Tick-borne encephalitis

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What is tick-borne encephalitis?

Tick-borne encephalitis (TBE) is an encephalitis caused by a specific virus within a group of viruses called flaviviruses. The virus is carried in certain ticks and some mammals (small rodents and deer, sheep, and goats) and passed between these when ticks feed on mammals.

There are three different main types of TBE virus: the European (Western), the Siberian and the Far-Eastern type. The European type is mainly found in central, eastern, and northern Europe. Most cases of TBE occur between April and November, with the peak in August, but cases can occur outside of these times.

How can you get tick-borne encephalitis?

People can be infected following a bite from an infected Ixodes tick. Ticks are small parasites that survive by sucking blood from animals – including humans. Ticks are mainly present in woodland, grassland, and shrubland. They usually live in the undergrowth, where they can easily get onto the clothes or skin of passers-by. People who spend time in these areas are at an increased risk of getting the disease. The highest risk is for people when hiking or camping in forested areas up to an altitude of about 1500 m.

Not all ticks carry the virus, but it can be present in up to 10% of ticks in some areas.

Occasionally, people have been infected after drinking untreated milk from infected animals such as goats.

TBE virus is endemic in 27 European countries, particularly in central Europe, the Baltic region, Russia and east Asia. Numbers of notified cases (reported cases), and affected areas have risen over recent years, and TBE virus has been detected for the first time in countries such as the Netherlands (2016) and the UK (2019). Rates are rising particularly fast in Italy, Slovakia, Lithuania, and Poland, and are at their highest rates in Lithuania, Estonia and the Czech Republic. It is predicted that the areas affected, and the total number of cases, will grow over the coming years due to global warming.

Symptoms of tick-borne encephalitis

Most people who are infected with the TBE virus show no symptoms at all. In those that do have symptoms (up to 30%), they typically appear one-two weeks after the bite. From those with initial symptoms, one third will develop neurological symptoms.

In the European type of TBE there are normally two phases to the illness. The first phase consists of flu-like illness with symptoms such as fever, headache, and generalised body aches, for around five days. There is then about a week with no symptoms, which is followed by the second phase of the illness, when the brain or nerves are involved.

The severity of the second phase varies between patients. Some people have a very mild illness whilst others may have a severe illness. Older people, or those receiving certain drugs which affect the immune system, tend to get a more severe illness than younger people or children. The symptoms in the second stage are like other causes of encephalitis (inflammation of the brain), meningitis (inflammation of the lining of the brain) and myelitis (inflammation of the spinal cord). The most common presentation is with meningitis, which causes neck stiffness, headache, and sometimes nausea and sensitivity to light. If the brain is inflamed (encephalitis) this may cause impaired consciousness (from drowsiness to coma), seizures (fits), poor coordination, tremor, and abnormal behaviour. Some patients will also get pain or weakness in their face, arms, or legs, due to inflammation of the spinal cord, and the nerves controlling these parts of the body. In severe cases the nerves that control breathing are affected and people may die.

How is it diagnosed?

TBE can be diagnosed by a blood test and lumbar puncture (LP). LP (sometimes called a 'spinal tap') is a procedure which involves passing a thin needle, under local anaesthetic, between two of the backbones at the base of your spine to collect a small sample cerebrospinal fluid (CSF). CSF is a clear fluid that surrounds the brain and the spinal cord.

The virus itself can be detected in the blood in the first phase of the illness (within 1-2 weeks of infection). As part of your body's reaction to the infection it will produce specific TBE antibodies (antibodies are proteins produced by our own body in response to infections). Antibodies can be tested for in blood and CSF. These can usually be found during the second phase of illness (at around the same time that neurological symptoms develop).

Brain scans such as magnetic resonance imaging (MRI) can show abnormalities that support a diagnosis of TBE, but do not show unique changes to make the diagnosis. Patients with encephalitis may also have an Electroencephalogram (EEG, especially if there is concern about seizures. This is an electrical recording of brain activity, taken from small electrodes on the surface of the head. This again may support a diagnosis, but would not show specific changes in TBE.

Consequences of tick-borne encephalitis

Some people (less than 2%) die from TBE. This is more common for the Far-Eastern type. Many people will recover completely. Others may have long lasting problems such as weakness of the arms or legs, difficulties with coordination, balance or speech, headache, tiredness, difficulty concentrating and poor memory. Children, if affected, may be left with cognitive problems (e.g. short-term memory problems), headache, fatigue and irritability. Consequences are related to the severity of the neurological illness, and the parts of the nervous system affected.

Treatment of tick-borne encephalitis

Unfortunately, there is no specific treatment for TBE. Most people will only need symptomatic treatment. Those with severe disease may need supportive treatment in hospital, including intensive care.

Prevention of tick-borne encephalitis

The risk of TBE can be dramatically reduced by avoiding the areas where the disease occurs. If this is not possible, and especially if engaging in high-risk activities such as walking or camping in affected areas, precautions should be

taken to avoid tick bites by wearing long trousers and sleeves and using an insect repellent that is effective against ticks. If a tick bites and attaches, this should be removed as soon as possible, using tweezers (pinch as close to the skin attachment as possible and pull steadily and straight back).

Unpasteurised dairy products should be avoided in endemic areas.

The best protection against TBE is given by vaccination. This should be considered in endemic areas, especially for those with high occupational or recreational risk, or those who have or are anticipated to have poorly functioning immune systems. At risk-travellers (travellers exposed outdoors in rural endemic areas between April to November) should be counselled about the risks of unpasteurised dairy products, and tick bite avoidance, and are advised to take up vaccination. The European vaccine is a series of three doses, at 0 months, 1-3 months and 12 months, however accelerated courses are possible. More information on prevention/vaccination can be found on our website www.encephalitis.info/encephalitis-guidelines-for-travellers

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Page Created: January 1999 /Last Updated April 2021/ Review date: April 2024

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Thank you!

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