Original Article

To Compare the Frequency of Ischemic and Hemorrhagic Stroke in Hypertensive Patients

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ABSTRACT

Objective: To compare the frequency of ischemic and haemorrhagic stroke in hypertensive patients presenting with stroke.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at the Department of Neurosciences, Divisions of Neurosurgery and Neurology at Sharif Medical and Dental College, Sharif Medical City Hospital, Lahore from August, 2017 to December, 2019.

Materials and Methods: This study included eighty hypertensive patients with stroke and were analysed. The clinical and laboratory variables were statistically evaluated. All the clinical examination and analysis was done by same person.

Results: Total of 80 patients, 18 (22%) patients were between 40-50 years of age and most of the patients 31 (39%) of stroke belong to 51-60 years of age. Mean age of the patients was 63.52±12.85 years. Forty eight (60%) patients were male and 32 (40%) patients were female with male to female ratio 1.5:1. Forty nine (61%) patients had ischemic stroke and 31 (39%) had haemorrhagic stroke.

Conclusion: In hypertensive patients the frequency of ischemic stroke is increased than hemorrhagic stroke.

Key Words: Hypertension, Ischemic stroke, Intracerebral haemorrhage.

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INTRODUCTION

Stroke is a leading cause of death and disability worldwide. It is an acute focal neurological deficit lasting for more than twenty four hours and is due to vascular lesions, which may be cerebral infarction or haemorrhage. It is a significant long term disability in adults and the third leading reason for death in the United States. Overall, another stroke happens every 45 seconds.[1,2] The rationale for thrombolysis in acute ischemic stroke, clinical evidence supporting the use of thrombolytics and the application of thrombolysis in practice. Thrombotic or embolic occlusion of a blood vessel leads to cerebral infarction which constitutes more than two thirds of all cases of stroke. The major modifiable risk factors associated with acute ischemic stroke include hypertension, diabetes mellitus, hyperlipidemia, smoking and atrial fibrillation.[3]

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Ischemic stroke has numerous causes, cerebral infarction may result from large artery atherosclerosis, cardiac embolism, small artery lipohyalinosis, cryptogenic embolism, or, more rarely, from other diverse conditions such as arterial dissection, infective endocarditis and sickle cell disease.[4] According to WHO estimates for the year 2020, stroke will become the second leading cause of death and ischaemic heart disease as the leading cause in developing and developed world. About 200 people per 100,000 populations will have first ever stroke every year. Stroke or brain attack is the second leading cause of death and disability worldwide and results due to interruption of cerebral circulation, either due to occlusion of main blood vessel due to thrombo-embolism or rupture of blood vessel thus resulting in hypoxaemia to brain cells and causing damage which may be transitory or permanent. Studies have shown that more than 50% of patients of ischaemic stroke, who survive, are left with severe and permanent disability.[5,6]

Ischemic stroke has numerous causes. Cerebral infarction may result from large artery atherosclerosis, cardiac embolism, small artery lipohyalinosis, cryptogenic embolism, or more rarely, from other diverse conditions such as arterial dissection, infective endocarditis and sickle cell disease. Arterial occlusion is the cause of at least 80% of acute cerebral infarctions.[7,8]

MATERIALS AND METHODS

This study was a cross sectional included eighty hypertensive patients with stroke in the Department of Neurosciences, Divisions of Neurosurgery and Neurology at Sharif Medical and Dental College, Sharif Medical City Hospital, Lahore from August, 2017 to December, 2019. Either gender patients above 40 years of age having ischemic stroke were enrolled after getting written consent with complete demographic data. Patients presentedin emergency department with acute ischemic stroke within 24 hours from the onset of symptoms. The diagnosis of acute ischemic stroke was based upon signs of focal neurological deficit resulting in partial or complete loss of motor or sensory function, supported by computed tomography scan of brain. The data was collected for hypertension, diabetes mellitus, hypercholesterolemia (hyperlipidemia) and smoking. A detailed history was taken with special emphasis on history pertaining to these risk factors. A patient was labelled hypertensive if he/she is on treatment with antihvpertensive drugs or is found to have an average systolic blood pressure >140mmHg or diastolic blood pressure >90mmHg or both on three separate occasions, discarding the first reading on admission. Similarly a patient was labelled diabetic if he/she is on treatment with oral hypoglycemic drugs or insulin or if the fasting blood sugar level is >126mg/dL and hypercholesterolemic (hyperlipidemic) if he/she is on treatment with lipid lowering drugs or has fasting total serum cholesterol level of >126mg/dL and hypercholesterolemic (hyper-lipidemic) if he/she is on treatment with lipid lowering drugs or has fasting total serum cholesterol level of >160mg/dL. Age was expressed as mean and standard deviation. Gender was expressed as percentage. The presence or absence of hypertension, diabetes mellitus, hypercholesterolemia and smoking was expressed as frequency and percentage of stroke patients studied suffering from them.

RESULTS

Majority of the patients of hemorrhagic stroke belong to 40-60 years of age (61%). Only 8 (10%) patients were >70 years. Mean age of patients was 63.52±12.85 years (Table 1). Forty eight (60%) patients were male and 32 (40%) patients were female with male to female ratio 1.5:1 (Table 2).

Out of 80 patients, 49 (61%) had ischemic stroke and 31 had haemorhagic stroke (P >0.05) (Table 3). Out of 49 patients of ischemic stroke, left middle cerebral artery is involved in 25 (51%) patients, right middle cerebral artery 18 (37%) and involvement of anterior cerebral artery 4 (8%) while only 2 (4%) posterior cerebral artery was involved (Table 4).

Thirty one (39%) patients had hemorrhagic stroke, there was cerebellum involvement in 6 (19%) patients while 11 (35%) involvement was noted among left anterior lobe. Pons 4 (13%) patients and right parietal lobe was also noted in 4 (13%) respectively and left basal ganglia in 5 (16%) while right basal ganglia was involved in 5 (16%) (Table 5)

Table No. 1: Age distribution of patients (n=80)

Age (years)	No.	%
40-50	18	22.0
51-60	31	39.0
61-70	23	29.0
>70	8	10.0
Mean±SD	63.52±12.85	

Table No. 2: Sex distribution of patients (n=80)

Sex	No.	%
Male	48	60.0
Female	32	40.0
M:F ratio	1.5:1	

Table No.3: Frequency of diagnosis in stroke patients (n=80)

Model of Stroke	No.	%
Ischemic	49	61.0
Haemorrhagic	31	39.0

Table No. 4: Distribution of ischemic stroke (n=49)

Ischemic Stroke	No.	%
Right middle cerebral artery	18	37.0
Left middle cerebral artery	25	51.0
Anterior cerebral artery	4	8.0
Posterior cerebral artery	2	4.0

Table No. 5: Distribution of haemorrhagic stroke (n=31)

Haemorrhagic Stroke	No.	%
Cerebellum	6	19.0
Left anterior lobe	7	23.0
Right parietal lobe	4	13.0
Pons	4	13.0
Left basal ganglia	5	16.0
Right basal ganglia	5	16.0

DISCUSSION

This study was determined the frequency of ischemic and haemorrhagic stroke in hypertensive patients. The stroke was common in elder age but it is not uncommon in younger age. Our study showed that the hypertensive patients of ischemic stroke were 49 (61%) and more common than haemorrhagic stroke 31 (39%) as compare to other studies.More elevation of blood pressure is more frequently associated with cerebral haemorrhage than cerebral infarction.[9,10]

The proportion of hemorrhagic strokes in Asian countries has been reported as high as 21-33%. Reported frequency of intracerebral haemorrhage in our country is even higher, ranging from 24-46%.[11,12] Our

results shows even more frequency of intracerebral bleed (49%).

The mean age was 63.52±12.85 years which was slightly higher than 57.5 years reported in a study and much lower than 70 years in United states. This difference is possibly because of better awareness and control of risk factors in United States or shorter life span in Pakistan as compared to Western countries. Various studies showed that stroke is more prevalent in men than women.[13,14] In our study males patients were 48 (60%) and females were 32 (40%) which is different from a study by Sacco et al where 57% were females which may be due to selection bias or geographical distribution.[15]

The result of a shorter life expectancy and a higher incidencerate of stroke in male as compared with female, lifetime risksof stroke in male and female were similar at different ages. Role of gender in predicting the stroke type in hypertensive patients is controversial. In a population based case control study, men were noted to have odds ratio of 3.51 for ischemic infarctions; however, another studydid not show any difference.[16,17]

Age below 70 years has been found to predict haemorrhage.We also found that younger age (<55 years) was associated with intracerebral haemorrhage. It is unclear why younger patients are more likely to have hemorrhagic stroke. Ross Russel's postulation suggests that massive haemorrhage is most likely to result if a miliary aneurysm ruptures early in its development. If rupture does not occur when elastic lamina of the parent vessel is breached, the aneurysm wall becomes stretched, thickened and the lumen becomes occluded by thrombus.[18] Younger patients have hypertension of shorter duration and the early stages of the pathological changes in their vessels (formation of the aneurysms) may be predisposed to a haemorrhage. Various studies have shown that compliance to anti-hypertensive therapy is relatively poor in young patients. The poor compliance will result in poorly controlled hypertension and could also explain higher rates of intracerebral haemorrhage in younger population.[19,20]

Hypertension is a most important risk factor for both ischemic and haemorrhagic stroke and reduction in blood pressure has been shown to decrease the risk of both stroke subtypes, however, risk reduction is greater for hemorrhagic stroke.[21]In hemorrhagicstroke contribution of other riskfactors is not straightforward, however, it is logical to assume that various risk factors for atherosclerosis e.g. DM, IHD and dyslipidemia would increase the risk of ischemic strokes. Frequency of hemorrhagic stroke is higher in Asian population as well as in black Americans.[10]It has been attributed to uncontrolled hypertension. Hypertension increases risk for ischemic infarction as well ashaemorrhage, however, the predictors of ischemic versus hemorrhagic stroke in an individual patient are not clear. A few studies have been done to address the issue.[22]

In this study previous stroke is another important risk factor, in a study 21 patients who gave history of a stroke in the past; there are four hypertensive, two smokers and two diabetics, while ten patients had shown no other risk factor than a previous stroke.[15]Most of our patients were uneducated and unaware of the drastic outcome of poor control hypertension and other risk factors.[23,24] Non-compliance to treatment is the main cause of stoke in our patients because they are very unlikely to take treatment because it is very expensive. As a result most of them stop anti-hypertensive, resulting in stroke and other complications which are more expensive to treat the patients.

CONCLUSION

It is concluded that the frequency of hypertensive patients of ischemic stroke is increased than hemorrhagic stroke patients.

Author's Contribution:

Concept & Design of Study:	Farhan Fateh Jang
Drafting:	Amna Malik
Data Analysis:	Muhammad Mossa
Revisiting Critically:	Farhan Fateh Jang, Amna Malik
Final Approval of version:	Farhan Fateh Jang

Conflict of Interest: The study has no conflict of interest to declare by any author.

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