ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 09,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

CLINICAL AND MICROBIOLOGICAL FEATURES OF HEPATITIS B AND D COINFECTION

Nazirova Khusnijahon Tolqinjon kizi
Laboratory Doctor Assistant, Bacteriology Laboratory, Uchkoprik District Department, Sanitary and Epidemiological Committee, Uzbekistan

Abstract: Hepatitis B virus (HBV) remains one of the major causes of chronic liver disease and hepatocellular carcinoma worldwide. Infection with hepatitis D virus (HDV) in individuals already infected with HBV leads to coinfection or superinfection, which significantly worsens the clinical outcome. This study reviews clinical and microbiological characteristics of HBV/HDV coinfection with a focus on available epidemiological data from Uzbekistan. The aim is to highlight virological interactions, disease progression, and implications for diagnosis and prevention.
Keywords: Hepatitis B, Hepatitis D, coinfection, liver cirrhosis, Uzbekistan, microbiology.

Introduction

Hepatitis B virus (HBV) infection affects nearly 300 million people globally. In countries with high endemicity, hepatitis D virus (HDV) coinfection poses an additional public health burden. HDV requires HBV surface antigen (HBsAg) for replication and persistence, making HBV carriers especially vulnerable. The coinfection leads to more severe liver damage, rapid progression to cirrhosis, and a higher risk of hepatocellular carcinoma compared to HBV monoinfection.

Uzbekistan, located in Central Asia, is considered a region with intermediate endemicity for HBV. Recent studies have demonstrated that HDV infection is widespread among HBV-infected patients, particularly those with cirrhosis. This article examines the clinical and microbiological features of HBV/HDV coinfection, with an emphasis on epidemiological findings from Uzbekistan.

Methods

This study is based on a literature review of PubMed, ResearchGate, and national epidemiological reports (2016–2024). Data were extracted on HBV and HDV prevalence, clinical manifestations, and microbiological characteristics. Particular attention was given to studies that specifically addressed the epidemiology of HBV/HDV coinfection in Uzbekistan.

Results

Clinical and Microbiological Features

- **Virological interaction:** HDV relies on HBV surface antigen for replication, making HBV carriers susceptible. HDV infection suppresses HBV replication but significantly enhances liver inflammation.
- **Clinical severity:** Patients with HBV/HDV coinfection show faster progression to cirrhosis, hepatic decompensation, and higher mortality.
- **Microbiological characteristics:** HDV is a defective RNA virus requiring HBV as a helper virus. Molecular analysis shows high variability among circulating HDV genotypes, with genotype I being the most prevalent in Central Asia.

Epidemiological Data from Uzbekistan

ORIGINAL ARTICLE
INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE
ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 09,2025
Journal: https://www.academicpublishers.org/journals/index.php/ijai

Epidemiological studies demonstrate high prevalence rates of HDV infection among HBV patients in Uzbekistan. In cirrhosis cases positive for HBsAg, HDV coinfection rates were recorded as follows:

- **2016 – 76.5 %**
- **2017 – 80.5 %**
- **2018 – 84.0 %** (PubMed, 2019, ResearchGate, 2020).

A recent national screening program (2022–2024) found:

- **HBsAg prevalence – 2.89 %**
- **Anti-HCV prevalence – 3.52 %** (PubMed, 2024).

Among children, due to successful HBV vaccination programs, HBsAg prevalence dropped to only **0.20 %** (PubMed, 2023).

Table 1. HBV and HDV epidemiology in Uzbekistan

Indicator	Data (Uzbekistan)
HDV coinfection among HBsAg+ cirrhosis (2016)	76.5 %
HDV coinfection among HBsAg+ cirrhosis (2017)	80.5 %
HDV coinfection among HBsAg+ cirrhosis (2018)	84.0 %
HBsAg prevalence (general population, 2022–2024)	2.89 %
Anti-HCV prevalence (general population, 2022–2024)	3.52 %
HBsAg prevalence (children, after vaccination)	0.20 %

Figure 1. Prevalence of HDV infection among HBsAg-positive cirrhosis patients in Uzbekistan (2016–2018)
(Diagram: line graph showing steady increase from 76.5 % in 2016 to 84 % in 2018)
This figure illustrates the rising trend of HDV coinfection in cirrhotic patients. Such a pattern indicates the heavy burden of HBV/HDV in high-risk groups, despite relatively lower prevalence in the general population.

Discussion

The data show that HBV/HDV coinfection is a major contributor to liver disease burden in Uzbekistan. The very high prevalence of HDV in cirrhosis cases indicates that HDV plays a critical role in disease progression. The sharp contrast between low HBsAg prevalence in children (0.20 %) and higher prevalence in adults (2.89 %) highlights the success of vaccination programs, but also shows the need for continued monitoring of older age groups.
Microbiologically, the presence of HDV significantly modifies HBV replication, suppressing HBV DNA levels but amplifying liver damage. This dual effect complicates both diagnosis and treatment. Current antiviral therapies are limited, and interferon-based regimens remain the mainstay, though with modest efficacy.

Conclusion

HBV/HDV coinfection represents a severe form of viral hepatitis with accelerated progression to cirrhosis and liver cancer. In Uzbekistan, epidemiological data demonstrate alarmingly high prevalence rates among cirrhotic patients, despite decreasing HBV prevalence in the general population and successful vaccination coverage among children.
Recommendations:

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 09,2025
Journal: https://www.academicpublishers.org/journals/index.php/ijai

- Strengthen national HBV vaccination programs and expand adult vaccination.
- Improve diagnostic screening for HDV in all HBsAg-positive patients.
- Encourage further research into genotype-specific therapies for HDV.
- Introduce public health policies targeting early detection and management of coinfection.

References

1. World Health Organization. Global Hepatitis Report. Geneva: WHO; 2023.
2. El-Serag HB. Hepatitis viruses and liver cancer. *Gastroenterology*. 2020.
3. Tu T, et al. Hepatitis B virus-related hepatocellular carcinoma. *Front Oncol*. 2021.
4. Zhou J, et al. The HBx protein in carcinogenesis. *Cell Mol Immunol*. 2020.
5. Forner A, et al. Hepatocellular carcinoma. *Lancet*. 2018.
6. Nishida N, et al. MicroRNAs in hepatitis and cancer. *Front Med*. 2019.
7. Sugimoto K. Gut microbiota in liver disease. *Hepatol Res*. 2021.
8. Terrault NA, et al. Prevention of HCC in hepatitis patients. *Clin Liver Dis*. 2020.
9. Holčapek M, et al. Lipidomics in hepatocellular carcinoma. *Metabolites*. 2021.
10. Tang A, et al. Epidemiology of hepatocellular carcinoma. *Abdom Radiol*. 2018.
11. Uzbekistan study on HDV prevalence. *PubMed* (2019), [PMID: 31505080].
12. Hepatitis D virus in Uzbekistan. *ResearchGate* (2020).
13. National screening data, Uzbekistan 2022–2024. *PubMed* (2024), [PMID: 40843480].
14. HBV prevalence in children after vaccination. *PubMed* (2023), [PMID: 39862544].
15. Nazirova Khusnijahon To‘lqinjon qizi. (2025). MICROBIOLOGICAL LINK BETWEEN HEPATITIS VIRUSES AND LIVER CANCER FORMATION. *Ethiopian International Journal of Multidisciplinary Research*, *12*(08), 83–86