

THE ASPARTATE AMINOTRANSFERASE TO ALANINE AMINOTRANSFERASE RATIO AND HCV INFECTION

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Abstract

Background: Hepatitis C virus (HCV) infection is responsible for the majority of cases of post-transfusion hepatitis. Biochemical analysis of liver enzymes used to estimate the severity of liver injury in HCV infected patients.

Objective: To estimate the aspartate aminotransferase to alanine aminotransferase (AST/ALT) ratio as non-invasive parameter for assessment of liver injury in HCV infected patients.

Methods: Two groups of subjects were included in this study. 238 thalassemic children from Al-Zahrawi Hospital (172 were seropositive and 66 were seronegative for HCV specific antibody) and 58 pregnant women (32 were seropositive and 26 were seronegative for HCV specific antibody) as a control group. Serum AST and

ALT and AST/ALT ratio levels estimated for each subject.

Results: The mean serum AST/ALT ratio levels for anti-HCV seropositive and seronegative thalassemic children were 3.38 ± 4.34 and 2.56 ± 3.09 respectively, while for anti-HCV seropositive and seronegative pregnant women 1.62 ± 1.34 and 0.59 ± 0.42 respectively.

Conclusion: The mean serum AST/ALT ratio is higher among HCV infected subjects than among the non-HCV infected ones.

Keywords: aspartate aminotransferase to alanine aminotransferase ratio, Hepatitis C virus

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Introduction

Hepatitis C virus (HCV) now considered as the leading cause of post-transfusion hepatitis world-wide^[1]. Chronic transfusion recipient, such as patients with thalassemia major have a high frequency of liver disease^[2,3]. HCV is responsible for the majority of cases of post-transfusion hepatitis in such patients^[1]. Generally, HCV infection is asymptomatic and most often cases are discovered by chance biochemical analysis when a subject found to have raised liver enzymes^[4].

Among routine laboratory tests for liver injury is the measurement of liver

enzymes. The AST/ALT ratio used to non-invasively assess the severity of the disease in patients with chronic liver disease^[5]. Hence, the aim of this study directed to evaluate the liver function impairment among patients infected with HCV by measurement of AST/ALT ratio.

Materials & methods

A total of 238 outpatients and inpatients thalassemic children were included in this study from Al-Zahrawi hospital from November 1996 to August 1997, of those 172 were seropositive and 66 were seronegative for HCV specific antibody. The control group for this study was 58 pregnant women (26 were seropositive and 32 were seronegative for HCV specific antibody). Serum samples collected from each subject and tested for serum ALT and AST levels using Dinitrophenylhydrazol colorimetric method^[6]. The AST/ALT levels estimated. Statistical analysis performed using t test.

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Results

As shown in table 1, the mean serum AST/ALT levels for anti HCV seropositive and seronegative thalassemic patient were 3.38 ± 4.34 and 2.56 ± 3.09 respectively with no significant difference ($p > 0.05$). Regarding the control group (pregnant women), the mean serum AST/ALT

levels for anti HCV seropositive and seronegative ones were 1.62 ± 1.34 and 0.59 ± 0.42 respectively with statistical significant difference ($p < 0.005$). A highly significant difference was observed when the mean serum AST/ALT levels for anti HCV seropositive thalassemic patient and pregnant women were compared ($p < 0.005$).

Table 1: The mean serum AST/ALT level \pm SD* in among different groups

Groups	Number	Mean \pm SD	P value
Anti HCV seropositive thalassemic patients	172	3.38 \pm 4.34	T= 1.407
Anti HCV seronegative thalassemic patients	66	2.56 \pm 3.09	Df= 236 (P > 0.05)
Anti HCV seropositive Pregnant women	32	1.62 \pm 1.34	T= 3.787
Anti HCV seronegative Pregnant women	26	0.59 \pm 0.42	Df = 56 (P < 0.005)
Anti HCV seropositive thalassemic patients	172	3.34 \pm 4.34	T = 4.33
Anti HCV seropositive Pregnant women	32	1.62 \pm 1.34	Df =202 (P <0.005)
Anti HCV seronegative thalassemic patients	66	2.56 \pm 3.09	T= 5.06
Anti HCV seronegative Pregnant women	26	0.59 \pm 0.42	Df= 90 (P < 0.005)

*SD: Standard deviation

Discussion

Chronic HCV infection is highly prevalent among thalassemic patient^[2]. HCV infection is commonly presents as an asymptomatic liver disease, which over years can cause inflammation, fibrosis and eventual cirrhosis in the liver^[7]. The challenge lies in identifying those patients. Who will go on to develop fibrosis and subsequent cirrhosis. Assessment of liver injury, therefore, can be important factor in determining both timing and effectiveness of therapy. Measurement of liver enzymes one of the routine laboratory tests for estimation of liver injury.

The serum AST/ALT ratio of more than one indicates progressive liver injury^[8] and correlates with both liver histology and clinical evaluation^[5]. Moreover, Reedy and coworkers stated that AST/ALT ratio although specific for liver cirrhosis, should not be the sole determinant to identify cirrhosis^[9]. In this study the mean serum AST/ALT ratio among anti-HCV seropositive pregnant women was greater than one and

showed a significant difference when compared with that of anti-HCV seronegative pregnant women ($p < 0.005$) reflecting liver injury in the former group. However, the mean serum AST/ALT ratio was higher among anti-HCV seropositive thalassemic patient than among the anti-HCV seronegative ones but with no significant difference ($p > 0.05$). A finding that can be explained on the basis that factors other than HCV infection may be involved in damaging the liver, like iron over load and possibly coinfection with other hepatitis viruses, because those patients are chronic blood transfusion recipients^[2,3]. Moreover, the mean serum AST/ALT ratio among anti-HCV seropositive thalassemic patients was significantly higher than that among anti-HCV seropositive pregnant women, a finding that support the statement that serum AST/ALT ratio can be used to assess the severity of liver injury^[5]. Although the current gold standard for assessing liver injury and fibrosis is the liver biopsy, however, it is assessed with patient discomfort, potential

complications, and high cost^[10]. Even this invasive measure relies on scoring system that may be limited by sampling error, biopsy size and observe reproducibility^[9] While measurement of liver enzymes is a non invasive, informative and less costly routine laboratory test. Although ALT level may inflect liver damage, correlation with hepatic fibrosis while elevation in the AST/ALT ratio was observed as patient prognosis for chronic hepatitis to cirrhosis^[12-14].

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