Original Article

Stroke: Frequency of Risk Factors in Patients Admitted at Liaquat University Hospital Hyderabad/Jamshoro

Suhail Ahmed Almani, Muzaffar Shaikh, Mumtaz Ali Shaikh, Khalid Shaikh,
M. Qasim Rahopoto, Ghulam Hussain Baloch and M. Iqbal Shah

ABSTRACT

OBJECTIVE: To determine the frequency of various risk factors for stroke and its sub-types among males and females.

DESIGN: Cross sectional /Observational study.

PLACE AND DURATION OF STUDY: The study was conducted at the Medical Department of Liaquat University Hospital Hyderabad/Jamshoro from January 2006 to March 2007.

MATERIAL AND METHODS: Patients with features of stroke confirmed by CT scan brain were enrolled. Brain imaging showing abnormality e.g. brain tumour, meningitis, multiple sclerosis and metabolic derangements that could explain focal neurologic deficit were the exclusion parameters. The frequency of various risk factors for stroke and its types among males and females were evaluated.

RESULTS: Out of total 100 patients, 78(78%) presented with infarction stroke and 22(22%) with hemorrhagic stroke. Their mean age at presentation was 56.89 with SD=8.92 years. Hypertension 35(59.3%) and smoking 18(94.7%) were the most important risk factors among males, while the presence of diabetes mellitus 16(55.2%) and IHD 10(62.5%) were found to be more common among females. Forty-two (42%) and 11(11%) males, while 36(36.3%) and 11(11%) females suffering from cerebral infarction and cerebral hemorrhage respectively. In-hospital mortality was 09(09%).

CONCLUSION: Frequency of various risk factors was high in this study which is similar to that observed in developed countries. Hypertension and smoking were the major risk factors for males, while diabetes mellitus and IHD were more common in females. We did not find any significant gender difference between the two stroke types.

CATEGORY: Internal Medicine

KEY WORDS: Hypertension, Ischemic strokes, Intracerebral hemorrhage, Diabetes mellitus, Ischemic heart disease.

INTRODUCTION

Stroke ranks second after ischemic heart disease as a cause of lost disability-adjusted life-years in high-income countries and as a cause of death worldwide.[1] Retrospective analysis of patients admitted with stroke in two hospitals of the same locality some 8 years ago in Karachi Pakistan showed that out of the 12,454 cases 796(6.4%) had stroke.[2] According to WHO report 2002, total mortality due to stroke in Pakistan was 78512.[3] The incidence of stroke varies among countries and increases exponentially with age.[4] It is also the leading cause of disability in adults. Of 350,000 survivors each year, 31% require assistance in activities of daily living, 20% require assistance in walking and 16% require institutional care.[5] Stroke not only increases mortality but also put a great economic burden on the society.[6] In western societies, about 80% of strokes are caused by focal cerebral ischemia and

the remaining 20% are caused by hemorrhages.[4] The likelihood of a poor outcome after stroke increases with increasing age, with the coexistence of diseases such as ischemic heart disease and diabetes mellitus, and with increasing size of the infarct.[5] Mortality in the first month after stroke has been reported to range from 2.5% in patients with lacunar infarcts[7] to 78% in patients with space-occupying hemispheric infarction.[8] Epidemiologic studies of the risk factors for stroke are important for determining the origin and its prevention. In the past several decades many studies have successfully identified non-modifiable risk factors for stroke such as age, gender, race, ethnicity, heredity and several well established modifiable risk factors. Hypertension, atrial fibrillation, diabetes mellitus, ischemic heart disease, hyperlipidemia, cigarette smoking, alcohol abuse, obesity, physical inactivity, asymptomatic carotid stenosis, transient ischemic attack and other cardiac disorders are all

potentially treatable conditions that predispose to stroke.[9] Though the mortality for stroke has been on the decline, still it represents the most common cause of chronic disability. The aim of this study was to determine the frequency of various risk factors for stroke and to compare its types among male and female patients hospitalized at Liaquat University Hospital Hyderabad/Jamshoro.

PATIENTS AND METHODS

This was a cross sectional/observational study in adult patients above the age of 18 years with stroke, verified by CT scan brain (plain) admitted to medical wards of Liaquat University Hospital Hyderabad/ Jamshoro during the period of January 2006 to March 2007. Brain imaging showing abnormality e.g. brain tumour, meningitis, viral or bacterial encephalitis, multiple sclerosis and metabolic derangements that could explain focal neurologic deficit e.g. hypoglycemia were the exclusion parameter. A proforma was designed to record the detailed history, risk factors for stroke, stroke type, pre-existing medical problems, laboratory and radiological investigations. The Results were analyzed by using SPSS software. All patients underwent neuroimaging i.e. CT scan brain or MRI brain or both. Stroke sub type was recognized by its characteristic features.[10] Hypertension was defined as a past medical history of hypertension, based on two blood pressure readings of >140/90mmHg or electrocardiographic or echocardiographic evidence of hypertension. Diabetes mellitus was defined as a past medical history of diabetes mellitus or sustained blood sugar elevation (fasting blood sugar > 110mg/dL or random blood sugar > 160mg/dL) requiring treatment with hypoglycemic agents or insulin throughout hospitalization. Abnormal cholesterol elevation was defined as history of high cholesterol (>200mg/dL) in the past or documentation of elevated cholesterol during hospital stay. A "current smoker" was defined as a person who smoked at least one cigarette per day for the preceding three months or more or had tobacco in any form. "Ex- smoker", a person who smoked at least one cigarette per day for three months or more or had tobacco in any form at some period. Cardiac disease was defined as ischemic heart disease, cardiac arrhythmia, valvular heart disease, or congestive cardiac failure present on past medical history or diagnosed during hospitalization. A positive family history of stroke was considered if a patient, had first degree relative (parent or sibling) who had a stroke/ TIA.

RESULTS

Total 100 patients with stroke, including 53(53%) males and 47(47%) females were studied. Their mean age was 56.89 with SD=8.920 years. Sixty-seven (67%) belonged to rural areas and 33(33%) from urban areas, 71(71%) patients were uneducated and 29(29%) were educated, 44(44%) patients had access to tertiary medical care facilities at ease while 56(56%) didn't reach at tertiary care medical facility in time (**Table I**). Eighty-three (83%) patients presented with left hemiparesis/hemiplegia, 17(17%) patients presented with right hemiparesis/ hemiplegia, 11(11%) were unable to speak properly, 24(24%) patients had headache, 18(18%) patients developed coma, 04 (04%) had fits and 3(3%) patients had vomiting as shown in **Table II**. The frequency of hypertension, diabetes mellitus, hypercholestrelemia, smoking, sedentary life style and ischaemic heart disease among male and female are shown in **Table III**. **Table IV** showed that 78(78%) had cerebral infarction and 22 (22%) had primary intracerebral hemorrhage, verified by CT scan of brain. Forty-two (42%) and 11(11%) of males, while 36(36%) and 11(11%) of females suffered from cerebral infarction and cerebral hemorrhage respectively. Out of 100 patients, 43(52.4%) males and 39(47.6%) females had a GCS between 12-15/15 while 6(66.7%) males and 3(33.3%) females had a GCS between 8-11/15. Four (44.4%) males and 5(55.6%) female who died during their hospital stay, had GCS between 3-7/15; of them 04 had cerebral hemorrhage and 05 had cerebral infarction. At the time of discharge from hospital, 46(46%) showed slight improvement and were dependant for bath, toilet, feed and other daily activities; while 32(32%) showed marked improvement, and 13(13%) were independent regarding daily activities.

TABLE I:
BASELINE CHARACTERISTICS (n=100)

Age (years) Mean ± SD	56.89 ± 8.92 n(%)
Male	53(53)
Female	47()47
Rural	67(67)
Urban	33(33)
Educated	29(29)
Un-educated	71(71)
Access to medical care	44(44)
No in time access to medical care	56(56)

TABLE II:
PRESENTING COMPLAINTS OF STROKE AMONG MALE AND FEMALE

Presenting complaints	Yes				No			
	Male	Female	Total	%	Male	Female	Total	%
Weakness on Left side	44	39	83	83.0	-	-	--	--
Weakness on Right side	9	8	17	17.0	-	-	--	--
Vomiting	2	1	3	3.0	51	46	97	97.0
Headache	13	11	24	24.0	40	36	76	76.0
Fits	0	4	4	4.0	53	43	96	96.0
Loss of speech/ Aphasia	8	3	11	11.0	45	44	89	89.0
Coma	**10**	**8**	**18**	**18.0**	**43**	**39**	**82**	**82.0**

TABLE III:
RISK FACTORS OF STROKE AMONG MALE AND FEMALE

Risk Factors	Male				Female			
	Count	% within Gender	% within Risk	% of Total	Count	% within Gender	% within Risk	% of Total
History of Hypertension	35	66.0	59.3	35.0	24	51.1	40.7	24.0
History of DM	13	24.5	44.8	13.0	16	34.0	55.2	16.0
History of Hypercholesteremia	9	17.0	47.4	9.0	10	21.3	52.6	10.0
History of Smoking	18	34.0	94.7	18.0	1	2.1	5.3	1.0
History of Sedentary Life Style	8	15.1	47.1	8.0	9	19.1	52.9	9.0
History of IHD	6	11.3	37.5	6.0	10	21.3	62.5	10.0
History of Previous Stroke	6	11.3	50.0	6.0	6	12.8	50.0	6.0

TABLE IV:
CT SCAN FINDINGS AND GCS SCORE OF STROKE PATIENTS

GCS	Gender	CT				Total	
		Cerebral Infarction		Cerebral Hemorrhage			
		Count	% of Total	Count	% of Total	Count	%
3-7	Male	2	22.2	2	22.2	4	44.4
	Female	3	33.3	2	22.2	5	55.6
8-11	Male	5	55.6	1	11.1	6	66.7
	Female	1	11.1	2	22.2	3	33.3
12-15	Male	35	42.7	8	9.8	43	52.4
	Female	32	39.0	7	8.5	39	47.6
Total		78	78.0	22	22.0		

DISCUSSION

Stroke is a major cause of morbidity and mortality with disability and social dependence throughout the world. Although, identifying the risk factors and modifying them remain the most important means of reducing stroke incidence. Increasing age is clearly the strongest determinant of the number of new cases of stroke each year.[11] The mean age of stroke in our study was 56.89 years, which was lower than in the west where incidence is between 76 to 80 years.[12-15] Role of gender in predicting the stroke type is controversial. In a population based case control study, men were noted to have odds ratio of 3.51 for ischemic infarctions[16], however, another study did not show any difference.[17] We also did not find any significant gender difference between the two stroke types. The proportion of cerebral infarction varied between 55% to 70.1% in the local studies and 60% to 84% in the western while most of the local, South Asian and the eastern studies have suggested that the intracerebral hemorrhage was 21% to 45% as compared in the west i.e. 10% to 20%.[18-21] We found in our study 78% cerebral infarction and 22% hemorrhagic stroke. HTN is the most prevalent and powerful modifiable risk factor for both ischemic and hemorrhagic stroke, irrespective of geographic region and ethnic group.[22,23] Persons with HTN are about 3 or 4 times more likely to have a stroke.[24,25] Risk of stroke can be reduced by at least 38% with control of hypertension[26]. Stroke risk mainly depends on the quality of blood pressure control as evidenced by studies from UK and Netherlands[27,28] The frequency of hypertension in our patients was 59% which was similar to 60% and 62% as reported in other studies[29,30] and lower to 72% and 85% as reported by Sacco et al[31] and Feigin et al[32] respectively. The proportion of diabetes mellitus in our patients was 29% which is more than 20% as reported by Jorgensen et al[33] but lower to 41% reported by Awada et al[34]. We found that diabetes mellitus in patients increase the likelihood of ischemic stroke by more than 3-folds. Results from a hospital based stroke database revealed that DM an independent predictor of ischemic stroke in woman and subsequent study from the same database revealed that diabetes increases the likelihood of ischemic stroke by approximately 2-folds.[34,35] Hypercholesterolemia (>250mg/dL) was found to be an independent predictor of ischemic vs hemorrhagic strokes.[36-38] It is logical to assume that presence of hypercholesterolemia would increase the likelihood of ischemic stroke as this is an important risk factor for atherosclerosis. In the presence of hypertension, it may accelerate the atherosclerotic process further. We found hypercholesterolemia in 19% of our patients which is almost similar to 11-23% reported in other studies.[37,38] The estimated risk for stroke among smokers in our study patients was 19%, and was an independent risk factor among males (94.7%), whereas local studies showed somewhat similar pattern of smoking as those in the west.[3,35,36] The frequency of sedentary life-style in our study patients was 16%, almost similar as reported in other studies.[12,13,37] Cardiovascular disease is common in patients with stroke. It increases the estimated risk of stroke by 2 to 4 times.[15] The frequency of IHD found in our population was 16%, while Western series had much higher frequency (35% to 72%).[3,18,35,37] It was also noted that ischemic heart disease is an independent predictor of ischemic stroke. Common risk factors for IHD and ischemic stroke may partly explain this relationship.[38] History of previous stroke/TIA was shown to be associated with ischemic strokes in hypertensive patients [17] and we found history of previous stroke in 12% of patients.

CONCLUSION

Stroke is frequent, recurring, and is more often disabling than fatal. The importance of preventing measures for a disease that has identifiable and modifiable risk factors must be emphasized. We found that hypertension, smoking, DM and hypercholesterolemia were major modifiable risk factors in the development of stroke. If these factors are detected and treated earlier then we can reduce the incidence and prevent the development of stroke. We did not found any significant gender difference between two stroke types.

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AUTHOR AFFILIATION:

Dr. Suhail Ahmed Almani *(Corresponding Author)*
Associate Professor
Incharge Department of Medicine
Liaquat University of Medical & Health Sciences
(LUMHS), Jamshoro, Sindh-Pakistan.
Email: saalmani123@yahoo.com

Dr. Muzaffar Shaikh
Department of Medicine
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. Mumtaz Ali Shaikh
Associate Professor of Medicine
Mohammad Medical College
Mirpurkhas, Sindh-Pakistan.

Dr. Khalid Shaikh
Lecturer
Department of Medicine
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. M. Qasim Rahopoto
Assistant Professor
Department of Medicine
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. Ghulam Hussain Baloch
Department of Medicine
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. M. Iqbal Shah
Senior Lecturer
Department of Medicine
LUMHS, Jamshoro, Sindh-Pakistan.