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Case Study IJPG

Decompensated Liver Failure and Acute Renal Failure in a Patient with Chronic HBV, HCV, and HIV Infections

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Abstract

This case study focuses on a 30-year-old male patient suffering from decompensated liver failure and acute renal failure, complicated by chronic hepatitis B (HBV), hepatitis C (HCV), and HIV/AIDS. Presenting with severe abdominal pain, nausea, and general weakness, the patient had a history of alcohol and intravenous drug use, leading to chronic liver disease and acute renal failure. Despite aggressive interventions, including intravenous antibiotics and fluid therapy, his condition worsened rapidly, leading to his transfer to the ICU and eventual death. The case emphasizes the complex interplay between HBV, HCV, and HIV infections. The patient's liver failure, compounded by hepatorenal syndrome – a functional renal impairment commonly seen in advanced liver disease – created significant clinical challenges. Furthermore, HIV's immunosuppressive effects accelerated liver disease progression and complicated management due to potential drug interactions. Key laboratory findings included elevated liver enzymes, indicating significant liver damage, and severe anemia, likely worsened by gastrointestinal bleeding due to portal hypertension. Kidney function was severely impaired, as reflected by elevated serum creatinine and blood urea nitrogen levels, alongside hyperkalemia. This report highlights the critical need for a multidisciplinary approach involving hepatologists, nephrologists, infectious disease specialists, and critical care teams in managing patients with multiple chronic infections. The patient's rapid deterioration underscores the importance of early diagnosis, aggressive treatment, and comprehensive care plans tailored to the complex needs of such high-risk individuals to improve outcomes.

Keywords: Acquired immunodeficiency syndrome (AIDS), Diagnosis, Hepatitis A, Hepatitis B, Human immunodeficiency virus (HIV)

INTRODUCTION

Decompensated liver failure and acute renal failure are severe complications that can arise in patients with chronic hepatitis B (HBV) and hepatitis C (HCV) infections. These conditions are further complicated when the patient is also infected with HIV/AIDS, leading to a complex interplay of pathophysiological mechanisms that significantly worsen the prognosis. The liver and kidneys play crucial roles in metabolism and detoxification, and their simultaneous failure presents significant clinical challenges [1]. In patients with chronic liver disease, the risk of renal impairment increases due to factors, such as hepatorenal syndrome, a condition characterized by functional renal failure without underlying kidney disease, which is commonly seen in advanced liver disease [2].

The management of such patients requires a multidisciplinary approach, involving

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hepatologists, nephrologists, infectious disease specialists, and critical care teams [3]. Early diagnosis and aggressive treatment are paramount in attempting to stabilize the patient and prevent further deterioration [1–5]. However, the coexistence of HBV, HCV, and HIV complicates the therapeutic strategies due to potential drug interactions and the cumulative impact of these infections on the patient's immune system [5]. This case report, highlights the rapid progression and complexity of managing multiple chronic infections, underscoring the critical need for integrated care and timely intervention to improve patient outcomes.

Case Presentation

This 30-year-old male, presented to the emergency department with severe abdominal pain and nausea that had persisted for four days, accompanied by generalized weakness. He reported no history of hypertension or diabetes mellitus but had a significant history of acute renal failure. He had been hospitalized twice in the past for various symptoms, including anaemia, which necessitated blood transfusions.

The patient had no history of surgical procedures. His father had died of liver cancer, and his mother was diagnosed with hypertension, but there was no known family history of immunodeficiency. Socially, he had a history of heavy alcohol use until 2022 and was currently abstinent. He also had a history of intravenous drug use and had been in recovery for the past year. He was fully immunized against COVID-19.

On admission, the patient appeared cachectic with icteric sclerae. His vital signs were notable for a blood pressure of 140/85 mmHg, a heart rate of 110 bpm, a respiratory rate of 20 breaths per minute, a temperature of 37.5°C, and an oxygen saturation of 97% on supplemental oxygen. Physical examination revealed jaundice, spider angiomata on the chest, and excoriations on his arms from scratching. His sclerae were icteric, and he had mild gingivitis but no oral thrush. There was no significant lymphadenopathy. Respiratory examination showed symmetrical chest movements and clear breath sounds, while cardiovascular examination revealed a regular rhythm without murmurs.

Abdominal examination indicated a distended abdomen with visible veins, hepatomegaly extending 4 cm below the costal margin, splenomegaly, and mild tenderness. There was also shifting dullness, suggesting ascites. Neurologically, the patient was mildly confused, oriented to person and place but not time, with decreased sensation in his feet and mild weakness in his lower extremities. His ankle reflexes were reduced, though upper limb reflexes were normal. Musculoskeletal examination revealed mild swelling in the knees with tenderness on palpation but full range of motion. The genitourinary examination was unremarkable.

Laboratory tests showed significant abnormalities: elevated levels of blood urea, serum creatinine, BUN, uric acid, potassium, and chloride, alongside low blood calcium. Liver function tests revealed elevated total bilirubin, direct bilirubin, SGOT/AST, and alkaline phosphatase levels, with reduced total protein and albumin, and an altered A/G ratio. Table 1 complete blood count indicated severe anaemia with a haemoglobin level of 5.5 gm/dl, a low RBC count, a high TLC with neutrophilia, low lymphocyte count, and an elevated INR (Table 2).

An abdominal ultrasound showed an enlarged liver with coarse echotexture, splenomegaly, and ascites.

The patient's condition deteriorated rapidly over the course of one week, with worsening abdominal distension, severe lethargy, and increasing abdominal pain. He was provisionally diagnosed with severe anaemia, acute kidney infection, hyperkalaemia, and chronic HBV and HCV infections complicated by HIV/AIDS. Despite aggressive treatment with intravenous antibiotics (Inj. Piptaz, Inj. Pantop, Inj. Emset, and Inj. Metrogyl) and intravenous fluids (NS 100ml), there was no significant improvement. The patient was transferred to the ICU, but unfortunately, he expired the following day despite intensive medical efforts.

Table 1. Kidney and Liver Function Tests Result.

Kidney Function Test		
Test Name	**Result**	**Bio. Ref. Interval**
Blood Urea	153.1 mg/dl	19–44 mg/dl
Serum Creatinine	4.62 mg/dl	0.4–1.4 mg/dl
BUN	71.54 mg/dl	7.0–18 mg/dl
Uric Acid	20.8 mg/dl	2.5–8 mg/dl
Sodium	146.5 mEq/L	135–145 mEq/L
Potassium	5.96 mEq/L	3.52–5.3 mEq/L
Blood Calcium	0.62 mmol/L	1–1.3 mmol/L
Chloride	116.0 mmol/L	94–100 mmol/L
Liver Function Tests		
Test Name	**Result**	**Bio. Ref. Interval**
Total Bilirubin	1.67 mg/dl	0.2–1.0 mg/dl
Direct Bilirubin	0.94 mg/dl	0–0.4 mg/dl
Indirect Bilirubin	0.73 mg/dl	0–0.8 mg/dl
SGOT/AST	137.8 U/L	0–45 U/L
SGPT/ALT	33.9 iu/l	0–40 iu/l
Alkaline Phosphatase	143 iu/l	50–140 iu/l
Total Protein	6.04 g/dl	6.4–8.2 g/dl
Albumin	2.00 g/dl	3.5–5.0 g/dl
Globulin	4.04 g/dl	2–3.5 g/dl
A/G Ratio	0.49	%

Table 2. Complete Blood Count Result.

Test Name	**Result**
Profile Name: Blood Group (ABO & RH Typing)	
BLOOD GROUP	B
RH TYPING	POSITIVE
Profile Name: CBC (Complete Blood Count)	
HAEMOGLOBIN	5.5 gm/dl
R.B.C. COUNT	2.77 mill/cumm.
HAEMATOCRIT	18.60%
MCV	67.2 fl
MCH	19.7 pg
MCHC	29.4 gm/dl
RDW-CV	19.50%
PLATELET COUNT	1.45 lacs/cumm
TOTAL LEUCOCYTE COUNT(TLC)	32900 /cumm
Differential Count	
Neutrophils	90%
Lymphocyte	6%
Monocyte	3%
Eosinophil	1%
Basophil	0%
Profile Name: PT (Prothrombin Time)	
TEST	30.0 sec
MNPT	13.0 sec
INR	2.36

DISCUSSION

This case underscores the critical challenges in managing patients with multiple chronic infections, particularly those with concurrent HBV, HCV, and HIV [5–7]. The interplay between these infections creates a complex clinical scenario where each condition exacerbates the other, leading to rapid deterioration in the patient's health. Hepatitis B and C are known to cause chronic liver disease, which can progress to cirrhosis and liver failure [4, 8]. When coupled with HIV, the progression of liver disease is accelerated due to the immunosuppressive nature of HIV, which not only increases the viral load of HBV and HCV but also hinders the body's ability to repair liver damage [9, 10]. This highlights the importance of early and aggressive treatment of liver infections in HIV-positive patients to prevent such dire outcomes [10, 11].

Renal failure in this patient can be attributed to multiple factors, including the hepatorenal syndrome, which is a common complication in patients with advanced liver disease [12]. Hepatorenal syndrome is characterized by functional kidney failure without underlying structural kidney disease, often triggered by systemic vasodilation and renal vasoconstriction. The patient's history of acute renal failure further complicates the management, as the kidneys are already compromised, making them more susceptible to further insults [13, 14].

Additionally, chronic HBV and HCV infections can directly affect renal function through mechanisms, such as immune complex deposition, which leads to glomerulonephritis, and direct viral invasion of renal tissue [15]. This necessitates a comprehensive approach to monitor and manage renal function in patients with chronic liver disease [15–17].

The patient's severe anaemia, as evidenced by a haemoglobin level of 5.5 gm/dl, further complicated his clinical picture. Anaemia in the context of liver disease can be multifactorial, including hypersplenism, bone marrow suppression due to chronic disease, and nutritional deficiencies, such as iron, folate, and vitamin B12 [16, 18]. In this patient, anaemia was likely exacerbated by gastrointestinal bleeding, a common complication in patients with cirrhosis due to portal hypertension leading to variceal formation and subsequent bleeding [18]. The high white blood cell count, and elevated neutrophil percentage suggest an ongoing infection or inflammatory process, which, in conjunction with severe anaemia, indicates a state of significant physiological stress [19].

Management of this patient was particularly challenging due to the need for a multidisciplinary approach involving hepatologists, nephrologists, infectious disease specialists, and critical care teams [13, 19, 20]. The therapeutic strategy included empirical intravenous antibiotics to combat potential infections, given the patient's immunocompromised state. However, the presence of multiple infections and organ failures required a delicate balance in the choice and dosing of medications to avoid further renal and hepatic toxicity [21]. The patient's rapid deterioration despite aggressive treatment underscores the critical need for early intervention and comprehensive management plans tailored to the unique challenges presented by patients with multiple chronic infections [21]. This case serves as a poignant reminder of the complexity and urgency in treating such patients, emphasizing the need for integrated care pathways and robust clinical guidelines to improve outcomes.

The presence of HIV/AIDS in this patient added another layer of complexity to his management. HIV infection is known to accelerate the progression of HBV and HCV-related liver disease, leading to a higher incidence of cirrhosis and hepatocellular carcinoma. Moreover, HIV can directly impact the kidneys, causing HIV-associated nephropathy (HIVAN), which can further compromise renal function. This patient's immunocompromised status due to HIV/AIDS likely played a significant role in his rapid clinical decline. The elevated white blood cell count, particularly the high neutrophil percentage, suggests a superimposed bacterial infection, which is common in immunocompromised individuals and necessitates prompt and effective antimicrobial therapy [22–24].

Another critical aspect to consider is the patient's social history, including his past heavy alcohol use and history of intravenous drug use. These factors not only predispose individuals to chronic liver disease and infections but also complicate their management due to potential non-compliance with treatment and increased risk of opportunistic infections. Alcohol use is a well-known risk factor for liver disease, contributing to both alcoholic liver disease and exacerbating viral hepatitis [8]. Intravenous drug use significantly increases the risk of acquiring bloodborne infections, such as HBV, HCV, and HIV. The patient's history of substance uses disorder highlights the need for comprehensive addiction support and counselling as part of the overall treatment plan to improve adherence to therapy and reduce the risk of reinfection or further liver damage [25, 26].

The laboratory findings in this case provide valuable insights into the patient's deteriorating condition. Elevated liver enzymes (SGOT/AST and alkaline phosphatase) indicate significant liver inflammation and damage, while low albumin levels reflect impaired synthetic function of the liver, commonly seen in chronic liver disease [24, 27]. The high serum creatinine and blood urea nitrogen (BUN) levels are indicative of acute kidney injury, while hyperkalaemia points to a potentially life-threatening electrolyte imbalance often seen in renal failure. The patient's severely low hemoglobin and elevated INR are consistent with advanced liver disease, where impaired coagulation due to decreased production of clotting factors occurs. These findings underscore the need for careful monitoring and management of both hepatic and renal functions to stabilize the patient [18, 24, 28].

Despite the aggressive treatment provided, including intravenous antibiotics and fluid management, the patient's condition did not improve, leading to his transfer to the ICU. The decision to move the patient to intensive care was warranted given his rapid clinical decline and the need for close monitoring and advanced supportive care. However, the lack of response to treatment and subsequent death highlights the critical nature of his condition and the limitations of current medical interventions in the face of multiple organ failure and severe immunosuppression. This case illustrates the importance of early identification and management of high-risk patients with chronic infections and the potential need for innovative therapeutic approaches and supportive care strategies to improve survival outcomes [25, 27, 29].

In conclusion, this case report of Birendra Kumar provides a stark reminder of the complexities and challenges involved in managing patients with multiple chronic infections, particularly when complicated by advanced liver and renal disease. The rapid progression and fatal outcome in this patient underscore the need for a multidisciplinary approach, early and aggressive treatment, and comprehensive care plans tailored to the individual needs of such patients. Further research and clinical guidelines are essential to enhance the management of patients with HBV, HCV, and HIV co-infections, aiming to prevent similar outcomes and improve the quality of life for affected individuals.

CONCLUSIONS

This case underscores the devastating interplay of chronic HBV, HCV, and HIV infections, leading to rapid decompensation and multi-organ failure. The patient's complex clinical picture, characterized by severe anaemia, liver and renal dysfunction, and immunosuppression, highlights the urgent need for integrated, multidisciplinary approaches in managing such high-risk individuals. Despite aggressive treatment efforts, the outcome was poor, emphasizing the necessity for early intervention, comprehensive monitoring, and tailored therapeutic strategies to address the multifaceted nature of these concurrent infections. This case serves as a poignant reminder of the challenges faced in treating patients with overlapping chronic infections and the critical importance of coordinated care.

Limitations

This case report is limited by its retrospective nature and the lack of detailed information on the patient's previous treatments and adherence to medical advice, which could have impacted the clinical outcome. Additionally, the absence of specific data on the timing and progression of each infection

limits the ability to fully understand the interactions between HBV, HCV, and HIV in this patient. The report also does not provide long-term follow-up data, which could offer insights into the effectiveness of various treatment strategies over time. These limitations highlight the need for prospective studies with comprehensive data collection to better elucidate the management of patients with multiple chronic infections.

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