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Alanine aminotransferase deficiency in a hepatitis B surface antigen positive patient presenting with acute hepatitis

Hepatit B yüzey antijeni pozitif bir hastada akut hepatit sırasında saptanan alanin aminotransferaz eksikliği

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This report presents a hepatitis B surface antigen positive case presenting with acute hepatitis and with findings of low serum alanine aminotransferase in contrast to very high levels of aspartate aminotransferase. A 64 year-old female patient was admitted to our hospital with fatigue and jaundice. Hepatitis B surface antigen was positive. During follow up, aspartate aminotransferase levels remained very high, while alanine aminotansferase levels continued to be extremely low. Additionally, all of the patients five daughters had low alanine aminotransferase levels. The clinical importance of alanine aminotransferase deficiency is still unclear.

Key words: Alanine aminotransferase deficiency, acute hepatitis, hepatitis B surface antigen.

Olduçka yüksek AST düzeylerine rağmen düşük ALT düzeyleri olan HbsAg pozitif akut hepatit geçiren bir olgu sunuyoruz.64 yaşında kadın hasta iştahsızlık ve sarılık nedeniyle hospitalize edildi. Hepatit B yüzey antijeni pozitifti. İzlem sırasında AST düzeyleri oldukça yüksek seyrederken aksine ALT düzeyleri oldukça düşük olarak saptandı. Ayrıca, Hastanın 5 kızında da düşük ALT düzeyleri saptandı. Böylece hastada ALT enzim eksikliği olduğu düşünüldü. Halen ALT enzim eksikliğinin klinik önemi bilinmemektedir.

Anahtar kelimeler: Alanin aminotransferaz eksikliği, akut hepatit, hepatit B yüzey antijeni.

INTRODUCTION

Alanine aminotransferase has an important role in amino acid metabolism. This enzyme reversibly catalyses interconversion of L-alanine and α-oxoglutarate to pyruvate and L-glutamate (1). Human ALT isoenzymes are located at cytosol. The enzymes are commonly found in liver tissue and kidney tissue, skeletal and cardiac muscles. Alanine aminotransferase is an important marker of hepatocellular injury. In the present study, we report a case of ALT deficiency presenting with acute hepatitis.

CASE REPORT

A 64 year-old female patient was admitted to Dokuz Eylül University Hospital with a recent history of fatigue and jaundice. She had no history of blood transfusion, alcohol abuse, cirrhosis or hepatitis. Significant family history included the death of a son after developing ascites. Physical examination was unremarkable apart from extreme jaundice of the skin and sclera. The results of laboratory tests on admission were as follows: complete blood count (CBC), coagulation tests and renal function tests were normal. Total bilirubin: 28.6 mg/dl, direct bilirubin: 15.7 mg/dl, alkaline phosphatase:417 IU/L, gamma-glutamyl transpeptidase:106 IU/L, alanine aminotransferase: 6 IU/L, aspartate aminotransferase: 1607 IU/L, total protein: 7.9 g/dl, albumin: 3.4 g/dl. The follow up of her liver function tests is summarized in Table 1.

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Table 1. Liver function test results of our case

Days	*Total bilirubin (mg/dl)*	*Direct biliribin (mg/dl)*	*ALP (IU/L)*	*Gamma-GGT (IU/L)*	*AST (IU/L)*	*ALT (IU/L)*	*Total protein (g/dl)*	*Albumin (g/dl)*
1.	28.6	15.7	417	136	1607	6	7.9	3.5
7.	15.0	8.4	296		691	3		
12.	9.7	4.4	358	70	520	3		
17.	5.3	2.5	305		281	2	7.0	3.4

ALP; alkaline phosphatase, Gamma-GGT;gamma glutamyl transpeptidase,
AST; aspartate aminotransferase, ALT; alanine aminotransferase.

Abdominal ultrasonography demonstrated normal liver morphology and biliary system. No ascites or spleen enlargement were observed. A hypodense area at the head and body of the pancreas was demonstrated in abdominal computed tomography. On further evaluation of this lesion with magnetic resonance imaging, normal pancreas and liver morphology was observed. In the evaluation of hepatitis markers, hepatitis B surface antigen (HBs Ag), hepatitis B core antibody (antiHBc), hepatitis B e antibody (Anti HBe) were positive. Hepatitis A immunoglobulin M antibody (anti HAV IgM), hepatitis B core immunoglobulin M antibody (anti HBc IgM), hepatitis B e antigen (HBe Ag), hepatitis B surface antibody (anti HBs), antibody to hepatitis C virus (anti HCV), delta antigen (delta Ag), delta antibody (delta Ab) were negative. HCV RNA and HBV DNA were negative. Antinuclear antibody (ANA), anti microsomal antibody (AMA), anti smooth muscles antibody (ASMA) and liver kidney microsomal antibody (LKMA) tests were negative. During the follow up, jaundice regressed spontaneously and the liver function tests progressively declined. Liver biopsy was recommended but refused by the patient. Interestingly when the AST levels were extremely high (≥1000 IU/L), the ALT levels were low (6, 3, 3, 2 IU/L). Prior to discharge the patient's AST was 140 IU/L and the ALT was 2 IU/L. The patient had five daughters whose transaminase levels are shown in Table 2. It is of note that all five daughters had ALT levels of less than 10 IU/L, and two of them had extremely low ALT when compared with AST levels.

DISCUSSION

Isolated ALT deficiency is a very rare condition. ALT and AST deficiency may be due to vitamin B6 deficiency, which is a co-factor for these enzymes, in cirrhotic and chronic renal failure patients on hemodialysis (2). Uno et al. reported a case with ALT deficiency in a chronic hepatitis C patient. They also found low ALT activity in the two sons of the patient (3). The ALT silent gene called ALT^0 gene was first reported in 1973 by Olaisen and presence of this gene can be detected by decreased enzyme activity (4). One case of ALT^0 homozygote was reported presenting with low ALT levels during the clinical course of acute hepatitis (5).

Our case was admitted with acute hepatitis. She was HBsAg positive, having extremely high levels of AST but very low levels of ALT. This is the first case in the literature reported to have HBs Ag positive acute hepatitis and ALT deficiency. The patient had five daughters and all had ALT levels lower than 10 IU/L, with two of them having extremely low ALT levels (2 and 3 IU/L).

In conclusion, ALT deficiency is a very rare condition. It is considered that people with ALT^0 gene

Table 2. Serum transaminase of the patient's daugthers

Daugthers	*AST (IU/L)*	*ALT (IU/L)*
1	17	2
2	19	3
3	23	7
4	19	8
5	21	9

AST; aspartate aminotransferase
ALT; alanine aminotransferase

have low or no ALT enzyme activity. To define this abnormality, gene cloning is necessary in these patients. The clinical importance of ALT deficiency is still unclear.

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