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REVIEW ARTICLE

ABNORMAL LIVER ENZYMES (ALT & AST) AND INCIDENCE OF THREE VESSEL CORONARY ARTERIES DISEASE

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ABSTRACT

Objective: A lot of Recent studies try to investigate the relationship between abnormal liver enzymes aspartate aminotransferase (AST), alanine aminotransferase (ALT) and incidence of coronary arteries disease. In this study we try to find a relationship between abnormal liver enzymes and three vessel coronary arteries disease. ***Method:*** One-hundred coronary arteries disease patients were randomly chosen from those who followed in outpatient clinic from Jan 2022 to June 2022 in queen alia heart institute. After reviewing angiography reports, patients were divided into two groups as three vessel CAD and non-three vessel CAD, non-three vessel CAD group also divided into 1-2 vessel CAD and medical CAD. In addition to optimal medical therapy and revascularization (percutaneous coronary intervention, coronary artery bypass grafting), measurements of serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) concentrations were performed in all patients before proceeding with coronary angiography. ***Results:*** The patient groups of CAD distribution were 13% medical CAD, 62% 1or 2-vessel CAD and 25% 3-vessel disease. Mean age was 63.48 ± 11.833 (range 33–87) years and 22 per cent (n = 22) were females. 49% them are diabetic and 72% are hypertensive patients. 5% of patients have elevated AST (>37) & 5% have elevated ALT (>41). All of them didn't show elevation > 3-folds of normal. None of the elevated enzymes patients found in the 3-vessel CAD group. ***Conclusion:*** abnormal liver enzymes aspartate aminotransferase (AST), alanine aminotransferase (ALT) may not be associated with angiographic severity of coronary arteries disease.

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INTRODUCTION

Coronary artery atherosclerosis starts at young age but start to be symptomatic in middle age (Tuzcu, 2001; Third Report of the National Cholesterol Education Program, 2002). Nowadays there is a great concern about relationship between abnormal liver transaminases and incidence of coronary artery atherosclerosis, endothelial dysfunction and carotid atherosclerosis (Schindhelm, 2007; Schindhelm, 2005; Brea, 2000). The commonest cause of elevated liver enzymes detected was non-alcoholic fatty liver disease (NAFLD), as it affects 15–20% of the general population in the united states (Clark, 2003) and is associated with cardiovascular risk factors, specifically insulin resistance and metabolic syndrome (Angelico, 2005; Bugianesi, 2005) studies also showed that insulin resistance has an appreciated role in atherosclerosis and plaque progression, while hyperglycemia also induce lesion formation (Bornfeldt, 2011; Bansilal, 2007; Nigro, 2006) also, studies revealed that metabolic syndrome and its components have an important role in progression of atherosclerosis (Mathieu,. 2006; Dziegielewska-Gesiak, 2021) this study done due to the possibility that mildly elevated transaminases might be related to the severity of coronary artery disease.

METHODS

The research population chosen from the patients attending outpatient follow up clinic from Jan 2022 to June 2022 in queen alia heart institute. The research was a single-blinded retrospective mono-center study. Patients were excluded if they have chronic liver disease, alcoholics, hypothyroidism, recently received antibiotics or having recent acute coronary syndrome. Blood samples for liver transaminases were collected on admission following 8 hours of overnight fasting. All blood samples were taken and measured before interventional procedures. Coronary angiography done by experienced interventional cardiologist, the number of diseased vessels was identified according to epicardial coronary vessel having more than angiographically 70% stenosis.

The decision on percutaneous coronary intervention, medical or surgical therapy was made according to clinical presentation and angiographic findings. Liver function tests were measured as continuous variables. Included in this study were ALT and AST.

Coronary artery disease severity was scored as follows: no more than 70% stenosis in any vessel was defined as medical CAD, 1 or 2 vessels with more than 70% stenosis separately and three-vessel with more than 70% stenosis. SPSS program was used for statistical analysis. descriptive analysis was used to test the hypothesis that severity of CAD was related to abnormal liver transaminases.

RESULTS

Descriptive statistics are shown in table 1. Mean LFTs were within normal range. The heart disease groups were distributed as (13 medical CAD, 62 one or two vessel disease, and 25 three vessel disease. Mean age was 63.48 ± 11.83 (range 33–87) years and 22 per cent (n = 22) were females.

Table 1

descriptive statistics (n=100)	
liver function tests	
AST: mean (SD)	20.3(8.92)
ALT: mean (SD)	22.29 (15.25)
Coronaries findings	
medical CAD: n (%)	13 (13%)
1 or 2 vessel disease: n (%)	62 (62%)
3 vessel disease: n (%)	25 (25%)
gender	
male: n (%)	22 (22%)
female: n (%)	78 (78%)
age	
age: mean (SD)	63.48 (11.833)

Simple analysis showed that 5% of study population have elevated ALT, and 5% have elevated AST.

Table 2

ALT	
normal: n (%)	95 (95%)
abnormal: n (%)	5 (5%)
AST	
normal: n (%)	95 (95%)
abnormal: n (%)	5 (5%)

40% of elevated ALT patients had medical CAD, while 60% of them had 1 or 2 vessel disease. None of them had 3 vessel disease. In elevated AST patients, all of them (100%) had 1 or 2 vessel disease and none of them had 33 vessel disease. So, in both elevated transaminases group none of the patients had 3 vessel disease.

Table 3

elevated ALT n=5	
medical CAD: n (%)	2 (40%)
1 or 2 vessel disease: n (%)	3 (60%)
3 vessel disease: n (%)	0 (0%)
elevated AST n=5	
medical CAD: n (%)	0 (0%)
1 or 2 vessel disease: n (%)	5 (100%)
3 vessel disease: n (%)	0 (0%)

DISCUSSION

Coronary artery disease was predicted to show an association with LFTs. Some pathophysiological mechanisms were explained for this relationship. firstly, strong evidence was reported in studies supporting the relation of elevated ALT with insulin resistance blamed as a major risk factor for atherosclerosis (Marchesini, 2005; Hanley, 2004). Add to that, there can be a systemic inflammatory response related to ALT and CRP levels (Kerner, 2005). Also, liver transaminases may be an indicator of lipoprotein metabolism disorders, resulting in the increase of triglyceride-rich lipoproteins in the circulation, which play a major role in atherogensis (Gianturco, 1988). In our study none of the three-vessel disease patient which was revascularized by percutaneous coronary intervention or coronary bypass grafting had elevated liver transaminases in pre-admission laboratories results.

CONCLUSION

Abnormal liver enzymes aspartate aminotransferase (AST), alanine aminotransferase (ALT) may not be associated with angiographic severity of coronary arteries diseases. So, another multi-center study is needed with larger population number should be established to deeply investigate the relationship between liver transaminases and severity of coronary artery diseases, as this relationship may be more sophisticated than expected.

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