



Encephalitis

WHAT IS ENCEPHALITIS?

Encephalitis is an inflammation of the brain that results from either direct infection (ie, acute encephalitis) or the immune response to an infection (ie, postinfectious encephalitis or acute demyelinating encephalomyelitis).

WHAT ARE THE SIGNS OF ENCEPHALITIS?

Acute encephalitis results in a change in the state of consciousness with symptoms such as headache, disorientation and neurological signs evolving within a period of days or one to two weeks. At some point during the illness, inflammation of the fluid around the brain (cerebrospinal fluid) will be apparent on lumbar puncture, although this may not be present on admission to hospital. There may be fever, seizures, particular neurological findings, behavioural disturbances, abnormal brain waves (ie, electroencephalogram) or abnormal diagnostic imaging (ie, computed tomography scan, brain scan or magnetic resonance imaging [MRI]).

With postinfectious encephalitis, illness follows a respiratory infection by one to three weeks. Symptoms begin with fever, headache, stiff neck, nausea and vomiting, and progress to include alterations in mental status and particular neurological signs. The disease is characterized by general depression of the senses, ranging from drowsiness to coma. While the neurological findings vary, they may include staggering, decreased reflexes, urine retention and loss of vision.

WHAT SPECIFIC INFECTIONS CAUSE ENCEPHALITIS?

The infectious causes and neurological outcome of childhood encephalitis are largely unknown. There is, however, optimism that this situation will change now that there are newer ways to diagnose infections (eg, by identifying the DNA or viral RNA of the infecting organism) and to evaluate what is happening in the brain by using new radiological techniques (eg, MRI).

In Canada, children with encephalitis in whom a cause is found are most likely to be infected with chicken pox, enterovirus, herpes simplex, influenza, human herpesvirus 6, measles, Epstein Barr virus or arbovirus. Mycoplasma and the bacteria of cat scratch disease, *Bartonella* species, are also increasingly identified as important causes of encephalitis. Infections that may mimic viral encephalitis include brain abscess, bacterial meningitis or sepsis, subacute bacterial endocarditis, tuberculosis, fungal infection, parasitic infection (*Naegleria* species, cysticercosis, toxoplasmosis), Rocky Mountain spotted fever, syphilis and leptospirosis.

IS THERE TREATMENT FOR ENCEPHALITIS ITSELF OR IS TREATMENT FOR THE SYMPTOMS THAT ENCEPHALITIS CAUSES?

There is treatment for direct infection caused by the herpes simplex virus (the 'cold sore virus'). The drug used for this infection is acyclovir. It may be given to any child for at least a short period until the physician is sure that herpes simplex virus is not the cause. Drug treatment is sometimes used for some of the other infections. New treatments for mycoplasma and bartonella infections require further research. There is treatment for postinfectious encephalitis. Children with this infection often respond promptly to steroid (ie, cortisone) treatment.

The symptoms of all types of encephalitis are managed with combinations of medicine to prevent seizures (ie, anticonvulsants), intravenous nutrition and, if necessary, a 'breathing machine' (ie, ventilator).

A NOTE FROM THE DOCTOR: ADVICE FOR PARENTS AND CAREGIVERS



DO CHILDREN WHO HAVE ENCEPHALITIS RECOVER?

The outcome of encephalitis is highly variable. It depends on individual child and the cause of the infection, if it is known. Only examination of the child during hospitalization and in the months after admission for encephalitis will clarify how complete the recovery will be. Some children will remain deeply unwell for several days or weeks in hospital only to make a full recovery. During the period of 'coma' in hospital, the child may fully understand and remember what is being said at the bedside. It is good to keep bedside talk helpful and supportive.

Some children may need to remain on medication to prevent seizures for some time after the encephalitis has occurred.

WHAT RESEARCH ABOUT ENCEPHALITIS IS BEING DONE IN CANADA?

Canadian researchers are in the process of developing a registry for all children with encephalitis. This registry will collect information about the age, associated symptoms and outcome of the child with encephalitis and the cause of their disease. All children with encephalitis can then be investigated in a standardized, complete way.

WHAT DOES IT MEAN TO BE ENROLLED IN THE ENCEPHALITIS REGISTRY?

Around the time of discharge from hospital, parents in participating regions will be asked by the registry nurse if they wish to enroll their child. Children enrolled in the registry will have a second blood sample collected 10 days to six weeks after their first one to help further identify the cause of their infection; their blood and spinal fluid may be sent, in the future, for additional testing in research facilities to determine the cause of their disease; and the child will be followed for a minimum of one year by infectious diseases and neurology specialists.

The information obtained from this process will be discussed at scientific meetings in Canada and elsewhere, and published in medical journals. This sharing of information is essential to the progress in the management and, ultimately, the prevention of infection.

This information should not be used as a substitute for the medical care and advice of your physician. There may be variations in treatment that your physician may recommend based on individual facts and circumstances.

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(Reviewed by the Canadian Paediatric Society Board of Directors.)