RESEARCH COMMUNICATION

Significance of Alanine Aminotransferase Testing in Diagnosis of Acute and Chronic HBV Infection

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Abstract

Hepatitis B is a major public health problem world wide; more than 350 million people have chronic infection. Diagnosis of hepatitis is made by biochemical assessment of liver function. Alanine aminotransferase (ALT), a liver enzyme, is markedly elevated in hepatitis and with other causes of acute liver damage associated with hepatic necrosis, blood levels being elevated even before the clinical signs and symptoms of disease such as jaundice appear. HBsAg can be detected in the serum from several weeks before onset of symptoms to several months after onset of acute HBV infection. The presence of HBsAg indicates that the person is potentially infectious. In our study we found that 80% patients who were HBsAg positive had abnormal ALT levels, while the remaining 20% had normal ALT values. This is despite suffering from acute or chronic liver disease, providing a reason why some patients positive for hepatitis B have a normal ALT.

Key Words: Alanine aminotransferase - HBC infection - HBs Ag - liver disease

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Introduction

Hepatitis B is one of the major diseases of mankind and is a serious global public health problem. It is preventable with safe and effective vaccines that have been available since 1982. Of the 2 billion people who have been infected with the hepatitis B virus (HBV), more than 350 million have chronic (lifelong) infections in which the patient never gets rid of the virus and many years later may develop cirrhosis or cancer of the liver. Diagnosis of hepatitis is made by biochemical assessment of liver functions. Initial laboratory evaluation should include total and direct bilirubin, alanine amino-transferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase and viral markers (Hollinger and Liang, 1981).

When hepatocytes are damaged, they may leak enzymes into the blood, where they can be measured as indicators of cell damage. Alanine aminotransferase (ALT) is one such enzyme. It is markedly elevated in hepatitis and from other causes of acute liver damage. When the liver is injured or inflamed, the levels of ALT in the blood usually rise; therefore, this enzyme is most suited for assessing liver disease. Aach et al have reported that high levels of serum alanine aminotransferase (ALT) may indicate viral hepatitis (1981). In viral hepatitis and other forms of liver disease associated with hepatic necrosis, blood levels of ALT are elevated even before the clinical signs and symptoms of disease such as jaundice appear (Dufour et al., 2000). HBsAg can also be detected in the serum from several weeks before onset of symptoms to months after onset of acute HBV infection, indicating that the person is potentially infectious (Hollinger and Liang, 1981; Robinson, 1005).

Materials and Methods

This study was performed on 207 patients at the Department of Gastroenterology, MLN Medical College, Allahabad U.P., and other reputed nursing homes of Allahabad during 5/10/2005 to 20/4/2008 and diagnosed to have chronic or acute liver disease. Blood samples of the targeted individuals were collected and stored at -70˚C for future investigation in our facility and formed the sample for evaluation of alanine aminotransferase.

Liver function test

The alanine amino-transferase (ALT) of the targeted patients was assessed with the help of ALT (GPT) Modified UV (IFCC), Kinetic Assay (Span Diagnostics Ltd.) following the instructions of the manufacturer. The normal values range between 10- 40 U/L at 37˚C.

Viral markers

Viral marker (serology) of HBV, viz, HBsAg was tested using an ERBA LISA Hepatitis B kit (Transasia Bio-Medicals Ltd.) following the instructions of the manufacturer.

Results

Of 207 patients, 66.7% (138) were males and 33.3% (69) females. The over all prevalence of HBsAg positivity

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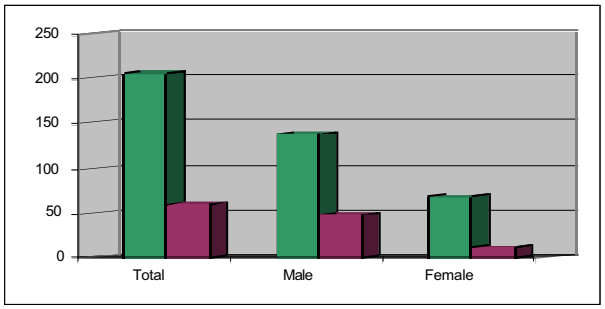

Figure 1. Bar Diagram showing HBsAg positivity. Green columns indicate number of patients and red columns HBsAg +ve patients

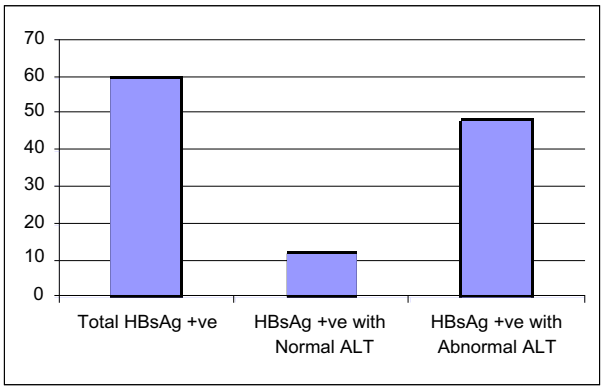

Figure 2. Bar Diagram Showing Normal and Abnormal ALT Groups in the Total HBsAg +ve Patients

in patients was 29 % (60 cases). Of these, 81.7% were males and 18.3% were females (Figure 1).

Forty-eight cases (80%) were found to be HBsAg positive with abnormal ALT values i.e. increases ranging between 48-245 U/L with mean 116.93 U/L and SD ± 51, but twelve cases (20%) showed HBsAg positivity with normal ALT values, in the range 17-39 U/L with mean 25.5U/L and SD ± 7 (Figure 2).

Discussion

In this study we found that 80% patients who were HBsAg positive had abnormal ALT levels. This is because they are either suffering from acute or chronic liver disease (Tassopoulos et al., 1987). This is the reason why some patients show positivity towards hepatitis B with normal ALT. Gigi et al (2007) reported that 234 out of the 307 HBsAg (+) patients (76.2%) had persistently normal ALT and In 73 patients (23.8%), a reactivation of the disease with elevated ALT and positive HBV DNA was recorded during follow up (Gigi et al., 2007). This was also seen by the Alberti et al (2002) in the diagnosis of hepatitis C virus (HCV) infection. They indicated that there were about 30% patients infected by HCV having normal ALT levels. These patients had mild necroinflammatory changes on liver biopsy and minimal disease progression over time. We found that the prevalence of hepatitis B infection was 29% in cases of chronic liver disease. This was also seen by Kurien et al (2005) in a Tamil Nadu population who reported the over all exposure of hepatitis B infection as 27%. The association of elevated ALT with acute viral hepatitis has been known for years and its usefulness in screening protocol for acute viral hepatitis testing was established in this study. A majority of the patients with abnormal ALT levels showed evidence of HBsAg positivity. Whereas 6% patients were HBsAg positive with normal ALT in the study.This indicates the usefulness of these enzymes as a screen prior to testing for chronic or acute viral hepatitis (Krugman et al., 1997). Chitkara and Fontes who studied more than 1,200 patients to determine ALT levels concluded that ALT may be used reliably to screen sera prior to performing serological tests for acute HAV and HBV infection. Their results showed that ALT levels were abnormal in 97% to 98% of patients who tested positive for acute HAV and HBV infection (Chitkara and Fontes, 1999).

Testing for hepatitis by estimating liver enzymes (ALT) can be an initial screening investigation, which would cut down the cost of management considerably without compromising on the quality of care, in acute or chronic hepatitis. When patients present with signs and symptoms of chronic or acute hepatitis, screening ALT levels prior to performing viral marker studies would be a cost saving and prudent step in their initial medical management.

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