

## Original Research Article

# A study on clinical and laboratory profiles of hemorrhagic and ischemic strokes in an Eastern Indian teaching Hospital

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## ABSTRACT

**Background:** Stroke is a frequent cause of death and disability. This study was carried out to establish the pattern of various types of cerebrovascular accident (CVA) and comparison between hemorrhagic and ischemic stroke in Eastern India.

**Methods:** This is a retrospective study of sample size 367 CVA patients; among them, 218 were ischemic and 149 were hemorrhagic admitted to Department of General medicine and Neurology of the hospital.

**Results:** Of the total 367 patients, there were 149 as hemorrhagic stroke patients and 218 patients as ischemic stroke patients. Ratio of hemorrhagic to ischemic stroke was 40.6: 59.4. Among patients in hemorrhagic patients male to female ratio was 1.6:1 and in ischemic stroke patients male to female ratio was 1.27:1. It was recorded that prevalence of ischemic stroke was higher than hemorrhagic type.

**Conclusions:** The CVA was associated with blood pressure, cholesterol and use of tobacco as the common risk factor for ischemic stroke. It was recorded that ischemic stroke patients had reported frequently than hemorrhagic patients.

**Keywords:** Blood pressure, Cholesterol, Cerebrovascular accident, Hemorrhagic stroke, Ischemic stroke

## INTRODUCTION

Stroke, after heart disease and cancer, is the third most common cause of death and morbidity in India. Since 1950, coincident with the introduction of effective treatment for hypertension, there has been a substantial reduction in the frequency of stroke. Developing countries like India are facing a double burden of communicable and non-communicable.<sup>1</sup> In general, the estimated prevalence rate of stroke ranges from 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population based studies.<sup>2</sup> In South Asian region,

the prevalence of stroke is high particularly in young adults, and in India strokes are reported as 10-15% among people under 40-year age.<sup>3</sup> It was feared that by 2020, 61 million disability adjusted life years (DALY) lost could be attributed to stroke, out of which 84% will be in the developing nations.<sup>4</sup>

This study was undertaken to assess the difference in clinical and laboratory profiles in hemorrhagic (ICH) and ischemic stroke patients. It is anticipated that the recorded delineation of the comprehensive information of stroke in the local setup shall be of immense use to physicians managing stroke patients.

## METHODS

Clinical and risk factor profiles of stroke victims were analyzed with acute CVA patients admitted to Department of General Medicine and Neurology of the hospital during 2014 April to 2016 March. Patients admitted for hemi paresis, mono paresis, para paresis other than CVA patients were excluded from the study, and the sample size was 367. Of them, 218 patients were with ischemic and 149 patients were with hemorrhagic strokes. Recording of clinical profiles, systemic hypertension (HT), total cholesterol, triglyceride (TG), high density lipoprotein (HDL) and low-density lipoprotein (LDL) as risk factors, chronic medical illness (diagnosed and/ or under treatment), manifestation of diabetes mellitus (DM), previous incidences of cardiac

disorders (ischemic heart disease, rheumatic heart disease (RHD), valvular heart disease, atrial fibrillation, cardiomyopathy and congenital heart diseases) were done. Adverse personal habits of patients, tobacco (smoking and chewing) and alcohol abuses were recorded.

## RESULTS

All cases were broadly divided into two groups, hemorrhagic (Group-1) and ischemic (Group-2) with age range, 16 to 100 year. There were 149 patients in the Group-1 and 218 patients were in the Group-2. The ratio of hemorrhagic and ischemic stroke was 40.6: 59.4. Among patients in the Group-1 male to female ratio is given (Table 1).

**Table 1: The age and sex distribution of both types of stroke.**

Gender	Ischemic (group 1)		Hemorrhagic (group 2)		%	
Age (year)	Male	Female	Male	Female	Overall Ish versus Hem m:f = 1.66:1	
≤45	7	2	3	4		
≥45-60	40	33	31	24		1.24:1
≤61-80	77	5	46	31		3.41:1
≥81 and above	11	7	3	6		1.82:1
Total	135	84	83	65	1.46: 1	

**Table 2: Prevalence of hypertension in stroke.**

Blood pressure	Group 1	Group 2	CVA (%)
Normal DBP ≤89 SBP≤139	77	42	35.5
HT DBP ≥ 90 SBP ≥ 140	141	104	64.5

The prevalence of ischemic stroke was higher than hemorrhagic. In Group-1, the prevalence of was (83.3%) and in Group-2 it was (73.2%), out of which there were (83.3%) males and (16.7%) females in group-1 and (57.7%) males, (42.3%) females in Group-2 (Table 1). The most common site of hemorrhage was ventricular, 33.3%, followed of thalamus, basal ganglia, paraventricular by 16.6%; the other sites were external capsule, frontal, parietal and temporal regions. In group-2 most common site of ischemia was thalamus 47.9%, followed by peri ventricular area 31.2%, basal ganglia 25%, parietal 22.9%, centrum semiovale 14.5%, internal capsule 10.4%, frontal 8.3%, with 4.6% of mid brain, cerebellar and temporal each; and 2% incidences of each of lentiform and paraventricular regions were noted. In this study, male patients were (Table 1).

In comparison between both groups, normal blood pressure and higher blood pressure were of higher values in the ischemic group (Table 2). Of the total 367 patients,

cholesterol levels of TG, HDL and LDL were higher in the ischemic group than the hemorrhagic group (Tables 3, 4 and 5). The total cholesterol level was in healthy range of ≤ 200 in Group-1 and 103 (Table 6).

**Table 3: Triglyceride level in ischemic and hemorrhagic stroke.**

Age	<150		≥150		Total
	GP 1	GP 2	GP 1	GP 2	
≤40	3	3	3	5	14
41-60	45	48	14	27	134
61-80	56	77	15	37	185
>81	10	16	3	5	34
Total	144	144	35	74	367

**Table 4: High density lipoprotein level in ischemic and hemorrhagic stroke.**

Age	≤40		>40		Total
	GP 1	GP 2	GP 1	GP 2	
≤40	2	5	4	3	14
41-60	13	24	46	51	134
61-80	9	10	62	104	185
>81	2	5	11	16	34
Total	25	40	124	178	367

**Table 5: Low density lipoprotein level in ischemic and hemorrhagic stroke.**

Age	≤130		>130		Total
	GP 1	GP 2	GP 1	GP 2	
≤40	4	5	2	3	14
41-60	41	63	19	12	134
61-80	42	51	49	43	185
>81	10	16	3	5	34
Total	97	134	73	63	367

**Table 6: Total cholesterol in ischemic and hemorrhagic stroke.**

Age	≤200		>200		Total
	GP 1	GP 2	GP 1	GP 2	
≤40	4	6	2	2	14
41-60	40	46	19	29	134
61-80	49	76	22	38	185
>81	10	12	3	9	34
Total	103	140	46	78	367

## DISCUSSION

The most common risk factors were HT and smoking in both groups. Other risk factors in Group-1 in order of frequency were, dyslipidemia and alcohol abuse, consistent with a study, in which HT was documented in 47.2% of the entire cohort of patients and was recorded as the most common risk factor.<sup>6</sup> Other risk factors in the descending order were, dyslipidemia, tobacco abuses, DM and excessive alcohol use. In a study done, smoking, alcoholism, increased BMI, DM and HT were significantly associated with strokes.<sup>7</sup> Of course, recurrent CVA was most commonly seen in < 45-year age in 25% patients, corroborating this study, in which it was 10%.<sup>8</sup> In the Group-2, the most common risk factor was HT followed by equal percentages of dyslipidemia and smoking history of CVA, DM, abuse of alcohol, past history of coronary artery disease and history of cancer. Similar trend was observed in another study, in which older patients were with HT 46.7%, as the most common risk factor, followed by previous episodes of stroke 24.6%, hyperlipidemia 23.6% and smoking history and DM of equal percentage 19.6%.<sup>9</sup> In another study it was found that modifiable risk factors such as, HT (40%), alcoholism 35%, smoking 28% and hyperlipidemia 17% were the common causes of stroke among the elderly.<sup>10</sup> Indian stroke studies have shown ratio between ischemic: ICH :: 2.21:1, while in Western countries the ratio was 5:1 in USA and 4.2:1. in UK.<sup>11,12</sup> However, in this study, the ratio is 1.56:1.

## CONCLUSION

Ischemic stroke patients had reported frequently than hemorrhagic patients. Common clinical presentations of

hemiplegia were HT, smoking and the past history of CVD from both groups, ischemic and ICH patients. Moreover, the most common type of stroke was ischemic stroke with male predominance followed by hemorrhagic stroke with female predominance in this zone. In hemorrhage stroke patients had lobar hemorrhage followed by thalamo ganglionic. More research is required to address stroke pattern in ischemic stroke and hemorrhage stroke to combat this deadly and disabling disease.

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## REFERENCES

- Hartona S. Experiences from a multicenter stroke register: a preliminary report. *Bull World Health Organ.* 1976;54(5):541-53.
- Bath P. Acute stroke. In: D. Machin, S. Day, S. Green, eds. *Textbook of Clinical Trials*. 2nd ed. Hoboken: Wiley; 2006:179-180.
- Das SK, Banerjee TK, Biswas A, Raut DK, Mukherjee CS, Chaudhari A, et al. A prospective community based study of stroke in Kolkata, India. *Stroke.* 2007;38(2):906-10.
- Nagaraja D, Gururaj G, Girish N, Panda S, Roy AK, Sarma GRK, et al. Feasibility study of stroke surveillance: data from Bangalore, India. *Indian J Med Res.* 2009;130:396-403.
- Ferri CP, Acosta D, Guerra M, Huang Y, Llibre-Rodriguez JJ, Salas A, et al. Socioeconomic factors and all cause and cause-specific mortality among older people in Latin America, India, and china: a population-based cohort study. *PLoS Med.* 2012;9(2):e1001179.
- Kameshwar P, Singhal K. Stroke in young: an Indian perspective. *Neurol India.* 2010;58(3):343-50.
- 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. *Neuroepidemiol.* 2008;31:254-61.
- Sethi P. Stroke-incidence in India and management of ischemic stroke. *Neuro Sci.* 2002;4(3):139-41.
- Das S, Banerjee T. Stroke Indian scenario. *Circu.* 2008;118:2719-24.
- Eapen RP, Parikh JH, Patel NT. A study of clinical profile and risk factors of cerebrovascular stroke. *Gujarat Med J.* 2009;64(2):47-54.
- Powell JL, Cook IG. Global ageing in comparative perspective: a critical discussion. *Int J Sociol Soc Policy.* 2009;29:388-400.
- Warlow CP, van Gijn J, Dennis MS, Wardlaw JM, Bamford JM, Hankey GJ, et al. Introduction. In: eds. *Stroke: Practical Management*. 3rd ed. Oxford: Wiley-Blackwell; 2008:1-5.

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