ORIGINAL ARTICLE

Comparison of Serum LDL Levels in Ischemic & Hemorrhagic Stroke

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ABSTRACT

Aim: To compare the Levels of LDL in Ischemic and hemorrhagic stroke to find out the association of LDL with stroke.

Methods: This comparative study was conducted at Department of Medicine, BVH, Bahawalpur from February 2013 to August 2013. Total 618 patients were included in this study. To determine the subtype of stroke, clinical examination followed by CT brain was done. Stroke patients were divided into two groups, 309 patients in each group. Finding of infarction (hypodense on CT scan) and hemorrhage (hyper dense on CT scan) were entered in performa.

Results: Low density lipoprotein levels were increased in 180(58%) patients of ischemic stroke (Group 1) and in 120(38%) patients of hemorrhagic stroke (Group 2).

Conclusion: We proved that LDL levels are higher in ischemic stroke than in hemorrhagic stroke.

Keyword: Low density lipoproteins, stroke, Intra cerebral hemorrhage, Ischemic stroke.

INTRODUCTION

Stroke is one of the leading causes of morbidity and mortality. It is an acute neurologic injury. According to WHO, stroke is defined as 'rapidly developing clinical signs of focal or global disturbance of cerebral function, with symptoms lasting 24 hours or longer, or leading to death, with no apparent cause other than that of vascular origin. This definition includes stroke due to both cerebral infarction or intra cerebral and subarachnoid hemorrhage. An arbitrary time window of 24 hours distinguishes stroke from transient ischemic attack (TIA), which is defined as a neurological deficit lasting less than 24 hours[1].

Approximately 80 percent of strokes are due to ischemic cerebral infarction and 20 percent are due to brain hemorrhage. An infarcted brain is pale initially, within hours to days, the grey matter becomes congested with engorged, dilated blood vessels and minute petechial hemorrhages[2]. A primary intra cerebral hemorrhage damages the brain directly at the site of the hemorrhage by compressing the surrounding tissue.[3] An infracted area is due to occlusion of a cerebral artery either due to thrombus or due to embolus from small or major artery like carotid artery[4]. Majority of ischemic strokes are caused by a diminished supply of arterial blood, which carries sugar and oxygen to brain tissue. Another cause of stroke that is difficult to classify is stroke due to occlusion of veins that drain the brain. Venous occlusion causes a backup of fluid resulting in brain edema, and in addition, it may cause both brain ischemia and hemorrhage into the brain[5]. The incidence and mortality of stroke vary greatly among different populations and has declined considerably in several foreign studies[6]. Cerebrovascular diseases predominate in the middle and late years of life[7].

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MATERIAL AND METHODS

This comparative study was conducted at Department of Medicine, BVH, Bahawalpur from February 2013 to August 2013. Total 618 patients were included in this study after informed consent. An approval was taken from institutional review committee. Patients having acute neurological deficit with hypo dense or hyper dense area on CT brain were included in this study. Patients having no established infarction or hemorrhage on CT brain, patients already on lipid lowering therapy, patients with past history of cerebro vascular disease, patients having TIAs were excluded from the study. Stroke patients were divided into two groups, 309 patients in each group. Finding of infarction (hypo dense on CT scan) and hemorrhage (hyper dense on CT scan) were entered in performa. Blood sample for LDL was taken as per protocol after 8 hours of overnight fasting. Mean and standard deviation was calculated for numerical data. Categorical data was presented as frequencies and percentages. Chi-square test was applied to find out the association of LDL with stroke. P value 0.05 was considered as significant.

RESULTS

Study population consisted of 618 patients of stroke undergone CT brain. It was divided into two groups. Group 1 comprised of 309 patients having infarction (hypo dense area) on CT brain. Group 2 comprised of 309 patients having hemorrhage (hyper dense area) on CT brain (Tables 1 & 2).

Table 1: Distribution of study variables between two groups

Study Variables		Ischemic Stroke	Hemorrhagic stroke
Mean age (yrs)		60.2	59.4
Sex	Male	224(72.5%)	204(66%)
	Female	85(27.5%)	105(34%)
Diab. Mellitus		123(39.8%)	78 (25.2%)
Hypertension		130(42.1%)	226 (76.1%)
IHD		184(59.5%)	47 (15.2%)

Table 2: Comparison of LDL cholesterol in patients of ischemic and hemorrhagic stroke

Type of Stroke	LDL (>150 mg/dl)	
	Yes	No
Ischemic Stroke (Group 1)	180(58.3%)	129(41.7%)
Hemorrhagic stroke(Group 2)	120(38.8%)	189(61.2%)

P value <0.01

DISCUSSION

According to some studies increased LDL levels are associated with increased risk of ischemic stroke[8]. In some other studies, it is shown that it has no association with ischemic stroke[9]. Hemorrhagic stroke is found to have inverse relationship with elevated LDL levels[10]. In our study, in group 1 (ischemic stroke), mean age was 60.2 years while in group 2 (hemorrhagic stroke) mean age was 59.4 years. While in study conducted by Mahmood et al[11] mean age was 64.2±12 years and in Sulheria et al[12] it was 62±10 years. In our study, male to female ratio was 2.6:1 while by Mahmood et al[11,] male to female ratio was 3.6:1.

Among risk factors in our study, diabetes mellitus was present in 123(39.8%) patients of ischemic stroke and 78(25.2%) patients of hemorrhagic stroke. While according to Mahmood et al[11] out of 100 cases, DM was present in 41(41%) patients of ischemic stroke and in 25(25%) patients of hemorrhagic stroke. So diabetes mellitus is a major risk factor for ischemic stroke. In our study, hypertension was found in 226(76.1%) patients of hemorrhagic stroke and 130(42.1%) patients of ischemic stroke. While Mahmood et al[11] found that out of 100 cases, hypertension was present in 70(70%) patients of ischemic stroke and 40(40%) patients of hemorrhagic stroke. It is concluded that hypertension is a major risk factor for hemorrhagic stroke.

In our study, LDL levels were increased in ischemic stroke patients. In group 1 (ischemic stroke) patients LDL levels were increased in 180(58%) patients while these were normal in 129(42%). patients and this is comparable with the Sulheria et al[12] in which out of 40 ischemic stroke cases, LDL levels were increased in 22(55%) patients and these were normal in 18(45%) patients. In Mahmood et al[11] out of 100 cases, increased LDL levels were seen in 42(42%) patients of ischemic stroke. In group 2 (hemorrhagic stroke), LDL levels were increased in 120(38%) patients while these were normal in 189(62%) patients. This is comparable with the Sulheria et al[12] in which out of 40 hemorrhagic stroke cases, LDL levels were increased in 18(45%) patients and were normal in 22(55%) patients. In Mahmood et al[11] out of 100 cases, increased LDL levels were seen in 22(22%) patients of hemorrhagic stroke. There were significantly greater no. of patients with raised LDL levels in ischemic stroke than in hemorrhagic stroke (p <0.01).

CONCLUSION

Increased LDL levels are major risk factors for ischemic stroke as compared to hemorrhagic stroke. Hypertension is seen commonly in hemorrhagic stroke as compared to ischemic stroke. Ischemic heart disease is a major risk factor for ischemic stroke as compared to hemorrhagic stroke.

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