



Assessment of Activity of Transaminase at Patient with Cardiovascular Problems

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ABSTRACT

Cardiovascular disease is characterized by the increase of aspartate aminotransferase (AST) and alanine aminotransferase (ALT). The main objective of this study is to investigate the possibility of impact of cardiovascular problems in activity of alanine aminotransferase level (ALT) and aspartate aminotransferase (AST). The blood samples taken from 50 patients who suffer from cardiovascular problems, at hospital Prishtina.

Keywords: Transaminase, ALT, AST, Cardiovascular.

INTRODUCTION

Heart failure is a systemic clinical syndrome with typical symptoms and signs (dyspnea, leg swelling, paroxysmal nocturnal dyspnea, and orthopnea) that result from any structural or functional impairment of ventricular filling or ejection of blood^{5,9}. HF is a major health problem with significant personal and public implications. In the United States, approximately 5.1 million people have HF, and approximately 50% of these people die within 5 years of diagnosis, despite survival having improved during the recent years with some advances in medical and device therapies^{9, 3}. Cardiohepatic interaction has been noted in patients with heart failure (Samsky, 2013), atrial fibrillation¹ and myocardial infarction⁴. Although the relationship between aminotransferase levels and cardiovascular disease has become a matter of discussion^{6,7}. The prognostic utility of aminotransferase has not been fully studied.

AST and ALT serum levels in some liver conditions can range anywhere from ten times the upper limits of normal to thousands of units/liter. The highest levels of AST and ALT are found with disorders that cause rapid death of numerous liver cells (extensive hepatic necrosis).

Although this degree of liver enzymes elevation is not common, it can occur in such conditions as: acute viral hepatitis A or B, profound liver damage inflicted by toxins as from an overdose of acetaminophen (brand-name Tylenol) or mushroom poisoning. Prolonged collapse of the circulatory system when the liver is deprived of fresh blood providing oxygen and nutrients. Also, very high AST and ALT levels can be a result of severe muscle diseases. Cardiogenic ischemic hepatitis is characterized by the dramatic transaminase serum increase after an acute and serious drop in cardiac output. It usually occurs within 2

to 24 hours after the causal phenomenon. The initial symptoms are usually weakness and apathy, but occasionally it can cause mental confusion, jaundice, oliguria, flapping and hepatic coma. Laboratory alterations in addition to the transaminase serum increase include elevated LDH and bilirubin serum levels and an increased prothrombin time. For patients who survive the cardiogenic ischemic hepatitis episode, liver function test abnormalities peak within one to three days and return to normal within five to ten days after the onset of symptoms⁸.

MATERIALS AND METHODS

A total of 50 patients of both gender suffering from Diabetes Mellitus type 2, age 30-60 and sex matched normal individuals were selected for the study. Half of the patients belong to the male gender (20) and half female gender.

Blood Sample 5 ml of venous blood was drawn from each volunteer in this study using a disposable plastic syringe. The sample was then analysed for serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), by 550 Expressed Plus Automatic Chemistry Analyzer

RESULTS AND DISCUSSION

The mean activity of serum ALT (50.55 U/L), serum AST, (51.99 IU/L), of male patients with cardiovascular problems shows significant difference from that of healthy - normal subjects (Table 1, Figure 1).

At female patients with cardiovascular problems average activity of serum ALT (49.47 U/L), serum AST, (49.63 IU/L), also shows significant difference compared with normal subjects



After separation in the group of young and the old, shows significant difference from that of healthy - normal subjects. At old group ALT 55.12; 51.58 U/L) show higher

activity compared with young group (49.21; AST 50.56 U/L).

Table 1: Comparison of serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST) activity in patients with cardiovascular problem and control group.

	Patient with cardiovascular problem Median Value of ALT/ IU/L,	Patient with cardiovascular problem Median Value of AST/IU/L,	Control group Median Value of ALT and AST / IU/L,	
			ALT	AST
Male	50.55	51.99	31.33	33.34
female	49.47	49.63	30.54	32.35
Old group	55.12	51.58	31.97	32.99
Young group	49.21	50.56	28.34	30.52

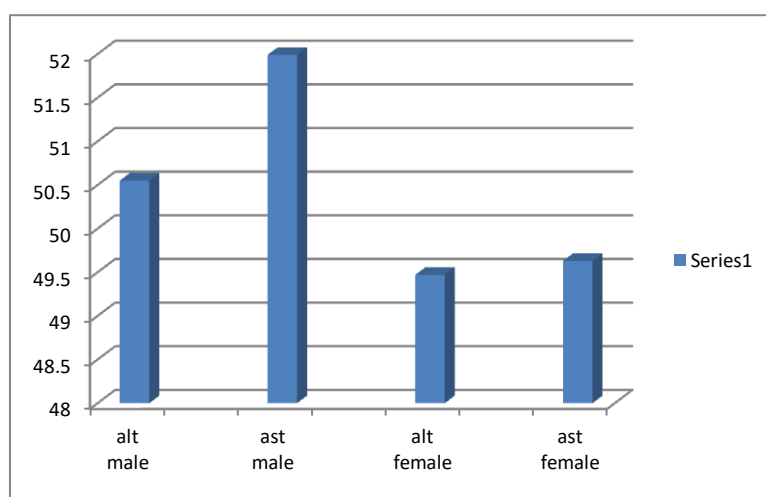


Figure 1: Comparison of serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST) activity at patients with cardiovascular problem.

The liver plays a central role in the absorption, distribution, and elimination of the majority of drugs. Drugs are biotransformed in the liver by enzymatic conversion into active, inactive, or even toxic metabolites. Hepatic impairment can alter the pharmacokinetic profiles of cardiovascular drugs, which can lead to unwanted toxicity.

Increasing ALT and AST value was directly associated with the cardiac problems, second or third degree AV block, evidence of permanent pacing, and prolonged QRS duration on baseline EKG. In contrast, there was a trend towards less electrocardiographic evidence of left ventricular hypertrophy. Echocardiographic findings including increased left ventricular (LV) dimensions, decreased left ventricular ejection fraction, and valvular disease were also directly related to higher admission ALT, while the association between ALT and documented LV aneurysm and mechanical complications secondary to acute myocardial infarction only trended towards significance.

The mean level of transaminase ALT and AST in patients Type-2 diabetic group was 49 IU/L in normal controls was

30.66 ± 20.81 IU/L. The ALT in fasting serum sample in diabetic patients group was found to be significantly higher in comparison to the normal control group with $P = 0.026$. Raised level of ALT was noted in 19.8% diabetic patients.

These findings are consistent with the results obtained from several other studies by various researchers. According to Gonem (), it was identified that the prevalence of ALT enzyme activity in diabetic patients ($n = 959$) was 15.7% (151).18 ALT catalyzes the reversible transamination between L-alanine and α -ketoglutarate to form pyruvate and L-glutamate as such having an important role in gluconeogenesis and amino acid metabolism.

CONCLUSION

Based in obtained results we can conclude that the liver enzymes alanine aminotransferase (ALT) level have shown higher activity at patients with cardiac problems than individuals who do not have cardiac problems, from control group.

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