Original Article

Prevalence of Hyperlipidemia in Adult Stroke Patient at Liaquat University Hospital Jamshoro, Sindh

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ABSTRACT

Stroke is most frequently found neurological problem with very high mortality & morbidity. It is common in Pakistani population. Hyperlipidemia is a potent risk factor for ischemic stroke.
OBJECTIVE: To observe the prevalence of hyperlipidemia in adult stroke patients and its comparison with patients of stroke without hyperlipidemia.
METHODS: Cross sectional descriptive study conducted in Medical wards of Liaquat University of Medical and Health Sciences Jamshoro / Hyderabad from June 2007 to November 2007.
RESULTS: Out of 100 patients 67 were males & 33 were females with mean age of 55.48 years. 71% had cerebral infarction and 29% had cerebral hemorrhage. Twenty patients had ischemic stroke because of dyslipidemia, while all patients with hemorrhagic stroke had normal lipid profile. Other important risk factors were hypertension 50 %, diabetes 30% and cigarettes smoking 10%.
CONCLUSION: Hyperlipidemia is strongly related with ischemic stroke. Proper awareness and treatment of dyslipidemia is required for both primary & secondary prevention of stroke.

KEY WORDS: Hemorrhage, hyperlipidemia, ischemia, stroke.

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INTRODUCTION

Stroke is classically characterized as a neurological deficit attributed to an acute focal injury of the central nervous system due to impairment of cerebral circulation, resulting in abnormal perfusion of brain causing acute neurological deficit. Blood supply may be impaired by cerebral infarction, intracerebral hemorrhage and subarachnoid hemorrhage. Stroke is about 25% to 30% more common in males. Stroke is a major cause of disability and third leading cause of death worldwide. [1]

There are two types of stroke.

1. Ischemic strokes (87%) result from an arterial obstruction by a thrombus or embolus.
2. Hemorrhagic strokes (13%) which are caused by rupture of artery.

Transient ischemic attack caused by a temporary clot often called as “mini stroke”.[2] World Health Organization reports 15 million people are sufferer of stroke worldwide each year. Out of those 15 million, 5 million die and another 5 million are permanently disabled. It is more frequently found in third world countries. About 20% of the world's population lives in South Asia and stroke is 5 -10 times more frequent in South Asia than USA and UK. In Pakistan stroke incidence is not exactly known but the estimated annual incidence is 250/100,000, translating to 350,000 new cases every year. Contrary to decline in the incidence of the disease in the Western population, the burden of the disease in South Asian countries (India, Pakistan, Bangladesh, and Sri Lanka) has inclined and is expected to rise.[3,4]

Worldwide non-modifiable risk factors are age, sex, family history, race and ethnicity while the modifiable ones include hypertension, cardiac disease, diabetes mellitus, hyperlipidemia, cigarette smoking, alcohol abuse, physical inactivity, carotid stenosis and transient ischemic attack.[5]

Many international and national studies suggest the strong link of dyslipidemia with ischemic stroke. Studies established direct relationship of ischemic stroke with increased serum triglycerides, total cholesterol, low-density lipoprotein and cholesterol.[6]

Few studies conducted on stroke and its risk factors in Sindh, so this study was designed to observe the role of dyslipidemia as a risk factor for stroke in poor population of interior of Sindh.

Objectives: To observe the prevalence of hyperlipidemia in adult stroke patients and to compare their clinical and demographic features with patients of stroke without hyperlipidemia.

MATERIAL AND METHODS

Study design: Cross sectional descriptive study.
Setting: Medical wards of Liaquat University of Medical and Health Sciences Jamshoro / Hyderabad.
Duration: Six months (01-06-2007 to 30- 11-2007).

Sample size: One hundred cases of stroke patients.
Sample technique: Non-probability convenience sampling.

Inclusion Criteria:

- All patients of stroke both male and female of age more than 20 years.

Exclusion Criteria:

- Patients suffering from Tuberculosis, Meningitis, Brain tumor, Viral or Bacterial encephalitis and Multiple sclerosis.
- Patients taking cholesterol lowering drugs.
- Patients addicted to alcohol.

Data collection procedure:
This study was carried out at the department of medicine at Liaquat university hospital Jamshoro from June 2007 to November 2007. After informed consent from patients proforma was filled. Detailed history and thorough clinical examination was carried out. Risk factors were evaluated. In addition to routine investigations fasting lipid profile, ECG and in some selected patient's echocardiography were performed. CT scan brain plain of all patients was performed. Sample of venous blood after 12 hour fasting on third day of admission was sent for analysis of fasting lipid profile, than sample analyzed for Total Cholesterol and triglyceride by enzymatic colorimetric method. HDL Cholesterol was determined after precipitation of chylomicron VLDL and LDL by adding phosphotungistic and magnesium ions.

Data analysis:
It was done by using SPSS Version 16.00 software.

RESULTS

One hundred patients of stroke were included in this study. Out of 100, 67 were males & 33 were female patients. Mean age of patients was 55.48 years with SD 11.61 for all cases, while mean age in male 55.34 years with SD 10.67 and mean age in female was 50.21 years with SD 13.34 respectively. Most of the patients belong to age group 60 to 70 years. Sixty eight patients were urban and 32 were rural residents. Forty one were physically active while 59 had sedentary life style. Data analysis shows that 71% had ischemic stroke with mean age 57.61 years with SD 10.51 and 29% had hemorrhagic stroke with mean age 50.24 and SD 12.67.The clinical features at the time of presentation are shown in Table I.
Dyslipidemia was present in twenty patients of ischemic stroke as only risk factor while all patients with hemorrhagic stroke had normal lipid profile. Other risk factors in relation to stroke shown in Table II.
The clinical and demographic features of stroke patients due to hyperlipidemia are shown in Table III.
The comparison of clinical & demographic features of patients of stroke due to hyperlipidemia and other risk factors are shown in Table IV.

TABLE I: CLINICAL FEATURES OF PATIENTS WITH ISCHEMIC STROKE & HEMORRHAGIC STROKE

Clinical features	No: of Patients (n=100)%	Type of Stroke	
		Ischemic stroke (n=100)%	Hemorrhagic stroke (n=100)%
Loss of consciousness	75(75%)	46(46%)	29(29%)
Hemiplegia / Hemiparesis	94(94%)	71(71%)	23(23%)
Headache/ Vomiting	41(41%)	12(12%)	29(29%)
Dysphasia/ Aphasia	69(69%)	69(69%)	00(00%)
Signs of meningeal irritation	13(13%)	01(01%)	12(12%)
Signs of Hyperlipidemia	09(09%)	09(09%)	00(00%)

TABLE II: PERCENTAGE OF RISK FACTORS IN RELATION TO SEX & TYPES OF STROKE

Risk factors	No: of Patients (n=100)	Sex		Types of Stroke	
		Male	Female	Ischemic stroke	Hemorrhagic stroke
Hypertension	50 (50%)	39 (78%)	11(22%)	21 (42%)	29 (58%)
Diabetes mellitus	31 (31%)	15(49%)	16 51%)	29 (94%)	02 (06%)
Hyperlipidemia	20 (20%)	09(45%)	11(55%)	20(100%)	00 (00%)
Smoking	10 (10%)	08(80%)	02(20%)	10(100%)	00 (00%)
Atrial Fibrillation	08 (08%)	07(88%)	01 (12%)	08(100%)	00 (00%)
Polycythemia	01 (01%)	01 (01%)	00 (00%)	01(100%)	00 (00%)

TABLE III: CLINICAL AND DEMOGRAPHIC FEATURES OF STROKE PATIENTS DUE TO HYPERLIPIDEMIA (n=20)

Parameters		Total Patients of Hyperlipidemia	Ischemic Stroke	Hemorrhagic Stroke
Age	18-39	02(10%)	02(10%)	0(00%)
	40-59	03(15%)	03(15%)	0(00%)
	60-70	15(75%)	15(75%)	0(00%)
Sex	Male	09(45%)	09(45%)	0(00%)
	Female	11(55%)	11(55%)	0(00%)
Resi-dence	Urban	11(55%)	11(55%)	0(00%)
	Rural	09(45%)	09(45%)	0(00%)
Life-style	Active	07(35%)	07(35%)	0(00%)
	Sedentary	13(65%)	13(65%)	0(00%)
Onset	Sudden	10(50%)	10(50%)	0(00%)
	Gradual	10(50%)	10(50%)	0(00%)
Loss of consciousness		15(75%)	15(75%)	0(00%)
Headache/ Vomiting		04(20%)	04(20%)	0(00%)
Hemiplegia/ Hemiparesis		20(100%)	20 (100%)	0(00%)
Dysphasia/ aphasia		19(95%)	19(95%)	0(00%)
Signs of men-ingeal irritation		00(00%)	00(00%)	0(00%)
Sign of hyperlipidemia		03(15%)	03(15%)	0(00%)

DISCUSSION

Stroke is one of the fatal disabilities causing neurological disorder with high prevalence and great socioeconomic burden worldwide. The magnitude of problem is varied geographically but enormously high in Asia. In third world countries incidence of stroke is increasing as compared to previous, probably due to increase in the prevalence of risk factors. Stroke is highly prevalent in Pakistan it is closer to 250 per 100,000 people.[7]

In a study conducted in urban poor population in Karachi authors found that prevalence of stroke is almost twice than reported prevalence in the world. Stroke has got well established associated risk factors and important modifiable risk factors among the hypertension, smoking, dyslipidemia and diabetes mellitus are very well known.[8]

TABLE IV: COMPARISON OF CLINICAL & DEMOGRAPHIC FEATURES OF PATIENTS OF STROKE DUE TO HYPERLIPIDEMIA AND OTHER RISK FACTORS

Demographic features and Clinical features		Stroke due to Hyperlipidemia (n=20)	Stroke due to other risk Factors (n=80)
Age (mostly)		60 - 70	40 - 70
Sex	Male	09(45%)	58(73%)
	Female	11(55%)	22(27%)
Residence	Urban	11(55%)	57(71%)
	Rural	09(45%)	23(29%)
Lifestyle	Active	07(35%)	34(43%)
	Not active	13(65%)	46(57%)
Onset (mostly)		**Gradual or Sudden**	**Sudden**
Loss of Consciousness		15(75%)	60(75%)
Headache / Headache		04(20%)	37(46%)
Hemiplegia / Hemiparesis		20(100%)	74(93%)
Dysphasia / Aphasia		19(95%)	50(63%)
Signs of Meningeal irritation		0(00%)	13(16%)
Signs of Hyperlipidemia		08(40%)	01(01%)

In this study mean age of patients was 55.48 years with SD 11.61, while age of patients with stroke due to hyperlipidemia was ranged between 60 to 70 years which is almost same as seen by Hamzullah khan and Rafique Ahmed in their studies. It is a well known fact that older people carries high risk of stroke, which is doubled every decade after the age of 55. In Pakistan stroke occurred at an average age of about 50 years patients which is about 5-10 times higher than western countries.[4,9, 10]

In this study frequency of ischemic stroke patient was 71% while of hemorrhagic stroke was 29% which is comparable with a study by Salman Khan and Farrukh Iqbal who also noted that 72.4% patients suffered from Ischemic stroke & 27.6% from hemorrhagic stroke. In another study researchers reported 68% & 32% of ischemic & hemorrhagic stroke respectively although in the literature frequency of ischemic stroke is near about 87% and of hemorrhagic stroke is 13%[3] worldwide indicate that primary hemorrhages constitute a higher percentage of all strokes, ranging from

10% to 25%.[11,12]

Next parameter of study was gender; males were suffered twice than females. In this study males sufferer were 67% and females were 33%, which is almost same as seen by Hamzullah and in which males were 60% & females were 40% and Syed Riazul Hassan found 41% female and 59% males. In this study among the dyslipidemia patients there was female predominance 55% as males were 45%.[9,13]

Hypertension is a major risk factor for both cerebral infarction and intracerebral hemorrhage. A reduction in diastolic blood pressure of 6 mmHg leads to a marvelous reduction of 42% in risk of stroke over 5 year. Syed NA et al reported that approximately 77% of their cohort had diabetes mellitus, hypertension or both. In this study 50% patients had hypertension, 31% had diabetes, 10% were cigarette smokers and 1 patient suffered from polycythemia. Polycythemia with other hyper coagulation disorders is sometimes the only cause of stoke observed by several authors.[14,15]

In this study population of patients whose stroke was associated with hyperlipidemia was 20% which is comparatively less than other researchers who observed in 37% abnormal lipid profile in stroke. All these patients suffered from the ischemic stroke. Dyslipidemia is an important risk factor for stroke. Role of LDL – C and HDL-C is significantly observed by Vijay and other authors.[6,16]

Large case series conducted by different authors on modifiable risk factors shows, hypertension was the most common modifiable risk factor seen in 43-66%, followed by diabetes mellitus 27-42%, then dyslipidemia 19-30%, smoking in 11-43%, ischemic heart disease 9-46% and previous stroke or TIA 11-26%.[17-19]

Another study conducted at Shifa International Hospital (SIH), Islamabad by Basharat and Mumtaz found dyslipidemia in 59.1% and 32.7% by study on patients at Jinnah Post Graduate Medical Centre while evaluating risk factors for ischemic stroke.[20, 21]

Dyslipidemia is a major public health issue. The National health Survey reported that 12% population above the age of 15 years is suffering from hypercholesterolemia. From various studies it is clear that hypertension, smoking, dyslipidemia and diabetes mellitus are most important causes of stroke. For the control of this deadly disease awareness and proper treatment of its associated risk factors are essential.

Statins are recommended for the prevention of recurrent stroke as mentioned in Stroke guidelines from many of the Asian countries. There is evidence suggesting that use of statins at the time of an ischemic stroke may have beneficial effects. Statins decreases the risk of stroke by improving hypercholesterolemia. As stroke carries high mortality and morbidity identification and curtailing important risk factors is the need of time. As hyperlipidemia is highly prevalent risk factor for stroke in our society its identification and treatment is warranted.[22]

CONCLUSIONS

Stroke prevalence is very high in Pakistan. Hyperlipidemia is one of the important modifiable risk factor for ischemic stroke. Females are more prone to develop ischemic stroke because of dyslipidemia. Proper awareness and treatment of dyslipidemia is required for primary and secondary prevention of Stroke as high quality stroke services are not widely available and there is an urgent need of improvement in infrastructure to conduct well-designed epidemiological studies, create awareness in general public regarding stroke and improve capacity building in order to meet the future challenge.

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