Case Report / *Olgu Sunumu*

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High Serum Transaminase Due to COVID-19 Infection

COVID-19 Enfeksiyonuna Bağlı Gelişen Serum Transaminaz Yüksekliği

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Abstract

Although COVID-19 was first described as a respiratory disease, current data has shown that it is a disease with multisystemic involvement including respiratory, cardiovascular, gastrointestinal, neurological, hematological and immune systems. COVID-19 associated liver injury may be due to various potential mechanisms. Direct viral cytotoxic effect, immun mediated injury, drugs, ischemic injury due to hypoxia-hypoperfusion are among these mechanisms. Here we present a five year-old male patient who had no known history of liver disease admitted to our clinic due to elevated transaminase during the course of COVID-19 infection.

Keywords: COVID-19, elevated transaminase, liver disease

Öz

COVID-19 öncelikle solunum yolu enfeksiyonu olarak rapor edilmesine rağmen, güncel veriler COVID-19'un solunum, kardiyovasküler, gastrointestinal, nörolojik, hematolojik ve immün sistemin de dahil olduğu multisistemik tutulum yapabilen bir hastalık olduğunu göstermiştir. COVID-19 ilişkili karaciğer hasarı çeşitli mekanizmalara bağlı gelişebilmektedir. Bu mekanizmalar; virüsün direkt sitotoksik etkisi, immün aracılıklı hasar, ilaçların etkisi, hipoksi, hipoperfüzyona bağlı iskemik hasar şeklinde sınıflandırılabilir. Burada daha önce bilinen karaciğer hastalığı olmayan, COVID-19 enfeksiyonu sırasında serum transaminaz yüksekliği gelişen, bu nedenle hastaneye yatışı yapılan beş yaşındaki bir erkek hasta sunduk.

Anahtar Kelimeler: COVID-19, transaminaz yüksekliği, karaciğer hastalığı

Introduction

A new coronavirus infection emerged in Wuhan, Hubei province of the People's Republic of China in December 2019, leading to viral pneumonia, which eventually was declared a global pandemic (1). The causative agent was named severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) by the World Health Organization (WHO), and the resulting disease was called Coronavirus Disease-2019 (COVID-19) (2). Although COVID-19 was primarily reported as a respiratory infection, the emerging data shows that it can have multi-systemic involvement including respiratory, cardiovascular, gastrointestinal, neurological, hematological and immune systems (3). Following viremia, SARS-CoV-2 typically affects tissues with high concentrations of angiotensin converting enzyme 2 (ACE-2) receptors, such as the lung, heart, and gastrointestinal system (4). Various degrees of liver damage have been described during the course and treatment of COVID-19 infection (5). COVID-19 can induce liver damage through various mechanisms. The liver can be damaged due to the virus's direct

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cytotoxic effect, immune-mediated damage, medication side effects, stasis due to myocardial damage, hypoxia, and ischemic damage due to hypoperfusion (6). Many pathways, including the ACE-2 receptors, have been proposed to explain the variable severity of infection in people, but the mechanism is still unknown. ACE-2 receptors are found on the cell surface of almost all organs in the human body. SARS-CoV-2 enters the cell by attaching to these receptors, viral replication takes place after it enters the cell. ACE-2 receptors are found extensively in hepatocytes, especially in cholangiocytes, and may play a role in liver damage (7). Mild liver damage without clinical symptoms has been observed in hospitalized COVID-19 patients. Mortality due to liver injury is rare in COVID-19, but hypoalbuminemia has been associated with poor prognosis (8).

Elevated liver enzymes are a common finding during viral infections. Previous studies have shown that some viruses that primarily target the upper respiratory tract, such as SARS-CoV, which causes severe acute respiratory syndrome, and MERS-CoV, which causes Middle East respiratory syndrome, also affect the liver (9).

Case Report

A five-year-old male patient with no known disease was admitted to the hospital as his parents had positive SARS-CoV-2 United Kingdom mutation (B1.1.7). The patient had no complaints other than mild myalgia at the time of admission. It was discovered that he had a recent illness and had not taken any medication. The patient's body temperature was 36.5°C and vital findings were normal. There was nothing noteworthy in his or his parents' medical histories. The laboratory results were as follows: hemoglobin 14.3 g/dL, leukocytes 6.2 10^9/L, platelets 175 10^9/L (200-445 10^9), CRP 0.005 g/L (0-0.005), procalcitonin 0.04 µg/L, aspartate aminotransferase (AST) 393 U/L (0-46), alanine aminotransferase (ALT) 726 U/L (0-32), total bilirubin 0.5 mg/dL, direct bilirubin 0.2 mg/dL, lactate dehydrogenase (LDH) 548 U/L, gamma glutamyl transferase (GGT) 35 U/L. Coagulation parameters and electrolytes were within normal limits. SARS-CoV-2 B1.1.7 variant was detected in the patient's nasopharyngeal swab sample. The patient was hospitalized with a diagnosis of hepatitis. Toxoplasma, rubella, EBV, CMV, hepatitis A, B, and C serologies, as well as HIV serologies, were all negative in the patient who had been tested for other reasons of increased serum transaminases. Liver and spleen size and echogenicity were normal on abdominal ultrasonography. Ursodeoxycholic acid was administered on the second day of hospitalization due to elevated AST (303 U/L) and ALT (711 U/L). The patient, who had a steady drop in liver function test parameters measured on the third day of his hospitalization, was discharged on the tenth day with AST of 65 U/L and ALT of 152 U/L and was followed up on an outpatient basis. Two weeks following discharge, AST was 24 U/L, ALT was 35 U/L, LDH was 276 U/L, total bilirubin was 0.3 mg/dL, direct bilirubin was 0.1 mg/dL, and coagulation markers were all within normal limits.

Discussion

Viral infections and medications are the most common causes of acute liver injury. The incidence of liver abnormalities has increased significantly after COVID-19 infection and during the course of the disease (10). During COVID-19, liver damage may develop directly due to the virus-induced cytopathic effect, the immune response to the virus, the resulting cytotoxic response, the activated coagulation mechanism and fibrinolytic system, the agents used before or during the treatment, hypoxia, and the agents used for respiratory support (11). Patients with severe COVID-19 infection have an increased likelihood of liver impairment (12). A post-mortem examination was performed on a 50-year-old patient with COVID-19 pneumonia who was treated with steroids, moxifloxacin, lopinavir/ritonavir, and interferon, to elucidate the changes in the liver during COVID-19, which revealed moderate microvesicular steatosis, mild lobular, and portal inflammatory activity in liver biopsy. The biopsy, however, showed no virus particles. Since the patient had no known underlying disease, pathological findings in the liver were thought to be related to SARS-CoV-2 infection or the drugs used (11). Our patient had no previous history of medication use.

Mild deterioration in liver function tests is frequently observed in COVID-19 patients at admission. It has been reported that ALT is elevated in 4-39% and AST is elevated in 4-58% of COVID-19 patients. The elevation in ALT and AST is usually mild and lower than five times the upper limit, and liver enzyme elevation is not accompanied by liver dysfunction and liver failure. According to reports, an increase in liver enzymes has no prognostic significance. No treatment is recommended for elevated liver enzymes during COVID-19 (13). In our patient, the ALT value was higher than five times the upper limit. Ursodeoxycholic acid was administered to the patient after a consultation with a pediatric gastroenterologist. A pediatric case with fulminant hepatitis and pneumonia caused by SARS-CoV-2 who died as a result of hepatorenal syndrome has been documented in the literature (10). Our patient had no underlying conditions, and during his follow-up, no clinical and laboratory abnormalities developed except for elevated serum transaminases. Our patient was infected with the SARS-CoV-2 variant B.1.1.7. In the literature, SARS-CoV-2 B.1.1.7 variant-associated hepatitis has not been reported before.

With this report, we wanted to emphasize that hepatitis may develop during COVID-19 infection. More research is required to fully comprehend the acute and chronic consequences of COVID-19 infection on liver function.

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