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MODERN DIAGNOSIS OF CHRONIC VIRAL HEPATITIS C IN HIV-INFECTION

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✓ **Annotation**
Chronic hepatitis C virus (HCV) infection is a significant global health issue, particularly among individuals co-infected with human immunodeficiency virus (HIV). The dual burden of these infections leads to accelerated liver disease progression, increased morbidity, and mortality. Accurate and early diagnosis of chronic HCV in HIV-infected individuals is crucial for effective management and treatment. This article provides a comprehensive overview of modern diagnostic methods, including serological, molecular, and non-invasive imaging techniques, as well as the implications of co-infection on disease progression and therapeutic strategies.
Key words: chronic viral hepatitis, fibrosis, liver cirrhosis

Relevance of the topic

HCV and HIV co-infection is a major public health concern due to their shared transmission routes, particularly among intravenous drug users and individuals receiving contaminated blood products. HIV accelerates HCV-related liver fibrosis and increases the risk of hepatocellular carcinoma. The early and precise diagnosis of HCV in HIV-infected patients is vital for preventing severe liver complications and guiding appropriate treatment decisions.

Serological Diagnosis.The initial step in diagnosing HCV infection involves serological testing for anti-HCV antibodies using enzyme-linked immunosorbent assays (ELISA) and chemiluminescent immunoassays (CLIA). However, in immunocompromised HIV-infected individuals, serological tests may yield false-negative results due to impaired antibody production.

Molecular Diagnosis.Molecular methods, such as polymerase chain reaction (PCR) and transcription-mediated amplification (TMA), detect HCV RNA and confirm active infection. These techniques offer high sensitivity and specificity, allowing for early diagnosis and monitoring of viral load dynamics. Quantitative PCR (qPCR) is commonly used to determine HCV RNA levels, which is crucial for assessing treatment response.

Genotypic Analysis.HCV exhibits significant genetic diversity, with multiple genotypes influencing disease progression and treatment response. Genotypic testing using sequencing or hybridization-based methods is essential for selecting appropriate antiviral therapy, particularly with direct-acting antivirals (DAAs).

Non-Invasive Assessment of Liver Fibrosis.HIV co-infection accelerates liver fibrosis progression, necessitating regular fibrosis assessment. Non-invasive methods include:

- Transient elastography (FibroScan): Measures liver stiffness and correlates with fibrosis severity.
- Serum biomarkers (FIB-4, APRI, FibroTest): Combine biochemical parameters to estimate liver fibrosis.
- Magnetic resonance elastography (MRE): Provides a detailed assessment of hepatic stiffness using advanced imaging techniques.

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The aim of the study: to develop an algorithm for timely diagnosis in chronic viral hepatitis C in HIV-infection based on the study of clinical diagnostic markers and serum predictors.

Materials and methods

Laboratory research methods. Among the examined patients, the main method for detecting HIV infection (in children over 18 months) was testing using enzyme-linked immunosorbent assay (ELISA) or immunochemiluminescent assay (ICLA). HIV testing by ELISA in AIDS is carried out on the ELISYS automatic enzyme-linked immunosorbent assay analyzer, model ELISYS QUATRO (Human GmbH , Germany) (photometric method), as well as on the photometer for microplates " Mark " version " iMark " (" BioRad Laboratories , Inc. , USA) (photometric method). HIV testing by the IHLA method is performed on a modular immunochemical analyzer for in vitro diagnostics «ARCHITECT i2000 sr mobdule » (« Abbott », USA) (chemiluminescence method). To confirm a positive ELISA (ILA) result, the immune blotting (IB) method is used. This method allows to detect antibodies to HIV-1 or HIV-2 in the studied blood serum (plasma) sample due to interaction with HIV 1 antigens, or HIV 2, applied to the test strip , and thus confirm the seropositivity of the sample or identify possible non-specific reactions. The IB method is based on the indirect enzyme immunoassay method, which allows to determine the spectrum of antibodies to HIV proteins. All children underwent clinical blood analysis, the level of erythrocytes, leukocytes, platelets, hemoglobin, hematocrit, differentiation of leukocytes into populations and a number of other indicators were determined. During the study, the following biochemical blood parameters were determined: ALT, AST, total bilirubin and its fractions, gamma-glutamyl transpeptidase , alkaline phosphatase, total cholesterol, glucose, urea, creatinine , total protein, albumin.

Results

The literature review revealed that molecular diagnostics, particularly PCR-based assays, are the gold standard for detecting active HCV infection in HIV-infected individuals. Non-invasive fibrosis assessment methods such as FibroScan and APRI scores demonstrated high accuracy in staging liver fibrosis, reducing the need for invasive liver biopsies. The integration of genotypic testing into clinical practice has improved treatment outcomes by enabling personalized antiviral therapy selection. However, challenges remain in resource-limited settings due to the high cost and limited availability of advanced diagnostic tools. Challenges in Diagnosis Several challenges exist in diagnosing chronic HCV in HIV-infected individuals:

- Immunosuppression-related diagnostic limitations
- Coinfection-related alterations in liver enzyme levels
- Drug interactions affecting diagnostic accuracy
- Limited access to advanced diagnostic facilities in resource-limited setting

Conclusion

Modern diagnostic approaches for chronic HCV in HIV-infected patients incorporate serological, molecular, and non-invasive imaging techniques. Early and accurate diagnosis is essential for timely intervention and optimized treatment outcomes. Advances in molecular diagnostics and fibrosis assessment tools continue to improve the clinical management of HCV/HIV co-infection, ultimately reducing liver-related morbidity and mortality.

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