U/L constricted	02 (02.0)	00 (00.0)	02 (02.0)
B/L constricted	02 (02.0)	01 (01.0)	03 (03.0)
U/L dilated	08 (08.0)	03 (03.0)	11 (11.0)
B/L dilated	01 (01.0)	01 (01.0)	02 (02.0)
Meningeal sign	08 (08.0)	07 (07.0)	15 (15.0)
Papilledema	07 (07.0)	05 (05.0)	12 (12.0)
Nystagmus/ cerebellar sign	08 (08.0)	07 (07.0)	15 (15.0)
Hemi sensory loss	12 (12.0)	07 (07.0)	19 (19.0)
Visuospatial defect	05 (05.0)	03 (03.0)	08 (08.0)
Hemianopia	04 (04.0)	04 (04.0)	08 (08.0)
Hemi neglect	04 (04.0)	03 (03.0)	07 (07.0)

Majority of patients were admitted between within 24 hours of onset of stroke (49%), followed by between 2-7th day (31% patient) and after 7 days of onset of stroke (20%).

As per JNC-7 criteria, Majority of patients were hypertensive with stage-2 hypertension (SBP≥160, DBP≥100) in 33% followed by stage-1 hypertension (SBP=140-159, DBP=90-99) in 18% and prehypertension

(SBP=120-139, DBP=80-89) in 13% respectively. Normal blood pressure (SBP<120, DBP<80) found only in 36% patients.

Most common side of weakness (Hemiparesis/ Hemiplegia) was left (51%) followed by right (44%). In 3% patients side of weakness could not be assessed. Quadriparesis was found in only 1 (1%) patient while in 1 (1.0%) patients focal deficit was found.

Time of onset of stroke was most common in the morning (50%) followed by evening (28%) and afternoon and night (15% and 7% respectively). Further progression of disease after onset of the stroke was observed in 52% patients while in 48% patients no progression was found.

Hemiparesis was the most common clinical feature (95%) followed by Altered sensorium (55%) and speech defect (46%). Glasgow coma scale was less than ten in 55% patients. Abnormal respiration was seen in 24% patients followed by hemi sensory loss in 19% patients (Table 2).

Mild anaemia was the commonest laboratory finding in 51% patients followed by leukocytosis in 35% patients. Decreased PCV was observed in 12% patients and increased ESR in 15% patients. Hyperglycaemia was found in 12%, increased serum creatinine in 9%, hyponatremia in 13% and hypokalemia in 9% patients. Abnormal lipid values were found in 54 patients (Table 3).

Table 3: Blood investigations among the stroke patients.

Name of investigations	Male (%)	Female (%)	Total (%)
Haemoglobin level (gm%)			
Normal (>13 in male, >12 in female)	26 (26.0)	18 (18.0)	44 (44.0)
Mild Anemia (9-12)	30 (30.0)	21 (21.0)	51 (51.0)
Moderate Anemia (7-9)	03 (03.0)	02 (02.0)	05 (05.0)
Total leucocyte count per cumm)			
Normal (4,000-11,000)	34 (34.0)	29 (29.0)	63 (63.0)
Leucoytosis (>11,000)	23 (23.0)	12 (12.0)	35 (35.0)
Leucopenia (<4000)	02 (02.0)	00 (00.0)	02 (02.0)
ESR			
Increased	09 (09.0)	06 (06.0)	15 (15.0)
Decreased	11 (11.0)	08 (08.0)	19 (19.0)
PCV			
Decreased	13 (13.0)	12 (12.0)	12 (12.0)
Random blood sugar (RBS)			
Normal	51 (51.0)	37 (37.0)	88 (88.0)
Hyperglycemia	08 (08.0)	04 (04.0)	12 (12.0)
Serum creatinine			
Normal (0.2-1.2 mg%)	54 (54.0)	37 (37.0)	91 (91.0)
Increased	05 (05.0)	04 (04.0)	09 (09.0)
Electrolytes			
Sodium			
Normal (135-155 meq/I)	52 (52.0)	35 (35.0)	87 (87.0)
Hyponatremia (<135 meq/I)	07 (07.0)	06 (06.0)	13 (13.0)
Potassium			
Normal (3.5-5.0meq/I)	50 (50.0)	35 (35.0)	85 (85.0)
Hyperkalemia (<3.5meq/I)	07 (07.0)	02 (02.0)	09 (09.0)
Hypokalemia (>5.5meq/I)	02 (02.0)	04 (04.0)	06 (06.0)
Coagulation study	Normal	Normal	
VDRL (Reactive)	01 (01.0)	00 (00.0)	01 (01.0)
Lipid Profile			
Normal	23(23.0%)	23(23.0%)	46 (46.0)
Abnormal	36 (36.0%)	18 (18.0%)	54 (54.0)

Abnormal ECG was present in 27% patients, with LVH with strain pattern as the most common presentation (17%). Chest X-ray was abnormal in 16% of patients, with cardiomegaly in 15% patients and miliary TB in 1% patient. On echocardiography valvular disease found in 4% patients (Table 4). Diagnosis of ischaemic stroke was made in 59% patient, intracranial hemorrhage in 40% patients and sub-arachnoid hemorrhage in 1% patient.

Table 4: ECG, chest X-ray and echo-cardopgraphy in stroke patients.

Name of investigations	Male (%)	Female (%)	Total (%)
Electrocardiogram (ECG)			
L.V. H. with strain pattern	11 (11.0)	06 (06.0)	17 (17.0)
Atrial fibrillation	02 (02.0)	04 (04.0)	06 (06.0)
Ventricular arrhythmia	01 (01.0)	00 (00.0)	01 (01.0)
Myocardial infarction	02 (02.0)	01 (01.0)	03 (03.0)
Chest X-ray			
Normal	31 (31.0)	18 (18.0)	49 (49.0)
Not done	18 (18.0)	17 (17.0)	35 (35.0)
Cardiomegaly	09 (09.0)	06 (06.0)	15 (15.0)
Miliary T.B.	01 (01.0)	00 (00.0)	01 (01.0)
Echocardiography			
Valvular heart disease	00 (00.0)	04 (04.0)	04 (04.0)

DISCUSSION

Age is an important nonmodifiable risk factor for stroke. The mean age of stroke onset in India (i. e., 63 years).[4] Incidence of stroke was observed to be 16.0% among individuals aged less than 50 in this study. Previous hospital-based data from India observed a high proportion of young stroke (first-ever stroke onset below 40 years of age), ranging between 15 and 30%.[5] Overall, there is male preponderance of stroke in this study. Similar findings have been reported from Coastal south India in young adults (15-45 years).[6] Among modifiable risk factors, hypertension (51.0%) and smoking (36.0%) were the most common ones found in the present study. Similar results have been obtained in a plethora of studies. Day time onset is reported to be more common, which is similar to our results.[11,12] Abnormal lipid values were found in almost half of the patients. Our study findings are supported by other studies.[13-16] However, further studies with bigger sample sizes are required to find out trends and risk factors among stroke patients.

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