

Original Article

Evaluation of pattern of dyslipidemia in acute stroke in type 2 diabetics

Torikul Islam¹, Nurul Amin Khan², Shaheen Wadud³, Liton Chandra Ghosh⁴, Farjana Bhuiyan⁵, Zobaer Ahmed⁶

¹Registrar, Department of Neuromedicine, Dhaka National Medical College, ²Associate Professor & Head, Department of Neuromedicine, Dhaka National Medical College, ³Assistant Professor, Department of Neuromedicine, Dhaka National Medical College, ⁴Assistant Professor, Department of Nephrology, Dhaka National Medical College, ⁵Medical Officer, Department of Oncology, Delta Medical College Hospital, ⁶Medical Officer, Department of Medicine, Dhaka Medical College Hospital.

Background: Stroke is a neurological disease, which is a major cause of death and disability worldwide and third leading cause of death in Bangladesh. Diabetes mellitus is more commonly accompanied by dyslipidemia which is the leading cause of atherosclerotic changes in blood vessels and which also increases the risk of stroke.

Aims: To observe the pattern of dyslipidemia in acute stroke in type 2 diabetics.

Methodology: It was a hospital based cross sectional observational study in DMCH, Dhaka. Total 100 patients of acute stroke with type 2 diabetes were enrolled in this study by purposive sampling after written informed consent. The initial clinical diagnosis of stroke was done from history obtained from patient himself or his/her attendant and confirmed by CT/MRI of brain. Patients taking lipid lowering drugs, brain tumour, meningitis, viral encephalitis and/or metabolic encephalitis, hypothyroidism and nephrotic syndrome were excluded. A standard preformed questionnaire was designed and filled up for each patient. Collected data were checked, verified for consistency and edited for finalized result. Data cleaning, validation and analysis was performed using the SPSS/PC and graph and chart by MS excel.

Results: Total 100 numbers of patients of acute stroke with type 2 diabetes patients admitted in DMCH were enrolled in this study. Eighty two (82.0%) patients had dyslipidemia and among them almost two third (60.0%) patients had total cholesterol ≤ 200 mg/dl, 64.0% had LDL > 100 mg/dl, 81.0% had HDL less than target value and 58.0% had TG > 150 mg/dl. Ischemic stroke and hemorrhagic stroke were found in 86(86.0%) and 14(14.0%) respectively. Total cholesterol, LDL, HDL, TG were not significantly ($p > 0.05$) different between two types of stroke.

Conclusion: This study was undertaken to observe the patterns of dyslipidemia in acute stroke in type 2 diabetics. Lipid profiles almost alike between Ischemic stroke and Hemorrhagic stroke. Ischemic strokes were more common in this study. Diagnosis and proper management of dyslipidemia can be an important part of prevention of stroke.

Keywords: Stroke, Diabetes, Dyslipidemia.

Introduction

Stroke may be defined as an acute, focal brain dysfunction due to vascular disease. Stroke is the most common clinical manifestation of cerebrovascular disease, and results in episodes of brain dysfunction due to focal ischaemia or haemorrhage. Cerebrovascular disease is the third most common cause of death in high-income countries after cancers and ischemic heart disease, and the most common cause of severe physical disability.¹

DM is a metabolic pathology characterized by systemic circulatory glucose accrual, accompanied by diminishing cellular glucose uptake and metabolism, as well as altered lipids and protein metabolism. These abnormalities are

the consequences of either inadequate insulin secretion or impaired insulin action or both. The main types of diabetes are type 1 and type-2 diabetes. Type 2 diabetes accounts for more than 90% cases of diabetes and is a major burden due to its rising prevalence and complications. The most important risk factor for these complications in diabetes is dyslipidemia. Dyslipidemia increases the risk of atherosclerosis which in turn increases the risk of cardiovascular disease, heart attack and stroke. According to US Center for Disease Control and Prevention it affects 70% to 97% of people with diabetes.²

With increasing number of diabetic patients diabetic dyslipidemia is also rising and both factors are combinedly

increasing the burden of stroke patients in our country, to our health system and also affecting the economy of a developing country like us. But there is very little studies are available of these problems among our people and also little information available about the pattern of dyslipidemia in acute stroke patient with type 2 diabetes.

Materials and methods

It was hospital based cross sectional observational study among 100 patients of acute stroke with type 2 diabetes who were admitted in Dhaka Medical College Hospital from April, 2015 to October, 2015 (6 months). Criteria for inclusion in this study were: (1) Acute stroke patients, (2) Patients with established known case of type 2 diabetes mellitus, (3) Age more than 30 years, (4) With informed written consent. Exclusion criteria were: (1) Patient taking lipid lowering drugs, (2) Patient with brain tumour, meningitis, viral encephalitis and or metabolic encephalitis, (3) patient with hypothyroidism and nephrotic syndrome.

Clinical information including age, sex, socioeconomic status, blood sugar level, lipid profile and type of stroke were recorded for all subjects. Here lipid profile was measured by automated biochemistry analyzer machine and every sample were taken in fasting condition and after 24 hr of acute stroke after patient stabilization.

Data were collected by a predesigned proforma. Patient's information was obtained through using patient's information sheet. All Patients were informed about the nature of the study. Their informed written consent was taken in a consent form before collecting the data. Proper permission was taken from concerned department and local ethical committee.

Statistical analyses were carried out by using the Statistical Package for Social Sciences version 16.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Chi-Square test was used to analyze the categorical variables, shown with cross tabulation. P values <0.05 was considered as statistically significant.

Results

Table I: Distribution of the study patients by age and sex (n=100)

Age-Sex distribution Age (in years)	Number of patients	Percentage
31 - 40	2	2.0
41 - 50	18	18.0
51 - 70	71	71.0
71 - 80	9	9.0

Mean±SD (in years) 60.0 ±8.9

Range (min-max) (in years) 35-80

Sex	Number of patients	Percentage
Male	82	82.0
Female	18	18.0

Table I shows age and sex distribution of the study patients, it was observed that majority (71.0%) patients belong to age 51-70 years. The mean age was found 60.0±8.9 years with range from 35 to 80 years. Majority (82.0%) patients were male and 18(18.0%) patients were female. Male female ratio was 4.6:1

Table II: Relation between type of stroke with lipid profiles (n=100)

Lipid profiles	Type of stroke				P value
	Ischemic (n=86)		Hemorrhagic (n=14)		
	n	%	n	%	
Total Cholesterol (mg/dl)					0.813ns
≤200	52	60.5	8	57.1	
>200	34	39.5	6	42.9	
LDL (mg/dl)					0.532ns
≤100	32	37.2	4	28.6	
>100	54	62.8	10	41.4	
HDL (mg/dl)					0.257ns
Male ≤40 & female ≤50	71	82.6	10	11.8	
Male >40 & female >50	15	17.4	4	4.7	
TG (mg/dl)					0.944ns
≤150	36	41.9	6	42.9	
>150	50	58.1	8	57.1	

s=significant; ns=not significant

P value reached from chi square test

Table II shows relation between type of stroke with lipid profiles of the patients. It was observed that total cholesterol, LDL, HDL and TG were not significantly (p>0.05) associated with type of stroke.

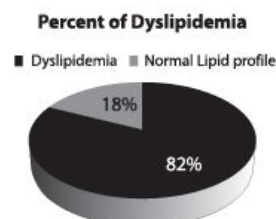


Figure-1: Percent of dyslipidemia in type 2 diabetic patient in acute stroke

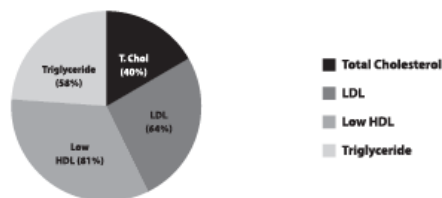


Figure-2: Pattern of dyslipidemia in Acute Stroke with Type II DM

Discussion

Dyslipidemia is defined as an abnormal level of one or more blood lipids, which most typically are total cholesterol >200 mg/dl, low density lipoprotein (LDL) >100mg/dl, high density lipoprotein (HDL) <40 mg/dl in male & <50 mg/dl in female, and/or triglyceride (TG) >150 mg/dl.³

In this present study it was observed that most (71.0%) of the patients having acute stroke in type 2 diabetics belongs to age 51-70 years and the mean age was found 60.0±8.9 years. In other study like Hossain et al.⁴ and Iqbal et al.⁵ Rahman et al.⁶ found similar findings.

In our study it was observed that acute stroke in type 2 diabetics is predominant in male subject, where the present study was found male to female ratio was 4.6:1. Similar observations regarding male predominant also observed by Pandya et al.⁷ Chowdhury et al.⁸ and Hasan et al.⁹ In this study male ratio much higher may be due to small sample size.

In this study it was observed that total cholesterol and TG were almost similarly associated with type of stroke but HDL significantly lower than target in 82.6% and LDL >100 mg/dl in 62.8% ischemic stroke patients than hemorrhagic patients. Atherogenic dyslipidaemia is characterized by increased triglyceride (TG) levels (TG ≥ 150 mg/dl) and decreased high density lipoprotein (HDL) levels (HDL ≤40 mg/dl).¹⁰ In other similar studies found majority (64.0%) of stroke patients had high TG levels and 68% had low HDL levels and among them ischemic stroke patients had much low 70.4% level of HDL then hemorrhagic stroke. Triglyceride (TG) level was high in 64.0% of stroke patients, among them ischemic stroke patients had more high level of TG (70.4%) than hemorrhagic patients.⁵

Raised serum cholesterol is an important risk factor for myocardial infarction, but its relationship with stroke was not clear.¹¹ Higher level of HDL cholesterol is associated with significant decrease risk of stroke.¹² During lipid profile assay in acute stroke patients with type 2 DM we found that 82.0% of the patients had dyslipidemia. Among the total patients, 40% patients had high total cholesterol level, 64.0% patients had LDL >100 mg/dl, majority 81.0% patients had low HDL and 58% TG >150 mg/dl. In Hossain et al.⁴ study observed 12.0% of the patients had raised serum cholesterol, similar findings also observed by Bashar.¹³ In another study Pandya et al.⁷ observed the

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mean serum cholesterol level was 188.9±43.70, mean serum triglyceride was 174.6±69.44, mean serum HDL was 46.2±17.08, mean serum LDL was 105.9±34.06.

Conclusion

Dyslipidemia is the major risk factor for stroke patients and it is more common in type 2 diabetic patients. So control of diabetes and management of dyslipidemia can play a major role in prevention of stroke.

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