

# COVID-19 Presenting With Acute Anicteric Hepatitis in Pediatric Patient: A Case Report

\*Gillian M. Greenberg, MD, †‡Salman S. Salman, MD

**Abstract:** The impact that severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has on the hepatobiliary system is poorly described in the pediatric population compared with the adult population. In adults, gastrointestinal symptoms and marked elevation in liver enzymes in the setting of coronavirus disease 2019 (COVID-19) has been directly correlated with disease severity. This case is a unique presentation of a pediatric patient with a relatively mild disease course despite the presence of gastrointestinal symptoms and marked elevation in transaminases, suggesting that SARS-CoV-2 virus may cause isolated acute hepatitis in pediatric patients.

**Key Words:** COVID-19, acute hepatitis, anicteric hepatitis, elevated transaminases

## INTRODUCTION

Since the onset of the coronavirus disease 2019 (COVID-19) pandemic, over 7.5 million children have been infected by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in the United States. This equates to 1 in 10 children and approximately 17.4% of total cases in the United States (1). Despite the high SARS-CoV-2 infection rates in the pediatric population, research describing the natural course of the illness, its effects on various organ systems, and potential manifestations has been limited. Specifically, the hepatic manifestations of SARS-CoV-2 infections are poorly described and have been generally limited to case reports and case series. Only one large cohort study reports this association in the pediatric population (2). Based on the limited data, liver enzymes are generally normal or mildly elevated (3) with marked elevations being uncommon. Brisca et al., describes a previously healthy 10-month-old, diagnosed with COVID-19, who presented with markedly elevated transaminases

and normal bilirubin, suggesting that SARS-CoV-2 could be associated with acute anicteric hepatitis in children (4). In adults and children, elevated liver transaminase levels and gastrointestinal manifestations during acute infection with COVID-19 correlate directly with disease severity and increased risk of admissions to intensive care units (2,3,5).

We present a case of a previously healthy COVID-19 positive 10-year-old female who presented with isolated gastrointestinal symptoms and markedly elevated transaminase levels without any other significant laboratory abnormalities. This is a unique presentation of a pediatric patient with a relatively mild disease course despite the presence of gastrointestinal symptoms and marked elevation in transaminases, which was previously associated with a more severe disease course. This case suggests SARS-CoV-2 virus may cause isolated acute hepatitis in the pediatric population.

## CASE REPORT

An obese 10-year-old African American female with body mass index (BMI) of 29.6 kg/m<sup>2</sup> (99th centile) presented with 3 days of severe abdominal pain, nonbloody, nonbilious emesis, sore throat, headache, and decreased oral intake. The patient was found to be COVID-19 positive during a school-administered test at the onset of symptoms. She described the abdominal pain as diffuse, constant, dull, and nonradiating; she rated her pain severity as 9 out of 10. The patient denied diarrhea, constipation, difficulty in breathing, cough, congestion, or any new rash. On admission, she was hemodynamically normal, afebrile, and in no acute distress. Family history was negative for liver disease. The patient was given ibuprofen, ondansetron, and IV pantoprazole. Nasopharyngeal PCR swab was positive for SARS-CoV-2, with other laboratory tests notable only for mild leukopenia. Aspartate aminotransferase (AST) was 1400 U/L and alanine aminotransferase (ALT) was 2252 U/L; however, alkaline phosphatase (ALP) (295 U/L) and total bilirubin (0.68 mg/dL) were normal (Table 1). Synthetic liver function was preserved as evidenced by normal coagulation tests and albumin. Troponin, ferritin, C-reactive protein, and lipase were within normal limits. Viral panels were negative for other viral agents (Table 2). Abdominal radiograph showed nonobstructive bowel gas pattern with mild colonic stool burden, and abdominal ultrasound without Doppler demonstrated normal hepatic parenchyma without biliary dilation.

Acetaminophen was undetected in serum. The patient was monitored for 48 hours without any additional interventions. At discharge, repeat AST was 630 U/L and ALT was 1578 U/L. The patient experienced significant clinical improvement with near resolution of abdominal pain and was able to tolerate oral intake without difficulty. On follow-up appointment 7 weeks later, the patient had complete resolution of abdominal pain, and laboratory tests normalized with AST of 12 and ALT of 16.

## DISCUSSION

SARS-CoV-2 has a multitude of effects on various organ systems. Our case highlights its possible effect on the gastrointestinal and hepatobiliary system in a pediatric patient. In a case series from

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From the \*Department of Pediatrics, Children's Hospital of Michigan, Detroit, MI; †Division of Pediatric Gastroenterology, Children's Hospital of Michigan, Detroit, MI; and ‡Central Michigan University, College of Medicine, Mount Pleasant, MI.

Correspondence: Salman S. Salman, MD, Division of Pediatric Gastroenterology, Children's Hospital of Michigan, 3901 Beaubien, 5th Floor Carls Building, Detroit, MI 48201. E-mail: ssalman@dmc.org.

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The parent of the child is aware of this case report and an informed consent was obtained from the parent.

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**TABLE 1.** Laboratory parameters on presentation and during follow-up 7 weeks later

Laboratory parameters	Patient value on presentation	Patient value on follow-up	References range
White blood cell, $\times 10^3/\mu\text{L}$	3.2	–	4.1–10.1
Platelets, $\times 10^3/\mu\text{L}$	188	–	130–450
Aspartate aminotransferase, U/L	1400	12	13–39
Alanine aminotransferase, U/L	2252	16	7–52
Prothrombin time, ratio	12.4	10.4	9.4–11.7
Alkaline phosphatase, U/L	295	370	141–460
Total bilirubin, mg/dL	0.68	0.89	<1.50
C-reactive protein, mg/dL	<5.0	–	<5.0
Lipase, U/L	15	–	11–82
Albumin, g/dL	5.6	4.6	3.9–4.9

**TABLE 2.** Viral laboratory results on presentation

Viruses	Results on presentation
Adenovirus*	Negative
Cytomegalovirus	Negative
Epstein-Barr Viral Panel	Consistent with past infection
Hepatitis A IgM	Negative
Hepatitis B Core antibody	Negative
Hepatitis B Surface antigen	Negative
Hepatitis C antibody	Negative
Human Metapneumovirus*	Negative
Influenza A*	Negative
Influenza B*	Negative
Parainfluenza*	Negative
Respiratory Syncytial Virus*	Negative
Rhino/Enterovirus*	Negative

\*Based on nasopharyngeal swab PCR test.

Shanghai, 50.7% of SARS-CoV-2 positive adult patients presented with significantly elevated transaminase levels and had more severe disease courses than those with only slightly abnormal transaminase

values. This led to the conclusion that markedly elevated transaminase levels directly correlated with disease severity and that patients with severe SARS-CoV-2 infection, pre-existing liver conditions, and the elderly should be observed carefully for liver injury (6). Similar findings were also demonstrated in the pediatric population (2). Our patient had a mild disease course with markedly elevated transaminase levels at disease onset, challenging the perception that elevated transaminase levels directly correlate with severity of disease. Similarly, Brisca et al (4) reported a 10-month-old with markedly elevated transaminase levels associated with a relatively mild disease onset and course. Demographic variables should also be taken into consideration. Specifically, our patient is obese and African American, both risk factors for a worse prognosis. However, despite having these risk factors, a mild disease course was observed. Also, steatosis brought on by obesity increases the liver's susceptibility to injury and nonspecific hepatitis (2); however steatosis is less likely in our patient with normalization of aminotransferase levels and normal echogenicity on liver ultrasound.

Although the mechanism of hepatic injury due to the virus is not fully understood, four possible mechanisms have been explored: a direct cytopathic effect, damage secondary to systemic inflammation, exacerbation of preexisting liver disease, and drug-induced toxicity during treatment of SARS-CoV-2 (5). Our case highlights that SARS-CoV-2 may cause acute hepatitis with a benign course, although the long-term implications of the hepatitis are not yet well delineated. It will be important to continue to explore the pathophysiology by which hepatic injury occurs to direct proper management and treatment options for patients, and to better understand the complications of acute hepatitis due to SARS-CoV-2.

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