

FREQUENCY OF CEREBRAL INFARCTION AND HAEMORRHAGE IN THE PATIENTS OF STROKE

Amanullah, Nazir Shah*, Shams-ur-Rehman**, Salma Ataullah***

Department of Medicine, Hayatabad Medical Complex, Peshawar, *Fauji Foundation Hospital, Peshawar, **District Specialist, DHQ Hospital, Swabi, ***Department of Pathology, Hayatabad Medical Complex, Peshawar, Pakistan

Background: Stroke is rapidly developing phenomena of symptoms and signs of focal, and at times global, loss of cerebral function with no apparent cause other than that of vascular origin. The Objective was to know the frequency of cerebral infarction and haemorrhage in one hundred patients of stroke in a period of one year. **Methods:** Data was collected by consecutive sampling technique. Total one hundred patients of stroke were collected for the study. They were assessed through a detailed history of hypertension, diabetes mellitus, smoking, previous stroke, transient ischemic attack (TIA), previous myocardial infarction, angina, atrial fibrillation, alcohol intake, drugs used for hypertension/diabetes mellitus. Blood pressure was recorded at arrival and 24 hours after admission. **Results:** There were 70% males and 30% females. Twenty percent of the patients were in the age range of 51–60 years, 26% of the patients were in the age range of 61–70 years and 18% were in the age range of 71–80 years. Cerebral infarction was present in 72% patients while cerebral haemorrhage was present in 28% patients. Hypertension was the most common risk factor among these stroke patients. Average blood pressure was 180/100 mmHg. **Conclusion:** Cerebral infarction is the commonest form of stroke. Hypertension is the leading risk factor in stroke patients.

Keywords: Cerebral Infarction, Cerebral haemorrhage, Hypertension, Stroke

INTRODUCTION

Stroke is rapidly developing phenomena of symptoms and signs of focal and at times global loss of cerebral function with no apparent cause other than that of vascular origin.^{1,2} Stroke is an emergency requiring urgent investigation and treatment.³ The main pathological types of stroke are cerebral infarction, primary intra-cerebral haemorrhage and subarachnoid haemorrhage. In developed countries, about 85 to 90% of strokes are due to cerebral infarction and 10 to 15% due to intracranial hemorrhage.⁴

Infarction may be due to thrombosis and embolic phenomenon while haemorrhage is mostly due to aneurysms or hypertensive bleed.⁵ Usually the haemorrhage is very sudden in onset and cerebral infarction has gradual onset and is usually progressive over a period of day or so, until it reaches its peak.⁵ To make a diagnosis of stroke, a detailed history and thorough clinical examination is mandatory followed by computerized tomography (CT) scan of the brain for confirmation.⁶ CT scan is a simple, non-invasive and accurate investigation in distinguishing cerebral infarction from hemorrhage.⁷ CT scan is preferable to magnetic resonance imaging (MRI) in the acute stage because MRI does not easily detect intracranial haemorrhage within the first 48 hours after a bleeding episode.⁸ The most common predisposing factor in both cerebral infarction and haemorrhage is hypertension.⁹ In Pakistan, 18–42% cases of cerebral haemorrhage have been reported which are attributed to uncontrolled hypertension. This study was undertaken to determine the frequency of ischemic and hemorrhagic stroke in the patients of hypertension.

MATERIAL AND METHODS

A descriptive study was conducted on one hundred patients of stroke with infarction and haemorrhage in general intensive care unit (ICU), Postgraduate Medical Institute, Hayatabad Medical Complex Peshawar by a consecutive sampling technique. The duration of this study was one year, from July 2005 to July 2006.

Criteria for inclusion consisted of patients admitted with acute stroke after 24 hours of stroke and patients having infarction or haemorrhage as a cause of stroke diagnosed on CT scan of the brain. Patients with stroke secondary to space occupying lesions, vascular lesions and blood dyscrasias were excluded.

One hundred consecutive patients with acute stroke, having infarction or haemorrhage as a cause of stroke, were admitted in general ICU, Postgraduate Medical Institute, Hayatabad Medical Complex Peshawar. Stroke was initially diagnosed on clinical ground and confirmed on CT scan brain. After formal consent, patients fulfilling the inclusion criteria were further assessed through a detailed history of hypertension, diabetes mellitus, smoking, previous stroke, TIA, previous myocardial infarction, angina, atrial fibrillation, alcohol intake and drugs used for hypertension and diabetes mellitus. Blood pressure was recorded at arrival and 24 hours after admission.

Patients who were known hypertensive or taking antihypertensive drugs or patients who had two readings of blood pressure more than 140/90 mmHg were finally selected for analysis. The diagnosis was established based on history, clinical examination and supplemented by CT scan of brain. The data was

recorded in the proforma and analysed, using SPSS version 11. Investigations like Blood Sugar, Lipid Profile, Blood Complete, Echo, and X-ray Chest; CT Scan Brain findings were recorded in the Performa. Other relevant data like name, age, sex, address, occupation, admission date and date of discharge were also recorded.

All the studied variables like age, sex, hypertension, diabetes mellitus, subtypes of stroke, e.g., ischemic or hemorrhagic etc., were analysed by using SPSS version 11. The data was described as Mean±SD for numeric variables and frequencies and percentages for categorical variables.

RESULTS

A total number of 100 consecutive patients with ischemic and hemorrhagic stroke were included in this study. There were 70 (70%) males and 30 (30%) female patients with male to female ratio of 2.33:1. The age of patients ranged from 20 to more than 80 years. In this study, the Mean±SD of age was 60±18 years. The Mean±SD age of male patients was 63.3±18.5 years and in females it was 63.7±14.8 years. Out of all patients, 20 (20%) patients were in age groups 51–60 years, 26 (26%) were in the age range of 61–70 years and 18% were 71 to 80 years as shown in the Table-1.

Out of 100 patients, 72 (72%) had ischemic stroke and 28 (28%) had hemorrhagic stroke as shown in figure-1. Out of 72 (72%) patients of ischemic stroke, there were 48 males and 24 females. While out of 28 (28%) patients of haemorrhagic stroke, there were 18 males and 10 were females (Table-2).

All patients of stroke with ischemia and haemorrhage presented from various cities and rural areas of the whole province. There were 56 (56%) patients belonging to rural area while 44 (44%) were from to urban areas of the province Occupation wise 30 (30%) patients were businesspersons, 26 (26%) were farmers, 26 (26%) were housewives and 18 (18%) were employees.

All of the patients were known hypertensive, 16 (16%) patients were smokers and 6 (6%) patients had previous history of stroke or TIA. No patient had previous history of myocardial infarction, angina or atrial fibrillation. Alcohol intake was also not present in history of any patient as shown in table 3. Maximum blood pressure in patients of stroke with ischemia or haemorrhage was 240/140 mmHg while average blood pressure recorded in all patients of stroke was 180/100mmHg. Different baseline investigations were done in all patients of stroke, which included electrocardiography, echo, x-ray chest, CT scan of brain, blood complete, total leukocyte count (TLC), differential leukocyte count (DLC), cholesterol, blood sugar and lipid profile.

Table-1: Age wise distribution of patients (n=100)

Age Group Yrs.	Male		Female		Total	
	Number	%	Number	%	Number	%
20–30	8	8.0	2	2.0	10	10.0
31–40	2	2.09	0	0	2	2.0
41–50	2	2.0	2	2.0	4	4.0
51–60	14	14.0	6	6.0	20	20.0
61–70	16	16.0	10	10.0	26	26.0
71–80	12	12.0	6	6.0	18	18.0
>80	16	16.0	4	4.0	20	20.0
Total	70	70	30	30	100	100

The overall Mean±SD of age was 60±18 years. Mean±SD in males was 63.3±18.5 years and in female it was 63.7±14.8 years.

Table-2: Gender distribution according to type of stroke in patients (n = 100)

Stroke Type	Gender				Total	
	Male	%	Female	%	Number	%
Ischemic	48	48.0	24	24.0	72	72.0
Hemorrhagic	18	18.0	10	10.0	28	28.0
Total	66	66.0	34	34.0	100	100

Table-3: Past history of various diseases in patients

Diseases	No. of Cases	%e
Known Hypertensive	100	100
Smokers	16	16.0
Previous Stroke	6	6.0

DISCUSSION

Stroke is a major public health problem leading to increased morbidity and mortality. Modifiable risk factors for stroke include hypertension, diabetes, atrial fibrillation, dyslipidemia, and smoking and alcohol abuse. Among these risk factors, hypertension and diabetes are rapidly growing epidemics, leading to a substantial increase in cardiovascular diseases and stroke.¹⁰ Cerebral infarction is more common in developed countries (as high as 80% and up to 60% in developing countries), whereas intracerebral haemorrhage was seen in 10% to 30%.¹¹ While ischemic stroke causes substantial death and disability than hemorrhagic stroke.¹² In a local study it was observed that out of 50 cases of stroke, 82% patients had cerebral infarction and 18% had intracerebral hemorrhage.¹³ While in other local studies, its frequency was 78–79% cerebral infarction and 17–21% intracerebral haemorrhage respectively.^{14,15} There were total 100 consecutive hypertensive stroke patients with infarction and haemorrhage included in this study. Hypertension was one of the most important risk factor in both hemorrhagic and ischemic strokes. These findings are also reported by other studies from Pakistan.^{4,5,11,13,16–18} In these hypertensive patients with stroke, 72% patients suffered from ischemic stroke and 28% were diagnosed with hemorrhagic stroke. These results are in agreement with various studies done at national and international level.^{4,11,17,19–21}

In this study, males were more than females, with male to female ratio of 2.33:1, which is little

higher than reported by few local studies.^{4,7,11,17,19} While in contrast to the results of this study, few national and international studies have reported more female compare to male.^{13,22} The low ratio of female patients in the present study may be probably due to the small number of patients and short study period. It is well documented that the risk of stroke increases with older age, especially in hypertensive patients. Higher rate of stroke has been reported in the age range of 61 to 70 years with overall mean age of 60 years.^{23,24} These finding were also observed in the present study that the majority of patients suffered from stroke with infarction or haemorrhage were in the age range of 61 to 70 years with overall mean age of 60 years.

Hypertension is a major risk factor for stroke that is usually associated with other risk factors such as smoking obesity, previous history of stroke or TIA, myocardial infarction, angina, atrial fibrillation, history of contraceptive pills used by women and alcohol intake.²⁵⁻²⁷ Strokes are increasing in number due to an ageing population and are largely preventable. In the highest risk patients, a 90% relative risk reduction for stroke is attainable by appropriately using all the measures proven to reduce stroke.²⁸

Smoking history was observed in 16% patients, 6% patients had history of previous stroke or TIA. Myocardial infarction, angina, atrial fibrillation were not present in any patient. History of the use of contraceptive pills was also not recorded in any women with stroke. Alcohol history as reported in international studies, as a risk factor was not recorded in any patients of stroke, which is due to Muslim culture in this part of the country.

Adequate control of blood pressure is a cornerstone of stroke prevention. Forty five percent of all strokes, among subjects with treatment for hypertension, might be attributed to uncontrolled blood pressure.²⁹ High and low blood pressure levels are common following acute stroke, with up to 60% of patients being hypertensive (systolic blood pressure >160 mmHg) and nearly 20% having relative hypotension (systolic blood pressure ≤140 mmHg), within the first few hours of the event, both conditions being associated with an adverse prognosis.³⁰ The present study showed a mean systolic blood pressure of 180 mmHg and mean diastolic blood pressure of 100 mmHg. While the maximum blood pressure recorded in all patients of stroke with ischemic or hemorrhagic, was 240/140 mmHg. These finding are little higher than other studies reported on national level.^{13,17}

CT scan is important to differentiate between cerebral infarction and intracerebral haemorrhage because nowadays, proper management

of the acute stroke syndrome is based on the correct diagnosis of the pathological type.⁶ According to one study, it was concluded that the positive predictive value for the clinical criteria in diagnosis of ischemic stroke is 72% and 60% for hemorrhagic strokes.⁵ The CT scan of brain was performed in all cases of the present study to confirm the clinical diagnosis and type of stroke. There was no comparison of the clinical presentation and CT scan findings but anticoagulation or thrombolytic therapy was planned after CT scan brain findings of the type of stroke.

CONCLUSION

Hypertension is a major risk factor of stroke. Infarction is more common form of stroke than haemorrhage. Despite intensive research efforts, few effective treatments are available once stroke has occurred. An increase in compliance with the pharmacological and non-pharmacological therapeutic regimen might be a key to reduction of stroke incidence and prevalence among hypertensive patients. Treatment of hypertension significantly reduces the risk of stroke and its adequate control is a cornerstone in stroke prevention. Therefore, stroke prevention should be a primary focus for all health care providers.

REFERENCES

1. Shah FU, Salih M, Saeed MA, Tariq M. Validity of Siriraj stroke scoring. *J Coll Physicians Surg Pak* 2003;13:391-3.
2. Khan JA, Shah MA, young stroke-clinical aspects. *J Coll Physicians Surg Pak* 2000;10:461-6.
3. Brown MM. Stroke: epidemiology and clinical features. *Med Int neural* 2000;10:45-52.
4. Alam I, Haider I, Wahab F Khan W, Taqweem MA, Nowsherwan. Risk factors stratification in 100 patients of acute stroke. *J Postgrad Med Inst* 2004;18:583-91.
5. Ahmed MM, Nasarullah M. Study of clinical presentation versus CT findings regarding the type of lesion in stroke. *Pak J Neurol* 2004;10:17-22.
6. Rehman SU, Khan MA. Clinical versus CT Scan diagnosis in stroke: a comparative study of 50 cases. *J Ayub Med Coll* 2002;14:2-5.
7. Demchuk AM, Coutts SB. Alberta stroke program early CT score in acute stroke triage. *Neuroimaging Clin North Am* 2005;15:409-19.
8. Kidwell CS, Chalela JA, Saver JL, Starkman S, Hill MD, Demchuk AM, *et al.* Comparison of MRI and CT for detection of acute intracerebral hemorrhage. *J Am Med Assoc* 2004;292:1823-30.
9. Khan NZ, Iqbal Z. Cerebrovascular disease, increasing incidence of primary intracerebral haemorrhage – a preliminary report of 100 cases. *Pak J Neurol* 1999;5:45-9.
10. McFarlane SI, Sica DA, Sowers JR. Stroke in patients with diabetes and hypertension. *J Clin Hypertens (Greenwich)* 2005;7:286-92.
11. Ali L, Jamil H, Shah MA. Risk factors in stroke. *J Coll Physicians Surg Pak* 1997;7:7-10.
12. Shafiqat S. Clinical guidelines for the management of ischemic stroke in Pakistan. *J Pak Med Assoc* 2003;53:600-2.
13. Khan A, Sherin A, Ahmad H, Khalil MA. Acute complications of stroke. *J Postgrad Med Inst* 2004;18:220-4.

14. Qureshi MA, Jamshaid TD, Siddiqui AM. Stroke—A study of clinical patterns and risk factors. *Ann KE Med Coll* 2003;9:98–100.
15. Basharat RA, Yousaf M, Iqbal J Khan MM. Frequency of known risk factors for stroke in poor patients admitted to Lahore General Hospital in 2000. *Pak J Med Sci* 2002;18:280–3.
16. Basharat RA, Ellahi A, Tariq M, Saeed A. One-month audit of stroke at PIMS. *Pak J Neurol* 1999;5:12–6.
17. Sherin A, Shabbier G, Rehman S, Shah NH, Zarif M. Hypertension in acute ischemic and haemorrhagic stroke. *J Postgrad Med Inst* 2005;19:220–5.
18. Khealani BA, Syed NA, Maken S, Mapari UU, Hameed B, Ali S, *et al.* Predictors of ischemic versus hemorrhagic stroke in hypertensive patients. *J Coll Physicians Surg Pak* 2005;15:22–5.
19. naseem A, Mahmood, Hussain T, Khan IA. Clinical spectrum of stroke in our adult population. *Pak Armed Forces Med J* 2003;53:59–67.
20. Koch S, Pabon D, Rabinstein AA, Chirinos J, Romano JG, Forteza A. Stroke etiology among Haitians living in Miami. *Neuroepidemiology* 2005;25:192–5.
21. Hannan MA, Rahman MM, Haque A, Ahmed HU. Stroke: Seasonal variation and association with hypertension. *Bangladesh Med Res Counc Bull* 2001;27:69–78.
22. Jones CA, Nagpal S. An update: women, hypertension and therapeutic efficacy. *Can J Cardiol* 2001;17:1283–9.
23. Iqbal I, Hussain S, Hassan M. Hypertension, diabetes mellitus and hypercholesterolaemia as risk factors for stroke. *Pak J Med Res* 2003;42:17–22.
24. Ramirez MF, Tibayan RT, Marinas CE, Yamamoto ME, Caguioa EV. Prognostic value of hemodynamic findings from impedance cardiography in hypertensive stroke. *Am J Hypertens* 2005;18(2 Pt 2):65S–72S.
25. Flossmann E, Rothwell PM. Family history of stroke in patients with transient ischemic attack in relation to hypertension and other intermediate phenotypes. *Stroke* 2005;36:830–5.
26. El-Atat F, Rundek T, Sowers JR, McFarlane SI. Stroke prevention in diabetic and other high cardiovascular risk patients. *Curr Diab Rep* 2005;5:200–7.
27. Liu XF, van Melle G, Bogousslavsky J. Analysis of risk factors in 3901 patients with stroke. *Chin Med Sci j* 2005;20:35–9.
28. Spence JD. Stroke prevention in the high-risk patient. *Expert Opin Pharmacother.* 2007;8:1851–9.
29. Li C, Engstrom G, hedblad B, Berglund G, Janzon L. Blood pressure control and risk of stroke: A population based prospective cohort study. *Stroke* 2005;36:725–30.
30. Potter J, robinson T, Ford G, James M, Jenkins D, Mistri A, *et al.* CHHIPS (Controlling Hypertension and Hypertension Immediately Post-stroke) Pilot Trial: rationale and design. *J Hypertens* 2005;23:649–55.

Address for Correspondence:

Dr. Amanullah, Medicine and General ICU Hayatabad Medical Complex Peshawar, Pakistan. **Cell:** +92-300-5907636

Email: draman.2009@yahoo.com