RESEARCH ARTICLE

OBSERVATION ON THE CAUSATIVE FACTORS AND PROGNOSIS OF ACUTE STROKE IN PATIENTS ADMITTED TO GOVERNMENT MEDICAL COLLEGE & HOSPITAL, HALDWANI NAINITAL (UTTARAKHAND)

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ABSTRACT

Observation of the frequency of causative factors and prognosis of acute stroke in patients admitted to Government Medical College Haldwani, and associated Dr. S.T.M. hospital Nainital (Uttarakhand) India. This study is hospital based observational study. This study was done in medical wards of GMC Haldwani from Nov 2011 to August 2013. In this study patients having age 18 years or above, presenting with history of stroke and admitted in medical wards were included in this study. CT scan brain was done at the time of admission. For identification of risk factors, a detail history and relevant investigations were done in same hospital. All findings were entered in individual proforma. A total of 50 patients were included in the study. The mean age of patients was 60.76 ± 14.53 years. 26 (52%) patients were male and 24 (48%) patients were female. In risk factors, 31 (62%) patients had hypertension, 14 (28%) patients had diabetes mellitus, 11 (22%) patients had history of smoking, 5 (10%) patients had previous stroke/TIA and 14 (28%) patients had high cholesterol level. the patients belonging to low GCS score had bad prognosis. We found that hypertension, diabetes mellitus, smoking and high cholesterol level were major modifiable risk factors in the development of stroke. Controlling of these risk factors might reduce the risk of stroke.

Key words: Acute stroke, CT, Risk factors, Hypertension, Diabetes mellitus.

INTRODUCTION:

Stroke is defined as "rapidly developing clinical symptoms and /or signs of focal and at times global (applied to patients in deep coma and those with subarachnoid haemorrhage) loss of cerebral function with symptoms lasting for more than 24 hours or leading to death, with no apparent cause other than that of vascular origin".[1] Stroke is the second largest contributor to mortality worldwide and the primary cause of disability among the elderly in Western Europe and the United States.[2] Among the various types of stroke, ischaemic stroke is the most prominent and accounts for the most long-term disability.[3] A stroke is caused by a portion of the brain being starved of oxygen. This can be due to a burst blood vessel or a clot blocking a blood vessel. The lack of oxygen causes damage to the brain. The long-term effects of a stroke depend on what part of the brain and how much tissue is affected.[4]

It is important for clinicians to distinguish between cerebral haemorrhage and infarction in cases of acute stroke, since management of these two disorders differs substantially. The most accurate method of distinguishing cerebral haemorrhage from infarction is computed tomography (CT).

In urban India stroke accounts for 1% mortality of all hospital admissions, 4% in all medical cases and about 20% in all disorders of central nervous system.[5]

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In the past several decades, case series, case-control studies, and prospective cohort studies have successfully identified non-modifiable risk markers for stroke, such as age, gender, race, ethnicity, heredity and several well-established modifiable risk factors for stroke.[6] Hypertension, atrial fibrillation, other cardiac diseases, hyperlipidemia, diabetes, cigarette smoking, physical inactivity, carotid stenosis, and transient ischaemic attack (TIA) are all potentially treatable conditions that predispose to stroke.[7] Age represents the strongest nonmodifiable risk factor associated with ischaemic stroke, while hypertension constitutes the most important modifiable cerebrovascular risk factor.[8]

More than 30 percent of all Emergency Hospital admissions are of stroke. Not only is the mortality associated with stroke, but also the morbidity puts a heavy emotional, psychological and financial burden both on the patient, as well as on the family and the country. Each year about 150-200 new patients with acute stroke, coming from Kumaun region are admitted through medical emergency or Medical OPD at Govt. Medical College and associated Dr. Susheela Tiwari Hospital, Haldwani. The presentation of cerebrovascular disease still leaves a clinician in a perplexity as to whether it is ischaemic stroke or haemorrhagic. This is because of considerable over-lap in clinical features of ICH and cerebral infarction.

However, patients with acute stroke often do not seek medical assistance on their own, both because they are rarely in pain, as well as because they may lose the appreciation that something is wrong: it is often a family member or a bystander who calls for help.

Therefore, patients and their family members have been be counselled to call emergency medical services immediately if they experience or witness the sudden onset of any of the following: loss of sensory and/or motor functions on one side of the body or if they experienced a sudden, severe headache.

MATERIAL AND METHOD:

After the clinical diagnosis of stroke was made, orderly processes of evaluation and treatment have been followed. This study of acute stroke was conducted in Government Medical College and associated Dr. Susheela Tiwari Hospital, Haldwani (Nainital) Uttarakhand. A total number of 50 adult patients in variable of both sex with age ranging between 18 – 85 Years with first ever stroke confirmed by CT/MRI scan of brain admitted to medical ward were included in this study.

INCLUSION CRITERIA:

All the patients of more than 18 years of age and both sex meeting the criteria for stroke as defined irrespective of sex & showing infarct and ICH on CT scan/MRI of brain within 24hrs of admission.

EXCLUSION CRITERIA:

Focal Neurological deficit due to infective pathology, trauma, brain tumour & patients with history of recurrent stroke. The data generated from the study was analyzed by appropriate statistical methods. Statistical analysis of data was performed using SPSS V.20.0 (Windows). Statistical significance was accepted at $p < 0.05$.

OBSERVATION AND RESULTS:

In this hospital based prospective study 50 patients in which 26 males and 24 females of different age groups were included. Data were obtained from history taking, physical examination and investigations. The following were the results of this study:

The peak age group was 60-70 years. There were 2 patients who were in the age group <30 yrs. (figure1)

Figure1: Histogram Showing Incidence of Stroke in Different Age Groups:
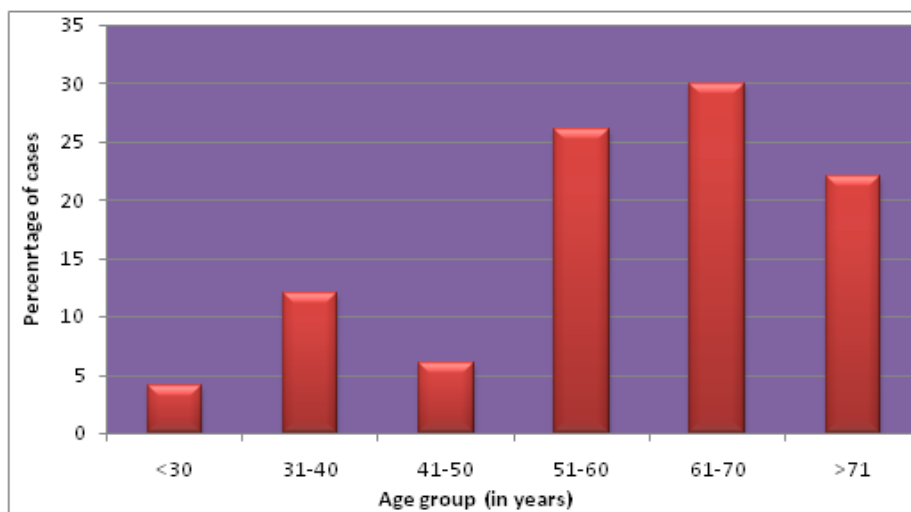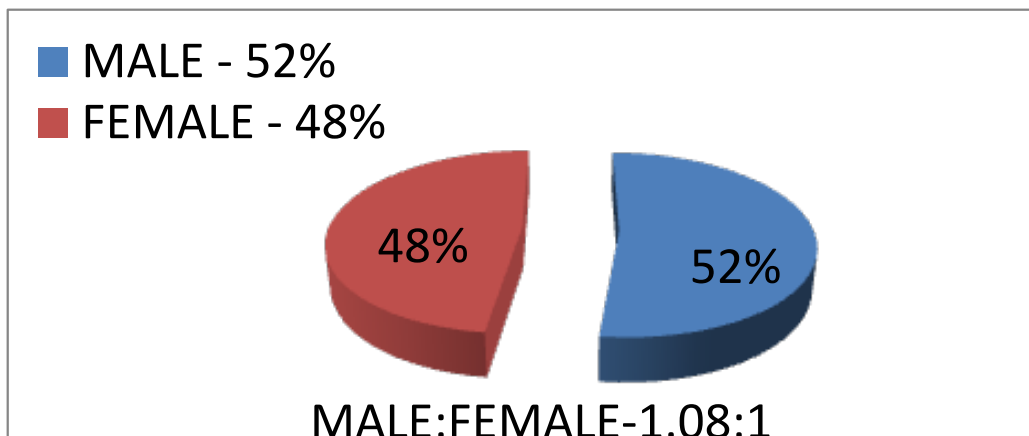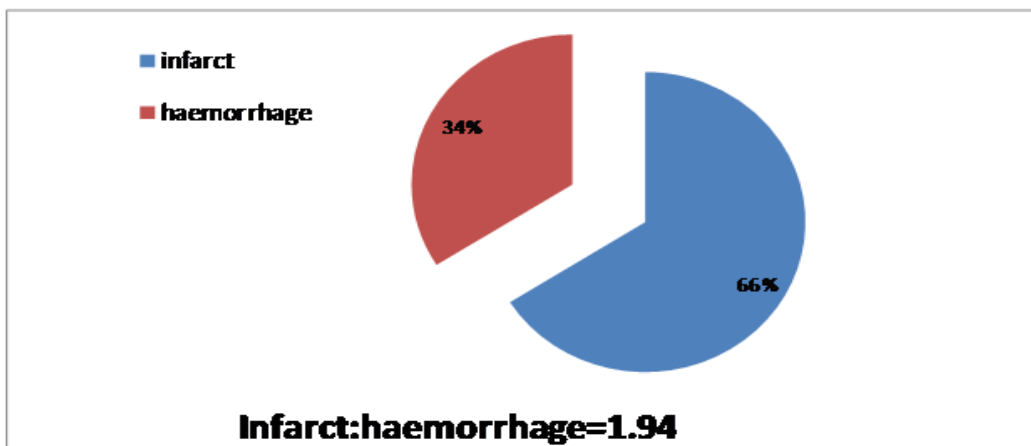
Figure 2: Pie Diagram Showing Percentage Sex Distribution of Study Group:

Males outnumbered the Females (males 52%, females 48%.the Male: Female ratio is 1.08:1) (figure 2)

Figure 3: Pie Diagram Showing Infarct V/S Haemorrhage in Study Group:

The incidence of Ischaemic stroke (66%) was higher incomparison to Haemorrhagic stroke (34%).(figure3)

Table 1: Percentage of Different Risk Factors in Stroke:

Risk factors for stroke	Infarction	%	Haemorrhage	%	Total	%
1. HYPERTENSION	16	48.48	15	88.23	31	62
2. SMOKING	8	24.24	3	17.65	11	22
3.CVS DISEASES	5	15.15	2	11.76	7	14
4.DIABETES MELLITUS	10	30.30	4	23.53	14	28
6.DYSLIPIDEMIA	8	24.24	6	35.29	14	28
7.ALCOHOL	3	9.09	6	35.29	9	18
8.TIA	4	12.12	1	5.88	5	10
9.OBESITY	7	21.21	3	17.65	10	20

Incidence of risk factors like hypertension (62%), dyslipidaemia (28%), diabetes mellitus (28%) smoking (22%), obesity (20%), outnumbered other risk factors like alcoholism (18%), CVD (14%), prior stroke/ TIA (10%).

In this study, hypertension was the most common risk factor for stroke. 62% stroke patients were hypertensive. Hypertension is the most prevalent and powerful modifiable risk factor for both ischemic and haemorrhagic stroke, irrespective, of geographic region and ethnic group.

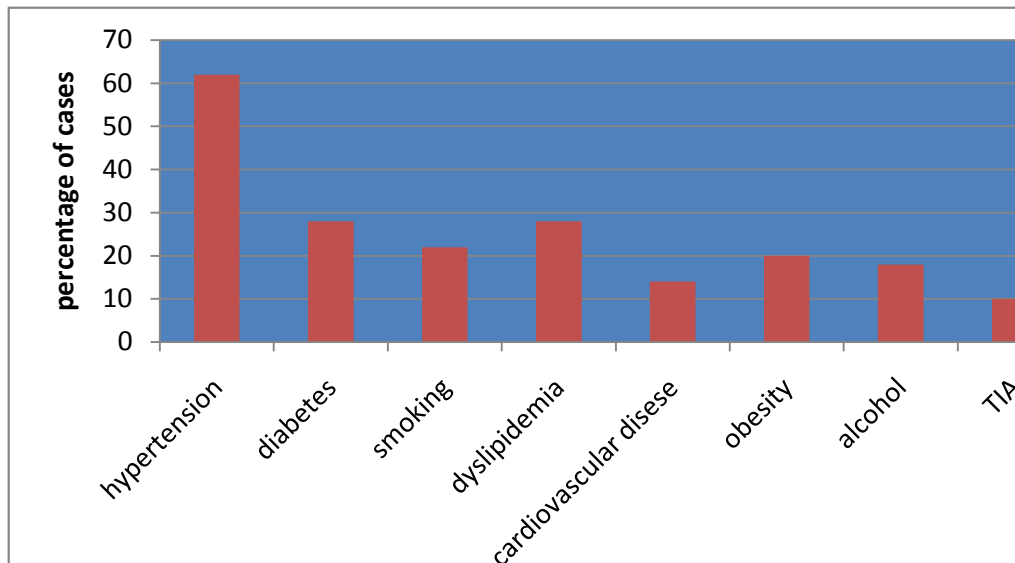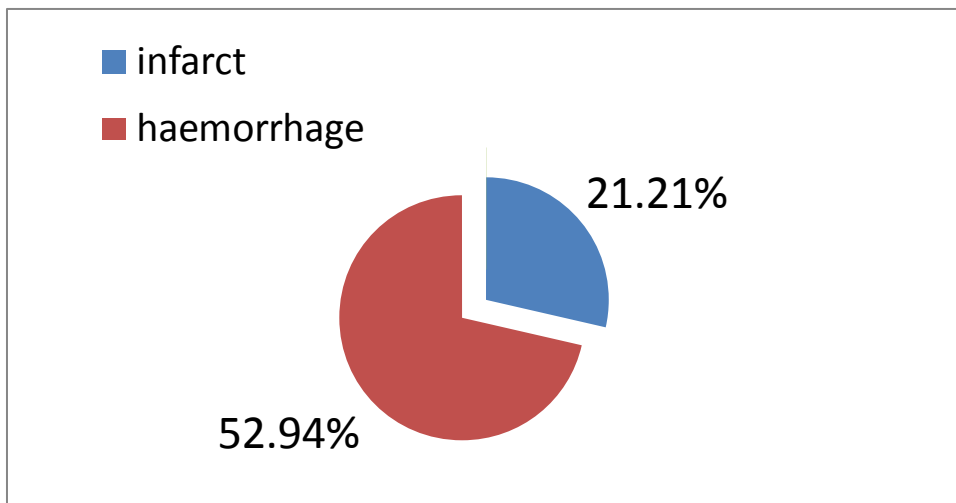**Figure 4: Histogram Showing Percentage of Different Risks Factors in Study Groups of Stroke Patients:**

Figure 5: Pie Diagram Showing Percentage of Mortality in Different type of Stroke in Study Groups:

The above figure shows that the mortality rate was higher in patients of haemorrhagic stroke in comparison to ischemic stroke.

Table 2: Showing the Prognosis by GCS Score:

| GCS		No.of patients	Expired		Survived	
			No. of patients	%	No. of patients	%
1.	4	13	12	92.30	1	7.69
2.	5-10	25	4	16	21	84
3.	11-15	12	0	0	12	100
Chi-square = 30.31 d.f. = 2 p = 0.01 (Significant)						

The above table shows that the patients belonging to GCS score 4 had bad prognosis (92.30% expired).

Table 3: Showing the Prognosis by Radiological Site:

Radiological site		No. of Patients	Survived		Expired	
			No. of patients	%	No. of patients	%
1.	PCA TERRITORY	4	0	0	4	100
2.	MCA TERRITORY	44	32	72.72	12	27.27
3.	ANT TERRITORY	2	2	100	0	0
Chi-square = 9.89 d.f. =2 p = 0.02 (Significant)						

The above table shows the the mortality rate was the highest in patients of PCA territory (bad prognosis).

Figure 6: Pie Diagram Showing Outcome in patients of Stroke :
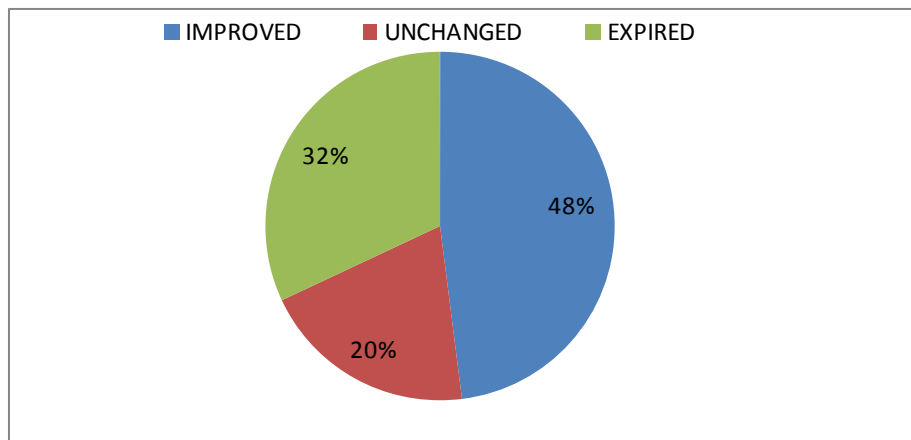
The above table shows that 48% improved, 20% were left with residual effect and 32% expired. The rate of recovery was found nearly in 50% of patients.

DISCUSSION:

Stroke continues to have a great impact on public health. Stroke is frequent, recurring, and is more often disabling than fatal.[9] Despite new post-stroke management strategies, stroke remains a serious disease affecting not only the patient but also his family as well.

Although some determinants of stroke, such as age, gender, race, ethnicity and heredity cannot be modified, they are risk markers. However, more important are the modifiable factors, and controlling them can will reduce the overall incidence of the disease.[10]Identifying the risk factors correctly and promptlyand modifying them remain the most important means of reducing stroke incidence. Increasing age is clearly the strongest determinant of the number of new cases of stroke each year.

The main pathological types of stroke are cerebral infarction, primary intra cerebral haemorrhage and subarachnoid haemorrhage. In developed countries, about 85-90% of stroke is due to cerebral infarction and 10-15% due to intracranial haemorrhage.[11]

All together 50 patient's 26 males and 24 females were included in this study.

Patients chosen were between 18 to 85 years of age. Maximum number of patients were in the age group of 60-70years (30%).Incidence of risk factors like hypertension (62%), dyslipidaemia (28%), diabetes mellitus (28%) smoking (22%), obesity (20%), outnumbered other risk factors like alcoholism, CVD, prior stroke/ TIA.

The mean age of patients in our study was 60.76 ± 14.53 years. A study done by Zahir Shah[12] at Peshawar noticed that mean presenting age of stroke patients was 55 years. The mean age in our study was lower than the studies conducted in West where the mean age was between 76 to 80 years.[13,14] A study conducted by Al RajehS et al[15]in Saudi Arabia showed that the mean age of the patients was 63±17 years that was slightly higher than the mean age in our study.

In our study, the male predominated the females and the percentage of males was 52% and percentage of females was 48%. A study conducted by Awada A etal[16] showed

that males (68%) outnumbered females. Similar results were found in another study conducted by Al Rajeh S et al.[15] showed that males predominated in all types of stroke.

In our study, the proportion of cerebral infarction was 66%, and the proportion of cerebral haemorrhage was 34%.

In this study, hypertension was the most common risk factor for stroke. 62% stroke patients were hypertensive. Hypertension is the most prevalent and powerful modifiable risk factor for both ischemic and haemorrhagic stroke, irrespective, of geographic region and ethnic group. Persons with Hypertension are about 3 or 4times more likely to have a stroke. Risk of stroke can be reduced by at least 38% with adequate control of hypertension. Stroke risk mainly depends on the quality and adequacy of blood pressure control as evidenced by studies from UK and Netherlands.[17,18]

Hypertension was found as a major risk factor in our study. Our findings are consistent with the study conducted by MemonAR[19] (61%), Javed MA[20] (62%), Kaul S[21] (62%), but lower than Reman S[23] (70%) and higher than Leckner H[24] (40.6%) and Liaquat A [25](56.4). History of irregular treatment of hypertension and no check on the control of blood pressure emphasize the importance of health education programme on stroke related mortality even at primary heath care center Level.[26]

Fourteen stroke patients were Type 2 diabetics. The proportion of diabetes mellitus in our patients was 28% which is more predominant in males than females. The results in our study were comparable to the results of some studies,while other studies showed ahigh frequency of diabetes mellitus. However, Jorgensen et al[27]reported the frequency of diabetes mellitus about 20%. 71.4% of these diabetic patients suffered from cerebral infarction and 28.6% from haemorrhagic stroke. We found that diabetes mellitus in patients increase the likelihood of ischaemic stroke by more than 3-folds.Low frequency of haemorrhage in the patients with Diabetes mellitus might be related to the specific angiopathy induced by diabetes in the small vessels that is characterised by thickening of the basement membrane and proliferation of the endothelium.

These changes might not favour haemorrhage. Moreover, prostacyclin synthesis is impaired, coagulability is increased, fibrinolytic activity is decreased and plasminogen activator inhibitor levels are increased. All these may tilt in favour of thrombosis rather than haemorrhage in diabetics.[28]

High cholesterol level (>200mg/dL) was found to be an independent predictor for both ischemic (24.2%) and haemorrhagic (35.3%) strokes in our study. It is logical to assume that presence of high cholesterol would increase the likelihood of haemorrhagic as well as ischemic stroke, as this is an important risk factor for atherosclerosis.

The estimated risk for stroke among smokers in our study was 22%, and was an independent risk factor among males (64%). This finding was comparable with that of Liquat A[25] (21%), and Tanveer A[29] (16%) but lower than that of Kau S9 (28%)[21].

Atrial fibrillation was present in 20% patients. This finding is comparable with Amin R[22] (23%), but higher than kaul S[21] (6%) and Alam I et al[26] (12%).

CONCLUSION:

In this prospective study 50 patients 26 males and 24 female belonging to 18-85 years of age have been included. Peak incidence of stroke was found in patients belonging to 60-70 years. The most commonly associated risk factors in this study were Hypertension, Diabetes mellitus, Hyperlipidemia and Smoking. The outcome of patients of acute stroke admitted to our hospital was as follows: recovery (48%), residual effects (20%), death-(32%). In conclusion stroke in our place of study had similar risk factors as elsewhere, and its mortality was higher than in Western and wealthier developed countries.

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There is a genuine need for health education programmes on stroke and its mortality/disability/morbidity. This may help promote more adherences to medication schedules, proper nutrition, regular exercise and the cessation of habits that may be deleterious to good health.

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