Case Report

Undiagnosed Wilson Disease Presented as Liver Failure after Hepatitis A Virus Super Infection

Lubana Akram[1], Tasfia Jannat Rifah[2], Md Rukunuzzaman[3], Khan Lamia Nahid[4]

Abstract

Hepatitis A super infection can cause severe or even fatal illness in patients with chronic liver disease. Here, we describe a ten-year-old boy who was admitted for acute hepatitis A virus infection but later on he was diagnosed Wilson disease. Wilson disease was diagnosed on the basis low ceruloplasmin, high urinary copper excretion, and presence of K-F ring. Hepatitis A was diagnosed by presence of antibody in the blood. This case report suggests that acute hepatitis A virus infection may play a role in acute decompensation in diagnosed or undiagnosed chronic liver disease.

Key words: *Wilson Disease, Liver Failure, Virus, Hepatitis A*

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Introduction

Viral hepatitis is a major health concern in both developed and developing countries and it is caused by the 5 pathogenic hepatotropic viruses recognized to date: Hepatitides A (HAV), B (HBV), C (HCV), D (HDV), and E (HEV) viruses. HAV infection occurs throughout the world and incidence of HAV infection globally is 1.5 million per year.[1] It is more prevalent in developing countries. In Asia, countries are divided into low, moderate, or high endemic regions for HAV infection.[2] Bangladesh is a highly endemic country as well as India, China, Nepal, Pakistan, Myanmar, and Philippines.[3]

In Bangladesh among children average prevalence of anti-HAV is 74.8%, which increased gradually with age.[4] Usually HAV causes acute hepatitis. This illness is more likely to be symptomatic in older patients, with the underlying disorders or immunocompromised patients.[5] Fulminant hepatic failure due to HAV is rare in children and its prevalence is unknown in our country.

Wilson disease (WD) is an autosomal disorder of copper metabolism in the liver attributed to the absence or dysfunction of a copper transporting P-type ATPase encoded on chromosome 13 and causes degenerative changes in various organs such as the brain, liver, and other organ involvement such as Kayser–Fleischer ring in eyes.[6-8] Patients of WD can present with a broad spectrum of liver diseases such as acute liver failure (ALF), acute hepatitis, chronic hepatitis, and cirrhosis. Initially the patient may present with non-specific clinical symptoms and it's rarely apparent before the age of five years; the typical young patient is at least eight years old. For this reason, the early severe hepatic form of WD may become undiagnosed in the absence of positive family history.[5]

Here, we present a case of acute hepatic failure occurring in a child with biochemical evidence for underlying WD complicated by HAV infection. This case indicates that HAV plays a role in the acute hepatic decompensation who have undiagnosed WD.

Case Presentation

A ten-year-old boy 1st issue of his non-consanguineous parents was admitted to the Paediatric Gastroenterology and Nutrition department, Bangabandhu Sheikh Mujib Medical University, Dhaka in February, 2022 with complaints of jaundice for the last 15 days and anorexia, nausea, and vomiting for the same duration. He has no history of previous jaundice. His family

1. Resident (phase-B), Department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University(BSMMU), Dhaka, Bangladesh.
2. Resident (phase-B), Department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh
3. Professor, Department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh
4. Assistant Professor, Department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh

Corresponding author: Lubana Akram, Resident (phase-B), Department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University(BSMMU), Dhaka, Bangladesh. Cell Phone: +8801816511361, Email: lubanaakram@gmail.com

history was not significant regarding inherited or metabolic liver disease. On examination, he was icteric, vitally stable, anthropometrically well thriving (BMI 18 kg/m^2, which lies in between 50th to 75th centile), hepatomegaly 4 cm present and stigmata of chronic liver disease were absent. After an initial laboratory investigation, he has diagnosed with a case of Acute Hepatitis A virus infection. But later on, jaundice became deepening day by day. So, we decided to re-evaluate this patient. The presence of K-F ring in both eyes, low ceruloplasmin, and high 24 hour urinary copper made the diagnosis of Wilson disease in addition to Hepatitis A virus infection. According to the Modified Leipzig score, the score was 5. But in the meantime, the patient developed acute liver failure with hepatic encephalopathy grade 4. The patient was treated with supportive treatment. Liver transplantation was the only definitive treatment for this patient. But this treatment option is not available in our country. Patient's condition was deteriorating day by day and ultimately we lost the patient.

Table I: Initial investigation of patient on admission

Test	Result	Reference value
S.ALT	1164 U/L	<50 U/L
Alkaline phosphatase	252 U/L	30- 120 U/L
S.AST	917 U/L	<50 U/L
S.Bilirubin	15.5 mg/dl	0.2- 1.2 mg/dl
Prothrombin time	22.30 sec	12.00- 16.00 sec
International Normalized Ratio	1.95	
Hb%	11 gm/dl	13-17 gm/dl
Platelet count	3500000	150000-400000/cumm
Ani HAV IgM	Positive	
Anti HEV IgM	Negative	

Table II: Re-evaluation of patient

Test	Result	Reference value
S.Ceruloplasmin	15 mg/dl	20-58 mg/dl
24-hourly copper	167 micro gm/L	>100 microgm/L confirms WD
Slit lamp examination of eye	K-F ring present in both eye	
IgG	10.7 g/L	4.62- 16.82 gm/L
Anti LKM1	Negative	
ANA	Negative	
ASMA	Negative	

Table III: Trend of laboratory findings of patient during hospital admission

	Prothrombin time	International Normalized Ratio	S.ALT	S.Bilirubin
Day 24	28.00 sec	2.33	938 U/L	25.5 mg/dl
Day 26	29.30 sec	2.55		
Day 28	50.80 sec	4.55	581 U/L	28.0 mg/dl
Day 30	60.00 sec	5.19		

Discussion

When a patient presents with liver failure it may be due to ALF in a previously healthy liver, an acute decompensation of CLD, or chronic decompensation in end-stage liver disease. Superimposed acute hepatitis A-E, drugs, sepsis, gastrointestinal bleeding, development of hepatic vein and portal vein thrombosis, and hepatocellular carcinoma can cause decompensation in a patient with CLD.

Our patient was diagnosed a case of ALF with no previous history of liver disease. After completing the diagnostic work-up for determining the etiology of liver failure, we reach the conclusion that the disease was hepatitis A super infection on a liver with undiagnosed WD.

Patients with Wilson disease may present with asymptomatic hepatomegaly, persistently elevated transaminases, acute hepatitis, chronic hepatitis, cirrhosis (compensated and decompensated), acute liver failure, acute on chronic liver failure, fatty liver, isolated splenomegaly, and cholelithiasis.[9] An ALF patient other than WD may present with abnormal serum copper concentration, high urinary copper excretion, and low ceruloplasmin concentrations. For that reason, the diagnosis of WD presenting with ALF is a diagnostic challenge. Measurement of hepatic copper content by liver biopsy is not available in our country. For early diagnosis, liver biopsy is essential because orthotropic liver transplantation is the only treatment option for a WD patient who presented with ALF. Our patient had established WD according to Modified Leipzig Score. The Leipzig score of 1993 was modified by consensus group members of Indian national association for study of the liver, the Indian society of pediatric gastroenterology, hepatology and nutrition, and the Movement disorders society of India and the new "Modified Leip-zig Score" was established.[9] According to the score, our patient had a score of 5, indicating the diagnosis of WD was established.

Fulminant presentation of hepatitis A is rare in the paediatric patient, occurring in 0.1%-0.4% cases[10] and the mortality rate is 0.14 to 2%.[11] There are several studies regarding the clinical course and outcome of HAV infection in patients with underlying chronic hepatitis B or hepatitis C.[12,13] We found few reports regarding outcome of hepatitis A in patients with WD.[5]

Due to improved hygiene and sanitation programme in recent year, many developing country changes the epidemiology from high to intermediate or low endemicity.[14,15] But mass vaccination is always recommended in developing countries. Routine vaccination against HAV in patients with CLD is recommended by the Centers for Disease Control.[16]

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