Scholars Journal of Applied Medical Sciences (SJAMS)
Abbreviated Key Title: Sch. J. App. Med. Sci.
ISSN 2320-6691 (Online)
ISSN 2347-954X (Print)

A Unit of Scholars Academic and Scientific Society, India
www.saspublishers.com

Biochemistry

Significance of Alanine Amino Transferase [ALT] in Diabetic Patients with Hearing Impairment

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Original Research Article

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Article History
Received: 14.11.2018
Accepted: 22.11.2018
Published: 30.12.2018

DOI:
10.36347/sjams.2018.v06i12.004

Abstract: In diabetes mellitus, hearing impairment[1] is a common complication. It occurs due to microangiopathy affecting cochlear blood vessels and neuropathy affecting cochlear nerve. This study is to find the significance between alanine amino transferase level and hearing loss in diabetic patients[2]. This cross sectional study includeshundred diabetic patients attending tertiary health care centre. Serum alanine amino transferase levels were assayed by enzymatic method, blood glucose by glucose oxidase-peroxidase method[3], HbA1c by Immuno turbidometry method& hearing by Pure-tone audiometry. Out of 100 diabetic patients, 68 hadalanine amino transferase level> 45 IU/L, & out of 68 diabetic patients withalanine amino transferase levels >45 IU/L, 53had hearing loss which is significant. From the results obtained, we find that the hearing impairment in diabetic patients is associated with elevated alanine amino transferase. Hence in the screening of diabetic patients, ALT level should also be included.
Keywords: Hearing impairment, Diabetes mellitus, alanine amino transferase, Pure-tone audiometry, immunoturbidometry.

INTRODUCTION

Diabetes mellitus (DM) is a common health problem .It occurs mainly due to decreased insulin secretion or insulin resistance which alters carbohydrate, fat and protein metabolism. Complications include retinopathy, hearing impairment, neuropathy, nephropathy and cardiovascular complications [4, 5]. Hearing impairment causes increased morbidity in diabetes mellitus.

Alanine amino transferase is mainly elevated in liver pathology but it is also elevated in insulin resistance in metabolic syndrome. So this study was done to estimate alanine amino transferase levels in serum in diabetics.

MATERIALS & METHODS

This cross sectional study includes 100 diabetes patients in the age group of 50 -70. The study was done in diabetic department of a tertiary care hospital. The study was done after getting the approval from the institutional ethical committee. Serum alanine amino transferase levels were assayed by enzymatic method, blood glucose by glucose oxidase-peroxidase method, HbA1c by Immuno turbidometry method & hearing by Pure-tone audiometry. Exclusion criteria include hearing loss due to other causes like trauma, infection, genetic. Informed consent was obtained from the patients.

RESULTS

Table-1: Comparing ALT levels with Hearing in diabetic subjects

ALT	Hearing loss		P value
	Normal	Unhealthy	
Normal 32	30	2	
Increased 68	15	53	< 0.000significant

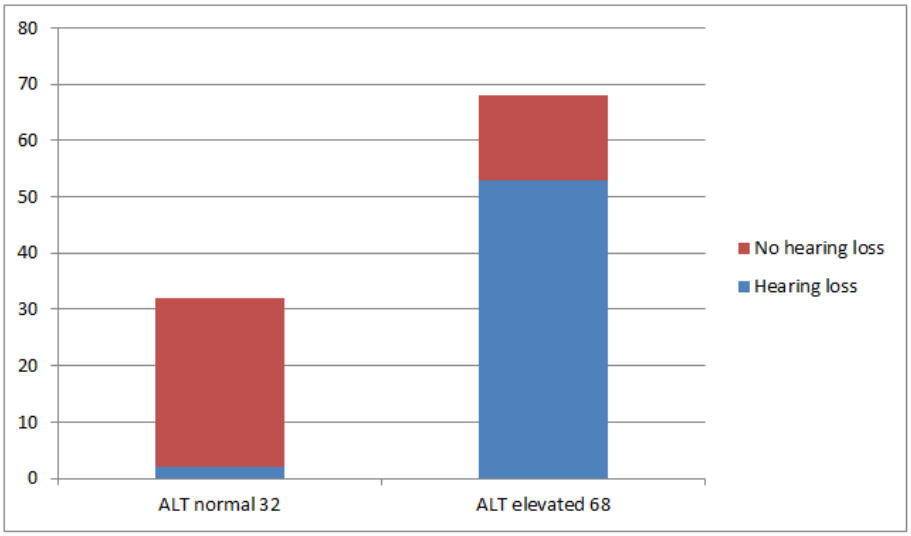

Fig-1

DISCUSSION

This cross sectional study was done in a tertiary care center with 100 diabetic patients taken randomly of age group 50–70 years. Alanine amino transferase is a transaminase enzyme which catalyses reversible transfer of amino group from glutamate to pyruvate [6, 7]. The reaction requires cofactor pyridoxal phosphate, the active form of Vit .B6.The relation between Alanine amino transferase and diabetes is well documented. It is due to pyruvate being gluconeogenic which increases the diabetogenic potential. Thus causing neuropathy, microangiopathy which in turn is related to cochlear vascular impairment causing hearing impairment. Many studies have shown the correlation between increased alanine amino transferase and hearing impairment in diabetic patient. The exact mechanism by which alanine amino transferase is related to hearing impairment is not known. Further studies needed to prove the cause effect relationship.

CONCLUSION

This study pointed out that the alanine amino transferase levels is one of the important screening tool in diabetic hearing impairment. In this study, 53 out of 68 diabetic patients with elevated Alanine amino transferase level more than 45IU/L had hearing impairment which is significant compared to 2 out of 32 diabetic patients with normal Alanine amino transferase level had hearing impairment. This, study shows that diabetics withalanine amino transferase levelsgreater than 45IU/L had high risk to get hearing impairment. So it is important to screen the diabetic patients by estimating serum alanine amino transferase levels & bone conduction by pure tone audiogram to prevent the occurrence of diabetic hearing impairment.

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