EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

STUDY OF EVALUATION OF RISK FACTORS IN ACUTE STROKE

Dr. Kiran Yadav*

[1]Senior Resident, Department of Medicine,Govt. Medical College Khandwa (M.P.).

*Corresponding Author: Dr. Kiran Yadav

Senior Resident, Department of Medicine,Govt. Medical College Khandwa (M.P.).

ABSTRACT

Introduction: Stroke is the second most common cause of death and major cause of disability worldwide. Approximately 20 million people each year suffer from stroke of which 5 million do not survive. Cerebral infarction is responsible for about 80% of all first ever in a lifetime strokes. There are many risk factors for cerebrovascular accidents (CVA) like hypertension, diabetes, aneurysm,smoking & coagulopathy . CVA can cause crippling morbidity in young as well as elderly individuals. **Aims & Objectives:** Identification of risk factors for cerebrovascular disease. **Material and Methods:** The present study was carried out in100 patients admitted in department of medicine, S.S. medical college and associated S.G.M.H hospital, Rewa (M.P.) from july 2014 to Jun. 2015. Inclusion Criteria: >16 years admitted to SGMH, Rewa. Neurodeficit lasting >24 hours. The stroke patients of both sexes aged. Exclusion Criteria: Head injury cases, neoplasm cases producing cerebrovascular disease were excluded. Detailed neurological examination including fundoscopy and cardiovascular examination was carried out in all the cases. All patients were subjected to routine Hematologic and Biochemical investigations. **Result:** Stroke was most common in 5th and 6th decade (55%). Males had higher preponderance among stroke patients (Male-female ratio 1.5:1). Hypertension was the most common risk factor in 45% of patients followed by smoking, diabetes mellitus. More common pathology was infarction. **Conclusion:** Common risk factors for acute stroke are hypertension, smoking, diabetes mellitus, alcoholism, obesity, cardiac disease. Stroke was confirmed by CT scan of brain.

KEYWORD: Cerebrovascular disease, risk factors ,hypertension ,diabetes, obesity.

1. INTRODUCTION

A stroke or cerebrovascular accident is defined by abrupt onset of neurologic deficit that is attributable to a focal vascular cause.[1] Cerebrovascular accident (CVA) or stroke is the most common life threatening disorder. t is the third leading cause of death in the developed countries after cardiovascular disease and cancer.[2]

Approximately 20 million people each year will suffer from stroke and of these 5 million will not survive.[3]

In developed countries, stroke is the first leading cause for disability, second leading cause of dementia and third leading cause of death.[4]

Cerebral infarction is responsible for about 80% of all first ever in a lifetime strokes. Primary intracerebral hemorrhage accounts (PICH) for 10% and subarachnoid hemorrhage for 5%.[5]

The incidence of stroke worldwide is 179 per 1,00,000 population in various parts. In Western countries overall prevalence rate is 794 per 1,00,000 population. CVA or strokes are capable of causing crippling morbidity in young as well as elderly individuals. They also have marked social, psychological and economic implications. Due to its wide prevalence and its high cost in economic terms as well as human disability, cerebrovascular accidents have evoked much interest in medical fraternity[6]. Stroke is more common in men, but women are more severely ill.

STROKE RISK FACTORS[7]
Non Modifiable
- Age
- Gender(male>female, except in the very young and very old)
- Race(afro Caribbean>Asian>European)
- Heredity
- Previous vascular events
- High fibrinogen

2. AIMS AND OBJECTIVES
- Identification of risk factors in acute stroke. This study included 100 patients of acute stroke admitted in S.S. Medical College & Associated S.G.M. Hospital Rewa, from May 2013 to Sept. 2014.

3.   MATERIAL AND METHODS

The material of the study comprised of 100 patients admitted in S.S. Medical College & Associated S.G.M. Hospital Rewa, from May 2013 to Sept. 2014.

Inclusion Criteria
1-Cases of CVA admitted within 72 hours after the onset of stroke were selected for the study.

Exclusion Criteria
1-Traumatic cases producing neurological deficits,
2-Infection,
3-Neoplasm.

After admission a detailed history regarding the temporal profile of the stroke including history of risk factors like hypertension, diabetes mellitus, alcohol intake, smoking, history of IHD and rheumatic heart disease were obtained.
Detailed neurological examination including fundoscopy and other systemic examination was carried out in all the cases.

The diagnosis of CVA was made on the basis of following criteria:
- Temporal profile of clinical syndrome
- Clinical examination
- CT scan of brain wherever possible

All patients were subjected to investigations like:
- Complete blood count
- Erythrocyte sedimentation rate
- Renal function test
- Serum electrolytes
- Lipid profile

In hospital follow-up was done to know their prognosis under two categories:
1. Live
2. Dead

Results were analyzed with reference to age, sex and risk factors and clinical examination.

4.OBSERVATIONS

Table-1: Age and sex distribution in stroke patients.

Age (years)	Male	Female	Total	Percent
21-30	2	1	3	3.00
31-40	6	4	10	10.00
41-50	15	5	20	20.00
51-60	16	11	27	27.00
61-70	14	14	28	28.00
71-80	4	4	8	8.00
81-90	-	2	2	2.00
91-100	1	1	2	2.00
Total	**58**	**42**	**100**	**100.00**

As evident from the above table, the incidence of stroke in the present study was more common in 5th and 6th decade and there was slight male (58%) preponderance compared to females (42%) making male-female ratio of 1.4:1.

Table 2: Incidence of Risk Factors in stroke patients.

		No. of Cases	Percent
No risk Factor (n-28)		**28**	**28.0**
Risk Factors (n-72)		**72**	**72.0**
a.	Hypertension	45	62.5
b.	DM	13	18.05
c.	Smoking	28	38.88
d.	Hyperlipidemia	8	11.11

The above table shows that hypertension was the most common risk factor and was present in 62.5% of the cases, followed by smoking in 38.88%, diabetes mellitus in 18.05% and hyperlipidemia in 11.11% in stroke patients.

Table 3: Distribution of Co-morbid conditions in patients with Stroke.

Co-Morbidity	Ischemic	Hemorrhagic	Total (n=100)	Mortality
Type II Diabetes	12(92.3%)	1(7.7%)	13 (p=0.04)	7(53.84%) {p=0.002}
Hypertension	26(38.23%)	19(59.38%)	45 (p=0.04)	14(63.64%) {p=0.04}
Hypertension + Type 2 Diabetes	8(100%)	0	8 (p=0.04)	4(50%) {p=0.04}

Type II diabetes is co-morbidity among 13% of patients while hypertension is prevalent among 45% of the study group. While maximum diabetic patients presented with Ischemic stroke (92.3%), maximum Hypertensive patients presented with Hemorrhagic stroke (59.38%). Mortality rate was highly significant among diabetics (53.84%) and significant among hypertensive patients (63.64%).

Table 4: Distribution of Stroke patients (n=100) according to Blood Pressure at Presentation.

Blood Pressure (mm Hg)	Ischemic	Hemorrhagic	Total (p>0.05)	Mortality (p=0.01)
<140 SBP, <90 DBP	20(57.14%)	15(42.86%)	35	4(11.42%)
140-180 SBP, 90-110 DBP	31(73.81%)	10(26.19%)	42	8(19.04%)
>180 SBP, >110 DBP	16(69.56%)	7(30.43%)	23	10(43.47%)
	68	**32**	**100**	**22**

Most patients (42%) presented with a blood pressure in the range of 140-180 mm Hg SBP/90-110 mm Hg DBP followed by 35% in the <140 mm Hg SBP/<90 mm Hg DBP. Highest mortality was seen among patients with a blood pressure >180 mm Hg SBP/>110 mm Hg DBP (43.47%) and least (11.42%) among patients with <140 mm Hg SBP/<90 mm Hg DBP.

Table 5: Distribution of patients according to Addiction.

Addiction	Ischemic	Hemorrhagic	Total (n=100)	Mortality
Tobacco	38(77.55%)	11(22.45%)	49 (p=0.04)	10(20.41%) (p>0.05)
Alcohol	22(57.89%)	16(42.11%)	38 (p>0.05)	7(18.42%) (p>0.05)
Tobacco + Alcohol	13(72.22%)	5(27.78%)	18 (p>0.05)	1(5.56%) (p>0.05)

Tobacco (smoke or smokeless) usage is the most common form of addiction among the study group (n=49). Maximum addicts of tobacco (77.55%) as well as Alcohol (57.89%) presented with Ischemic stroke. Mortality was higher among tobacco addicts (20.41%) compared to alcohol addicts (18.42%).

Table 6: Distribution of Stroke patients (n=100) according to BMI.

BMI (kg/m^2)	Ischemic {Mean: 21.47±3.43}	Hemorrhagic {Mean: 23.48±3.52}	Total (p=0.01) {Mean: 22.12±3.49}	Mortality (p>0.05) {Mean: 24.61±3.56}
<18.5	3(75%)	1(25%)	4	2(50%)
18.5-24.9	57(75%)	19(25%)	76	7(9.21%)
>25	8(40%)	12(60%)	20	13(65%)
	68	**32**	**100**	**22**

Maximum study subjects (76%) are in the normal BMI range. Ischemic stroke was higher in patients with a Normal or sub-normal BMI (75%) while Hemorrhagic stroke predominated among patients with high BMI (60%). Mortality was highest in patients with high BMI (65%).

Table 7: Distribution of Stroke patients (n=100) according to Blood Glucose at Presentation.

RBS (mg/dl)	Ischemic {Mean: 151.81±42.94}	Hemorrhagic {Mean: 177.84±42.83}	Total (p=0.0004) {Mean: 160.14±43.19}	Mortality (p=0.0007) {Mean: 190.77±42.29}
<200	61(76.25%)	19(23.75%)	80	12(15%)
>200	7(35%)	13(65%)	20	10(50%)
	68	**32**	**100**	**22**

Twenty percent of subjects presented with an RBS of >200 mg/dl of which maximum (65%) had hemorrhagic stroke. Among those with RBS <200 mg/dl, maximum (76.25%) had Ischemic stroke. Mortality was higher among those with higher blood glucose levels (50%).

Table 8: Distribution of Stroke patients (n=100) according to Serum Sodium at Presentation

S. Na$^+$ (mEq/L)	Ischemic {Mean: 138.17±4.64}	Hemorrhagic {Mean: 137.12±4.94}	Total (p=0.004) {Mean: 137.84±5.04}	Mortality (p=0.0003) {Mean: 136.3±4.89}
<135	8(42.1%)	11(57.9%)	19	10(52.63%)
135-145	54(76.05%)	17(23.95%)	71	10(14.08%)
>145	6(60%)	4(40%)	10	2(20%)
	68	**32**	**100**	**22**

Nineteen percent of patients presented in hyponatremia while 10% had hypernatremia. Hyponatremia was more common among Hemorrhagic stroke patients (57.9%) while hypernatremia predominates among Ischemic stroke patients (60%). Significantly higher mortality rates were seen in hyponatremia (52.63%) compared to hypernatremia (20%).

Table 8: Distribution of Stroke patients (n=100) according to Serum Cholesterol at Presentation.

S. Cholesterol (mg/dl)	Ischemic {Mean: 164.23±32.58}	Hemorrhagic {Mean: 184.78±33.05}	Total (p=0.002) {Mean: 170.81±33.65}	Mortality (p=0.002) {Mean: 197.32±32.80}
>200	9(40.9%)	13(59.1%)	22	10(45.45%)
<200	59(75.64%)	19(24.36%)	78	12(15.38%)
	68	32	100	22

Seventy-eight percent of subjects had a Serum Cholesterol <200 mg/dl. Among these patients, Ischemic stroke (75.64%) was more common. On the other hand, Hemorrhagic stroke was more common among those with S. Cholesterol >200 mg/dl (59.1%). Mortality was significantly higher among those with an elevated serum cholesterol level (45.45%).

5. DISCUSSION
A hospital based prospective study was done to know the risk factors of acute stroke.

Comparison of Incidence of Stroke Patients above age group of 51 years

Study group	Venkataraman et al (1977)	Carlo et al (2003)	Present study
Incidence of stroke	41%	71.8%	55%

Stroke is one of the leading causes of death in many countries. Although there was a lack of unanimity, several factors have been reported to increase the risk of stroke. Reports from different countries have implicated different factors associated with high risk of stroke. To evaluate the risk factors, a prospective survey of a given population of the years as done in the Framinghan Study was essential. The only epidemiological study of Abraham et al (1970) who found hypertension, diabetes mellitus, hypercholesterimea and syphilis to be the risk factors associated in hemiplegia patients.[10] Shaper et al in 1991 concluded that, hypertension, cigarette smoking and pre-existing IHD was found to be the major risk factors.[11]

Among the 100 patients 58 were males and 42 were females (sex ratio was M:F-1.4:1), age ranged from 24-92 years and the mean age of patients of alive and dead were 58.73 and 54 years respectively. The cases of stroke were more common in the 5th and 6th decade, making 55%, which is comparable to Venkataramana et al (1977)[8] study in which the percentage of stroke cases above the age of 51 years was 41% and in the Carlo study (2003)[9] was 71.8%.

Comparison of association of risk factors in different studies

Risk factors	Smith[12] (2005) (%)	Carlo et al[9] (2003) (%)	Present Study (%)
Hypertension	87.00	48.00	45.00
Diabetes mellitus	50.00	20.90	13.00
Smoking	35.22	--	28.00
History of stroke	39.30	12.50	22.00
Hyperlipidemia	22.95	--	8.00

In the present study, hypertension was present in majority of the cases i.e., 45%, which is comparable with that found in the studies of Smith (2005) and Carlos (2003) i.e., 87% and 48% respectively and next commonest risk factor was smoking (28%) and history of stroke (22%), which are comparable with that found in Smith (2005) i.e., 35.22% and 39.30% and diabetes mellitus was present in 13% of the patients in the present study and the least was hyperlipidemia.[9,12]

6. SUMMARY
1. Stroke was most common in 5th and 6th decade (55%).
2. Males had higher preponderance among all the stroke patients. In infarct group, 51.45% were males, whereas females were 48.33%. In hemorrhage group 59.37% were males where in females were 40.63% with male-female ratio of 1.4:1.
3. Hypertension was the most common risk factor comprising 45% followed by smoking 28%, past history of stroke 22%, diabetes mellitus 13% and the least was hyperlipidemia with 8%.

7. CONCLUSION

In the present study, the most common risk factor for acute stroke was hypertension which was present in majority of patients. So to prevent stroke, strict control of hypertension is necessary. The next commonest risk factors were smoking, diabetes mellitus, cardiac disease, hyperlipidemia, to prevent acute stroke, smoking should be avoided, strict control of blood sugar in diabetes mellitus patients, and control of LDL cholesterol was necessary.

REFERENCES

1. Wade S Smith, Joey D English, S Claiborne Johnston: Cerebrovascular diseases; Harrisons Principles of Internal Medicine-Anthony S Fauci, MD, Dennis C Kasper MD, Dan l Lango, MD et.al. 17th edition, 2513.
2. Dalal PM. Cerebrovascular disorders in *API Textbook of Medicine*,7th Edition, 2004; 796-809.
3. Dalal P, Bhattacharjee M, and Vairale J, Bhat P. UN millennium development goals: can we halt the stroke epidemic in India? Ann Indian Acad Neurol, 2007; 10: 130-6.
4. Marc Fisher MD, Bo Norrving. 1st Global Conference on Healthy. Lifestyles and Non communicable diseases Control. Moscow, April 28-29, 2011.
5. Mathers CD, Lopez AD, Murray CJL. The burden of disease and mortality by condition: data, methods, and results for 2001. In: Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL, editors.
6. Donnan GA, Fisher M, Macleod M, Davis SM. Stroke. Lancet, May 10, 2008; 371(9624): 1612-23.doi: 10.1016/S0140-6736(08)60694-7.
7. CMC Allen, C J Lueck, M Dennis: Cerebrovascular disease: Davidson's Principles and Practice of Medicine, Nicki R. Colledge, BSC FRCP(ed), Brian R. Walker, BSC MDFRCP(ed), Sthart H. Ralston, MD, FRCP F Med sci FRSE 21st edition, table, 26-48: 1181.
8. Venkatraman S et al. Cerebrovascular accidents-Clinical and Radiological Features. JAPI, 1977; 25(8): 523
9. Carlo AD et al. Sex difference in the clinical presentation, resource use and 3 month outcome of acute stroke in Europe. *Stroke*, 2003; 34: 1114-1119.
10. Abraham et al. Risk factors in stroke. *Lancet*, 1970; 32: 464-966.
11. Sharper AG, Philips AN, Pocock SJ et al. Risk factors of stroke in middle aged British men. *BMJ,* 1991; 302: 1111-1115.
12. Smith. Neurology, September 27, 2005; 65(6): 855-858.