

Risk Factors and Clinical Profile of Ischemic Stroke Patients Attending Emergency Care Facility in Bangalore City

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Abstract

Original Research Article

Introduction: Stroke is one of the most common public health problem and leading cause of mortality and disability worldwide. The gradual onset of ischemic stroke among high risk individuals makes difficulty to assess the prognosis of the patients. The attributable risk of such high risk factors is important to study from time to time. **Objectives:** to study the knowledge, association of high risk factors and clinical profiles of ischemic patients attending the emergency care facility of the hospital. **Methods:** This is a cross sectional and explorative study conducted in Dr. B R Ambedkar Medical College Hospital, Bangalore during 2013-14. Patients with history of acute onset of central nervous system conditions to the emergency care facility were subjects. All patients were clinically examined in detail after getting the appropriate history and investigated with necessary blood tests, EEG and CT scan. Data from the patients were filled in structured proforma and it was analysed with SPSS software. **Results:** There were 140 and 60 male and female patients of ischemic stroke and the mean age of total patients was 59.6+6.1 years. The most common clinical presentation was hemiparesis and involved and onset was gradual in 90 percent of the subjects. Maximum number of stroke reported in the age group of 56 to 76 years (63%). Stroke on left side was common in both sexes and Middle Cerebral artery was involved in majority of the subjects. At least one high risk factor was present in 22% and two risk factors present in 48% of the subjects. The prevalence of stroke was high among patients with known history of Diabetes Mellitus, Hypertension, comorbid of Diabetes and Hypertension, Dyslipidemia, Tobacco users and Alcohol consumers in both sexes. **Conclusion:** Presence of any high risk factors for non-communicable diseases may predict the onset of stroke. Periodic screening for stroke should be conducted among patients with known cardio vascular diseases, Diabetes or any other attributable high risk factors.

Keywords: Ischemic Stroke, Diabetes, MCA, PCA, High Risk factors.

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INTRODUCTION

Stroke is not an uncommon disease among the middle aged population worldwide. At the global level, it is one of the leading causes of mortality and disability [1-3]. According to World Health Organisation, 15 million suffer stroke worldwide each year, of these 5 million die and another 5 million are left permanent disabled [2, 4, 5]. The prevalence of the stroke is 200 per 100000 in South East Asia region countries. Since last two decades the incidence of stroke is increasing at higher rate in economically middle and low developed countries signifies the presence of underlying conditions in higher proportion of their population [2, 3, 6-8]. The causes of stroke vary according to the presence of high risk factors, their life style habits and their suffering from underlying chronic non communicable diseases. Ischemic and Hemorrhagic

causes for the stroke is quite common throughout the world and the case fatality rates are also variable [9].

The pattern of presentation of patients with stroke in the acute phase to the emergency care facilities also varies and quite often most of the ischemic origin stroke present with gradual onset rather than the sudden onset. The hemorrhagic stroke manifests with sudden onset and the progress of the clinical features related to the damage of parts of the central nervous system is evident in short period of observation. It is estimated through C T scanning and MRI that 85% are Ischemic stroke, 12% are intra cerebral hemorrhages and 3% are subarachnoid hemorrhages are the common causes [10-12]. The set of protocol for identification, diagnosis and causes of stroke are followed in most of the tertiary health care settings [4, 13]. This study aims to bring the knowledge, association of high risk factors and clinical

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profiles of ischemic patients attending the emergency care facility of our hospital.

MATERIALS AND METHODS

The cross sectional and explorative study was conducted among patients reporting to the emergency care facility of Dr B R Ambedkar Medical College hospital, Bangalore with acute Central nervous system conditions during the period of one year 2013 -2014. Total of 253 cases of cerebro vascular conditions attended the emergency care facility. Among them, stroke cases were 230 and 12 cases were either head injury or other conditions. There were 4 deaths from head injury and severe intra cerebral hemorrhage conditions. All the cases were subjected for investigations like complete blood profile, EEG, CT scanning, MRI if indicated after detailed clinical examination. The progress of the patients was taken into account for the first 24 hours of observation in this study. Set of protocol suggested by the WHO is followed for all the cases [13].

Inclusion criteria of cases for the study are patients aged above 18 years, sudden onset of consciousness, sudden onset of hemiparesis with or without speech disturbance and clinical features suggestive of focal neurological deficits.

Exclusion criteria are recent head injury, pregnant women, and epileptic disorders. Recurrent stroke, mental retardation, stroke more than 7 days duration and known case TB meningitis or other bacterial meningitis.

Pilot tested Standard questionnaire was administered for collecting data from all the patients. Data included clinical details, systemic hypertension, manifestation of Diabetes Mellitus, Heart diseases, total cholesterol, Triglycerides, High density lipoprotein, low density lipo protein, other chronic medical conditions (diagnosed and or under treatment). History of adverse personal habits like Tobacco usage, Alcohol consumptions were included. Dyslipedemia is considered in this study if any of the stroke subjects had two or more abnormal findings in their lipid profiles at the time of admission. Incomplete information or lack of results of investigations or deficits in information in the data was excluded for analysis purpose.

The categorical variables were expressed as frequencies and percentages, and continuous variables as mean and standard deviation. The data was analyzed

using statistical package for the social sciences (SPSS) version 20.

RESULTS

There were 200 and 30 Ischemic and Hemorrhagic stroke cases reported respectively during the study period. There were 140 (70%) male and 60(30%) female cases respectively; the ratio was 2.3:1 among the Ischemic stroke cases in this study. The range of age of the subjects was 40 to 81 years and the mean age of the total Ischemic stroke patients was 59.6+6.1 years.

The highest number of total of cases was in the age group of 56 to 75 years accounting 63% as shown in Table 1. The number of stroke cases among male and female in the same age group were 56.4% and 78.3% respectively. The number of cases in the age group of 45 years or less was 22.1% among males compared to 6.7% in females.

More number of patients with Stroke on left side was observed among both sexes in all age groups except in the age group of 46 to 55 years as seen in Table 2. There were differences in the occurrence of stroke (Hemiparesis) on left or right side among male and female cases.

Most of the subjects in this study had involvement of Middle Cerebral artery in both sexes compared to posterior cerebral artery involvement depicted in Table 3.

Table 4 reports 64% of males and 26% females had gradual onset of ischemic stroke among all age groups. However the sudden onset was observed in the age group of 76 years or more in men (70%) and 46-55 years in females (44.4%).

At least one high risk factor was present in 79% an 52% in males and females patients respectively as seen in Table 5. Tobacco use and alcohol consumption as high risk factor was most prevalent among male patients (76%) than females. Comorbid conditions of Diabetes and Hypertension was most common high risk factor in females (73.3%) than males (54.3%). Dyslipedemia accounted for 66% among all subjects.

The mean (Standard Deviation) age of males and females in the different categories was depicted in Table 6 and the mean age was lesser in male subjects compared to female subjects in most of the parameters.

Table -1: Distribution of Ischemic stroke among different age groups in male and females

Age group in years)	Male		Female		Total	
	Num	%	Num	%	Num	%
<45	31	(22.1)	4	(6.7)	35	(17.5)
46-55	20	(14.3)	9	(15.0)	29	(14.5)
56-65	37	(26.4)	21	(35.0)	58	(29.0)
66-75	42	(30.0)	26	(43.3)	68	(34.0)
>75	10	(7.1)	-	-	10	(5.0)
Total	140	(100)	60	(100)	200	(100)

Table-2: Distribution of Ischemic stroke involvement among different age groups in male and females

Age group in yrs	Male				Female				Total	
	Left		Right		Left		Right		Num	%
	Num	%	Num	%	Num	%	Num	%	Num	%
<45	23	(74.2)	8	(25.8)	4	(100.0)	0	(0.0)	35	(17.5)
46-55	8	(40.0)	12	(60.0)	3	(33.3)	6	(66.7)	29	(14.5)
56-65	27	(73.0)	10	(27.0)	10	(47.6)	11	(52.4)	58	(29.0)
66-75	40	(95.2)	2	(4.8)	15	(57.7)	11	(42.3)	68	(34.0)
>75	10	(100)	-	-	-	-	-	-	10	(5.0)
Total	108	(77.1)	32	(22.9)	32	(53.3)	28	(46.7)	200	(100)

Indicates left or right side Hemiparesis

Table-3: Distribution of involvement of cerebral arteries among Ischemic stroke in male and female subjects with different age groups

Age group	MCA				PCA			
	Male		Female		Male		Female	
	Num	(%)	Num	(%)	Num	(%)	Num	(%)
<45	23	(16.4)	4	(6.7)	12	(8.6)	-	-
46-55	19	(13.6)	5	(8.3)	5	(3.6)	6	(10.0)
56-65	22	(15.7)	19	(31.7)	12	(8.6)	7	(11.7)
66-75	28	(20.0)	20	(33.3)	24	(17.1)	3	(5.0)
>75	-	-	-	-	7	(5.0)	-	-
Total	92	(65.7)	48	(80.0)	60	(42.9)	16	(26.7)

MCA indicates Middle Cerebral Artery and PCA indicate Posterior Cerebral Artery

Table-4: Distribution of onset of Ischemic stroke among different age groups in male and female subjects

Age group in yrs	Male				Female				Total	
	Gradual		Sudden		Gradual		Sudden		Num	%
	Num	(%)	Num	(%)	Num	(%)	Num	(%)	Num	(%)
<45	31	(100)	-	-	4	(100)	-	-	35	(17.5)
46-55	20	(100)	-	-	5	(55.6)	4	(44.4)	29	(14.5)
56-65	33	(89.2)	4	(10.8)	21	(100.)	-	-	58	(29.0)
66-75	41	(97.6)	1	(2.4)	22	(84.6)	4	(15.4)	68	(34.0)
>75	3	(30.0)	7	(70.0)	-	-	-	-	10	(5.0)
Total	128	(91.4)	12	(8.6)	52	(86.7)	8	(13.3)	200	(100)

Table-5: Distribution of Ischemic stroke involvement among male and female subjects with their high risk factors

Risk Factors	Male(140)		Female(60)		Total (200)	
	Num	(%)	Num	(%)	n	%
DM only	12	(8.6)	-	-	12	(6.0)
HTN only	24	(17.1)	8	(13.3)	32	(16.0)
DM and HTN	76	(54.3)	44	(73.3)	120	(60.0)
Dyslipidemia	96	(68)	38	(64)	132	(66)
Smoking only	44	(31.4)	-	-	44	(22.0)
Alcohol only	-	-	-	-	-	-
Smoking and Alcohol	76	(54.3)	4	(6.7)	80	(40.0)

Table-6: Mean age in years of the male and female subjects with different parameters

Factors	Male		Female		p-value
	Num	Mean \pm Sd	Num	Mean \pm Sd	
MCA	92	53.0 \pm 12.9	48	59.0 \pm 7.8	0.004
PCA	60	58.3 \pm 15.0	16	56.0 \pm 6.5	0.553
Diabetes	88	60.8 \pm 8.7	44	60.7 \pm 5.6	0.945
Hypertension	100	59.9 \pm 10.8	52	59.5 \pm 7.8	0.813
Smoking	120	54.1 \pm 14.5	4	60.0 \pm 0.0	0.419
Alcohol	76	54.2 \pm 14.0	4	60.0 \pm 0.0	0.413
Sudden onset	12	70.3 \pm 9.2	8	57.0 \pm 9.6	0.006
Gradual onset	128	54.2 \pm 13.6	52	59.3 \pm 7.7	0.002

P value less than 0.05 is statistically significant.

DISCUSSION

According to WHO, Stroke is defined as an accident to the brain with rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting 24 hours or longer or leading to death with no apparent cause other than of vascular origin and includes cerebral infarction, intra cerebral haemorrhage and Sub-arachnoid haemorrhage[4]. Study among adults and middle aged population has recently become a subject of interest as a result of increase in the prevalence of many non-communicable conditions [5, 12, 14]. The impact of this study results make the differences in better quality of life in both short or long term outcomes in future cases.

Stroke was considered as a disease of middle or old age group in developed countries [1, 6, 14]. However the similar pattern noticed in urban and rural population in India [7, 15]. The trend in incidence of stroke among young adults apart from head injury is increasing especially in urban areas due to higher prevalence of diabetes, hypertension, cardiovascular diseases and mental stress [8, 15]. In these study patients aged 45 or less accounted for 17.5 % and most of these patients were males as seen in Table 1. Similar observation was noticed in the age group of 76 years or more in males (7%) [7, 10, 11, 16]. The differences in the distribution of stroke cases among males and females in different age groups was found to be statistically significant ($p < 0.001$). Generally it is believed that the age of the patients with stroke in developing countries is usually 10 -15 years younger than those in the developed countries. One fifth of the patients in the hospital with first ever stroke in India was estimated to be 40 years or less [2, 3].

The mean age of the total cases was 59.6 \pm 6.1 years, and the mean age among male and female subjects was 62.1 \pm 2.9 and 59.5 \pm 3.2 years respectively. This difference in the mean age was statistically significant ($p, 0.05$). The mean age of the patient with stroke was 54.5 years in Bangalore in the year 2007-2008[18]. The findings of mean age was different in other reported studies on stroke in different parts of India [5, 12, 14, 19, 20]. In all the above studies on

stroke, there was higher number of stroke cases among men than women.

It is evident in the Table 2 that the left side stroke or hemiparesis was higher in the age group of 56 years and above in men compared to almost equal number among women in the same age groups. Nearly 75% of the patients in the age group of 45 years or less among male patients were affected on left side compared to all the female patients in this study. The observation was similar in other studies [7, 16, 19, 21, 22]. However the left side hemiparesis was common in many subjects in both sexes but the right side affected were more in the age group of 46 to 65 years. This can be attributed to the presence of high risk factors, family history of chronic diseases and some other underlying conditions.

The ischemia of regions of the brain receiving blood supply from Middle Cerebral artery (MCA) is affected in most of the cases due to thrombotic, embolic, hypo perfusion, atherosclerosis of small blood vessels, intra vascular abnormalities [4]. Even though there are variations in the right or left MCA involvement, seventy percent of cases involved MCA irrespective of sex, right or left hand use habits as in Table 3. There are subjects with involvement of both MCA and PCA accounting 20 percent. The gradual onset of stroke was observed common findings in most of the cases at the global level attributed to the development of ischemia of the affected part of the brain which is supported by the studies [2, 8, 9]. In this study nearly 90 percent of the subjects had gradual onset of their symptoms as shown in Table 4, however the gradual onset among female patients was 86.7% compared to 13.3% of sudden onset. In the age group of 46-55 and 66 – 75 years, 44.4% and 15.4% of the female subjects had sudden onset which is similar to the findings of other studies [12, 22, 23]. The conditions of Diabetes and malignant Hypertension were attributed for sudden onset of stroke in few cases in this study. It is well established fact that co morbid conditions of Diabetes and Hypertension may result in sudden onset of stroke either from thrombosis, emboli or haemorrhage.

The overall prevalence of Diabetes, Hypertension and co morbid of diabetes and hypertension among all the stroke patients were 6%, 16% and 60% respectively as seen in Table 5. As already mentioned single high risk factor was present in 25.7 (males) and 13.3% (females), two risk factors present in 54.3% and 73.3% in men and women patients reflecting higher proportion in females than males. However the Dyslipidemia was almost equally prevalent among both male and female stroke affected patients in this study. The patients with co morbid conditions were higher in number in both males (54.7%) and females (74.3%). The tobacco use alone was prevalent among men only and use of alcohol and tobacco was also seen in females in lower percentage (6.7%). There were no subjects with alcohol consumption only in this study.

The stroke event was observed more in the people with three or more high risk factors in male than female subjects. The attributable risk of tobacco use and Dyslipidemia was found to be 12% and 15% [10, 19, 22]. Nearly 50 percent of the patients had history of hypertension and Diabetes, 25% of the subjects had the history of tobacco use and dyslipidemia [5, 10, 11]. One risk factor was present in 22%, two risk factors in 48% and three or more in 25% of patients. Few studies reported almost equal number of risk factors either one or two among the patients in Trivandrum [10].

The mean age of the study subjects among males and females with different parameters are shown in Table 6. There are statistical significant differences in mean ages with involvement of MCA, gradual and sudden onset of stroke were found to be statistically significant ($p < 0.05$) while other parameters there is no such statistical significant differences between high risk factors in male and female patients.

CONCLUSION

The high risk factors like Diabetes mellitus, Hypertension, other co morbidities, Dyslipidemia, tobacco use, alcohol consumption were clinically attributed for gradual onset of ischemic stroke among patients attending emergency care facility. The periodic screening of patients with high risk factors needs to be considered as a strategy for stroke prevention program.

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