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ISCHEMIC STROKE;
FREQUENCY OF HYPERTENSION, DIABETES AND SMOKING IN PATIENTS

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ABSTRACT… Stroke is characterized by the sudden loss of blood circulation to an area of the brain, resulting in a corresponding loss of neurologic function. It is also called as cereberovascular accident (CVA) or stroke syndrome. **Objectives:** To determine frequency of hypertension, diabetes mellitus and smoking in patients with ischemic stroke. **Patients and methods:** This cross sectional study of six months was carried out in the department of medicine, Liaquat University of Medical and Health Sciences. Patients aged 20-70 years of age with ischemic stroke on CT were enrolled in the study after taking consent from caretaker of patients. Detailed history focusing on hypertension, diabetes and smoking and their duration was taken. Blood pressure was recorded and fundoscopy was done to find out diabetic or hypertensive retinopathy. Thorough neurological examination was done and blood sugar (fasting and random) was evaluated. Data was entered and analyzed using SPSS version 16. **Results:** A total of 100 patients were included in the study during study period. 64% of patients were in ≥ 50 years of age group with mean age of 52±11 years. A total of 66 (66%) were male; with male to female ratio was 2:1. Hypertension was present in 61% of cases, Diabetes was found in 32% cases and 40 patients were cigarette smokers. **Conclusions:** It was concluded that high blood pressure, diabetes mellitus and smoking are associated with ischemic stroke.

Key words: Ischemic stroke, Hypertension, Diabetes, smoking and cigarette

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INTRODUCTION

Stroke is characterized by the sudden loss of blood circulation to an area of the brain, resulting in a corresponding loss of neurologic function. It is also called as cereberovascular accident (CVA) or stroke syndrome. Stroke is a nonspecific term encompassing a heterogeneous group of pathophysiologic causes, including thrombosis, embolism, and hemorrhage[1]. Arterial dissection and thrombophilia are unusual causes of stroke; although the final cause may remain undetermined in 21% to 31%[2]. Stroke remains a major cause of mortality and morbidity worldwide. The burden of stroke arises largely from the elderly population[3]. Strokes currently are broadly classified as hemorrhagic or ischemic. Acute ischemic stroke refers to stroke caused by thrombosis or embolism and accounts for 85% of all strokes[4]. Incidence for first-time stroke is more than 400,000 per year. At current trends, this number is projected to jump to one million per year by the year 2050[5]. Numerous risk factors for stroke have been identified and classified into modifiable and non modifiable risk factors[6]. Modifiable risk factors are; hypertension, cigarette smoking, diabetes mellitus, physical inactivity, hyperlipidemia, carotid artery stenosis, elevated homocysteine, atrial fibrillation, transient ischemic stroke, protein C and S deficiency and systemic inflammation[7]. Non-modifiable risk factors are; old age, male sex, race and genetic predisposition[8]. Hypertension affects at least 65 million people in the United States and is major risk factor of cerebral infarction. Higher the blood pressure greater would be stroke risk[9]. High blood pressure contributes to 70% of all strokes. Both systolic and diastolic blood pressures lead to ischemic stroke[10]. Control of blood pressure contributes to the prevention or reduction of the other target organ damage. By controlling hypertension risk of stroke can be reduced by 38%[11]. Diabetes mellitus is modifiable risk factor; patients with type 2 diabetes have 2 to 5 fold increased risk of stroke compared to non diabetics[12]. DM predicted incident of stroke in

several studies, with similar hazard ratio, possibly related to diabetic angiopathy in cerebral blood vessels. Fasting blood sugar and glycosylated hemoglobin (Hb A_{1C}) were significant risk factors for the stroke[13]. In recently published observations of 5017 patients with ischemic stroke revealed that diabetes was significantly higher in subject with small cereberovascular accidents (35.5%)[14]. igarette smoking is well established risk factor for all cause mortality as well as vascular disease mortality such as ischemic stroke. Heavy cigarette smokers (smoke > 40 cigarettes per day) are at much higher risk of developing vascular diseases compared to light smokers (smoke <10 cigarettes per day). Both current and/or past smoking is associated with high morbidity and mortality[15]. Smoking is known to promote vascular endothelium damage and procoagulate stat[16]. It had been established in older adults the stroke risk associated with cigarette smoking fall to lowest level within five years of its cessation[17]. The purpose of this study was to determine frequency of modifiable risk factors, such as, hypertension, diabetes mellitus and smoking in ischemic stroke, so targets of primary and secondary prevention can be achieved which may help us in reducing mortality and morbidity due to stroke as well as improving rehabilitation of such patients.

PATIENTS AND METHODS

This cross sectional study of six months was carried out in the department of medicine, Liaquat University of Medical and Health Sciences. The inclusion criteria of the study were the patients aged 20-70 years, of either gender, known hypertensive, diabetic or smoker and CT scan brain demonstrate ischemic stroke whereas the exclusion criteria of the study were Patients diagnosed to have tuberculous meningitis, brain tumor, viral encephalitis and multiple sclerosis. The patients who meet inclusion criteria were enrolled in the study after taking consent from caretaker of patients. A detailed history was taken, emphasizing on hypertension and duration, diabetes and its duration and cigarette smoking/ day and its duration. Blood pressure was recorded and fundocopy was done to find out diabetic or hypertensive retinopathy. Thorough neurological examination was done and Blood sugar (fasting and random) was also evaluated.

The data was entered and analyzed by using SPSS version 16. The nominal data (Gender, smoking, hypertension and diabetes) was presented in frequencies and percentages, numerical data (age, blood pressure, fasting and random sugar levels) by mean, minimum, maximum and standard deviation. Male to female ration was also calculated.

RESULTS

A total of 100 patients were included in the study during study period. Sixty four percent of patients were in ≥ 50 years of age group with mean age of 52±11 years. Mean age in male was 53.4±11 years and in female 51±12years (Figure 1). Minimum age was 24 years and maximum age 70 years. A total of 66 (66%) were male; with male to female ratio was 2:1 (Figure 2). Among these patients 85% were presented with focal neurologic deficits followed by unconsciousness accounting for 70% (Figure 3).

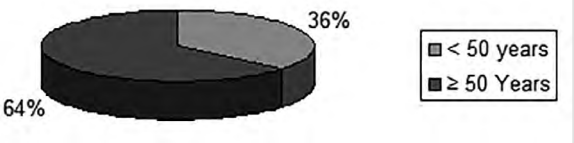

Fig-1. Age distribution

Mean Age: 52±5 (Minimum 24 and maximum 70 years)

Fig-2. Gender distribution

Male to female ratio: 2:1

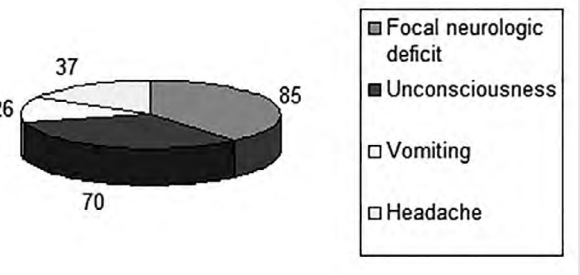

Fig-3. Clinical presentation

Hypertension was present in 61% of cases. The mean systolic blood pressure was 140.5±2.3 and mean diastolic BP was 95±2.5 mmHg in overall population whereas mean systolic and diastolic blood pressure in male and female population was 141±2.6 / 95.4±2.5 and 140±2 / 95±2.6. The hypertension is more common in male (60%) and it is not statistically significant, p-0.47 (Table I). It is higher in older age group (53.1%) and it is statistically significant (p-0.01) Table II.

Gender	Hypertension		Total
	Yes	No	
Male	40 (60%)	26 (40%)	66
Female	21 (61%)	13 (39%)	34
Total	61	39	100

Table-I. Gender distribution of patients of stroke with Hypertension

P-0.47
Note: Out of 61 patients with hypertension 65.5% were male.

Age group	Hypertension		Total
	Yes	No	
< 50 years	28 (77.7%)	8 (22.3%)	36
≥ 50 Years	34 (53.1%)	30 (46.9%)	64
Total	62	38	100

Table-II. Age distribution of patients of stroke with Hypertension

P-0.01
Note: out of 61 patients with hypertension 55.7% were ≥ 50 Years of age

Diabetes was found in 32% cases. Diabetes is more common in male but statistically not significant p-0.86 (Table III). It is common in older age group (32.8%) and statistically significant, p-0.04 (Table IV). A total of 40 patients were current smokers. The mean cigarette smoking per day was 22.8±5 (Table V). Though smokers were more than 50 years of age but the findings are not statistically significant (Table VI).

Gender	Diabetes		Total
	Yes	No	
Male	21 (31.8%)	45 (68.2%)	66
Female	11 (32.3%)	23(67.7%)	34
Total	32	68	100

Table-III. Gender distribution of patients of stroke with diabetes

P-0.86
Note: Out of 32 patients with diabetes 67.7% were male.

Age group	Diabetes		Total
	Yes	No	
< 50 years	10 (27.7%)	26 (72.3%)	36
≥ 50 Years	22 (32.8%)	42 (67.2%)	64
Total	32	68	100

Table-IV. Age distribution of patients of stroke with Diabetes

P-0.25
Note: Out of 32 patients with diabetes 62.5% were ≥ 50 Years of age

Smoking	Frequency	Percent
Yes	40	40.0
No	60	60.0
Total	100	100.0

Table-V. Smoking associated with ischemic stroke

Mean cigarettes / day: 22.8±5

Age group	Smoking		Total
	Yes	No	
< 50 years	13 (36.1%)	23 (63.9%)	36
≥ 50 Years	27 (42%)	37 (58%)	64
Total	**40**	**60**	**100**

Table-VI. Age distribution of patients of stroke with smoking

P-0.39
Note: Out of 40 patients with diabetes 67.5% were ≥ 50 Years of age

DISCUSSION

Acute ischemic stroke refers to stroke caused by thrombosis or embolism and accounts for 85% of all strokes[18]. Stroke is the second most common cause of death in the world,[19] and it remains a major cause of long-term disability[20]. In recent years, significant advances have also been made in stroke prevention, supportive care, and rehabilitation. With emerging evidence that the brief counsel of emergency physicians may impact primary and

secondary prevention of disease processes, the emergency medicine specialty is also challenged to be vigilant in utilizing "teachable moments" or "brief negotiated interviews" to impact patient education, awareness, and compliance with established preventative treatments. However, the success of this strategy depends on the recognition and control of all important causal and modifiable risk factors[21]. The primary aim of this study was to determine association of modifiable risk factors such as hypertension, diabetes mellitus and smoking.

In this study, out of 100 patients with ischemic stroke, 64% patients were ≥50 years of age and 66% were male. This finding is consistent with international literature. A study was conducted in the northern Manhattan in 2004, it described 63% patients were older age group and 62.7% were male[4]. Other international studies also described male dominance in patients with ischemic stroke[22,23]. In our study the mean age was 52 ± 5 years and male to female ratio was 2:1. In a study conducted in Nigeria and published in BMC Neurology 2008 described mean age 58±9 years and male to female ratio similar to our study i.e. 2.1:1[24].

The clinical signs and symptoms of stroke are depending upon involvement of the involved area of brain. Headache, vomiting, diplopia, Hemiplegia or hemipareses and a decreased level of consciousness develop if the area of involvement is sufficiently large. Headache and vomiting can also occur[25]. The common clinical presentation in this study was focal neurological signs and unconsciousness were common clinical presentation of hemorrhagic stroke each accounting 85% and 70% respectively. Headache was present in 41% cases. Studies from Nigeria and Pakistan reported similar clinical presentation in patients with stroke[24,26].

In this study hypertension was identified as most common cause of ischemic stroke accounting for 61% of cases. The patients with hypertension were male (65.5%) belongs to older age (≥ 50 years) group (55.7%). Many international studies described that hypertension was the most common single risk factor in patients with ischemic stroke followed by smoking and diabetes mellitus[22,24]. In this study the mean systolic BP was 140.5±2.3 and mean diastolic pressure was 95±2.5. Similar findings were reported by Khan et al[26].

Cigarette smoking is a potent risk factor for ischemic stroke. It increases stroke risk by producing acute effect on the risk of thrombus generation in narrowed arteries and chronic effect to an increased burden of atherosclerosis. It had been established association of smoking in older age group in ischemic stroke. In this study the second most common risk factor was smoking accounting for 40% cases. This was followed by diabetes mellitus. Khan et al reported that 58.1% patients with ischemic stroke were smokers and 32.7% patients were diabetes[26].

In this study 32 patients with ischemic stroke were diabetes. It is more common in male (67.7%) and older age (≥ 50years of age group) grouo (62.5%). But this finding is not statistically significant. Khan et al, Nigel et al and John et al reported similar results[26, 22,24].

In this study the combination of smoking and hypertension was found in (20.4%), combination of diabetes mellitus and hypertension was present in 19.3% cases and combination of hypertension, diabetes and smoking was present in (5.7%) cases in patients with ischemic stroke.

In this study 22 patients with ischemic stroke had no identifiable risk factors. This has also been reported by a study[26].

CONCLUSIONS

It was concluded that high blood pressure, diabetes mellitus and smoking are associated with ischemic stroke both as single and multiple risk factors. These risk factors were found in male patients older than 50 years so priority should be made to treat these patients to avoid morbidity and mortality. We propose a population based study to know all risk factors in order to develop preventive model that can be used in our setup.

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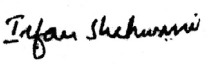
"When choosing between two evils,
I always like to try the one
I've never tried before."

Mae West (1892-1980)

AUTHORSHIP DECLARATION

Sr. N.	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Irfan Murtaza Shahwani	Contribute to conception and design, acquisition of data, analysis and interpretation of data	
2	Dr. Faisal Shahab	Drafting the article and shares its expert research opinion and experience in finalizing the manuscript	
3	Dr. Shuaib Ansari	Contributed in conception and interpretation of data and give his expert view for manuscript designing	
4	Dr. Syed Zulfiquar Ali Shah	Analysis and interpretation of data Contributed in conception and shares its expert research opinion.