Original Research Article

Association of dyslipidemia in patients with idiopathic tinnitus – A cross sectional study in a tertiary care center in Nalgonda

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Abstract

Background: Tinnitus is a common neurosensory disorder that can lead to many problems such as stress and sleep disorders to the patients and affect their quality of life. Its pathophysiology has not been exactly discovered yet, but there have been some studies executed about the possibility of dyslipidaemia causing tinnitus. Elevated blood lipid levels can affect cochlear blood flow and fluidity, leading to decreased hearing and tinnitus. Studying more on this subject and specially on the Indian population in order to provide us with evidence-based information, can help us find the optimal method to control and treat this disorder. **Methods:** The lipid profiles of the patients with idiopathic tinnitus who were selected among the patients who came to Kamineni Medical College, Narketpally, Nalgonda district, Telangana between September 2019 to September 2020 were examined. The test results were compared with non-tinnitus group and statistical evaluation was performed. **Results:** The study showed that association of dyslipidaemia in patients with tinnitus is not statistically significant. Despite of this, the most prevalent type of dyslipidaemia in tinnitus group was hypercholesterolemia and hypertriglyceridemia with the frequency of 80%, followed by high LDL levels with the frequency of 76%, followed by low HDL levels of 52 %. Of these 72% were females and 28% are males. In non tinnitus group,52% are having hypercholesterolemia; 36% has low HDL; 60 % high LDL. Hypertriglyceridemia was detected in 68 % of all patients. Of these 60% were females and 40% are males. **Conclusion:** The Study suggests that despite the Hypercholesterolemia prevalence of 80% among tinnitus patients, dyslipidemia does not have a significant relationship with tinnitus.

Keywords: Association; Dyslipidemia; Tinnitus.

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INTRODUCTION

Tinnitus is derived from a Latin word which means to ring. Definition of tinnitus is a sensation of hearing a sound in the absence of an external stimulus or internal acoustical source or electric stimulation[1] . Tinnitus is a symptom of an underlying disease. Around 50 million people have chronic tinnitus in the United States, as said by American Tinnitus Association [2]. Tinnitus is of two types - Pulsatile and Non-Pulsatile. Pulsatile tinnitus is considered to be either synchronous or non-synchronous, depending on whether the sound is in synchrony with the patient's arterial pulse. It can be subjective or objective forms: in the former, only the patient is aware of the sound sensation. Majority of people with tinnitus report subjective non-pulsatile tinnitus with no specific associated pathological process other than age-associated hearing loss (subjective idiopathic tinnitus)[3]. Tinnitus can be manifested with very mild effects to psychological effects that may seriously impair the patient's work, family, and social life. Tinnitus can be caused by many local or systemic problems. If an

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underlying disease is detected treatment should be directed towards the treatment of the disease.[3] Cholesterol has many effects, especially on atherosclerosis and coronary artery disease. Total cholesterol is recognized by three lipoprotein fractions, high-density lipoproteins (HDL), low-density lipoproteins (LDL) and very-low-density lipoproteins (VLDL). Lipoproteins are spherical macromolecule complexes composed of lipids. These lipids consist of free and bound cholesterol, triglycerides, and phospholipids. Lipoproteins give stability to cholesterol structurally[4]. Two primary lipoproteins make up total cholesterol. These are low-density lipoprotein (LDL) and high density lipoprotein (HDL). It is converted from cholesterol to LDL in liver and stored in other organs, especially in the heart and arteries. In contrast, HDL is transported from other organs and tissues to the liver through circulation. It causes a decrease in the formation of cholesterol plaques in large arteries. Consequently, high LDL and low HDL are characteristic of coronary artery disease. It is often accompanied by an increase in serum triglyceride levels and shows raised levels of fat in the bloodstream.[5] According to the American heart association criteria,the normal lipid values are as follows: [6]

TABLE 1: NORMAL RANGE OF LIPID PROFILE

LIPID PROFILE (mg/dl)	OPTIMAL	INTERMIDIATE	HIGH
TOTAL CHOLESTEROL	<200	200-239	>239
HDL CHOLESTEROL	>60	60-40	<40
LDL CHOLESTEROL	<130	130-159	>159
TRIGLYCERIDES	<150	150 -199	>199

It is well known that cause of atherosclerosis and coronary artery disease, myocardial infarction, shock, and death is dislipidemia.[7] Therefore, dyslipidemia should be treated. Hyperlipoproteinemias (Hyperlipidemias) constitute commoner type of dyslipidemia. Hyperlipoproteinemia is described as an increase in plasma cholesterol, triglyceride, or low-density lipoprotein (LDL)[8]. VLDL is not considered in the definition of hyperlipoproteinemia and it is not compared and studied in our study. High LDL has association with atherosclerosis and coronary artery diseases. High HDL levels often reduce the risk of coronary artery disease. High triglyceride levels, pose a risk of pancreatitis and coronary artery diseases. High cholesterol levels may cause cancer, liver cirrhosis, respiratory problems, acute diseases, and injuries.[4]

Association of dyslipidemia with tinnitus : Dyslipidemia causes a localized pathological process ,characterized by alteration of blood vessels of the inner ear . Specific changes mentioned are the capillary thickening in the endolymphatic sac and the basement membrane and stria vascularis. Biochemical changes in the scala media and ischemia leads to occlusion of the capillaries of the stria vascularis. These pathologies can affect inner ear function through a decrease in blood flow. As a result, dyslipidemia causes pathological changes which can be cause of tinnitus.[7] **The aim of the study is to know the** association of dyslipidemia with idiopathic tinnitus in a tertiary care centre in Nalgonda, India.

NEED FOR STUDY: Pathophysiology of tinnitus is been a mystery from decades, though the possibility of dyslipidaemia causing tinnitus was given in few studies. Studying this subject and especially on the Indian population to provide us with evidence-based information, can help us find the optimal method to control and treat this disorder.

METHODS: Study design is Cross-sectional study. Study duration is September 2019– September 2020.Study population are patients attending ENT and medicine OPD at KIMS . Inclusion criteria are patients with the complaint of tinnitus were selected. (idiopathic tinnitus lasting for 6 months).Both the genders are included .Age group from 20 – 60 years are selected .Exclusion criteria are patients who had previously head trauma, Pulsatile, objective tinnitus, Middle ear diseases, Meniere disease, Patients who are on Ototoxic drugs/ history of taking these drugs. Noise induced hearing loss, Presbycusis, Patients with Psychiatric disorders. Sample size is 50, with Group A(Tinnitus)-25 and Group B (Non Tinnitus) -25 .All the patients had undergone blood test for lipid profile after giving consent .

OBSERVATIONS AND RESULTS

In this study, data of 25 patients with idiopathic tinnitus(group A) and 25 patients in the control group without tinnitus(group B) were compared.

TABLE 2: GENDER DISTRIBUTION (n=50)9n

Gender	Group A(Tinnitus)	Group B(Tinnitus	Total(n)	Percentage(%)
Males	7	10	17	34%
Females	18	15	33	66%
Total(n)	25	25	50	100%

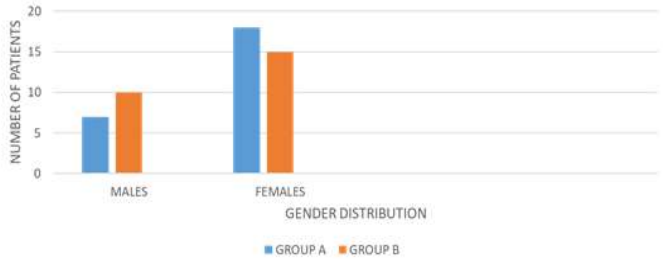

Chart 1: Gender wise distribution of both tinnius and nontinnitus patients

In tinnitus group , 72% were females and 28% are males.In non tinnitus group, 60% were females and 40% are

males.In this study ,Tinnitus is found more in female population.

TABLE 3: AGE DISTRIBUTION (n=50)

Age in year	Tinnitus Group	Non-Tinnitus Group	Total(n)
20-30	3	7	10
31-40	8	6	14
41-50	9	8	17
51-60	5	4	9
Total(n)	**25**	**25**	**50**

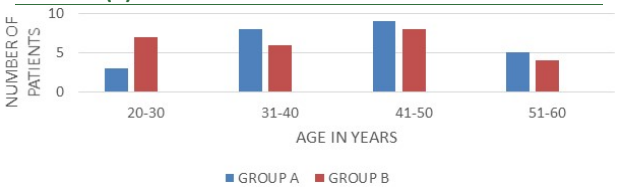

CHART 2: AGE DISTRIBUTION

As seen here, the complaint of tinnitus starts to occur more frequently over 30 years and peaks during 41- 50 years.

TABLE 4: DISTRIBUTION OF SERUM LIPOPROTEINS AMONG BOTH GROUPS: GENDER WISE

Serum lipid levels(mg/dl)		Tinnitus		Non-Tinnitus		P Value
		Males	Females	Males	Females	
CHOLESTEROL	<200	1	4	5	7	0.105*
	200-239	4	8	3	5	
	>240	2	6	2	3	
HDL	<40	3	10	4	5	0.141*
	>40	4	8	6	10	
LDL	<130	2	4	4	6	0.531*
	130-159	5	10	5	5	
	>160	1	3	1	4	
TRIGYCERIGES	<150	1	4	4	4	0.515*
	151-199	**4**	**9**	**4**	**5**	
	>200	**2**	**5**	**2**	**6**	

*P value is not significant

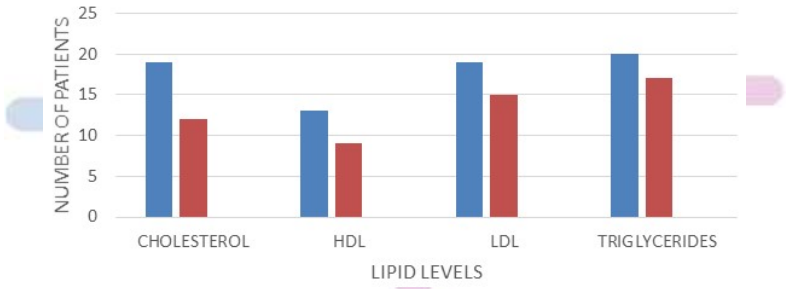

CHART 3: DISTRIBUTION OF SERUM LIPOPROTEINS AMONG BOTH GROUPS: GENDER WISE

Hypercholesterolemia is seen in 80% of idiopathic tinnitus; 52 % had low HDL levels,76% high LDL, Hypertriglyceridemia was detected in 80%. Hypercholesterolemia prevailed among the all and Hypertriglyceridemia(80%),followed by LDL (76%), followed by HDL levels(52%). In non tinnitus group,52% are having hypercholesterolemia; 36 % has low HDL;60 % high LDL. Hypertriglyceridemia was detected in 68 % of all patients.

•P value is more than 0.005, is statistically not significant. The lesser sample size might be a reason for this .

DISCUSSION

Tinnitus is a problem caused by many local and systemic diseases. In the presence of an underlying disease, tinnitus treatment will be directed towards eradicating this disease[5] .Tinnitus can be seen at any age, in both men and women. Along with it, psychological problems affect quality of life of individuals can cause problems such as difficulty in concentration and sleep. It is seen in 10% to 15% of the adult population[9] Shargorodsky *et al.*. detected tinnitus in around 50 million Americans. Smoking and hypertension accounted to these. Also, they found a relationship between tinnitus in those working in gunshots and noisy environments[2]. Melo *et al.*. found in 502 patients over the age of 60, 40% accounted to occupational noise exposure, detected tinnitus.[10] In 1973, Spencer was first to find hyperlipoproteinemia as etiology of inner ear diseases and stressed a possible relationship between hyperlipoproteinemia and sensorineural hearing loss and/or vestibular symptoms. Hyperlipoproteinemia was detected in 42% of patients.[11] Evans *et al.* study on 40

volunteers with dyslipidemia, concluded that chronic dyslipidemia caused by an increase in triglycerides can cause decrease in hearing[11]. He stressed tge need for hearing testing[12]. In 1977, Lowry analysed lipid profile 100 bilateral sensorineural hearing loss patients and detected hyperlipoproteinemia in 20 patients.[13]Pulec *et al.*, found frequency of hypercholesterolemia in tinnitus patients was 5.1%. In their studies, they concluded that the hypolipidemic diet improves serum lipid profile and tinnitus. Researchers have noted that in hypercholesterolemia, there is chronic obstruction of the capillary part of the stiff vessels, which can lead to both biochemical change in the endolymphatic area and ischemia. They explained that tinnitus will be improved by hypolipidemic diet.[14]Basut *et al.*, stated that a low-fat and low-glycemic-index diet decreased the severity of tinnitus[15].Sutbas *et al.* stated that dyslipidemia was more in tinnitus patients compared to the general population, and was found to be statistically significant.[16]Kazmierczak and Doroszewska, compared with the control groups, established relationship of glucose metabolism with tinnitus; which was not significant.[17] Shirazi could not find a relationship between Tinnitus and dyslipidemia.[18] Etemadi found that patients with tinnitus with dyslipidemia had the mostly hypercholesterolemia and was not statistically significant compared to the general population[19].

CONCLUSION

In this study, the association of dyslipidaemia with tinnitus was not significant . However, its presence can lead to tinnitus as proven by other studies. Larger study need to be done, to know the actual prevalence of the dyslipidaemia with tinnitus in our community , as the studies on this were lacking in India.

FURTHER STUDIES RECOMMENDED: Further studies on association of both fasting and postprandial serum lipid profile in patients with idiopathic tinnitus was needed. Simultaneous investigation of their dietary intake is also needed. Sample size should be more for accurate results.

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