

Enterovirus encephalitis

By Alina Ellerington, Encephalitis International and reviewed by Dr Christopher Duncan, Newcastle University, Khaleefa Alnaham, University of Liverpool and Dr Aravindhan Baheerathan, Imperial College London, UK

What are enteroviruses?

Enteroviruses are a group of viruses that are transmitted from person to person via direct contact with the virus. They can cause a variety of illnesses from mild (febrile illness) to more serious illnesses (encephalitis). Each year, a billion or more people (more often infants and children) worldwide are affected by enteroviruses. Infection is seasonal in temperate climates (summer and autumn) but perennial in the tropics.

Symptoms of enterovirus infections

Most enterovirus infections do not present with symptoms. Over 90% patients have an asymptomatic or mild illness. When symptoms do occur, they usually produce mild symptoms such as a short febrile illness with or without a sore throat, vomiting, and on occasions, diarrhoea.

Only rarely, enteroviruses cause severe disease, involving the heart (myocarditis) or nervous system. When enterovirus affects the nervous system, it can result in meningitis (inflammation of the lining of the brain), acute flaccid paralysis (limb weakness) or encephalitis (inflammation of the brain). Enterovirus encephalitis (EVE) can present as meningoencephalitis (where it results in both inflammation of the brain and its lining), an illness similar to herpes simplex encephalitis, or a severe brainstem encephalitis. Symptoms can include lethargy, somnolence, altered consciousness, personality change, hallucinations, stiff neck, ataxia (incoordination), seizures or coma.

Diagnosis

A doctor may suspect enterovirus infection based on the symptoms and the risk factors (age, exposure, geographic locations). When there are signs of encephalitis, a magnetic resonance imaging scan (MRI) may be used as part of the diagnostic process to rule out other diagnosis (e.g. tumour) and to help in differentiating the type of the encephalitis. A lumbar puncture may also be used to detect the virus in the CSF and exclude other organisms as the cause of the patient's symptoms. The diagnosis can be confirmed by using various tests (e.g. by identifying the virus in samples taken from the patient: faeces, nose or throat secretions, CSF, vesicle fluid and/or blood, or identifying antibodies against enteroviruses).

Treatment

Unfortunately, there is no specific antiviral medication for enterovirus infection and treatment is supportive. Treatment consists of medication to control fever and pain and/or intensive care therapies in severe cases. Intravenous immunoglobulin (IVIG) therapy has been used in chronic enterovirus infections in immunocompromised patients (patients with weakened immune systems) with some success. Also, an experimental drug, plecoranil, has shown some promise in enteroviral infections.

Prevention

Enterovirus infections are hard to prevent. People may not show symptoms and yet may be carrying and spreading the virus. Enteroviruses are very contagious. They spread through faecal-oral, respiratory and oral-to-oral routes in crowded environments. For example, transmission may occur if you touch hands with an infected person, or objects that have the virus on them, change nappies or drink infected water. Perinatal (immediately before and after the birth) and post-natal transmission from mother to baby can occur. A person is most contagious during the first week of illness, although the virus may present a few days before illness and for a few weeks in stools after recovery.

Early diagnosis and effective management of identified cases are key to limiting transmission. Careful attention to hand and personal hygiene can help limit outbreaks particularly after contact with secretions from an infected individual. The viruses are very resilient. They can be killed with standard disinfectant and heat, but they are resilient to freezing and chlorine.

Enteroviruses are a major public health concern given the increase in outbreaks of serious neurological diseases, such as brainstem encephalitis due to serotypes 71 (please see below). These may lead to death and disability in survivors. Effective antiviral treatment and vaccination are still needed.

Risk factors

Risk factors associated with enterovirus infections are:

- Environmental: poor sanitation and crowded living conditions
- Age: young children are at a greater risk because of poor hygiene and lack of prior immunity
- Health: immunocompromised people have a higher risk of severe or chronic infection and certain medication (rituximab) can potentially increase the risk.

Enterovirus encephalitis in newborns (neonatal)

Newborns are at a particular risk of developing meningoencephalitis after infection with enteroviruses. Enterovirus infection in newborns may present with fever, poor-feeding, irritability, lethargy, jaundice, and 'sepsis'. In a newborn with symptoms and signs suggestive of possible enterovirus infection, a lumbar puncture (LP) should be considered to obtain and examine the cerebrospinal fluid (CSF). The illness can result in significant brain injury and long-term neurological and developmental problems.

Human Enterovirus 71 (HEV71)

HEV71 is a type of enterovirus that can cause large outbreaks of hand-foot-mouth disease (HFMD) and, in some children, meningitis, acute flaccid paralysis and a severe brainstem encephalitis with high mortality (death). Children with brainstem encephalitis usually present with myoclonus (quick, involuntary muscle jerks), tremor, ataxia (co-ordination, balance and speech difficulties), nystagmus (involuntary eye movement) and cranial nerve palsies. The outcomes of brainstem encephalitis are poor. Only a few children recover fully, many are left with permanent neurological damage.

HEV71 epidemics have caused great public health concern because of their size and the risk of children younger than five-year-old developing severe neurological disease and potentially death. HEV71 epidemics are seasonal, with the highest transmission rates occurring during warmer and wetter months. Infection control practices consist mainly of hand washing, disinfection, and isolation during epidemics.

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Thank you!

Encephalitis International, 32 Castlegate, Malton, North Yorkshire, YO17 7DT, UK

Administration: +44 (0) 1653 692583 **Support:** +44 (0) 1653 699599

Email: mail@encephalitis.info **Website:** www.encephalitis.info

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