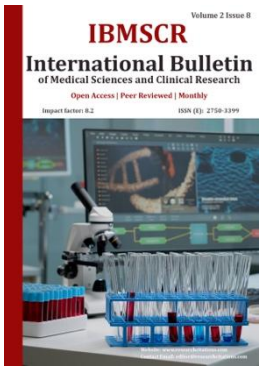

INFECTIOUS MONONUCLEOSIS AS A MODEL OF CHRONIC VIRAL INFECTION BASED ON OWN CLINICAL OBSERVATIONS

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Annotation

This article examines infectious mononucleosis not only as an acute disease, but also as a unique model of chronic viral infection, which allows us to understand the mechanisms of long-term persistence of the virus in the human body. The work describes in detail the properties of the Epstein-Barr virus, the specifics of its interaction with the immune system, the factors that contribute to the chronicity of the process, as well as the clinical manifestations and complications of the disease. Modern approaches to diagnosis and treatment are presented, and the role of EBV infection in the development of autoimmune diseases and cancer is discussed. It also describes a clinical case of a child with the disease.

Key words: infectious mononucleosis, Epstein–Barr virus, chronic infection, lymphotropic viruses, herpes viruses, immunopathogenesis, lymphadenopathy, immune response, cytokines, persistence, EBV-associated tumors.

Introduction

Infectious mononucleosis is one of the most mysterious and fascinating viral diseases in humans, rightly called the "kissing disease" due to its transmission routes. It is caused by the Epstein-Barr virus (EBV), discovered in 1964 by British scientists M. Epstein and I. Barr while researching Burkitt's lymphoma.

The relevance of this topic is determined by the widespread prevalence of the virus—by the age of 40, more than 95% of the world's population is infected. The virus can persist in the body for long periods without causing clinical manifestations, but when the immune system is weakened, it reactivates, triggering chronic forms of infection and even oncogenic processes.

Thus, infectious mononucleosis is not only an independent disease, but also a model of chronic viral infection, demonstrating the complex interaction between the virus and the immune system.

Objective of the study: To study infectious mononucleosis as a model of chronic viral infection, to determine pathogenetic mechanisms, clinical course features and the significance of the disease in the formation of long-term viral persistence.

Main part

Etiology and properties of the pathogen

The Epstein–Barr virus (EBV) belongs to the γ-herpesvirus subfamily (Herpesviridae). Its genome consists of double-stranded DNA surrounded by a capsid and a lipid membrane containing glycoproteins responsible for binding to CD21 cellular receptors. The virus selectively attacks B lymphocytes, penetrating their DNA and transforming them into immortal

cells capable of unlimited division. This characteristic explains its potential oncogenicity. After the initial infection, the virus remains in the body for life, remaining in a latent state and activating under stress, fatigue, immunosuppression, or other unfavorable factors.

Pathogenesis and immunological aspects

The pathogenesis of infectious mononucleosis is based on the interaction of the virus with the immune system. EBV infects B lymphocytes, activating them and causing polyclonal proliferation. In response, T lymphocytes (CD8+) begin to destroy the infected cells, leading to a pronounced lymphoid reaction—enlargement of the lymph nodes, tonsils, spleen, and liver.

The immune response plays a dual role: on the one hand, it controls viral replication, and on the other, it contributes to tissue damage. EBV's resistance to immune surveillance is ensured by the expression of viral proteins (EBNA, LMP1) that suppress apoptosis and interferon production. This enables long-term viral persistence, making infectious mononucleosis a model for chronic viral infection.

In addition, EBV infection is associated with the development of autoimmune processes, including systemic lupus erythematosus, multiple sclerosis, chronic fatigue syndrome and rheumatoid arthritis.

Clinical manifestations

The incubation period for the disease lasts from 4 to 6 weeks. The illness begins gradually, with weakness, malaise, low-grade fever, and a sore throat. Gradually, the classic triad of symptoms develops:

1. Fever – persistent, up to 38–39°C, may persist for 1–2 weeks.
2. Lymph node enlargement – enlargement of the posterior cervical, submandibular, and axillary lymph nodes.
3. Angina – hyperemia of the pharynx, plaque on the tonsils, sometimes resembling diphtheria.

In 80% of cases, hepatosplenomegaly is observed, in 20% - a rash, especially after taking ampicillin or amoxicillin.

In children, the disease usually progresses more mildly, while in adults it often develops into a protracted or chronic form, accompanied by asthenic syndrome, sleep disturbances, subfebrile temperature and decreased performance.

Diagnostics

Diagnosis of infectious mononucleosis is based on clinical data and laboratory tests:

- Complete blood test: lymphocytosis, monocytosis, atypical mononuclear cells (more than 10%).
- Biochemical blood test: increased ALT, AST, bilirubin.
- Serological tests: detection of IgM and IgG antibodies to capsid antigen (VCA), early antigen (EA) and nuclear antigen (EBNA).
- PCR method: detection of viral DNA in saliva or blood.
- Instrumental methods: ultrasound of the abdominal organs, if necessary - CT scan of the lymph nodes.

Treatment

There is no specific etiotropic therapy for EBV infection. Treatment is aimed at relieving symptoms and supporting the immune system.

The followings are used:

- Bed rest and a gentle diet (table 5).
- Antipyretics (paracetamol, ibuprofen).
- Gargling with antiseptics (furacilin, chlorhexidine).
- Hepatoprotectors for liver damage.
- Immunomodulators and interferons – to activate antiviral immunity.

Glucocorticosteroids are used for severe tonsil swelling or airway obstruction. Physical activity and sports are contraindicated for a month after recovery due to the risk of splenic rupture.

Clinical case

We observed a 10-year-old girl. According to her mother, she complained of fever, malaise, swollen cervical lymph nodes, a sore throat, and refusal to eat. She had been ill for two weeks; the illness began after swimming in a local pond and drinking cold water. According to her mother, the girl grew up sickly, frequently suffering from acute respiratory infections, several bouts of strep throat, and always getting seriously ill with fevers. She was always diagnosed with strep throat, and was almost always treated with antibiotics, which subsequently caused intestinal upset. She was vaccinated according to schedule. The last illness was treated on an outpatient basis (amoxacillin, tonsilgon, ibuprofen, zinc), after which the general condition worsened, swollen lymph nodes appeared in the anterior cervical region on both sides, and a rash on the skin.

Upon examination, the child's general condition is grave. She is lethargic, cranky, and refuses to drink. Breathing through the nose and mouth is difficult. The skin is pale, with a mottled pattern on the body and extremities. A maculopapular rash is visible on the abdominal skin and the inner surfaces of the upper and lower extremities. Visible mucous membranes are pale and dry. Skin turgor and elasticity are decreased. The musculoskeletal system is normal. The girl is thin. Examination of the neck reveals enlarged superficial anterior and posterior cervical lymph nodes, tenderness, and warmth to the touch. The visible mucous membranes of the oropharynx are pale, the tongue is coated, the peritonsillar area is red, and the palatine tonsils are enlarged, red, and slightly coated. Nasal breathing is difficult, and the adenoids are enlarged. Vesicular breathing is present in the lungs, heart sounds are muffled, the abdomen is soft, and the liver and spleen are slightly enlarged.

Bowel movement and urination are normal. The girl was examined at the Regional Children's Medical and Medical Center, and then at the Research Institute of Pediatrics and the Institute of Virology. Blood tests were performed for allergic dermatitis, rheumatism, non-rheumatic fever, TORCH infection, HIV, and mononucleosis.

A throat sample was taken for streptococcal infection and PCR diagnostics for EBV DNA detection. The test results showed moderate anemia (G-85g/l), leukopenia (L-3x10^9), lymphocytosis, neutropenia, increased ESR (32mm/h), detection of atypical mononuclear cells (more than 20%), moderate increase in liver enzymes (ALAT-56ME/l, ASAT-48ME/l). The CRP level was high (48 mg/L), rheumatoid arthritis tests were negative, herpes and CMV tests were negative, and the HIV test was also negative. IgE was within normal limits (60 IU/L), while IgA and IgM were elevated. An ELISA test detected specific antibodies to EBV (Epstein-Barr virus). An abdominal ultrasound revealed a slightly enlarged liver and spleen. A chest X-ray shows enlarged intrathoracic lymph nodes. An ECG shows hypoxic changes in the myocardium. The girl was treated and monitored at the Institute of Virology. Anti-inflammatory and antiviral

treatments were administered, along with immunomodulators, hepatoprotectors, and topical antiseptics. Bed rest and a gentle dietary regimen yielded positive results. The girl was discharged with improved test results for rehabilitation at her place of residence. For the next two years, she also suffered from inflammatory diseases of the upper respiratory tract, but without enlarged lymph nodes.

At age 13, the same symptoms recurred: fever, sore throat, weakness, and swollen cervical lymph nodes. The girl's mother is undergoing EBV testing, which shows that the girl has developed immunity to EBV (AB to EBV capsid antigen, i.e., EBV-VCA IgG, was -3.613). However, her EBV-VCA IgM levels were -1.680, indicating virus persistence. This could be attributed to the girl's adolescence. She was subsequently monitored by specialists at the Regional Children's Medical Center, where she received appropriate antiviral and immunomodulatory therapy.

Chronic mononucleosis and its significance as a model.

Chronic infectious mononucleosis occurs in 5-10% of those who have recovered. Its clinical presentation includes prolonged weakness, low-grade fever, lymphadenopathy, and decreased immunity.

This condition demonstrates how the virus can persist in the body without causing significant symptoms, yet constantly stimulating the immune system.

Thus, chronic mononucleosis serves as a model for studying the mechanisms of:

- viral persistence in the body;
- virus-induced autoimmune processes;
- viral carcinogenesis.

Of scientific interest is the association between chronic EBV infection and the development of Hodgkin's lymphoma, nasopharyngeal carcinoma and some forms of gastric cancer.

Conclusions

Infectious mononucleosis is not simply a benign viral infection, but a unique model of a chronic viral process. Studying EBV infection allows us to understand how the virus can "coexist" with the host body, evading complete destruction by the immune system.

Early diagnosis, patient monitoring, and immune strengthening are key measures to prevent chronicity and complications.

Understanding the role of the Epstein-Barr virus in the development of chronic and oncogenic diseases opens new perspectives in virology, immunology, and clinical medicine.

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