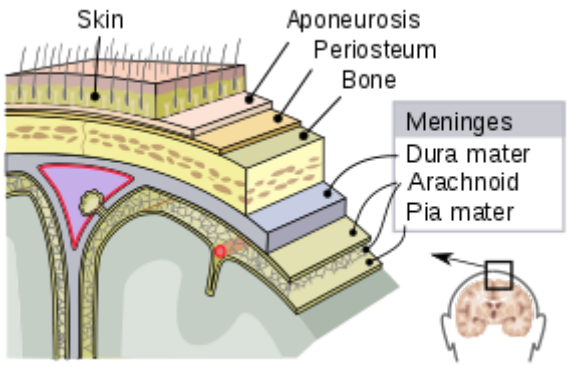
Meningoencephalitis

Meningoencephalitis (/mɪˌnɪŋgoʊɛnˌsɛfəˈlaɪtɪs, -ˌnɪndʒoʊ-, -ən-, -ˌkɛ-/;[3][4] from Greek μῆνιγξ *meninx*, "membrane", ἐγκέφαλος, *enképhalos* "brain", and the medical suffix *-itis*, "inflammation"), also known as **herpes meningoencephalitis**, is a medical condition that simultaneously resembles both meningitis, which is an infection or inflammation of the meninges, and encephalitis, which is an infection or inflammation of the brain.

Meningoencephalitis	
Other names	Herpes meningoencephalitis[1][2]
	
Meninges	
Specialty	Infectious disease, neurology

Contents

Signs and symptoms

Signs of meningeoncephalitis include unusual behavior, personality changes, and thinking problems.[1][5]

Symptoms may include headache, fever, pain in neck movement, light sensitivity, and seizure.[2]

Causes

Causative organisms include protozoans, viral and bacterial pathogens.

Specific types include:

Bacterial

Veterinarians have observed meningoencephalitis in animals infected with listeriosis, caused by the pathogenic bacteria *L. monocytogenes*. Meningitis and encephilitis already present in the brain or spinal cord of an animal may form simultaneously into meningeoencaphilitis.[6] The bacterium commonly targets the sensitive structures of the brain stem. *L. monocytogenes* meningoencephalitis has been documented to significantly increase the number of cytokines, such as IL-1β, IL-12, IL-15, leading to toxic effects on the brain.[7]

Meningoencephalitis may be one of the severe complications of diseases originating from several *Rickettsia* species, such as *Rickettsia rickettsii* (agent of Rocky Mountain spotted fever (RMSF)), *Rickettsia conorii*, and *Rickettsia africae*. It can cause impairments to the cranial nerves, paralysis to the eyes, and sudden hearing loss.[8][9] Meningoencephalitis is a rare, late-stage manifestation of tick-borne ricksettial diseases, such as RMSF and Human monocytotropic ehrlichiosis (HME), caused by *Ehrlichia chaffeensis* (a species of rickettsiales bacteria).[10]

Other bacteria that can cause it are *Mycoplasma pneumoniae*, Tuberculosis, *Borrelia* (Lyme disease) and Leptospirosis.

Viral

- Tick-borne encephalitis.
- West Nile virus.
- Measles.
- Epstein-Barr virus.
- Varicella-zoster virus.
- Enterovirus.
- Herpes simplex virus type 1.
- Herpes simplex virus type 2.
- Rabies virus.
- Mumps, a relatively common cause of meningoencephalitis. However, most cases are mild, and mumps meningoencephalitis generally does not result in death or neurologic sequelae.[11]
- HIV, a very small number of individuals exhibit meningoencephalitis at the primary stage of infection.[12][13]

Autoimmune

- Antibodies targeting amyloid beta peptide proteins which have been used during research on Alzheimer's disease.[14]
- Anti-N-methyl-D-aspartate (anti-NMDA) receptor antibodies, which are also associated with seizures and a movement disorder, and related to Anti-NMDA receptor encephalitis
- **NAIM** or "Nonvasculitic autoimmune inflammatory meningoencephalitis" (NAIM).[15] They can be divided into GFAP- and GFAP+ cases. The second is related to the Autoimmune GFAP Astrocytopathy.

Protozoal

- Primary amoebic meningoencephalitis, e.g., *Naegleria fowleri*, *Balamuthia mandrillaris*, *Sappinia diploidea*
- *Trypanosoma brucei*
- *Toxoplasma gondii* (sporozoa)

Amoebic pathogens exist as free-living protozoans. Nevertheless, these pathogens cause rare and uncommon CNS infections. *N. fowleri* produces primary amoebic meningoencephalitis (PAM). The symptoms of PAM are indistinguishable from acute bacterial meningitis. Other amoebae cause granulomatous amoebic encephalitis (GAE), which is a more subacute and can even a non-symptomatic chronic infection. Amoebic meningoencephalitis can mimic a brain abscess, aseptic or chronic meningitis, or CNS malignancy.[16]

Animal

- *Halicephalobus gingivalis*

Animal pathogens exist as facultative parasites. They are an exceptionally rare cause of meningoencephalitis.[17]

Other/multiple

- Granulomatous meningoencephalitis.
- The fungus, *Cryptococcus neoformans*, can be symptomatically manifested within the CNS as meningoencephalitis with hydrocephalus being a very characteristic finding due to the unique thick polysaccharide capsule of the organism.
- Vasculitis.

Diagnosis

Clinical diagnosis includes evaluation for the presence of recurrent or recent herpes infection, fever, headache, altered mental status, convulsions, disturbance of consciousness, and focal signs.

CSF, EEG, CT, MRI are responsive to specific antivirus agent.

Definite diagnosis – besides the above, the following are needed: CSF: HSV − antigen, HSV − Antibody, brain biopsy or pathology: Cowdry in intranuclear

CSF: the DNA of the HSV(PCR)

cerebral tissue or specimen of the CSF:HSV

except other viral encephalitis

Treatment

Antiviral therapy, such as acyclovir and ganciclovir, work best when applied as early as possible. May also be treated with interferon as an immune therapy.

Symptomatic therapy can be applied as needed. High fever can be treated by physical regulation of body temperature. Seizure can be treated with antiepileptic drugs. High intracranial pressure can be treated with drugs such as mannitol.

If caused by an infection then the infection can be treated with antibiotic drugs.

See also

- Meningitis
- Meningism
- Primary amoebic meningoencephalitis
- Encephalitis
- *Naegleria fowleri*

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External links

Classification	**ICD-10**: G04 (http://apps.who.int/classifications/icd10/browse/2016/en#/G04) · **ICD-9-CM**: 323.9 (http://www.icd9data.com/getICD9Code.ashx?icd9=323.9) · **MeSH**: D888590 (https://w

ww.nlm.nih.gov/cgi/mesh/2015/MB_cgi?field=uid&term=D888590) · **DiseasesDB**: 22354 (http://www.diseasesdatabase.com/ddb22354.htm)