

ANALYSIS OF COMPLICATIONS AND CONSEQUENCES OF MENINGOENCEPHALITIS OF VARIOUS ETIOLOGIES IN ADULTS.

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Abstract. Meningoencephalitis, an inflammatory process involving both the meninges and brain parenchyma, remains a critical neurological condition with high morbidity and mortality rates in adults. Etiologies include bacterial, viral, fungal, and autoimmune origins, each associated with a distinct clinical course and outcome. Complications range from acute neurological syndromes such as seizures, cerebral edema, and hydrocephalus, to long-term sequelae including cognitive decline, hearing loss, and epilepsy. The prognosis largely depends on the etiological agent, timeliness of diagnosis, and adequacy of treatment. This review summarizes the main complications and consequences of meningoencephalitis of different etiologies in adults, with emphasis on pathophysiological mechanisms and clinical implications.

Keywords: meningoencephalitis, complications, adults, etiology, neurological sequelae, prognosis

Introduction. Meningoencephalitis is a severe inflammatory disorder that simultaneously affects the meninges and cerebral tissue. Its global burden is considerable, with bacterial and viral forms being most common in adults. Despite modern advances in neuroimaging, microbiological diagnostics, and antimicrobial therapy, mortality remains high, ranging from 10–30% depending on the etiology, and up to 50% of survivors develop neurological sequelae [1]. This article reviews the major complications and long-term outcomes of

meningoencephalitis of various etiologies in adults, focusing on clinical relevance and prognostic significance.

Etiology of meningoencephalitis. Meningoencephalitis in adults arises from a wide spectrum of infectious and non-infectious causes.

The most common are bacterial and viral infections, while fungal and autoimmune etiologies are less frequent but clinically important.

Bacterial causes. The most frequent pathogens are *Streptococcus pneumoniae* and *Neisseria meningitidis*. Pneumococcal meningoencephalitis is associated with the highest morbidity and mortality among bacterial causes, often leading to severe neurological sequelae [3]. *Listeria monocytogenes* is a significant cause in elderly and immunocompromised adults, frequently resulting in brainstem involvement and cranial nerve palsies [3].

Viral causes. Herpes simplex virus type 1 (HSV-1) is the most common sporadic cause of viral encephalitis in adults, characterized by necrotizing inflammation of the temporal lobes, often resulting in cognitive impairment and epilepsy [2]. Other viral agents include enteroviruses, arboviruses (such as West Nile virus, Japanese encephalitis virus), and varicella-zoster virus. Arboviral infections tend to follow epidemic patterns and can lead to widespread brain inflammation with high mortality [1].

Fungal causes. *Cryptococcus neoformans* remains the leading fungal cause, especially in HIV-positive patients and other immunocompromised adults. Cryptococcal meningoencephalitis develops insidiously, often with increased intracranial pressure and chronic neurological complications [4].

Autoimmune and parainfectious causes. Autoimmune encephalitis (such as anti-NMDA receptor encephalitis) and post-infectious syndromes can mimic infectious meningoencephalitis. These etiologies are increasingly recognized in

adults, particularly in younger populations, and may present with psychiatric symptoms and seizures [1,5].

Thus, the etiology of meningoencephalitis is heterogeneous, and accurate identification of the causative factor is crucial for targeted therapy and prognosis.

Complications of meningoencephalitis. Complications of meningoencephalitis are divided into acute (occurring during the active phase) and long-term (persisting after recovery). They largely determine the prognosis and quality of life of patients.

Acute complications. Cerebral edema and intracranial hypertension.

Brain swelling is one of the most severe acute complications, leading to increased intracranial pressure (ICP) and brain herniation. It is particularly common in bacterial meningoencephalitis due to massive inflammatory exudation and disruption of the blood-brain barrier [3].

Seizures and status epilepticus. Seizures occur in 30–40% of adults with viral or bacterial meningoencephalitis. In HSV encephalitis, seizures are often focal and associated with temporal lobe involvement. The occurrence of status epilepticus significantly increases mortality [2,1].

Hydrocephalus. Obstruction of cerebrospinal fluid (CSF) pathways by inflammatory exudate may lead to acute or chronic hydrocephalus. This complication is common in tuberculous and cryptococcal meningoencephalitis, where the basal meninges are predominantly affected [4].

Cerebrovascular complications. Meningoencephalitis may provoke cerebral vasculitis, ischemic stroke, and intracerebral hemorrhage. This is particularly characteristic of HSV encephalitis and tuberculous meningoencephalitis [2].

Long-term complications.

Cognitive impairment. Survivors of meningoencephalitis frequently suffer from memory loss, attention deficits, and impaired executive functions. These are especially pronounced after HSV infection and bacterial etiologies [1].

Hearing loss. Sensorineural hearing loss is a common permanent sequela, particularly of pneumococcal meningoencephalitis. It develops due to inflammatory injury to the cochlea or auditory nerve [3].

Post-encephalitic epilepsy. Structural brain damage caused by inflammation often leads to chronic epilepsy. This occurs in 10–20% of cases, most frequently after HSV encephalitis [2].

Motor and speech deficits. Stroke-related complications or cortical injury may result in persistent hemiparesis, dysarthria, or aphasia [1,6].

Psychiatric and behavioral disorders. Depression, anxiety, and psychosis are well-recognized sequelae, especially in autoimmune-associated and viral meningoencephalitis [1,7].

Conclusion. Meningoencephalitis of various etiologies in adults remains a life-threatening condition with high rates of complications and long-term consequences. Acute complications include cerebral edema, seizures, hydrocephalus, and cerebrovascular events. Survivors are at risk of chronic sequelae such as cognitive decline, epilepsy, hearing loss, and psychiatric disorders. Etiological diagnosis and early treatment are crucial for improving outcomes. Comprehensive rehabilitation and neurocognitive support should be considered essential components of patient management.

References:

1. Granerod J., Ambrose H.E., Davies N.W., et al. Causes of encephalitis and differences in their clinical presentations in England: a multicentre, population-based prospective study // *Lancet Infectious Diseases*. – 2010. – Vol. 10(12). – P. 835–844.

2. Whitley R.J. Herpes simplex virus infections of the central nervous system: encephalitis and meningitis, including neonatal herpes // Journal of Neurovirology. – 2017. – Vol. 23(2). – P. 176–179.
3. van de Beek D., Brouwer M.C., Thwaites G.E., Tunkel A.R. Advances in treatment of bacterial meningitis // Lancet. – 2021. – Vol. 398(10306). – P. 303–313.
4. Perfect J.R. Cryptococcosis: the epidemiology and medical management of advanced disease // Journal of Fungi. – 2010. – Vol. 46(1). – P. 1–12.
5. Delkasheva S. D. CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND OBESITY: CLINICAL AND SOCIAL ASPECTS // Экономика и социум. – 2025. – №. 5-1 (132). – С. 1653-1655.
6. ДЕЛКАШЕВА Ш. Д. ЭКОНОМИКА И СОЦИУМ // ЭКОНОМИКА. – С. 499-502.
7. Djamolitdinovna D. S. CHRONIC KIDNEY DISEASE AS A MANIFESTATION OF COMORBIDITY IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE // Russian-Uzbekistan Conference. – 2024. – Т. 1. – №. 1.