

Original Research Article

A study of pattern, risk factors, types, complications and outcome of stroke in geriatric age group

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Received: 19 June 2017

Accepted: 18 July 2017

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ABSTRACT

Background: Stroke is the number one cause of disability and third leading cause of death in the world after heart diseases and cancer with an incidence approximately 150 to 200 in 100,000. The objective of this study was to study how the pattern of stroke in elderly differs from that of younger population.

Methods: This is a prospective observational comparative study of stroke patients done over a period of one year at ACPM Medical College, Dhule. We studied 100 consecutive patients of stroke admitted in neuro-medicine department of this hospital. We have studied the risk factors, incidence, pattern, severity, complication and outcome of stroke in Geriatric age group compared to stroke in younger age group. The individuals who were 60 and above (≥ 60) are included in the 'geriatric group' and those below 60 were considered as 'younger patients'. Those more than 85 years were classified as 'very elderly'.

Results: There is an increased incidence of both ischemic and hemorrhagic strokes in geriatric population compared to younger people. Statistically there is increased incidence of ischemic stroke compared to hemorrhagic stroke in geriatric age group. PAC subtype of stroke has highest predilection to develop in both age groups and also PAC is the most common subtype of stroke leading to stroke related complications in geriatric population. There is no statistically increase incidence of severe stroke seen in elder age as compared to the younger people.

Conclusions: The geriatric population does not have a poorer stroke outcome as compared to younger people. There is also no statistically significant difference in mortality rate in stroke patients between geriatric vs. younger age group.

Keywords: Geriatric age group, Pattern, Stroke

INTRODUCTION

Stroke is the number one cause of disability and third leading cause of death in the world after heart diseases and cancer with an incidence approximately 150 to 200 in 100,000.¹

Stroke is a global problem of enormous proportion. The incidence of cerebrovascular diseases increases with age and the number of strokes is projected to increase as the

elderly population grows, with a doubling in stroke deaths in the United States by 2030.²

However, developing countries, where more than two-thirds of the world's populations live, face the daunting prospect of a stroke epidemic in the coming years. In the next 30 years the burden of stroke will grow in the developing countries rather than in the developed countries.³ The identification of major risk factors through population based studies and effective control strategies combining community health promotion and

targeted management of high risk contributed to a decrease in mortality rates due to stroke in developed countries.⁴

World Federation of Neurology, World Health organization and international Stroke organization have uniformly emphasized that the campaign against stroke has to be global.⁵

In recent years, in the field of prevention of stroke, rehabilitation, significant advances have been seen. The quality of stroke victims' life can be improved by proper rehabilitation comprising physical therapy, occupational therapy and speech therapy and all these should be started as early as the patient is stabilized. It is of utmost importance to create awareness among public about risk factors of stroke and their prevention in order to reduce the associated mortality and morbidity.⁶ Only through a sustained, affordable and comprehensive approach it is possible to limit the global stroke epidemic thus saving millions of lives.

Globally, stroke contributes as third leading cause of death. It is also a major contributor to the disability. As the age increases, the disability and death rate due to stroke increases. The causes remain different for different age groups. The risk of stroke has shown an increased risk after the age of 30 years.⁷ Majority i.e. 95% of population shows occurrence of stroke above 45 years of age and 66% of these can be seen among people above the age group of 65 years.^{8,9}

The main aim of this study was to study how the pattern of stroke in elderly differs from that of younger population.

METHODS

This is a prospective observational comparative study of stroke patients done over a period of one year at ACPM Medical College, Dhule. We studied 100 consecutive patients of stroke admitted in neuro-medicine department of this hospital. We have studied the risk factors, incidence, pattern, severity, complication and outcome of stroke in geriatric age group compared to stroke in younger age group. The individuals who were 60 and above (≥ 60) are included in the 'geriatric group' and those below 60 were considered as 'younger patients'. Those more than 85 years were classified as 'very elderly'.

Comparisons were done between these two groups regarding incidence, stroke subtype, complications, severity, outcome and mortality. Subarachnoid hemorrhage, extradural and subdural hemorrhages were excluded as these were pure surgical cases and these cases were not easily accessible for our study. Thus, only parenchymal bleeds were studied.

Detailed history taking (presenting complaints, past medical illness, family history, personal history and risk stratification) general and neurological examination were performed. CT brain was done to know the site of lesion in the brain and to distinguish ischemic from hemorrhagic stroke. Repeat CT was done in case of worsening neurological deficits or if the first scan was negative. In some indicative cases MRI too was done to delineate the lesion more precisely. All the patients were assessed by blood routine, electrolytes, and renal function test as well as urine microscopic examination as a basic investigation. Additional investigation was ordered only if a complication was suspected. Fasting lipid profile and fasting blood sugar was done in all the patients on the subsequent day of admission.

The severity of neurological deficits in stroke during admission and at discharge was assessed by National Institute of Health Stroke (NIH) scale. The ischemic stroke subtypes were classified according to Oxford shire classification of stroke guidelines into Total Anterior Circulation stroke (TAC), Posterior Anterior Circulation stroke (PAC), Lacunar stroke (LAC) and Posterior Circulation stroke (PC). In-hospital outcome of stroke was assessed by Modified Rankin's scale, at the time of discharge. Mortality rate was calculated in percentage in each age group. Complications developing in patients were noted in particular and were classified as 'stroke related' or 'systemic'.

Choice of treatment was individualized according to the stroke subtype, onset of symptoms, age, risk factors, complications etc. Comparison was done regarding type of stroke, stroke severity, outcome, complications and mortality with the younger patients. Statistical analysis was done at appropriate places and deductions drawn from these.

RESULTS

A total of 100 consecutive patients of stroke have been included in this prospective study taken from September 2007.

Table 1: Stroke incidence in geriatric versus younger age.

	Geriatric pts	Younger pts
Size of the sample	n ₁ = 100	n ₂ = 100
Number of patients	77	23
Proportion %	P ₁ = 77%	P ₂ = 23%

Stroke incidence was most in the age group 70 to 79 years (40%) and in this age group (70-79) the male to female ratio was 18: 22 (0.9). Youngest patient was 34 years and the oldest was 96 years, average age was 68.57. There is a statistically increased incidence of stroke in geriatric age compared to younger group.

Table 2: Geriatric population ischemic and hemorrhagic stroke.

	Total patients	Sample	Proportion %
Ischemic	n ₁ = 77	58	P1= 75.32
Hemorrhagic	n ₂ = 77	19	P2 = 24.67

Out of total 100 patients, 78 patients were of ischemic stroke (78%) and 22 patients were of hemorrhagic stroke (22%). Among the geriatric population showed ischemic stroke in 74.35% and hemorrhagic stroke in 24.67% whereas the younger subjects had ischemic stroke in 86.95% and hemorrhagic stroke in 13.04%. 8 patients were classified as ‘very elderly’ and among them 5 (62%) had ischemic and 3 (37%) had hemorrhagic stroke.

Table 3: Hemorrhagic stroke: geriatric versus younger.

	Sample 1	Sample 2
Size	n ₁ = 100	n ₂ = 100
Mean NIH score	x ₁ = 76.84	x ₂ = 53.66
SD	S ₁ = 7.6	S ₂ = 4.9

Statistically there is increased incidence of ischemic stroke in geriatric age as compared to hemorrhagic stroke.

Standard deviation of population (S) is 6.39. Calculated Standard error of difference between two means (S x₁-x₂) is 0.90. Critical ratio = 25.75. Here the critical ratio follows the normal distribution. The 5% level is 1.96 and the 1% level is 2.576. Our observed value is 25.75.

Table 4: Analysis of severe stroke (NIH > 7) in the two groups.

	Geriatric age group	Younger age group
Total patients	n ₁ = 44	n ₂ = 7
Mean NIH score	x ₁ = 17.41	x ₂ = 15.71
SD	S ₁ = 19.1	S ₂ = 17.65

‘Severe stroke’ was defined as stroke with NIH score >7 assessed at the time of admission. 65% had severe stroke. Of These 44 (57.14%) belonged to geriatric group while 7 (30.43%) belonged to younger age group.

Table 5: Poor stroke outcome (MRS ≥3) the two groups.

	Patients ≥ 60 years	Patients <60 years
Sample	N ₁ = 34	n ₂ =6
Mean MRS score	X ₁ = 4.41	x ₂ = 4
SD	S ₁ = 1.42	S ₂ = 1.41

Mean NIH score in geriatric and younger group were calculated to be 9.6 and 7.82 respectively. There is no evidence to show that geriatric age predisposes to more severe stroke as compare to younger age.

MRS outcome: It was assessed at the time of discharge. Mean MRS score in geriatric as well as younger age group was 2.7 and 2.04 respectively. ‘Poor outcome’ due to stroke was defined as MRS ≥ 3. 34 (44.15%) patients in geriatric group and 6 (26.08%) patients in younger age group had ‘poor outcome’. Stroke patients among geriatric did not have statistically poorer outcome as compare to younger age.

DISCUSSION

Our study showed that most of the stroke patients had one or more risk factors and among them 75% were ≥ 60 and 25% were below the age of 60.

Among the geriatric population incidence of ischemic stroke was observed to be more (75.32%) than the hemorrhagic stroke (24.67%) and was found statistically significant (p<0.01).

Among total ischemic patient’s PAC had the highest predilection 53 (67.94%) compared to LAC 12 (15.38%), PC 8 (10.25%), TAC 5 (6.410%). PAC was found as the commonest subtype of stroke among geriatric as well as younger age group followed by in geriatric LAC 10 (17.2%), TAC 5 (8.6%), and PC 4 (6.8%) and in younger age, PC 4 (20%) LAC (10%), and none under the subtype TAC. Again, interestingly enough, PAC subtype of stroke had highest predilection to develop stroke related complication in elderly.

There was no statistically significant correlation between both age groups with regards to the severity of stroke (which was defined as NIH score > 7) at the time of admission. These results are also consistent with earlier study by DeGraba TJ et al.¹⁰ Such an observation was also made in our study as well. It should be noted that 11 out of 12 patients who died due to stroke in the hospital had NIH score > 16.

MRS is a valid tool to assess recovery after an attack of stroke.¹¹ In this study, poor stroke outcome defined as MRS ≥ 3 was not found to be statistically different between the geriatric and younger age group. This finding goes against a common grain of wisdom that older age has a negative impact in the outcome of stroke.

More than half in our study had some complication classified as either ‘stroke related’ or ‘systemic’. The incidence of complication in general was more (57.14%) in geriatric age group as compared to younger age (39.13%) if at least advent of any one of such complication was taken into account. Again, systemic complications were more among the geriatric population 41 (53.24) where as in the younger group systemic

complications were seen only in 9 (39.13%). Urinary tract infection was the most commonly seen 'systemic complication' in total stroke patients in the tune of 15% followed by hyponatremia in 13% patients. Respiratory infection was observed in 5% patients and hematuria in 2% patients. Seizure was the most common stroke related complication and was seen in 5% subjects. Hemorrhagic transformation in an infraction was seen in 2 of the patients suffering from ischemic stroke.

Among the ischemic stroke patients 71 (91%) were treated with anti-platelets agents, 74 (94.87%) were administered anticoagulants with low molecular weight heparin (Nadroparin) and 4 (5.12%) were thrombolysed with rTPA. Two of the thrombolysed patients belonged to geriatric age. Among these thrombolysed patients one patient had bleeding (25%) and this patient deteriorated but ultimately survived with moderate deficits. 2 (50%) of the thrombolysed patients had poor outcome. However, no patients who received rTPA expired. For the hemorrhagic patient's medical management was given for 21 (95.45%) and only one (4.5%) underwent surgical evacuation.

A total of 12 patients (12%) expired out of 100 in our study. Mortality rate was observed to be almost equal (11.68% versus 8.69%) in both age groups. A statistical analysis also did not show any significant difference between the mortality rates between these groups. It was particularly of interest to note that no patient who suffered from stroke above 85 years (very elderly) had in-hospital mortality.

Yao X et al found that at the onset of stroke, male patients were younger than females.¹² Females were found to have more prevalence of risk factors like diabetes, atrial fibrillation and heart disease. Even though as usually expected, females were not heavy drinkers and smokers as compared to males. This prevalence was more seen among young patients. Older had high prevalence of heart disease in comparison to their young counterparts.

Subha PP et al found that there was an incidence of 15% of stroke among young population and among them 60% had ischemic heart disease, considered as one of the risk factor.¹³ Among all the risk factors, the prominent risk factor was high blood pressure. Factors like use of alcohol, hyperlipidemia, smoking and atrial fibrillation were common among young people. One more contributory factor found to contribute to stroke was physical inactivity.

Iihara K et al studied mortality rates among stroke patients and observed that death rate was 7.8% in ischemic stroke cases, 16.8% among those with intracerebral hemorrhage and highest for those cases who had subarachnoid hemorrhage i.e. 28.1%.¹⁴

Wang P et al studied complications of stroke and found that 14.7% had a repeat attack of stroke within one year

of onset.¹⁵ They also noted that the medical complications which occurred during the hospital stay were the risk factors for a repeat attack of stroke.

CONCLUSION

There is an increased incidence of both ischemic and hemorrhagic strokes in geriatric population compared to younger people. Statistically there is increased incidence of ischemic stroke compared to hemorrhagic stroke in geriatric age group. There is no statistically increase incidence of severe stroke seen in elder age as compared to the younger people. The geriatric population does not have a poorer stroke outcome as compared to younger people. There is also no statistically significant difference in mortality rate in stroke patients between geriatric vs. younger age group.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: More PP, Samel SS, Patil DR. A study of pattern, risk factors, types, complications and outcome of stroke in geriatric age group. *Int J Adv Med* 2017;4:1364-8.