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Research Article

A study on clinical profile of stroke in young and elderly in GMERS Medical College and Hospital, Gandhinagar, Gujarat

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ABSTRACT

Background: The cerebrovascular stroke is one of the leading causes of morbidity & mortality in adult life. Indian studies have shown a stroke prevalence of 471.58/100000 population. Stroke mostly occurs in elderly people. Risk factors for stroke differ between young and elderly patients. The aim was to study the clinical presentation, risk factors, types, topography as per CT scan findings in ≤45 years and >45 years patients from GMERS medical college and hospital Gandhinagar.
Methods: This is a retrospective study of all new patients managed for stroke in the medical ward of GMERS medical college and hospital, Gandhinagar, Gujarat from January1, 2012 to December 31, 2013.
Results: Incidence of stroke in elderly (≥45 years) was than young (<45 years) patients with male predominance in both the groups. Most common clinical presentation from both age groups was hemiplegia (75% in young vs. 72.1% in elderly). Common risk factors in were HT and past h/o CVD (25%) and smoking (16.6%) in young and HT (37.1%), dyslipidemia and smoking (14.3%) in elderly. Most common type of stroke in both age groups was ischemic (83.3% in young vs. 73.2% in elderly), followed by Hemorrhagic. Common sites of hemorrhage in young and elderly were lobar and thalamoganglionic. Most common infarction site in both age groups is MCA territory.
Conclusion: The cerebrovascular stroke was more in elderly with hypertension and smoking was the most common risk factor in both age groups and most common type was ischemic.

Keywords: Cerebrovascular stroke, Ischemic stroke, Young, Elderly

INTRODUCTION

Stroke is a devastating and disabling cerebrovascular disease with significant amount of residual deficit leading on to economic loss. It has been defined as a rapidly developing signs of focal (or global) disturbance of cerebral function with symptoms lasting for ≥24 hours, or leading to death with no apparent cause other than vascular origin.[1]It is a collection of clinical syndromes resulting from cerebral ischemia to intracranial hemorrhage. In the west, it is the 3rd most common cause of morbidity and mortality.[2]

Some of the recent studies have elucidated the stroke pattern to considerable extent in our country with a prevalence rate of 471.58/100000 population.[3] Recent study identified that 7% of medical and 45% of neurological admissions were due to stroke with a fatality rate of 9% at hospital discharge and 20% at 28 days.[4]

In a recent study conducted in India, Latin-America and China, chronic diseases as a whole (stroke, heart disease, diabetes, chronic respiratory disease, and malignancy) accounted for the majority of death among the elderly.[5] Individual Indian studies have estimated that the prevalence rates increases from 0.1-0.3/1000 in the <45 year age group to 12-20/1000 in the 75-84 year age group.[6] In India stroke in younger people is high (18-32%) of all stroke cases) compared to high income countires.[7] Men are more likely to have a stroke than women: the male/female sex ratio for India is 7:1.[8] This may be due to differences in risk factors such as smoking and drinking which are more prevalent among men in India compared with women.[9]

In a recent study conducted in Gujarat, It was found that modifiable risk factors such as hypertension (40%), alcoholism (35%), smoking (28%) and hyperlipidemia (17%) are the commonest cause of stroke among the elderly;[10] and smoking, alcoholism, increased BMI, diabetes and hypertension are significantly associated with strokes among young people.[10] by 2050, the global number of old people (aged ≥65 years) will exceed the number of young people (aged <65 years) for the first time since formal records began.[11]

This growth in the aged population, together with the influence of aging on stroke, suggests that the incidence and economic cost of this disease will rise.[12] One report estimates that the global occurrence of first-ever strokes will increase to 18 million by 2015, and to 23 million by 2030.[13] moreover, this study estimates that the death toll from stroke will reach 6.5 million per year by 2015 and 7.8 million per year by 2030.[13] We conducted this study to know the difference in clinical profile in young and elderly stroke patients, by knowing this we can help young physicians to combat this deadly and disabling disease in effective manner.

METHODS

This is a retrospective study of 238 cases managed for stroke in the medical ward of GMERS medical college and Government hospital Gandhinagar, Gujarat from January 1, 2012 to December 31, 2013. The case notes of the pts were retrieved from the medical department of the hospital and relevant data extracted and analyzed. We have only CT scan machine in house, for MRI we have to send pts to higher centers. We divided patients in 2 groups. First group (Group-1) was consisting of young patients group (age <45 years), second group (Group-2) was consisting of elderly patients (age >45 years). We studied difference in clinical presentation, risk factors, neurological presentation, pattern of brain strokes, areas of brain affected as per CT scan findings in both the groups GMERS medical college and hospital Gandhinagar. Now onwards we will address young patients group as group-1 and elderly patient group as group-2 in this study.

Inclusion criteria

1) All pts above age 18 years & having clinical & CT confirmed diagnosis of stoke.

Exclusion criteria

1) Pts below 18.

2) Stroke due to trauma.

3) Pts' medical records which were not showing CT confirmed diagnosis.

4) Medical records in which patient sent for MRI brain with inconclusive CT scan findings.

The data obtained were analyzed using SPSS version 21.0 software. Results were expressed in frequencies and percentages.

RESULTS

238 cases of stroke case records managed in medical ward of GMERS medical college and government hospital, Gandhinagar during a period of 1st January 2012 to 31st December 2013 were studied & evaluated for clinical presentation, risk factors, neurological presentation, pattern of brain strokes, areas of brain affected as per CT scan findings in both the groups GMERS medical college and hospital Gandhinagar, Gujarat.

Incidence of stroke as per individual group

In this study youngest pt was 26 years & oldest was 100 years old. There were 36 patients from group-1 and 202 patients from group-2. Mean age in group-1 was 40.11 year and mean age in group-2 was 64.93 year. Incidence of stroke in group-1 was (15.1%); in group-2 it was (84.9%), as shown in (Table 1).

Table 1: Frequency & percentage of cases according to age groups.

Age groups	Frequency	Percent
Group-1	36	15.1%
Group-2	202	84.9%
Total	238	100%

Sex distribution of stoke pts as per age groups

Out of 238 pts, as shown in (Table-2) in group-1 there were 29 (80.6%) males and 7 (19.4%) were females. In group-1 male to female ratio was 4.1:1. In group-2 there were 113 (55.9%) males and 89 (44.1%) were females. In group-2 male to female ratio was 1.2:1.

Table 2: Sex wise distribution of stoke cases as per age groups.

Age groups	Sex			
	Male		Female	
	Frequency	Percent	Frequency	Percent
Group-1	29	80.6%	7	19.4%
Group-2	113	55.9%	89	44.1%

Clinical presentation of stroke pts in both the age groups

In our study (Table 3) most common clinical presentation from both age groups was hemiplegia (75% in group-1 vs. 72.1% in group-2), followed by speech involvement (44.4% vs. 36.8%) in group-1 and group 2 respectively.

3rd most common clinical feature was altered sensorium (13.9% vs. 20.9%) in group-1 and group 2 respectively.

Other clinical features present in group-1 in order of frequency were convulsions (11.1%), instability of gait (8.3%) and headache (5.6%).

Other clinical features present in group-2 in order of frequency were convulsions (7%), instability of gait (5.5%), vomiting (5.5%) and headache (2%).

Table 3: Clinical presentation of stroke pts in both the age groups.

Age groups	Clinical features													
	Altered sensorium		Instability of gait		Convulsions		Speech involvement		Headache		Vomiting		Hemiplegia	
	No.	%*	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Group-1	5	13.9	3	8.3	4	11.1	16	44.4	2	5.6	0	0	27	75
Group-2	42	20.9	11	5.5	14	7	74	36.8	4	2	11	5.5	145	72.1

*Shows percentage

Prevalence of risk factors in stroke pts in both age groups

In our study (Table 4) most common risk factors in group-1 were hypertension (HT) and past history of cerebrovascular disease (CVD) with equal (25%), second most common risk factor was smoking with (16.6%), other risk factors in order of frequency were dyslipidemia and alcohol with similar percentage (11.1%), past history of Coronary Artery Disease (CAD) and diabetes (DM) with similar percentage (5.5%) and 1 case (2.7%) was with rheumatic (RHD) valvular heart disease. In group-2 most common risk factor was hypertension (37.1%) followed by equal percentage of dyslipidemia and smoking with (14.3%), past history of CVD (13.8%), diabetes (10.39%), alcohol (7.4%), past history of CAD (4.9%) and history of cancer in 2 cases.

Table 4: Prevalence of risk factors for stroke pts in both the age groups.

Age groups	Risk factors																	
	HT		DM		Past H/o CAD		Dyslipidemia		Alcohol		Smoking		RHD with valvular disease		Past H/o CVD		H/o cancer	
	No.	%*	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Group-1	9	25	2	5.5	2	5.5	4	11.1	4	11.1	6	16.6	1	2.7	9	25	0	0
Group-2	75	37.1	21	10.39	10	4.9	29	14.3	15	7.4	29	14.3	0	0	28	13.8	2	0.9

*Shows percentage

Type of stroke according to age groups

In our study (Table 5 and Table 6) most common type of stroke in both age groups was ischemic stroke, in group-1 it 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.

Second most common type of stroke in both age groups was hemorrhagic stroke, in group-1 it was (16.6%) and in

group-2 it was (23.7%), out of which there were (66.7%) males and (33.3%) females in group-1 and (47.9%) males and (52.1%) females in group-2.In group-2 there were 6(2.9%) cases of stroke due to primary brain malignancy or secondaries in brain, out of which (66.7%) males and (33.3%) females were from group-2,no patient was from group-1.

Table 5: Age group wise frequencies of different types of stroke.

Age groups	Type of stroke			Total
	Ischemic stroke	Hemorrhagic stroke	Stroke due to primary brain mali-gnancy or secondaries in brain	
Group-1				
Count	30	6	0	36
Percent	83.3%	16.6%	0	
Group-2				
Count	148	48	6	202
Percent	73.2%	23.7%	2.9%	
Percent	75.1%	22.8%	2.5%	100%

Table 6: Gender wise distribution as per age groups in stroke.

Age groups	Type of stroke					
	Ischemic stroke		Hemorrhagic stroke		Stroke due to primary brain malignancy or secondaries in brain	
	M	F	M	F	M	F
Group-1						
Count	25	5	4	2	0	0
Percent	83.3%	16.7%	66.7%	33.3%	0	0
Group-2						
Count	86	63	23	25	4	2
Percent	57.7%	42.3%	47.9%	52.1%	66.7%	33.3%

Topographic distribution of hemorrhage according to age groups

In our study (Table 7) most common site of hemorrhage in group-1 was ventricular (33.3%), followed by 1 case each (16.6%) of thalamus, basal ganglia, paraventricular, external capsule, frontal, parietal and temporal.

In group-2 most common site of hemorrhage was thalamus (47.9%), followed by ventricular (31.2%), basal ganglia (25%), parietal (22.9%), centrum semiovale (14.5%), internal capsule (10.4%), frontal (8.3%), with equal percent (4.6%) of mid brain, cerebellar and temporal and (2%) each of lentiform and paraventricular region.

Table 7: Topographic distribution of cerebral hemorrhage.

Affected areas of brain on CT scan brain	Cerebral hemorrhage			
	Group-1		Group-2	
	Frequency	%	Frequency	%
Pons	-	-	-	-
Midbrain	0	0	2	4.6%
Thalamus	1	16.6%	23	47.9%
Basal ganglia	1	16.6%	12	25%
Centrum semiovale	0	0	7	14.5%
Paraventricular	1	16.6%	1	2%
Ventricular	2	33.3%	15	31.2%
External capsule	1	16.6%	0	0
Internal capsule	0	0	5	10.4%
Lentiform nucleus	0	0	1	2%
Cerebellar	0	0	2	4.6%
Frontal	1	16.6%	4	8.3%
Parietal	1	16.6%	11	22.9%
Temporal	1	16.6%	2	4.6%

Topographic distribution of infarct according to age groups

In our study (Table 8) most common site of infarct in group-1 was parietal (63.3%), followed by frontal (26.6%) and temporal (23.3%). In age group-2 most common area of infarct was also parietal (56.7%), followed by frontal (29%) and occipital (14.1%).

Table 8: Topographic distribution of cerebral infarct.

Affected areas of brain on CT scan brain	Cerebral infarct			
	Group-1		Group-2	
	Frequency	%	Frequency	%
Pons	1	3.3%	1	0.67%
Midbrain	1	3.3%	1	0.67%
Thalamus	0	0	4	2.7%
Basal ganglia	4	13.3%	28	18.9%
Centrum semiovale	1	3.3%	4	2.7%
Paraventricular	1	3.3%	13	8.7%
Ventricular	0	0	0	0
External capsule	2	6.6%	10	6.7%
Internal capsule	1	3.3%	6	4%
Lentiform nucleus	1	3.3%	0	0
Cerebellar	3	10%	8	5.4%
Frontal	8	26.6%	43	29%
Parietal	19	63.3%	84	56.7%
Temporal	7	23.3%	17	11.4%
Occipital	3	10%	21	14.1%
Caudate nucleus	2	6.6%	9	6%
Medulla oblongata	1	3.3%	2	1.3%

DISCUSSION

Incidence of stroke in group-1 was (15.1%), it correlates with the study done by P. Chitrambalam et al.,[15] in which 20% patients were below 45 years. It also correlates with the study done by Baiju et al.,[16] in which incidence of stroke in young was 18.5 percent. In group-2 it was (84.9%). As with prior articles[14] in this study also the peak incidence of stroke is in ≥45 years age group. It also correlates with the study done by P. Chitrambalam et al.,[15] in which 80% of patients were more than 45 years. Mean age of male in elderly age group was 63.55 years and in female it was 66.94 years. It correlates with the study done by Bhattachatya et al.[17] and study by Dalal et al.,[18] in which it was stated that the mean onset of stroke for men in India ranges from 63-65 for men and 57-68 for women. In our study mean age in group-1 was 40.11 year which correlates with the study done by Antonio et al.,[19] in which Mean age was 35.7 ± 7.4 years. In group-1 male to female ratio was 4.1:1. It correlates with study done by Baiju et al.,[16] in which it was 2.1:1, in study by Sethi et al.,[20] the male/female sex ratio for India is 7:1. In group-2 male to female ratio was 1.2:1, which correlates with 1.4:1 ratio in study of P. Chitrambalam et al.[15]

Men are more likely to have a stroke than women. This may be due to differences in risk factors such as smoking and drinking which are more prevalent among men in India compared with women.[21] Though majority of case (84.9%) were seen in the elderly, stroke in the young carries special importance as they form the most productive age group. Young stroke has increased in the recent times with changing lifestyles and better diagnostic modalities.

In our study most common clinical presentation from both age groups was hemiplegia (75% in group-1 vs. 72.1% in group-2), followed by speech involvement (44.4% vs. 36.8%) in group-1 and group 2 respectively, which correlates with study by P. Chitrambalam et al.[15] In that study also most common clinical presentation from both age groups was hemiplegia (93.3% in young vs. 89.2% in elderly), speech involvement was (43.3% vs. 30.8%) in young and elderly respectively.

In our study most common risk factors in group-1 were hypertension (HT) and past history of cerebrovascular disease (CVD) with equal percentage and second most common risk factor was smoking. In group-2 most common risk factor was hypertension followed by equal percentage of dyslipidemia and smoking, this observation correlates with the study done by Trilochan Srivastava et al.,[22] in which hypertension and smoking were the most common risk factors in both young and elderly groups. In assessing the combination and their effects of risk factors, tobacco abuse and hypertension appear to act synergistically as stroke risk factors.[23] It was evident in study by P. Chitrambalam et al.,[15] in which hypertensive tobacco abusers were 60.43% in contrast to only hypertensives without tobacco abuse were only 39.57%. In study done by Hirotaka Shimizu et al.,[24] it was found that most common risk factors were hypertension and smoking in both age groups. Other risk factors in group-1 in order of frequency were dyslipidemia and alcohol with similar percentage, past history of Coronary Artery Disease (CAD) and diabetes (DM) with similar percentage and 1 case was with rheumatic (RHD) valvular heart disease. These findings were consistent with study done by Kay Sin Tan et al.,[25] In which hypertension was documented in 47.2% of the entire cohort of patients and was the most common risk factor. The risk factors in descending order were dyslipidemia, smoking, diabetes and alcohol excess. In study done by Prasad et al.,[6] smoking, alcoholism, increased BMI, diabetes and hypertension are significantly associated with strokes among young people. Recurrent CVA was most commonly seen in <45 years (25%). Similar trend was seen in study done by P. Chitrambalam et al.,[15] in which it was (10%). In group-2 most common risk factor was hypertension followed by equal percentage of dyslipidemia and smoking past history of CVD, Diabetes, alcohol, past history of CAD and history of cancer in 2 cases. Similar trend was observed with study done by Hirotaka shimizu et al.,[24] in which older patients were having hypertension(46.7%) as most common risk factor followed by previous stroke (24.6%), hyperlipidemia (23.6%) and equal percentage (19.6%) of smoking and diabetes. In study done by R. P. Eapen et al.,[10] it was found that modifiable risk factors such as hypertension (40%), alcoholism (35%), smoking (28%) and hyperlipidemia (17%) are the commonest cause of stroke among the elderly.

In our study most common type of stroke in both age groups was ischemic stroke, in group-1 it was (83.3%) and in group-2 it was (73.2%), more young patients suffered ischemic stroke than elderly counterpart. Similar trend was there in study done by George MG et al.,[30] in which increases in the prevalence of ischemic stroke hospitalizations and coexisting traditional stroke risk factors and health risk behaviors were identified among acute ischemic stroke hospitalizations in young adults. In both the groups in ischemic stroke there was male predominance. It correlates with study done by Arindam Datta et al.,[29] in which also there was male predominance in both young and old age groups in ischemic stroke. In both the age groups, infarction was the predominant pathology. In accordance to prior studies conducted in India, cerebral infarction was major pathology encountered (76%).[26]

Recent Indian stroke studies have shown ratio between infarction: ICH is 2.21:1 (Western countries - 5:1).[27,28] However in this study the ratio is 5:1 in group-1 and 3.1:1 in group-2. Similar trend was there in study done by P. Chitrambalam et al.,[15] in which it was 4.2:1. It also correlates with the study done by Arindam Datta et al,[29] in which in young patient ratio of infarction to hemorrhage was 5:1. In older age group ratio was 4.6:1.

Second most common type of stroke in both age groups was hemorrhagic stroke, in group-1 it was (16.6%) and in group-2 it was (23.7%), therefore in elderly group there were more chances of hemorrhagic stroke, which was seen in study done by Arindam Datta et al.,[29] in which (22.2%) hemorrhagic stroke was in young patients and (77.7%) hemorrhagic stroke was in elderly age group.

In group-1 of hemorrhagic stroke there was male predominance which correlates with study done by Jose´ Luis et al.,[31] in which (53%) were males and , (47%) were females in young hemorrhage. In group-2 hemorrhagic stroke there was female predominance which correlates with study done by Latha Ganti et al.,[32] in which there (51.0%) females and (49.0%) males in adult hemorrhage.

In our study most common site of hemorrhage in group-1 was lobar hemorrhage with 3 cases of frontal, parietal and temporal. This was also seen in study done by Jose´ Luis et al.,[31] in which the most common locations of ICHs were lobar in (55%), second most common site was thalamoganglionic and ventricular with 2 cases, which was shown in book Neuroimaging - Methods,[33] in which most common site of hemorrhage was lobar followed by thalamoganglionic. In group-2 most common site of hemorrhage was thalamoganglionic (77%) followed by lobar (35%), similar trend was seen in study done by P. K. Chhetri et al.[34] and Pipat Chiewvit et al[35].

In our study most common site of infarct in both group-1 and group-2 was area supplied by middle cerebral artery which was also seen in study done by Trilochan Srivastava et al.,[22] and Baiju et al.[16]

CONCLUSION

To conclude stroke Incidence of stroke in young (<45 years) patients is on rise. Peak incidence of stroke is in ≥45 years age group. Mean age of male in elderly age group was 63.55 years and in female it was 66.94 years. Mean age for young age group was 40.11 year. In young age group male to female ratio was 4.1:1.In elderly it was 1.2:1. Most common clinical presentation from both age groups was hemiplegia most prevalent risk factors in young patients were hypertension (HT) and past history of cerebrovascular disease and smoking and hypertension, dyslipidemia and smoking in elderly. Most common type of stroke in both age groups was ischemic stroke with male predominance followed by hemorrhagic stroke with female predominance in elderly. Most common site of hemorrhage in young patients was lobar hemorrhage followed by thalamoganglionic. Most common site of hemorrhage in elderly was thalamoganglionic followed by lobar. Most common site of infarct in both age groups was area supplied by middle cerebral artery. More research is required to address stroke pattern in young and elderly to combat this deadly and disabling disease.

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