

STROKE AND ITS RELATIONSHIP TO RISK FACTORS

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ABSTRACT

Background: Stroke is a medical emergency and can cause permanent neurological damage, complications, and death. This trial was conducted to study the risk factors for stroke in our set up.

Material & Methods: This observational study was conducted in Department of Medicine, Saidu Teaching Hospital Swat, from January 2006 to December 2006. Eighty-eight patients, 62 males and 26 females with stroke were included in the study. History, general physical and neurological examination was recorded. Relevant investigations were performed, risk factors noted and the outcome studied after one week.

Results: Out of 88 patients, 62 were males and 26 females with age range of 45-95 years (Mean 65.9 ± 9.15). Cerebral infarction constituted 50%, intra-cerebral hemorrhage 29.5% and subarachnoid hemorrhage 11.3%. Hypertension was the most common risk factor 68 (75%) followed by diabetes mellitus 48 (54.5%), ischemic heart disease 32 (36.3%), hyperlipidaemia 12 (13.6%), smoking (13.6%) and valvular heart disease 6 (6.8%). Most of these patients on presentation were semi-comatosed (50%), few were comatosed (29.5%) or alert (20.5%) at presentation. The outcome of these patients was recorded after a week of presentation and it showed mortality in 24 (27.2%). There was no improvement in 22 (25%), 30 (34%) partially improved while complete recovery occurred in 12 (13.6%).

Conclusion: Mortality rate in stroke is 27.2% in our set up. The main risk factors for stroke are hypertension, diabetes mellitus, ischaemic heart disease, hyperlipidaemia and smoking. These can be modified by proper health education.

Key words: Stroke, Risk factor, Hypertension, Diabetes mellitus.

INTRODUCTION

A stroke is the rapidly developing loss of brain functions due to a disturbance in the blood vessels supplying blood to the brain. This can be due to ischemia caused by thrombosis or embolism or due to a hemorrhage. As a result, the affected area of the brain is unable to function, leading to inability to move one or more limbs on one side of the body, inability to understand or formulate speech or inability to see one side of the visual field.¹ Stroke is the second most common cause of death and major cause of disability worldwide. Because of the ageing population, the burden will increase greatly during the next 20 years, especially in developing countries.

Stroke is a medical emergency and can cause permanent neurological damage, complications and death. It is the number two cause of death worldwide and may soon become the leading cause of death worldwide.² Risk factors for stroke include advanced age, hypertension, previous stroke or transient ischemic attack (TIA), diabetes, high cholesterol, cigarette smoking and atrial fibrillation. High blood pressure is the most important modifiable risk factor for stroke. The older terms of TIA, reversible ischaemic neurologic deficit (RIND), stroke in evolution and completed

stroke are rather misleading sometimes and may not predict the actual outcome of the disease. They represent the continuum of the same process which culminates in various degrees of morbidity or ultimately end as an unfortunate mortality.³⁻⁶

The hospital based studies conducted in Pakistan has revealed 31–40% cases of stroke due to cerebral hemorrhage and 60–69% due to ischemia in centers where facilities for CT scan were available.^{7,8} The traditional definition of stroke, devised by the World Health Organization in the 1970s, is a “neurological deficit of cerebrovascular cause that persists beyond 24 hours or is interrupted by death within 24 hours”. This definition was supposed to reflect the reversibility of tissue damage and was devised for the purpose, with the time frame of 24 hours being chosen arbitrarily. The 24-hour limit divides stroke from transient ischemic attack, which is a related syndrome of stroke symptoms that resolve completely within 24 hours. With the availability of treatments that, when given early, can reduce stroke severity, many now prefer alternative concepts, such as brain attack and acute ischemic cerebrovascular syndrome (modeled after heart attack and acute coronary syndrome respectively), that reflect the ur-

gency of stroke symptoms and the need to act swiftly.

A stroke is occasionally treated with thrombolysis, but usually with supportive care like speech therapy, physiotherapy and occupational therapy and secondary prevention with antiplatelet drugs, blood pressure control, statins, and in selected patients with carotid endarterectomy and anticoagulation.^{9,10}

This trial was conducted to study the risk factors for stroke in our set up.

MATERIAL AND METHODS

This study was conducted in Department of Medicine Saidu Teaching Hospital, Mingora Swat from January 2006 to December 2006. Stroke was defined as 'a focal neurological deficit due to vascular lesion, which may be a cerebral infarction or haemorrhage. CT scan of the brain was performed in all these patients. Inclusion criteria were all the patients fulfilling the definition of stroke admitted to the Department of Medicine. Only patients with first stroke and presenting within 24 hours after stroke were included in the study. Patients with recurrent stroke, reporting late and neurological deficit due to causes like trauma and tumor were excluded from the study.

Hypertension was defined as blood pressure $\geq 140/95$ mmHg on two separate occasions or the use of antihypertensive medication at any time before the onset of stroke. Patients were diagnosed as diabetic if fasting plasma glucose level was ≥ 126 mg/dl on more than one occasions or random glucose level ≥ 200 mg/dl on more than one occasion. Patients who were normoglycaemic at the time of presentation but history of diabetes, taking insulin or oral hypoglycaemics were also labeled as diabetics. Hyperlipidaemia was defined as cholesterol in excess of 200 mg/dl, triglycerides of more than 200 mg/dl, LDL of more than 130 mg/dl and HDL of less than 40 mg/dl in men and 50 mg/dl in women.¹¹

A detailed history of patients was taken. A general physical and detailed neurological examination was carried out. History of predisposing illnesses hypertension, diabetes mellitus, ischaemic heart diseases, valvular problems, bleeding diathesis, hyperlipidaemia, connective tissue disorders and hyperviscosity syndrome were specifically asked. Co-morbid conditions like smoking, alcoholism, drug abuse and the use of oral contraceptives and illicit and alternative drugs were also taken into account. History was taken from close relatives if the patients was unconscious, drowsy or aphasic, making direct communication with the patient impossible. These patients pre-

sented with various levels of consciousness. Coma was defined as an unconscious state from which the patient can not be aroused. Semi-coma or stuporous state was defined as a mild coma from which the patient could be aroused.

CT brain of each patient was performed. These patients were studied after one week and a detailed neurological examination was performed on all the survivors and compared with the initial clinical examination for improvement, worsening or status quo. The number of deaths was noted.

Statistical analysis of the results was performed utilizing Microsoft Excel version 2008.

RESULTS

Out of 88 patients, 62 were males and 26 females with a male to female ratio of 2.38:1. Age range of patients was 45-95 with a mean of 65.9 ± 9.15 years. Only 2.3% patients were under 50 years of age and 29.5% patients were under 60 years. All other patients were above the age of 60. (Table 1 & 2).

Ischaemic stroke constituted 44 (50%), intra-cerebral haemorrhage 26 (29.5%) and sub-arachnoid haemorrhage 10 (11.3%) cases. (Table-3).

Hypertension was the most common risk factor found in 68 (75%) cases of stroke. None of these patients were taking their anti-hypertensive medications regularly. Many of these patients had co-morbid conditions and more than one risk factor. Diabetes mellitus was present in 48 (54.5%) cases. Among these 48 patients, 44 were known diabetics while 4 patients were diagnosed as diabetics during hospital stay. Among known diabetics, 25 patients were either not using anti-diabetic medication or using it irregularly. All except 10 diabetic patients were on oral hypoglycaemic agents. Ten patients were using insulin for less than five years and were also skipping their doses. Thirty patients were suffering from both hypertension and diabetes mellitus. A big chunk of the studied patients had ischaemic heart disease (IHD) confirmed by ECG, echo, previous ETT or history of anti-anginal drugs. They numbered 32 (36.3%). Twelve (13.6%) were smokers and 12 (13.6%) were having dyslipidaemia. Six (6.8%) patients were having valvular heart disease. (Table-4).

These patients presented in various levels of consciousness. (Table-5).

Twelve (13.6%) of these patients completely recovered after one week. There were 24 deaths (27.2%). Twenty-two (25%) had no improvement or worsened while 30 (34%) had partial recovery with residual deficit. (Table-6).

Table-1: Age distribution of patients.

Age (Years)	Number	Percentage	Cumulative No.	Cumulative percentage
41-50	2	2.3	2	2.3
51-60	24	27.2	26	29.5
61-70	42	47.7	68	77.2
71-80	12	13.6	80	90.9
≥80	8	9.0	88	100

Table-2: Sex distribution of patients.

Sex	Number	Percentage
Male	62	70.5
Female	26	29.5
Total	88	100

Table-3: CT scan findings.

Finding	Number	Percentage
Infarct	44	50
Intra-cerebral Bleed	26	29.5
SAH	10	11.3
None	6	6.8
Others	2	2.2
Total	88	100

Table-4: Risk factors and predisposing conditions.

Risk Factor	Number	Percentage
Hypertension	68	75
Diabetes Mellitus	48	54.5
Ischemic Heart disease	32	36.3
Valvular Heart Disease	6	6.8
Smoking	12	13.6
Dyslipidaemia	12	13.6
Total	88	100

Table-5: Conscious level of patients.

Level	Number	Percentage
Comatose	26	29.5
Semi-conscious	44	50
Alert	18	20.5

Table-6: Clinical outcome at one week.

Outcome	Number	Percentage
Complete Recovery	12	13.6
Partial improvement	30	34.0
No improvement	22	25.0
Death	24	27.2
Total	88	100

DISCUSSION

Stroke is currently the third leading cause of death in the developed world, surpassed only by heart disease and malignancies respectively.¹ The main pathological types of stroke are cerebral infarction, primary intra-cerebral haemorrhage and subarachnoid haemorrhage. In developed countries, about 85-90% of strokes are due to cerebral infarction and 10-15% due to intracranial haemorrhage. Haemorrhagic stroke constitutes a larger percentage in Asians. The incidence of Haemorrhagic stroke in various Asian countries is as follows: Malaysia 33%, Indonesia and Singapore 26%, Taiwan 28%, Thailand, Hong Kong, Philippines and Korea 30 % while in India, the incidence of haemorrhagic stroke ranged from 35-40 % in different studies.¹² The hospital based studies in Pakistan have almost the same results.¹³

In this study, hypertension was the most common risk factor for stroke. 75% stroke patients were hypertensive. It was an utter surprise and was very unfortunate that on close probing all of these patients were non-compliant with their anti-hypertensive medications. Fifty four percent of patients were diabetics and so a very high figure (36.3%) had diabetes and hypertension both. Only 16% had only one predisposing illness. All others 84% had more than one predisposing illness. Ischemic heart disease was very prevalent (36.3%) probably because of its association with diabetes and hypertension and also possibly because of the age of these patients where IHD is more common. Thirteen percent were smokers; mostly men and a similar number were hyperlipidaemics. Seven percent were suffering from valvular heart disease and atrial

fibrillation was the underlying cause in this group which constituted exclusively females suffering from mitral valve disease and were relatively young. There is no established cause for high incidence of hemorrhagic stroke in this study but it could be social or environmental, related to generally poor control of risk factors in our population. The other reasons may be the disease pattern or different social factors in different communities.

In this study, ischemic stroke contributed ischaemic infarct 50%, intracerebral hemorrhage 29.5% and SAH 11.3%. These findings are almost comparable with that of Tanveer A¹⁴ (cerebral infarct 76% and ICH 24%), Intikhab⁸ ischaemic stroke 68%, intracerebral haemorrhage 31% and SAH 01% cases, Liaquat A¹⁵ (ischaemic stroke 69.3%, intracerebral haemorrhage 27.7%) and Memon AR¹⁶ (ischemic stroke 70% and intracerebral haemorrhage 30%). These results are also similar to similar studies done in Pakistan by Basharat RA¹⁷ (ischemic stroke 54% and intracerebral haemorrhage 46%), Javaid MA¹⁸ (ischemic stroke 56.4%, intracerebral haemorrhage 37.8%), Amin R¹⁹ (ischemic stroke 58%, intracerebral haemorrhage 35%) and Rehman S²⁰ (ischemic stroke 58%, intracerebral hemorrhage 42%). These differences may be due to the study design, number of patients, chance, and exclusion and inclusion criteria. Hypertension is found as a major risk factor in this study. This finding is almost consistent with the studies in Pakistani population.^{8,14-19} History of irregular treatment of hypertension and no check on the control of blood pressure emphasize the importance of health education program on stroke related mortality at primary health care center.

Diabetes mellitus increases the risk of stroke. Forty-eight stroke patients were diabetics in this study. In other studies, diabetes mellitus has been reported as following: Intikhab⁸ (28%), Kaul S²¹ (38%) Liaquat A¹⁴ (27%) Basharat RA¹⁶ (21%), Javaid MA¹⁷ (32%) and Al-Rajeh²² (42%).

Deaths occurred in 27.2% in the first week and these patients were all above 50 years of age and except for 6 (6.8%) of patients, all had more than one predisposing factors. Vohra EA⁷ has described a mortality of 33% in community hospital and 13% in a private setup. Basharat RA¹⁵ has reported a mortality of 20%. Similar studies by Fayyaz²³ have reported a mortality of 32.8%. In another study the same author has given an overall mortality of 11% in a study done exclusively on diabetic patients.²⁴ The cause though not given by the authors may be due to less chances of hemorrhagic stroke in diabetics who have early stiff vessels due to atherosclerosis which are probably less amenable to hemorrhage. There is probably a role of altered haemodynamics too.²⁵

CONCLUSION

Main risk factors for stroke are hypertension, diabetes mellitus, ischaemic heart disease, hyperlipidaemia and smoking in our set up. These can be modified by proper health education. This can have a great impact on the morbidity and mortality of stroke.

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