ABSTRACT: A prospective study of lipid profile was done in 60 patients of vertigo at E.L.M.C. Lucknow from 2011 to 2014. All components of serum cholesterol were analyzed. Serum cholesterol and hyperlipidemia as an etiology of the atherosclerosis of all blood vessels also have a role in vestibulo-cochlear vessels. It was found that there were 34 females and 26 males and maximum number of patients (63.33%) in the age group of 31-50 years. Appreciable difference (p<0.05) in the mean value of total lipid, total cholesterol, triglycerides and phospholipids in the control and study group was found but difference was not significant in the mean value of HDL, LDL and VLDL cholesterol level. Four cases of diabetes and ten cases of hypertension of 60 vertigo cases were having marked vertigo of longer duration. These findings were similar to Mehra Y.N. Thus we find that serum lipid studies are important in the patients of vertigo for the diagnosis and management.

KEYWORDS: Vertigo, Hyperlipidemia, Atherosclerosis.

INTRODUCTION: The human evolution led to acquire erect posture. The balance he needed depends upon visual, vestibular, proprioceptive and superficial sensory system. Distortion of data from above system leads to vertigo.

The membranous labyrinth within the semicircular canal consists of utricle saccule and three semi-circular membranous labyrinth. Which have special neuro-epithelium as macula and crista-ampularis to control the linear and circular acceleratory movements of the head. The vascular supply of vestibular system is from vertebro-basilar artery. The labyrinth is supplied by labyrinthine artery a branch of anterior inferior cerebellar artery.

Serum lipids mainly cholesterol, phospholipids and triglycerides increases, in most cases of vertigo (Mehra Y. N. et.al. 1980).1 Hyperlipidemia and hyper-lipoproteinemia (Stone N. J. and Levy R. L) have a role in atherosclerosis which involves all vessels of body.2 Hyper-lipoproteinemia consists of five clinical types and all have clinical significance in diagnosis and treatment. Vertebral artery and its branch anterior inferior cerebellar artery also gets compromised leading to decrease blood flow to vestibular organ especially in sudden head movement against gravity causing positional vertigo. Spencer and Chariston 1975 found 51% patients of inner ear disease have hyperlipidemia.3

Jorgesen in 1961 described PAS positive thickening of blood vessels in diabetics similar to changes found in atherosclerosis because of hyper-lipoproteinemia leading to vertebro-basilar ischemia which causes s vertigo hearing loss, ataxia, and nausea etc.4

Serum lipid studies should be done in all patients of vertigo as it has great prognostic value (Mehra Y.N. et.al. 1980).1
The lipid and lipid fractions content as well as lipoproteins were studied by Buyanovskaya O.A. and Tananona G.V. in 1981 in blood serum of 19 patients of aged 35-50yrs with menieres’s disease and found their level significantly high compared to control.5

Kitamura K. and Berreby M. in 1983 found histological evidence of atherosclerosis in vertebral basilar arteries. Torossian F. and Laredo C. in 1986 found that the patients with hyperlipidemia and of hearing loss and vertigo improved significantly when given fenofibrate for 3 months in comparison to placebo.6,7 Endothelial dysfunction is an early event in atherogenesis proceeding formation of plaque. Celermajor D.S, Sorensen K.E. et al in 1991 found endothelial dysfunction in children and adults with risk factor for atherosclerosis such as smoking and hypercholesterolemia.

Hanna A. Sadah9 in1993 found cholesterolemia as a treatable cause of vestibular vertigo. Patients on MRI who were found to have slow blood flow in the vestibular system were at higher risk of developing sudden sensory-neural deafness and vertigo and their symptoms took long to resolve on medication. Kikuchi S. and Kaga K. et al in 1993, N. Fujita, T.Ueda et al 10,11 1995 found vertigo and hyperlipidemia are both common but hyperlipidemia is not recognized as a cause of vertigo. Ahmed S. in 1996 conducted a study on 12 patients with hypercholesterolimia and disabling vestibular vertigo and found after 8-12 months of low cholesterol and lovastatin 20 mg per day, a significant improvement in vertigo.12

**MATERIALS AND METHODS:** The study was conducted on the total of 60 patients with vertigo over a period of 3yrs from 2011 to 2014 at ELMCH Lucknow. A total of 40 subjects for control were taken. Controls were patients of ear nose and throat but with no symptoms or investigatory evidence of vertigo, sensory neural deafness, diabetes mellitus, hypertension, ischemic heart disease, myocardial infarction, peripheral vascular disease etc. There were 60 patients of vertigo in the study group and those having history of trauma, surgery, sensory neural deafness and middle or inner ear infection induced vertigo were excluded.

Diagnosis was made on the basis of history and relevant investigation. All patients of study and control group were subjected for complete lipid profile tests which included total serum lipid, total serum cholesterol, Serum triglycerides, serum phospholipids, HDL cholesterol and VLDL cholesterol.

**OBSERVATION:** The study was carried out in a total of 60 patients of vertigo with 40 subjects in the control group. There were 32(53%) females and 28(47%) males in the study and 22(55%) males and 18(45%) females in the control group.
Table 1: Age distribution of control and study group

| Age group | Control group | Study group |
|-----------|---------------|-------------|
| 20-30     | 2             | 10          |
| 31-40     | 12            | 18          |
| 41-50     | 16            | 20          |
| 51-60     | 6             | 8           |
| 61-70     | 4             | 4           |
| Total     | 40            | 60          |

Figure 1: Study group distribution

Figure 2: Control group distribution
In this study all the patients were in the age group 20-70 years and maximum numbers of patients were in the 41-50 years, 33.33%. Besides in both control and vertigo group age distribution was similar with maximum numbers in 30-60 years (Table-1).

| Lipid profile          | Control group (mg/dl) | Mean value (mg/dl) | Study group (mg/dl) | Mean value (mg/dl) |
|------------------------|-----------------------|--------------------|---------------------|--------------------|
| Total lipid            | 605-787               | 690.75             | 627-916             | 723.66             |
| Total cholesterol      | 141-264               | 181.35             | 158-292             | 209.26             |
| Triglycerides          | 72-237                | 132.50             | 81-286              | 169.40             |
| Phospholipids          | 192-283               | 220.90             | 203-303             | 240.26             |
| HDL cholesterol        | 37-58                 | 46.10              | 32-47               | 41.60              |
| LDL cholesterol        | 70-173                | 131.20             | 71-226              | 139.73             |
| VLDL cholesterol       | 15-46                 | 27.70              | 16-63               | 33.46              |

Table 2: Serum lipid profile in control and vertigo group

The serum lipid profile of control and study group is shown in table-2. There is appreciable difference (p<0.05) in the mean value of total lipid, total cholesterol, triglycerides and phospholipids in the control and study group but much difference was not found in the mean value of HDL, LDL and VLDL cholesterol level.

| Lipid profile          | Control group Increased incidences | Percent (%) | Study group Increased incidences | Percent (%) |
|------------------------|------------------------------------|-------------|----------------------------------|-------------|
| Total lipid            | 12                                 | 30          | 36                               | 60          |
| Total cholesterol      | 4                                  | 10          | 18                               | 30          |
Incidences of increased lipid values of control as well as study group are shown in Table 3. Increased value of total lipid was found in 12 of 40 patients (30%) while 36 of 60 patients (60%) were having increased serum total lipid. Cholesterol was increased in 4(10%) and 18(30%) respectively in control and study group. Triglyceride was increased in 20(33.33%) of vertigo patients and phospholipids was found increased in none of the control while 13.33% showed raised in the study group.

**DISCUSSION:** A total of 60 patients in the study and 40 patients in control group were taken, for the estimation of serum lipid profile and to establish the significance of high serum lipid profile in the etiology of vertigo. Various authors (Harrold C. Pillsbury 1991) and Leonard P Rybak in 1964 established a relationship between vertigo and metabolic disorders and hyperlipidemia. In this study, only lipid profile has been evaluated. Vestibular vertigo is a common syndrome of multiple causes with increased incidence in older population (Hanna A Saddah 1993). Mehra Y N et al in 1980 found majority of patients in the age group of 30-70yrs with higher incidence in males 85% and maximum in age group of 41-50yrs.

In this study maximum patients were in the age group of 30-50yrs (63.33%) with males to female ratio of 43.33% and 56.33%. It was found that 75% of all men above 50yrs have significant atherosclerosis and its changes were established in inner ear vessels. The effects of hypertension, lipid profile and atherosclerosis on vertebral artery system were studied along with flow velocity in the vertebral artery and serum lipid. vertebro-basilar insufficiency indicate that the difference in flow velocity between right and left induce vertigo and hypertension and hyperlipidemia do increases the difference in between sides. Decrease in blood flow in vertebro-basilar artery decreases the flow in labyrinthine artery leading to peripheral vestibular disorder related to hypoxia (S. Kikuchi, K. Kaga et al 1993). Inner ear is very sensitive organ and needs continuous smooth blood flow for nutrition and removal of waste and any disruption in blood flow because of metabolic disorder induce vestibular symptoms (Leonard P, Rybak 1994).

In this study increased lipid values in vertigo patients are; increased total lipid in 60% cases, total cholesterol in 30% cases, triglycerides in 33.33% cases, phospholipids in 13.33%, LDL cholesterol in 23.33% cases and VLDL in 30% cases. These values are significantly higher than control group. Four cases of diabetes and ten cases of hypertension of 60 vertigo cases were having marked vertigo of longer duration. These findings were similar to Mehra Y.N. Thus we find that serum lipid studies are important in the patients of vertigo for the diagnosis and management.
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