Community Acquired Infection

CASE REPORT

Case analysis and literature review of liver cirrhosis combined with influenza A virus infection

Mingyi He, Wencui Huang, Yue Chen, Weiping Tang, Rugang Wang*

Dalian Public Health Clinical Center, Dalian 116033, Liaoning Province, China

ABSTRACT

This article presents a case of liver cirrhosis complicated by H1N1 influenza virus infection. Analysis was informed by relevant early case reports and medical literature published since 2020. The patient, a 73-year-old male with decompensated cirrhosis of unknown origin, was admitted to the hospital due to fever, cough, and breathing difficulties. After receiving antiviral treatment (oseltamivir), liver protection, and management of complications, his condition improved. The discussion focuses on the mechanisms of influenza infection in patients with liver cirrhosis, treatment strategies, and the prevention and management of complications, emphasizing early diagnosis and comprehensive treatment.

Key words: cirrhosis, influenza A virus, oseltamivir, complications, case report

INTRODUCTION

Patients with liver cirrhosis are more susceptible to infectious diseases due to impaired liver function and a weakened immune system. Influenza virus infections can lead to severe complications and even death. Influenza A viruses, such as H1N1 and H3N2, are common pathogens that can exacerbate liver damage in patients with liver cirrhosis, potentially leading to multiorgan failure. In recent years, the use of antiviral drugs, such as oseltamivir, has provided new treatment options for patients with liver cirrhosis and influenza. This article combines the latest literature and case studies to explore the clinical characteristics, treatment strategies, and prognoses of these patients.

CASE PRESENTATION

Basic information

The patient is a 73-year-old male who was admitted to the hospital on May 10, 2025, with an 11-year history of intermittent fatigue and abdominal distension, the latter worsening over the last month. He also had a fever and cough for 4 days, which worsened with breathing difficulties for 1 day. Prior to 2019, he was diagnosed with psoriasis and had been intermittently treated with oral Baimingning and methotrexate for 11 years. Eleven years ago, he began experiencing fatigue, abdominal distension, reduced urine output, and edema in both legs, accompanied by abdominal pain, fever, and skin itching. He presented to a local hospital, where an abdominal ultrasound revealed liver cirrhosis, splenomegaly, and ascites. Based on these findings, he was diagnosed with decompensated cirrhosis and admitted for further management. After liver protection and diuretic treatments, his symptoms improved, and he was discharged. Since then, these symptoms have recurred, leading to multiple hospitalizations for upper gastrointestinal bleeding. He has undergone multiple endoscopic procedures for esophageal variceal sclerotherapy and fundoplication at our hospital. In April

***Corresponding Author:**
Rugang Wang, Dalian Public Health Clinical Center, Dalian 11603, Liaoning Province, China. E-mail: 498381028@qq.com; https://orcid.org/0009-0006-9488-0070
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2019, he was diagnosed with primary liver cancer and underwent three transarterial chemoembolization (TACE) procedures. He has had elevated blood glucose levels for over 7 years, occasionally experiencing dry mouth, increased thirst, and frequent urination. He has not monitored his blood glucose or used medication to control it. He has a smoking history of over 40 years, averaging 20 cigarettes per day, and a drinking history of 30 years, averaging 500 mL of beer per day. He has been abstaining from alcohol for over 10 years. He has no history of influenza vaccination, but has a history of egg allergy and cephalosporin sodium sulbactam sodium allergy.

Clinical manifestations

On admission, the patient had a body temperature of 39.2 ℃, a respiratory rate of 32 breaths per minute, and an oxygen saturation of 88% (on air). Physical examination revealed a chronic appearance, jaundice of the skin and sclera, palmar erythema (+), spider nevi (+), wet rales in both lungs, abdominal distension, shifting dullness (+), and edema in both lower limbs (++). Laboratory tests showed the following: blood routine—white blood cell count 1.8×10^9/L, neutrophil ratio: 0.87, and platelet count 48.0×10^9/L; liver function—total bilirubin 26.7 μmol/L, ALT (glutamic-pyruvic transaminase) 14.0 U/L, AST (glutamic-oxalacetic transaminase) 25.0 U/L, albumin 25.6 g/L, and Prothrombin Time - International Normalized Ratio (PT-INR) 1.36; renal function—serum creatinine 78.9 μmol/L; and routine examination of ascites—color: light yellow, transparency: slightly milky, LFT (Li Fan's experiment): weakly positive (±), and white blood cell count 38.0×10^6/L. Chest CT revealed multiple patchy groundglass opacities in both lungs, consistent with viral pneumonia.

Etiology and imaging examination of triple influenza

Influenza virus A IgM antibody (IVA-IgM) is positive (+). Abdominal ultrasound shows multiple solid space-occupying lesions in the liver after interventional surgery, cirrhosis, splenomegaly, and a large volume of ascites.

Treatment process

Upon admission, the patient was immediately placed on nasal cannula oxygen (3 L/min) and initiated on antiviral therapy. Oseltamivir (75 mg, oral) was selected. Additionally, basic liver protection and antitumor treatments (vitamin B6 from blister beetle), paracentesis to reduce abdominal pressure, diuretics (spironolactone + furosemide) to control ascites, and prophylactic antibiotics (levofloxacin) were administered. It also provides energy supplements to restore strength. On the third day of hospitalization, the patient's body temperature dropped to 37.8 ℃, dyspnea improved, and blood oxygen saturation rose to 94% (on air). During the hospital stay, liver function, coagulation function, and complete blood count were monitored, and the dose of diuretics was adjusted as needed. After 5 days of antiviral treatment, the influenza virus nucleic acid test was negative, and a lung CT scan showed that the inflammation had significantly decreased. Prior to publication,written informed consent was obtained from the patient for the use of their clinical data and images in this case report.

Outcome

The patient was hospitalized for 14 days, during which his symptoms improved significantly. His body temperature was normal, his liver function indicators were improved (total bilirubin 24.2 μmol/L, ALT 28.5 U/L, and albumin 28.4 g/L), and his ascites decreased. After discharge, he continued to take entecavir antiviral treatment orally and received regular follow-up.

DISCUSSION

In patients with liver cirrhosis, the immune system is weakened for several reasons: (1) the liver's ability to clear pathogens is reduced; (2) hypersplenism leads to a decrease in white blood cells and platelets; (3) malnutrition and hypoalbuminemia impair immune cell function;[1,2] and (4) an imbalance in gut flora increases the risk of infection. Additionally, patients often suffer from complications, such as portal hypertension and ascites, which further weaken the body's defenses.

Antiviral treatment options

(1) Oseltamivir. Oseltamivir is a neuraminidase inhibitor that should be administered within 48 h of symptom onset to minimize the risk of complications. No dose adjustment is required in patients with liver dysfunction, but renal function should be monitored.[3] In this case, the patient's body temperature dropped, and viral nucleic acid levels rapidly declined within 24 h of taking oseltamivir, suggesting a potential therapeutic effect.

(2) Paramivir. Paramivir is a venous neuraminidase inhibitor used in patients who are unable to take the drug orally or who have severe illnesses. In cirrhosis of the liver, the dose should be adjusted according to renal function. The dose should be halved when the creatinine clearance rate is less than 30 mL/min.[4] In this case, because the oseltamivir therapy was shown to be effective, there was no need to use paramivir.

Management of complications

(1) Respiratory Failure. Influenza virus infection can lead

to viral pneumonia, and patients with liver cirrhosis are prone to hypoxemia due to increased pulmonary shunt. In this case, the patient improved after oxygen therapy, but close monitoring should be performed to avoid acute respiratory distress syndrome (ARDS).

(2) Hepatic Encephalopathy. Infection and stress can induce hepatic encephalopathy. In this case, the blood ammonia level was normal. However, it is necessary to closely observe changes in patients' consciousness, highlighting the importance of early identification and intervention.

(3) Secondary Infection. Patients with liver cirrhosis have low immune function and are prone to bacterial infections. In this case, antibiotics were used for prophylaxis, but excessive use should be avoided, as they can lead to microbial imbalance.[5–8]

Preventive measures

(1) Vaccination. Patients with compensated cirrhosis should be vaccinated against influenza every year.[9] Those with decompensated cirrhosis can also be vaccinated if their immune function is normal and there are no serious complications. In this case, the patient was not vaccinated, highlighting the need for improved patient deucation on the importance of influenza roevention.

(2) Antiviral Therapy. Patients with chronic hepatitis B need long-term antiviral therapy to stabilize liver function and reduce the risk of infection. In this case, continued entecavir therapy after discharge will help improve the prognosis.

CONCLUSION

Patients with liver cirrhosis and influenza A virus infection have complex conditions, making them prone to multiorgan dysfunction. Early diagnosis, timely antiviral treatment (*e.g.*, with oseltamivir), and comprehensive management of complications are crucial for improving outcomes. Future research should focus on examining the epidemiological characteristics of influenza infection in patients with liver cirrhosis and on evaluating the long-term safety of new antiviral drugs to optimize treatment strategies.[10]

DECLARATIONS

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None.

Author contributions

He MY: Concept design, draft writing, final review and editing; Chen Y, Tang WP: Data collation; Huang WC: Methodology; Wang RG: Academic advisor. All authors have read and approve the final manuscript.

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Ethical approval

Not applicable.

Informed consent

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images. The patient has been informed that all personal identifiable details will be removed to protect their anonymity.

Conflict of interest

The authors declare no competing interest.

Use of large language models, AI and machine learning tools

None declared.

Data availability statement

No additional data.

REFERENCES

1. Lan Q, Liu C, Zheng XD. [1 case of liver cirrhosis complicated with severe influenza A/H1N1 pneumonia]. *J Sichuan Univ.* 2015;36(2):204–206.
2. Wang YD, Zhou JY, Zhao CY, Tian FJ, Zhou DF, Huang QS. [A case of multiple organ failure caused by alcoholic cirrhosis combined with influenza A (H1N1)]. *Chin J Infect Dis.* 2011;29(10):588.
3. Shao XG, Xu L, Sun X, Wu Q. [A Retrospective Case Study on Clinical Complications in H1N1 Influenza Patients]. *J Jilin Med Univ.* 2016,37(03):181-183.
4. Chinese Society of Hepatology, Chinese Medical Association. Guidelines for the iagnosis and treatment of liver cirrhosis. *J Mod Med & Health.* 2020;36(2):320.
5. National Medical Products Administration. [Announcement on the Revision of the Package Insert for Oseltamivir Phosphate Capsules]. Accessed May 6, 2025. https://www.nmpa.gov.cn/xxgk/ggtg/ypggtg/ypshmshxdgg/20070613010101398.html
6. National Medical Products Administration. [Rapid Pharmacovigilance Communication]. Accessed May 6, 2025. https://www.nmpa.gov.cn/xxgk/yjjsh/ywjjkx/20081208120001872.html
7. The People's Republic of China. National Health Commission, National Administration of Traditional Chinese Medicine. [Notice on issuing the influenza diagnosis and treatment protocol (2025 edition)]. Accessed May 6, 2025. https://www.gov.cn/zhengce/zhengceku/202501/content_7000939.htm
8. Li L, Xiao TT, Li SM. [Analysis of Epidemiological Characteristics of Liver Cirrhosis Patients in Mianyang Area in the Past 5 Years]. *Liver.* 2025;30(3):322–325.
9. Lu WQ, Yu J. [Influenza Is Not Equal to the Common Cold: Five High-Risk Populations Should Not Be Negligent]. *Zhu Nin Jian Kang.* 2025;(23):24.
10. Song XH. [Epidemiological and clinical characteristics of influenza A virus infection outbreaks]. *Chin J Schisto Control.* 2025;37(2):226.