



ROLE OF SERUM ALANINE AMINOTRANSFERASE IN TYPE -2 DIABETES MELLITUS

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ABSTRACT

Liver disease is a very common disease world-wide not only among the alcoholics but also frequently among the non-alcoholic population due to various other risk factors like drug abuse, systemic hypertension, diabetes etc. The aim of this study is to show the increased level of alanine amino transferase in poor glycemic controlled diabetics. This study includes 27 diabetics not under glycemic control with HbA_{1c} levels above 7 and 23 with HbA_{1c} levels below 7 showing a good glycemic control. Serum alanine amino transferase was estimated by enzymatic (kinetic) method and HbA_{1c} by ion exchange chromatography. Out of 27 poorly controlled diabetics, 19 had increased serum alanine aminotransferase which is significant. It is concluded from this study that diabetes may lead to liver damage, which implicates the importance of having good glycemic control. It is also mandatory to screen the diabetics particularly those not under glycemic control by estimating ALT which is a sensitive hepatocyte marker.

KEYWORDS: Alanine aminotransferase, ion exchange chromatography, hepatocyte marker.



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INTRODUCTION

Liver is the central and critical organ playing a major role biologically in the metabolism, digestion, detoxification and elimination of substances from the human body. These functions make it a potentially important organ. The liver not only helps in detoxification of various organic wastes and a wide range of xenobiotics. It also plays a major role in the production of certain metabolically important substances like glycogen, triacylglycerides and plasma proteins. The organ also helps in the digestion process by bile production and blood glucose regulation. Studies show that, every year the need for liver transplantation in various European countries has been increasing not only among the alcoholics but also the non-alcoholics due to a variety of other systemic diseases such as Systemic Hypertension and Diabetes Mellitus. Hence, there is a need to analyse the most possible liver-damaging risk factors and assess the liver function, thereby preventing the liver damage. Thus, I would like to make a study on the prevalence of liver damage among the poorly controlled diabetic patients. The extent of liver damage caused by diabetes mellitus is

assessed by comparing HbA_{1c} with ALT. therefore the aim of the study is to show the increased level of alanine amino transferase in poor glycaemic controlled diabetics.

MATERIALS AND METHODS

This cross-sectional study was done in Sree Balaji medical college and hospital, Chennai. A 50 diabetic cases of age group between 40 – 55 years attending the diabetology OP department were included in this study. Out of 50, 23 had good glycaemic control (HbA_{1c}<7) and 27 were not under control. The liver diseases with elevated serum transaminases, acquired immunodeficiency syndrome, cancer or cardiac disease, history of consumption of drugs which are hepatotoxic were excluded in this study. The institutional ethical committee gave approval for this study. After getting consent from the patients, whole blood was taken for the estimation of HbA_{1c} by the ion exchange chromatography method and serum was collected for the estimation of alanine amino transferase by the kinetic method.

RESULTS

Table 1
Diabetic status of the subjects

Subjects/ Sex	Diabetes under good control	Diabetes not under good control
Male	10	12
Female	13	15
Total	23	27

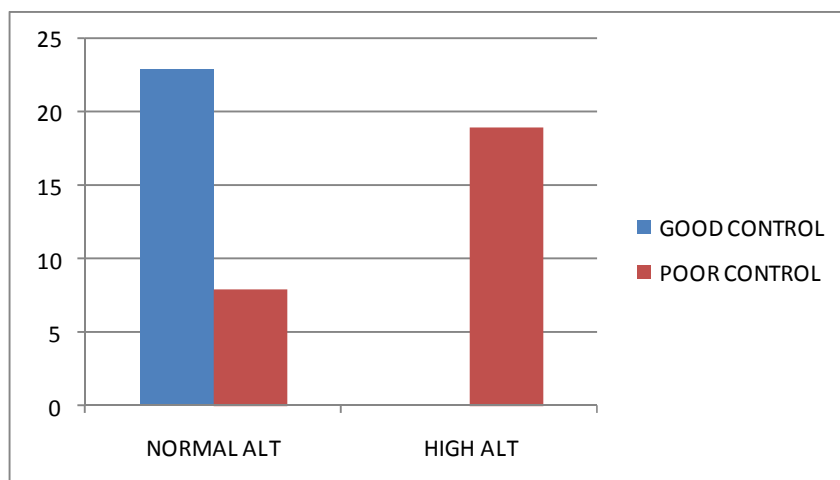
Note: Out of the 50 cases, 23 diabetic patients were under good control of their glycaemic status (HbA_{1c}<7).

Table 2
Comparison between HbA_{1c} and Alanine aminotransferase in diabetics

HbA _{1c}	ALT		Total	P value
	Normal	Increased		
Good Control HbA _{1c} < 7	23	Nil	23	< 0.000 Significant
Poor Control HbA _{1c} > 7	8	19	27	

Note: Out of 27 diabetic patients not under glycaemic control, 19 had increased ALT, which is significant.

The bar diagram shows increased ALT in those diabetics not under glycemetic control.



DISCUSSION

This study was a hospital based study conducted in Sree Balaji medical college and hospital aimed at studying the direct relationship between insulin resistance and serum alanine aminotransferase. There was a retrospective review of the datas of 50 randomly selected diabetic patients of age group between 40-55 of both sex, out of which 23 were under good glycemetic control ($HbA_{1c} < 7$) and 27 under poor glycemetic control ($HbA_{1c} > 7$) in July 2013. Glycemetic control was assessed by their HbA_{1c} levels. It was found that the serum Alanine aminotransferase levels were increased among the poor glycemetic controlled diabetics irrespective of their age and sex. Diabetes mellitus is one of the most common diseases among the European population which has been showing a potential importance in the recent times by increasing in prevalence even among the Asian countries and also among the younger generation due to the change in life-style. The fact that it exists as a reversible risk factor and a comorbid condition leading to various other end-organ damages due to micro and macro-angiopathies. The pathology being dependent purely on the circulating serum glucose levels, its control plays a vital role not only in preventing further organ damage but also in reversing the structural and functional damage to a considerable extent. One of the most common organs involved is the Liver. Studies

show that Liver enzymes are found to have a direct relationship with the insulin resistance levels of the human organism¹, thus helping in prediction of the organ damage. The most common hepatocyte marker enzymes are the Alanine and Aspartate aminotransferases with Alanine aminotransferase being more specific. The study conducted by *Dr.Elizabeth H.Harris*¹ among the diabetics in also shows the same. *Salmela et al.*² looked at 72 consecutive diabetic inpatients with hepatomegaly or abnormal LFTs who were awaiting liver biopsy. Sixty-eight of the patients had type 2 diabetes; four had type 1 diabetes. *Erbeyet al.*³ analyzed non-institutionalized patients within the United States with an oversampling of African Americans and Mexican Americans. Of those with type 2 diabetes, the prevalence of elevated ALT was higher, compared to a lower prevalence in those without diabetes. The extent of the liver damage and the need for transplantation can also be assessed by monitoring the serum ALT levels. The study conducted by *Lebovitz et al.*⁴ also shows abnormal liver function tests among type 2 diabetes mellitus. The various other studies *Leeds JSet et al.*⁵, *West J et al.*⁶, *SherifGonemet et al.*⁷, *Ayman S. Idris et al.*⁸, *Vozarova B et al.*⁹ also show the importance of the ALT levels among diabetics. Limitation to our study is that it is a retrospective study conducted in a small study population which makes it to be of lesser importance. Thus, further large scale studies are proposed.

CONCLUSION

The study suggests that there is a direct relationship between insulin resistance and serum alanine aminotransferase.

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