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Original Research Article

"A STUDY ON ACUTE ISCHEMIC STROKE OUTCOME WITH REFERENCE TO RISK FACTORS IN A TERTIARY CARE HOSPITAL"

Dr.Vamsi Krishna Kotagiri[1], Dr. Lakshmi Lavanya Muppalla[2], *Dr.Sudhir Suggala[3]

1.2.Assistant Professor, Department of Neurology, Dr.PinnamanenisiddharthaInstitute of medical sciences & research foundation, Chinnavutapalli, Vijayawada, Andhra Pradesh.

3. Assistant Professor, Department of Neuro Surgery, Dr.PinnamanenisiddharthaInstitute of medical sciences & research foundation, Chinnavutapalli, Vijayawada, Andhra Pradesh.

***Corresponding Author:Dr.SudheerSuggala, Assistant Professor, Department of Neuro Surgery, Dr.PinnamanenisiddharthaInstitute of medical sciences & research foundation, Chinnavutapalli, Vijayawada, Andhra Pradesh.**

ABSTRACT:

Background: Cerebrovascular accident (CVA) or stroke is the most common life threatening disorder. It is the third leading cause of death in the developed countries after cardiovascular disease and cancer.[1]Cerebrovascular accidents as a result of atherosclerosis are a major cause of morbidity and mortality worldwide.

OBJECTIVES:

1. To evaluate the risk factors in patients with ischaemic stroke.
2. To find out the prognosis of ischaemic stroke with reference to risk factors
3. To identify the patients having modifiable risk factors so that preventive care can be taken to improve the prognosis and prevent recurrences

Material & Methods: Study Design: Hospital based observational study. **Study area:** The study was done at department of Neurology, Dr. Pinnamanenisiddharthainstitute of medical sciences & research foundation, Chinnavutapalli, Gannavaram Mandal, Krishna (dist.).**Study Period:**April 2021 to March2022.**Study population:** Patients with history and clinical features suggestive of cerebrovascular accidents attending to the hospital.**Sample size:** 100 cases were included in our study.**Sampling method:** Simple randomsampling method.**Ethical consideration:** Institutional Ethical committee permission was taken prior to the commencement of the study. **Study tools and Data collection procedure:**The patients enrolled in the study were subjected to a detailed clinical history and physical examination. Clinical history was obtained from the attenders when the patient was having speech disturbances.

Results: Out of 100 patients, 35 patients (35%) were smokers. Among these 35 patients, 15 patients were had smoking history only, of those 2 patients (13.33%) had complete recovery, 7 patients (46.66%) had partial recovery and5 patients (33.33%) had no recovery.

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CONCLUSION: Commonest modifiable risk factors in ischaemic stroke are hypertension, smoking, dyslipidemia, alcohol consumption, and diabetes mellitus.Commonest non modifiable risk factors are increasing age, male sex and family history of stroke.Prognosis depends on the number of risk factors present.

Keywords: Cerebrovascular accident, modifiable risk factors, ischaemic stroke

INTRODUCTION:

Cerebrovascular accident (CVA) or stroke is the most common life threatening disorder. It is the third leading cause of death in the developed countries after cardiovascular disease and cancer.[1]Cerebrovascular accidents as a result of atherosclerosis are a major cause of morbidity and mortality worldwide. Stroke is defined by the sudden onset of focal neurological deficit resulting from pathological process of blood vessels. The pathologic process includes occlusion of vessel by thrombus or embolus, rupture of a vessel, an altered permeability of vessel wall, or increased viscosity or change in quality of blood flowing through the blood vessels.

Epidemiologic studies help us estimate their prevalence and provide insights into aetiologies and risk factors. About 795,000 Americans each year suffer a new or recurrent stroke. Stroke kills nearly 129,000 people a year. It is the No. 5 cause of death. About 40 percent of stroke deaths occur in males, and 60 percent in females. In 2010, worldwide prevalence of stroke was 33 million, with 16.9 million people having a first stroke. Stroke is the leading cause of adult disability. [2]

Several population-based surveys on stroke were conducted from different parts of India. During the last decade, the age-adjusted prevalence rate of stroke was between 250-350/100,000 nearly 1.5 % of all urban hospital admissions. Recent studies showed that the age-adjusted annual incidence rate was 105/100,000 in the urban community of Kolkata and 262/100,000 in a rural community of Bengal.[3]

Stroke is second only to dementia as a neurological disorder leading to long term institutionalized care. Recurrent stroke produces dementia, and its effects exacerbate cognitive impairments from degenerative dementias, such as Alzheimer's disease.

Due to the high incidence of stroke and the high costs expended for each individual patient, it accounts for a sizeable amount of the health care costs. Thus, stroke and its sequelae are important issues for health care planners in governments, insurance companies, and medical services everywhere. Because the costs of treatment and the economic consequences of lost productivity are so great, prevention of stroke will be a very cost effective strategy.[4]

OBJECTIVES:

1. To evaluate the risk factors in patients with ischaemic stroke.
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Material & Methods:

Study Design: Hospital based observational study.

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Study area: The study was done at department ofNeurology, Dr. Pinnamanenisiddharthainstitute of medical sciences & research foundation, Chinnavutapalli, Gannavaram Mandal, Krishna (dist.).

Study Period: April 2021 to March2022.

Study population: Patients with history and clinical features suggestive of cerebrovascular accidents attending to the hospital.

Sample size: 100 cases were included in our study.

Sampling method: Simple randomsampling method.

Inclusion Criteria: Patients with the evidence of ischaemic stroke. Ischaemic stroke is diagnosed if the following criteria are present:

1. Symptoms and signs suggestive of acute loss of focal or global cerebral function
2. Evidence of ischaemia on CT scan of head.

Exclusion criteria:

1. Patients with focal epilepsy, migraine, and structural brain lesions (such as tumors).
2. Patients with evidence of haemorrhage on CT scan of head.
3. Stroke secondary to infection and connective tissue disorders.

Only the patients who met the above inclusion criteria and did not have any exclusion criteria were included in the study.

Ethical consideration: Institutional Ethical committee permission was taken prior to the commencement of the study.

Study tools and Data collection procedure:

The patients enrolled in the study were subjected to a detailed clinical history and physical examination. Clinical history was obtained from the attenders when the patient was having speech disturbances. The following investigations were carried out as part of the study

- Complete blood count.
- Urine analysis
- Fasting blood sugar / post prandial blood sugar. Blood urea.
- Serum creatinine Lipid profile
- Electro cardiogram (ECG)
- 2D-Echo with colour doppler
- Computed Tomography (CT scan)

The prognosis was studied with regard to the outcome during the Hospital stay (according to modified ranking scale) and was classified as follows:

- Complete recovery (mRS 0,1)
- Partial recovery (mRS 2,3)
- No recovery (No improvement)(mRS4,5)
- Death

The risk factor profile of each patient was evaluated during the stay. In the studyHypertension was defined as a BP recording of >140/90 mmHg on 3 separate occasions,

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taken on 3 different days. Patients who are already on antihypertensive medications were also taken as hypertensive.[2]Dyslipidemia was taken as serum cholesterol>200mg/dl, LDLcholesterol >130mg/dl and HDL cholesterol <35mg/dl in females and <40mg/dl in males.[2]Patients were included as suffering from heart diseases if they hadischemic heart disease, congestive heart failure, rheumatic heart disease, atrial fibrillation or evidence of left ventricular hypertrophy on ECG or Echocardiography.Smoking, tobacco chewing and alcohol intake were based on the clinicalhistory of past and present consumption of these substances.Diabetic patients were diagnosed as per the American diabeticassociation guidelines. Patients on antidiabetic medications were also considered as diabetics.A family history of stroke was entertained if the first degree relatives ofthe patients suffered from stroke.Patients were considered as obese if their BMI was ≥ 30.[2]

Statistical analysis: Data Entry done using Microsoft excel 2013 and analyzed by SPSS V 20. Qualitative data was expressed in frequencies and percentages and Quantitative data in mean and standard deviation. Non parametric statistics i.e.Chisquare test/ Fishers exact test was used to find the significant association between the two qualitative variables. Unpaired t test and ANOVA was used to find the statistical significance between quantitative variables. Bar diagrams & pie charts were used to represent data. p value of <0.05 considered significant statistically.

OBSERVATIONS & RESULTS:

Table 1: Sex Distribution in our study

Gender	total	Expired recovery	complete	partial recovery	recovery
Male	58(58%)	6(10.34%)	9(15.51%)	24(41.37%)	19(32.75%)
Female	42(42%)	6(14.28%)	4(9.52%)	13(30.95%)	19(45.23%)

Among 100 patients, 588 (58%) were males and 42 (42%) were females. In the58 male patients, 6 patients (10.34%) expired, 9 patients (15.51%) had complete recovery, 24 patients (41.37%) had partial recovery and 19 (32.75%) had no recovery. In the 42 female patients, 6 patients (14.81%) expired, 4 patients (9.52%) had complete recovery, 13 patients (30.95%) had partial recovery and 19 patients (45.23%) had no recovery.

Table 2: Distribution of study subjects according to their age

Age in Years	**Total**	**Expired**	**Complete Recovery**	**Partial Recovery**	**No Recovery**
20-29	6	0	3 (50)	2 (33.33)	1 (16.66)
30-39	9	0	2 (22.22)	6 (66.66)	1 (11.11)
40-49	14	2 (14.28)	2 (14.28)	5 (35.71)	5 (35.71)

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50-59	20	2	(10)	2 (10)	10	(50)	6	(30)
60-69	34	4	(11.76)	6 (17.64)	10	(29.41)	14	(41.17)
>70yrs	17	3	(17.6)	0	4	(23.52)	10	(58.82)

Table 3: RISK FACTORS OBSERVED IN ISCHEMIC STROKE PATIENTS:

Risk factors	No of patients	Percentage
Hypertension	38	38%
Diabetes mellitus	25	25%
Smoking	35	35%
Tobacco chewing	9	9%
Dyslipidemia	20	20%
Alcohol	21	21%
Heart diseases	15	11%
Obesity	16	16%
History of rec delivery	1	1%

Table 4: Prognostic Outcome in Hypertension

Out come	No of cas	%
Complete recovery	3	15.78
Partial recovery	8	42.10
No recovery	5	26.31
Expired	3	15.78
Total	19	100

Out of 100 patients 38 patients (38%) had history of hypertension. Among 38patients, 19 patients had only hypertension, of those 3 patients (15.78%) expired, 8 patients (42.10%) had partial recovery, 3 patients (15.78%) had complete recovery and 5 patients (26.31%) had no recovery.

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Table 5: showing Prognostic outcome in Diabetes mellitus

Outcome	No of cases	%
Complete recovery	2	16.66
Partial recovery	4	33.33
No recovery	4	33.33
Expired	2	16.66
Total	12	100

Out of 100 patients 25 (13.84%) had diabetes mellitus. Among 25 patients 12 had only diabetes, of those 2 patients (16.66%) expired, 2 patients complete recovered,4 patients (33.33%) had partial recovery and 4 (33.33%) had no recovery.

Table 6: showing prognostic outcome in smokers in present study

Out come	No of cas	%
Complete recovery	2	13.33
Partial recovery	7	46.66
No recovery	5	33.33
Expired	1	6.66
Total	15	100

Out of 100 patients, 35 patients (35%) were smokers. Among these 35 patients, 15 patients were had smoking history only, of those 2 patients (13.33%) had complete recovery, 7 patients (46.66%) had partial recovery and5 patients (33.33%) had no recovery.

Table 7: Prognostic Outcome in Dyslipidemic patients

Out come	No of cas	%
Complete recovery	1	9.09
Partial recovery	5	45.45
No recovery	3	27.27
Expired	2	18.18
Total	11	100

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Among 100 patients, 21 patients (21%) had dyslipidemia, among these patients 11had only dyslipidemia, among those 2 patients (18.18%) expired, 5 patients (45.45%) had partial recovery and 3 patients (27.27%) had no recovery,1(9.09) patient had complete recovery

Table 8: Prognostic outcome in patients with Heart diseases

Out come	No of cas	%
Complete recovery	2	18.18
Partial recovery	5	45.45
No recovery	1	9.09
Expired	3	27.27
Total	11	100

Among 100 patients, 11 patients had only heart diseases (11%) which consisted of AF, valvular heart disease (RHD), IHD, LVH. Among them 3 patients (27.27%) expired, 2 patients (18.18%) had complete recovery and 5 patients (45.45%) had partial recovery,1 patient(9.09%) had no recovery.

Table 9: Prognostic outcome in patients with multiple risk factors

Outcome	No of cases	%
Complete recovery	5	20.83
Partial recovery	12	50
No recovery	4	16.6
Expired	3	12.5
Total	24	100

Among 100 patients, 24 patients (24%) had multiple risk factors like hypertension, smoking, diabetes etc. among these, 3 patients (12.5%) expired,4 patients (16.6%) had no recovery, 12 patients (50%) had partial recovery and5 patients (20.83%) had complete recovery.

DISCUSSION:

Stroke especially ischemic is a common clinical problem; current treatment for patients with established stroke is relatively ineffective. Approximately 50% of patients are left with permanent disability. Effective risk factor intervention offers a real hope of reducing stroke morbidity and

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mortality.Certain risk factors have been consistently identified as significant predictor of stroke outcome, while some are less consistent. Because of the large projected morbidity burden of stroke, finding factors that may reduce stroke morbidity is becoming increasingly important.

In the present study which involved 100 patients of ischaemic stroke admitted in the ICU attached to our institute, we examined the prediction of stroke outcome in relation to sex, age, smoking, tobacco chewing, hypertension, heart disease(valvular heart diseases, coronary artery diseases, atrial fibrillation etc), diabetes, dyslipidemia and obesity.

It was consistent with previouspublished studies; smoking, hypertension anddyslipidemia were themost common risk factors.

In present study ischaemic stroke is predominant in males (58%) compared to females (42%). this is consistent with Bogoussalvsky [5] study and P.M. Dalalstudy.[6] In the present study 51 patients (51%) were aged above 60 years and 7 patients (13.72%) who expired were from this group. This is consistent with the A.G. Shaper, A.N. Philips study.[7]

In present study 15(15%) patients were aged less than 40 years. Ischemic stroke under the age of 45 is not rare In the Lausanne Stroke Registry; more than 10% of the patients were within this age limit.

In the present study which involved 100 patients of ischaemic stroke admitted in the ICU we examined the prediction of stroke outcome in relation to risk factors like smoking, tobacco chewing, hypertension, heart disease (valvular heart diseases, coronary artery diseases, atrial fibrillation etc), diabetes, dyslipidemia and obesity.

Comparison of Incidence of risk factors with other studies

Risk factors	Bansal Study[8](%	Feigin Study[9](%	Shridharan Study(%)	Present Study(%
Hypertension	56.4	84.8	38.7	38
Diabetes	22.1	7.2	29.4	25
Smoking	38.6	19.4	22.5	35
Tobacco chewir	7.8	-	-	9
Dyslipidemia	8.8	-	-	20
Alcohol	15		14.7	21
Heart diseases	22.9	39.2	29.9	11
Recent delivery	-	-	-	1

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Family history stroke	27	18.1		1
Obesity		27.9		16

In the present study 38 patients (38%) were hypertensives. This was low when compared to the Bansal[8] study and Feigin[9] study but was consistent with the Sridharan[10] study.

The prognostic influence of BP during the acute phase of ischemic stroke is still a matter of controversy. Several works have associated raised BP levels with a poor prognosis, (Carlberg B et al, Robinson TG et al) [11,12] whereas others have found a relationship with good outcome(Allen C et al, Jørgensen H et al) [13,14] or no influence(Fiorelli M et al).[15] These opposite findings may be partially explained by a U-shaped relationship between BP levels and outcome measures.

25 patients (25%) were diabetics in the present study and this was low when compared with theFeigin study(7.2%).[9] But consistent with Bansal [8]study(22.1%) and shridharan study(29.4%).[10] 35 patients (35%) included in this study were smokers, this was very high when compared to the other studies like, Feigin,[9] Sridharan[10] study.But was close to Bansal[8] study in this smokers were 38.6%.

In the present study 20 patients (20%) were suffering from dyslipidemia this was higher when compared with the Bansal[8] study.Tziomalos K et al study showed dyslipidemia as a major risk factor for coronary heart disease (CHD), and role in the pathogenesis of ischemic stroke as less clear. Epidemiological studies have provided conflicting findings regarding the association of dyslipidemia with ischemic stroke.[16]11 patients (11%) suffered from heart ailments in the present study. This was much lower when compared to Bansal [8]study, Feigin[9]study and Shridharan[10]study.

In present study, mortality and morbidity more with females when compared to males. In the 42 female patients, 6 patients (14.81%) expired and 19 patients (45.23%) had no recovery where as In the 58 male patients, 6 patients (10.34%) expired and 19 (32.75%) had no recovery.This is consistent with Skolarus and Morgenstern et al [17] study, inwhich Worse post stroke functional outcomes have been observed in women when compared with that in men. Chen et al study [18] showed that sex and SES (socio economic status) have additive negative effects on outcome and suggests the need to focus on poor women in post stroke recovery efforts particularly.

Hyperglycemia is an adverse prognostic factor. In the present study of the 12 diabetic only patients, there are 4 diabetic patients (33.33%) who had no recovery, 4 patients (33.33%) had partial recovery and 2 patients (16.66%) were expired.Acute hyperglycemia predicts increased risk of in-hospital mortality after ischemic stroke in nondiabetic patients and increased risk of poor functional

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recovery in nondiabetic stroke survivors. many studies have shown that diabetes increases the risk of mortality after stroke, few have explored the relationship between admission hyperglycemia and prognosis after stroke in diabetic patients.

Britton et al[19] showed that lack of evidence of a beneficial effect of blood pressure reduction in the setting of an acute stroke and also considered that the deterioration might have been the natural terminal cause in these patients with severe brain lesions and no conclusion drawn on the management of blood pressure in patients with ischemic stroke.In many studies shown that blood pressure at the time of admission and method of lowering determines the outcome than the duration of history of hypertension.In present study the major limitation is blood pressure at the time of presentation not correlated with the outcome only hypertension status compared.

In the present study 24 patients (24%) were associated with multiple risk factors, they had a higher morbidity that is complete recovery 20% (5 patients)and partial recovery 50%(12 patients). This was consistent with the Bogousslavsky[5], Feigin[9] and Bansal [9]study.Dyslipidemia is a major risk factor for coronary heart disease (CHD), its role in the pathogenesis of ischemic stroke is less clear. Epidemiological studies have provided conflicting findings regarding the association of dyslipidemia with ischemia[14].

CONCLUSION:

Commonest modifiable risk factors in ischaemic stroke are hypertension, smoking, dyslipidemia, alcohol consumption, and diabetes mellitus.Commonest non modifiable risk factors are increasing age, male sex and family history of stroke.Prognosis depends on the number of risk factors present. Multiple risk factors are associated with poorer prognosis.Increasing age and hyperglycemia are also associated with poorer prognosis.Treatment or prevention of modifiable risk factors can reduce the mortality and morbidity of stroke.

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