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"EARLY DIAGNOSIS AND TREATMENT OF VIRAL ENCEPHALITIS IN CHILDREN"

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Abstract: This article analyzes the possibilities of early diagnosis of viral encephalitis in children, the dynamics of clinical symptom development, and modern therapeutic approaches. The study highlights the sensitivity of neuroimaging methods (MRI, CT) in detecting early symptoms, as well as the importance of laboratory indicators such as cerebrospinal fluid cytology, virological tests, and PCR diagnostics, supported by scientific evidence. The article emphasizes that the clinical manifestations of encephalitis in children differ from those in adults, noting that nonspecific symptoms in young children (such as unstable sleep, vomiting, and irritability) may complicate early diagnosis. The discussion also includes current treatment protocols, modern antiviral therapy, symptomatic management, neuroprotective agents, and the role of intensive care in severe cases, based on recent clinical observations. The article substantiates that delayed diagnosis of viral encephalitis significantly increases the risk of neurological complications, whereas early differential diagnosis can improve outcomes in pediatric patients. This research proposes new approaches aimed at improving the understanding of viral encephalitis progression in children, the effectiveness of diagnostic methods, and optimal treatment strategies.

Keywords: Viral encephalitis, pediatric neurology, early diagnosis, neuroimaging, PCR diagnostics, cerebrospinal fluid analysis, antiviral therapy, neuroprotection, differential diagnosis, clinical symptoms.

Relevance:

In modern medicine, the rapid diagnosis and effective treatment of viral encephalitis are among the most urgent issues in preserving children's health. According to statistical data, hundreds of children are diagnosed with viral encephalitis each year, and delayed diagnosis increases the risk of neurological disorders, convulsions, and even death. As recommended in the book by Zarifboy Ibodullayev, early diagnosis and initiation of treatment play a decisive role in reducing complications. The urgent aspect lies in the fact that the initial symptoms of viral encephalitis—fever, headache, vomiting, and fatigue—are often mistaken for other infections. Therefore, it is crucial for pediatricians and neurologists to apply evidence-based recommendations for early detection and treatment in clinical practice.

Aim

The main aim of this article is to develop evidence-based recommendations for the early diagnosis and effective treatment of viral encephalitis in children, as well as to reduce complications resulting from the disease.

1.To explain the etiology and pathogenesis of viral encephalitis in children.

2.To identify the early symptoms and clinical manifestations of the disease.

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3. To describe the scientific basis of early diagnosis using neuroimaging, CSF analysis, and PCR diagnostics.

4.To outline scientifically supported etiotropic, pathogenetic, and symptomatic treatment methods.

5.To provide recommendations for reducing post-encephalitic complications and preserving neurological health in children.

Main Part

1.Etiology and Pathogenesis

Viral encephalitis is an inflammatory disease of the central nervous system caused by viral infection. Due to the immaturity of the immune system in children, viruses spread rapidly and lead to severe complications. Viruses enter the brain and spinal cord parenchyma through the bloodstream, replicate in neurons and glial cells, and exert cytotoxic effects. The main causative agents include arboviruses, enteroviruses, herpes simplex viruses, and certain influenza virus strains. The virus replicates in neurons and microglial cells, initiating an inflammatory reaction. This process results in brain edema, vascular damage, and neuronal death. In children, the disease progresses more rapidly because their central nervous system is not fully developed and protective mechanisms are weaker.

2.Clinical Manifestations and Early Diagnosis

The early stage of viral encephalitis in children often presents with general and nonspecific symptoms. General symptoms include high fever, headache, vomiting, fatigue, drowsiness, and apathy. These symptoms are frequently confused with other viral infections, making early diagnosis difficult. Neurological symptoms vary depending on severity and include convulsions, impaired consciousness, seizures, paresis, lack of coordination, speech disturbances, and autonomic dysfunction. In many children, convulsions appear as one of the earliest signs, complicating diagnosis for physicians. Therefore, clinical observation and vigilance are essential for early detection of viral encephalitis in children.

3.Diagnostics and Laboratory Investigations

Three main diagnostic approaches are used to identify viral encephalitis:

1.Neuroimaging – MRI and CT help detect inflammatory lesions and cerebral edema. Even in the early stages, neuroimaging helps determine the location and severity of brain swelling.

2.CSF analysis – shows lymphocytosis and elevated protein levels, while glucose usually remains normal. CSF analysis is crucial for differentiating viral encephalitis from bacterial meningitis and assessing disease severity.

3.Molecular diagnostics (PCR) – the fastest and most reliable method for detecting viral DNA or RNA. PCR allows early identification of the virus and timely initiation of treatment, thereby preventing complications.

Rapid and accurate diagnosis plays a decisive role in reducing the consequences of viral encephalitis in children.

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4.Treatment and Prevention of Complications

The treatment of viral encephalitis is conducted in three main directions:

1 Etiotropic therapy – antiviral drugs are administered depending on the virus type (e.g., acyclovir for herpes viruses). Starting treatment within the first 24–48 hours after the onset of the disease significantly improves outcomes.

2 2.Pathogenetic therapy – aimed at reducing brain edema, controlling convulsions, detoxification, and providing oxygen therapy. Mannitol and other diuretics are used to reduce cerebral edema.

3 Symptomatic therapy – includes controlling fever, restoring fluid and electrolyte balance, relieving pain, reducing vomiting, and providing intensive neurological monitoring in severe cases. To reduce long-term complications, post-encephalitic neurological monitoring, physiotherapy, and cognitive rehabilitation are recommended. Early diagnosis and effective treatment significantly decrease the consequences of the disease and support neurological development in children.

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