JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH

How to cite this article:
PUJAR S , KASHINAKUNTI S V , KALLAGANAD G S , DAMBAL A, DODDAMANI G B. EVALUATION OF DERITIS IN ALCOHOLIC AND NON-ALCOHOLIC LIVER DISEASES - A CASE CONTROL STUDY.Journal of Clinical and Diagnostic Research [serial online] 2010 June [cited: 2010 June 10]; 4:2463-2466.

Available from
http://www.jcdr.net/back_issues.asp?issn=0973-709x&year=2010 &month= June &volume=4&issue=3&page=2463-2466 &id=593

ORIGINAL ARTICLE

Evaluation Of Deritis In Alcoholic And Non-Alcoholic Liver Diseases - A Case Control Study

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ABSTRACT

Background: Oxidative stress and the influence of free radicals and their metabolites decrease the serum antioxidant status. They play a very important role in the pathogenesis of liver disease. The aim of the present study is to assess the Deritis in alcoholic and non-alcoholic liver disease patients in comparison to healthy controls and to evaluate its significance as a prognostic marker of liver disease.

Methods: 100 cases were studied, of which 50 were normal healthy controls,10 were alcoholic hepatitis patients, 10 were non-alcoholic hepatitis patients, 10 were alcoholic cirrhosis patients and 20 were non-alcoholic cirrhosis patients. Serum AST and ALT levels were estimated in all subjects by using commercial kits from CPC diagnostics (Raichem USA). The readings were taken on a semiautoanalyser (STATFAX 3300). Statistical analysis was done by using the Student's 't' test.

Results: The Deritis was significantly increased in patients with alcoholic hepatitis and cirrhosis as compared to non-alcoholic hepatitis and cirrhosis patients, respectively ($P<0.05$). Further, significantly elevated Deritis was observed in non-alcoholic hepatitis and cirrhosis patients as compared to healthy controls ($P<0.001$).

Conclusion: The findings of the present study are consistent with previous studies, suggesting that hepatocyte damage causes leak of these enzymes into the circulation. This study concludes that Deritis is a dependable marker of alcoholic liver disease.

Key Words: Deritis, ALD, AST, ALT.

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Introduction

Physicians have long sought for an accurate and inexpensive means to distinguish alcoholic liver disease from the non-alcoholic ones, as it has important implications for treatment and management [1]. Several markers for high alcohol consumption per se have been studied e.g. carbohydrate deficient transferrin(CDT), gamma glutamyl transferase (GGT) and aspartate aminotransferase (AST). Most have fairly low sensitivities and specificities [2]. Previous studies have shown that the Deritis ratio (serum aspartate amino transferase to serum alanine amino transferase) is greater than 2 in cases of alcoholic liver disease [3]. The Deritis ratio is more sensitive during any phase of the disease. This ratio is based on common tests of liver function and can be investigated in any laboratory and is more relevant where alcohol abuse is a major cause of liver disease [4]. The excess alcohol leads to increased oxidative stress, cell membrane permeability, cell necrosis and leakage of mitochondrial AST into the blood [5]. This has raised the interest in

lipid peroxide product, antioxidants and Deritis levels in liver disease. In this context, the present study was undertaken to assess the Deritis ratio in alcoholic and non alcoholic liver disease patients and to evaluate its significance.

Material and Methods

The present study was carried out jointly by the Department of Biochemistry and Medicine at the S. Nijalingappa Medical College and HSK Hospital and Research Centre from June-2007 to July-2008. The institutional ethical committee approved the study and informed oral consent was taken from all the subjects. The study comprised 100 subjects-50 healthy controls who were voluntary donors, 10 alcoholic hepatitis patients, 10 non-alcoholic hepatitis patients, 10 alcoholic cirrhosis patients and 20 non-alcoholic cirrhosis patients. All were males whose ages ranged from 30-60 years and they were from a low socio-economic status.

Inclusion Criteria: Cases – Patients attending the Medicine Department on an OPD/IPD basis with complaints regarding tender hepatomegaly/ jaundice/ ascites / hemetemesis/viral hepatitis/ alcoholic or non-alcoholic liver disease of any aetiology.

Controls – Healthy males without liver disease.

Exclusion Criteria: Subjects with HIV, diabetes mellitus, renal disorders and hypertension were excluded.

Sample collection and estimation: 5ml of blood was drawn by venipuncture under aseptic precaution in the fasting condition in a plain tube. The serum was separated and was transferred into a plastic tube. The estimation of serum AST and ALT was done by using commercial kits from CPC diagnostics (Raichem, USA). The readings were taken on a semiautoanalyser (STATFAX 3300). The statistical evaluation was done using the Student's 't' test.

Results

In the present study, the serum AST and ALT levels in the control group are given in [Table/Fig 1]. The levels of AST and ALT in liver disease are given in [Table/Fig 2]. The ratio of serum AST and ALT in all the groups are given in [Table/Fig 3]. The ratio of serum AST/ ALT in the control group was 0.94 ± 0.97. In ten patients of alcoholic hepatitis, the ratio was 1.91± 3.08. The group with non - alcoholic hepatitis (10 patients) had a ratio of 1.83 ± 0.5. In the alcoholic cirrhosis patients group, the ratio was 1.60 ± 1.8 as compared to the non- alcoholic cirrhosis group (20 patients), which had a ratio of 1.49 ± 1.9.

In the present study, there was a significant elevation of AST and ALT in patients with alcoholic and non- alcoholic liver diseases as compared to the controls ($p<0.001$). But the increase in alcoholic liver disease patients was more significant than those with non -alcoholic liver disease ($p<0.05$).

(Table/Fig 1) Serum AST and ALT levels in control group.

Enzyme in serum	No of cases	Normal control values	
		Mean U/L	SD
AST	50	13.34	7.30
ALT	50	14.10	7.49

(Table/Fig 2) Serum AST and ALT levels in liver disease.

Disease Ground	Enzyme in Serum	No of Cases	Enzyme Activity Mean U/L	SD
Alcoholic hepatitis	AST	10	81.92	24.02
	ALT		42.80	7.78
Non Alcoholic hepatitis	AST	10	58.73	14.76
	ALT		31.94	24.76
Alcoholic Cirrhosis	AST	10	91.77	25.30
	ALT		57.13	13.40
Non Alcoholic Cirrhosis	AST	20	57.84	34.58
	ALT		38.57	17.47

(Table/Fig 3) Ratio between AST and ALT in all the Groups.

Group	AST / ALT ratio Mean ± SD
Control	0.94 ± 0.97
Alcoholic hepatitis	1.91 ± 3.08
Non – Alcoholic hepatitis	1.83 ± 0.5
Alcoholic cirrhosis	1.60 ± 1.8
Non – Alcoholic cirrhosis	1.49 ± 1.9

Discussion

Serum AST and ALT were raised in patients with liver disease. The increase in Deritis was more in patients with alcoholic liver disease as

observed in previous studies. The elevation in ALT was not as high as that of AST in alcoholic liver disease patients, thus reflecting the diminished hepatic activity of these enzymes which made them to leak into the serum from damaged hepatocytes [6]. ALT is solely located in the cytosol [7]. The increase in AST may be due to increased cell membrane permeability, cell necrosis and mitochondrial leakage into the blood, caused by excessive alcohol consumption [5]. Since AST is located both in the cytosol and mitochondria, serum levels depend markedly on the degree of liver damage and also on how recently the alcohol has been consumed [8]. The determination of the Deritis ratio in alcoholic liver disease patients can be considered as a dependable marker, which has also been proved by international data [9].

Some interrelated reasons have been reported for the high AST/ALT ratio in alcoholic liver disease: i) A decreased hepatic ALT activity [10]: ii) Pyridoxal 5' phosphate depletion in the liver of alcoholics [11]: iii) Mitochondrial damage leading to an increase in the serum activity of mitochondrial aspartate in patients with high alcohol consumption[12]: There may also be some contribution of the direct toxic effect of alcohol on the AST/ALT ratio[13].

Our findings of a high AST/ALT ratio in alcoholic liver disease patients are at variance with those reported by authors in a clinical series in an Australian private practice. They observed that the AST/ALT ratio was greater than unity only in two-third of the patients with alcoholic cirrhosis [14]. It could be that the AST/ALT data were recorded in connection with the biopsies and that the biopsies were performed after a period of abstinence, when the AST/ALT ratio might have already declined [13].

Conclusion

The estimation of the Deritis ratio is essential for the rational understanding of the extent of damage in alcohol liver disease. Hence, the Deritis ratio can be considered as a reliable marker of ALD. However, further studies with greater sample size are necessary to finally accept the concept.

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