Case Report

Acute liver failure resulting from coinfection with dengue and hepatitis A virus: A case report

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ABSTRACT

Acute liver failure (ALF) is an infrequent and varied condition characterized by severe impairment of liver function that occurs in individuals without any preexisting liver disease. This particular case study presents a distinctive occurrence of ALF resulting from a simultaneous infection of both hepatitis A virus (HAV) and dengue virus, accompanied by dengue hemorrhagic fever. The patient, a 26-year-old male, exhibited symptoms such as fever, nausea, vomiting, abdominal pain, and generalized body aches. Subsequently, the patient developed jaundice, hepatic encephalopathy, acute cholecystitis, and acute pancreatitis. Laboratory tests confirmed the presence of markers for both dengue and HAV, along with decreased platelet count and hemoglobin levels. However, with a treatment plan focused on conservative management, the patient's condition gradually improved, leading to eventual discharge. This case underscores the potential for coinfection with dengue and HAV to precipitate ALF and emphasizes the significance of early diagnosis and timely intervention to achieve the best possible outcomes for the patient.

Key words: Acute liver failure, Coinfection, Dengue virus, Hepatitis A virus, Intensive care

Acute liver failure (ALF) is characterized by the rapid onset of severe liver injury, accompanied by encephalopathy, and impaired synthetic function which is indicated by an international normalized ratio (INR) of 1.5 or higher. It occurs in individuals without preexisting liver diseases or cirrhosis and is typically of shorter duration, lasting <26 weeks. While ALF carries significant morbidity and mortality risks, advancements in intensive care management and emergency liver transplantation have led to improved overall survival rates [1]. The most common causes of ALF include hepatotropic and non-hepatotropic viral hepatitis, drug-induced liver injury, alcohol abuse, exposure to toxins, and mushroom poisoning. [2].

In this particular case, we present a report of fulminant hepatic failure resulting from a coinfection of hepatitis A virus (HAV) and dengue virus, along with dengue hemorrhagic fever. This case underscores the potential for coinfection with dengue and HAV to precipitate ALF and emphasizes the significance of early diagnosis and timely intervention to achieve the best possible outcomes for the patient.

CASE PRESENTATION

A 26-year-old male patient presented with a constellation of symptoms including a 5-day history of fever, accompanied by nausea, vomiting, abdominal pain, and generalized body aches. The patient had a previous history of drug-induced liver injury from antifungal medication (Ketoconazole) 6 months ago. Physical examination revealed dehydration, but the patient remained conscious, alert, and without signs of jaundice. Vital signs indicated a high temperature of 104°F, pulse rate of 110 beats per minute, and blood pressure of 100/60 mmHg.

The dengue non-structural protein 1 test was negative, but the platelet count was low at 104,000/uL, and the hematocrit was within normal range. Serum glutamic pyruvic transaminase (SGPT) levels were elevated at 657 IU/L, while serum bilirubin and electrolyte levels were normal.

During the initial 48 hours of hospitalization, the patient experienced moderate upper abdominal pain, vomiting, and unstable blood pressure. Conservative management was implemented, including continuous intravenous fluid administration and regular vital sign monitoring. On the 7th day, the patient developed jaundice, flapping tremors, and signs of disorientation, necessitating transfer to the intensive care unit (ICU) for advanced care. At this stage, the platelet count dropped to 60,000/uL, hematocrit declined to 26%, and serum bilirubin levels spiked to 9.6 mg/dL. Positive results were obtained for Anti-HAV immunoglobulin (Ig)M, dengue IgM, and dengue IgG. Ultrasonography revealed mild hepatomegaly and cystitis. C-reactive protein levels were elevated at 15.6 mg/L.

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On the 8th day, the patient experienced severe upper abdominal pain radiating toward the back, accompanied by intractable vomiting. Laboratory tests indicated a further decrease in platelet count to 50,000/uL, reduced hemoglobin levels at 9.1 g/dL, and a hematocrit of 24%. Serum SGPT skyrocketed to 3054 IU/L, while prothrombin time increased to 38 s and INR reached 4.1. In addition, elevated amylase levels were observed at 144 U/L, along with lipase levels at 435 U/L. A subsequent ultrasound scan identified acute acalculous cholecystitis and acute pancreatitis. Serum ammonia levels were measured at 253 umol/L, while brain computed tomography (CT) scans showed no abnormalities and abdominal CT scans confirmed the presence of acute pancreatitis. Other investigations yielded normal results (Tables 1 and 2).

The patient received a treatment regimen consisting of intravenous fluids, antibiotics, antiemetics, analgesics (excluding non-steroidal anti-inflammatory drugs and acetaminophen), proton-pump inhibitor, hydrocortisone, mannitol, N-acetylcysteine, fresh whole blood, apheresis platelets, and fresh frozen plasma transfusion. With conservative therapy, the patient's condition gradually improved, leading to discharge on the 21st day.

DISCUSSION

ALF is a rare form of severe liver damage that occurs in people without prior liver disease. The main causes of ALF worldwide are viral hepatitis and drug-induced hepatitis, particularly HAV and hepatitis E virus, which are more common in developing countries with poor sanitation. In the past, hepatitis A and B accounted for 75% of ALF cases [3]. The World Health Organization estimates around 1.4 million new cases of HAV infection annually, with a small percentage progressing to ALF. HAV-related ALF represents about 3% of all ALF cases [4]. Most HAV-infected adults experience symptoms, but only a small portion develops ALF. The prognosis for HAV-related ALF is generally positive, with a 70% spontaneous resolution rate, although some cases require a liver transplant or can be fatal [5]. Poor prognostic indicators for HAV infections include elevated creatinine and ALT levels and the need for intubation [6]. The relationship between self-limited hepatitis A cases and HAV infections leading to ALF is not well understood. Factors such as age and preexisting liver disease may increase the risk of severe disease. Immune response is believed to play a central role in liver damage during HAV infections [7].

Dengue virus infection can present with various clinical manifestations, including ALF. Approximately 50 million dengue infections are reported annually across roughly 100 tropical and subtropical nations [8]. Liver failure associated with dengue was first reported in Indonesia in 1970 and subsequently documented in Thailand and Malaysia. Dengue serotypes 1, 2, and 3 have been found in patients with liver failure, and DENV3 and DENV4 show a stronger association with hepatic involvement [9]. The

Table 1: Laboratory results of patient according to the day of illness. The patient first sought medical care on day 5

Laboratory tests	Day 5	Day 7	Day 8	Day 11	Day 14
Hemoglobin (g/dL)	13.3	12.0	9.1	9.0	8.6
Total count (/uL)	3100	4000	14350	11230	7300
n %	60	53	68	72	78
Hematocrit (HCT)%	37.2	26	24	22	22
PC (/uL)	104000	60000	50000	45000	21000
Serum glutamic pyruvic transaminase (U/L)	657	970	3022	875	273
serum glutamic-oxaloacetic transaminase (U/L)	340	450	2080	173	67
Alkaline phosphatase (U/L)	38	-	34	27	40
Gamma-glutamyl transferase (U/L)	48	-	-	43	-
Bilirubin (mg/dL)	1.8	9.6	-	24	14
Direct (mg/dL)	-	5.0	-	-	11
Indirect (mg/dL)	-	4.6	-	-	3.0
PT (second)	14	39	-	18	13
INR	1.2	4.1	-	1.5	1.0
Albumin (g/L)	-	38.7	-	39.9	36
Amylase (U/L)	-	-	144		
Lipase (U/L)	-	-	435	260	132
Sodium (mmol/L)	135	-	142	138	137
Potassium (mmol/L)	3.4	-	3.5	3.2	3.1
Creatinine (mg/dL)	1.0	-	0.6	0.44	0.8
Blood sugar (mmol/L)	5.8	-	-	-	-
Dengue NS1	Negative	-	-	-	-
Dengue IgM	-	Positive	-	-	-
Dengue IgG	-	Positive	-	-	-
ICT for Malaria	-	Negative	-	-	-

PT: Prothrombin time, INR: International normalized ratio, ICT: Immunochromatographic test, IgM: Immunoglobulin M, IgG: Immunoglobulin G, NS1: Non-structural protein 1

Table 2: Profile of hepatotropic virus

Anti-HAV IgM	Positive
Anti-HEV IgM	Negative
HBsAg	Negative
Anti-HBc Total	Negative
Anti-HCV	Negative

HEV: Hepatitis E virus, HCV: Hepatitis C virus, IgM: Immunoglobulin M, HBc: Hepatitis B core

exact mechanism of liver failure is unclear but likely involves complex interactions among the viruses, the host, and the disease duration. Liver specimens are rarely examined due to the risk of bleeding in acutely ill patients [10,11].

Coinfection of dengue and HAV leading to ALF is rare, and limited data are available on this condition. Bangladesh is an endemic region for both HAV and dengue, with different transmission routes (fecal-oral for HAV and mosquito bites for dengue). Atypical presentations of dengue fever may occur in endemic countries, leading to potential misdiagnosis. This patient with ALF showed significant improvement after 3 weeks of conservative management in the ICU. This case suggests that N-acetylcysteine therapy may be effective for ALF caused by factors other than acetaminophen poisoning. A high level of suspicion, adequate supportive care, and early referral to a specialized liver transplantation center are essential for managing ALF.

CONCLUSION

Dengue and HAV coinfection, which can lead to ALF, is uncommon but documented. This case emphasizes the need to recognize unusual manifestations and coinfections in regions where both HAV and dengue are prevalent. It also highlights the criticality of early detection and prompt treatment to optimize patient outcomes.

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REFERENCES

1. Sedhom D, D'Souza M, John E, Rustgi V. Viral hepatitis and acute liver failure: Still a problem. Clin Liver Dis 2018;22:289-300.
2. Lee WM, Seremba E. Etiologies of acute liver failure. Curr Opin Crit Care 2008;14:198-201.
3. Manka P, Verheyen J, Gerken G, Canbay A. Liver failure due to acute viral hepatitis (A-E). Visc Med 2016;32:80-5.
4. Taylor RM, Davern T, Munoz S, Han SH, McGuire B, Larson AM, *et al*. Fulminant hepatitis A virus infection in the United States: Incidence, prognosis, and outcomes. Hepatology 2006;44:1589-97.
5. Ajmera V, Xia G, Vaughan G, Forbi JC, Ganova-Raeva LM, Khudyakov Y, *et al*. What factors determine the severity of hepatitis A-related acute liver failure? J Viral Hepat 2011;18:e167-74.
6. Shammout R, Alhassoun T, Rayya F. Acute liver failure due to hepatitis A virus. Case Rep Gastroenterol 2021;15:927-32.
7. Vinodh BN, Bammigatti C, Kumar A, Mittal V. Dengue fever with acute liver failure. J Postgrad Med 2005;51:322-3.
8. Suganthan N, Sakthilingham G, Kumanan T. Dengue fever complicated with acute liver failure: A case report of expanded dengue syndrome and literature review. SAGE Open Med Case Rep 2020;8.
9. Fleischer B, Fleischer S, Maier K, Wiedmann KH, Sacher M, Thaler H, *et al*. Clonal analysis of infiltrating T lymphocytes in liver tissue in viral hepatitis A. Immunology 1990;69:14-9.
10. Kumar R, Tripathi P, Tripathi S, Kanodia A, Venkatesh V. Prevalence of dengue infection in north Indian children with acute hepatic failure. Ann Hepatol 2008;7:59-62.
11. Jhamb R, Kashyap B, Ranga GS, Kumar A. Dengue fever presenting as acute liver failure--a case report. Asian Pac J Trop Med 2011;4:323-4.

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