Tick-Borne Encephalitis (TBE)

Introduction

It is estimated that there are 10,000 cases of Tick-Borne Encephalitis (TBE) each year in Russia and 3,000 in Europe, although the true incidence is thought to be much higher.

The incidence of TBE has risen significantly in recent decades and is spreading to new risk areas. This is particularly the case in Europe where the number of human cases of TBE in European endemic areas has increased by almost 400% in the past 30 years.

What is Tick-Borne Encephalitis?

Tick-Borne Encephalitis is a viral infection spread by infected ticks which are found in rural parts of Central to Eastern Europe and North Asia. Ticks feed on the blood of animals and humans so viruses such as TBE and Lyme disease can be transmitted while the tick is biting. The tick can be born infected or pick up the disease while feeding on infected rodents, dogs or grazing mammals. Infected ticks fall from the animals into long grass and bracken and can then opportunistically latch onto exposed human skin. They bite through the skin and can transmit the TBE virus causing a flu-like illness which can sometimes lead to severe “brain fever” or encephalitis. Humans can also become infected after consuming unpasteurised dairy produce from infected animals.

Tick-Borne Encephalitis is caused by 3 different subtypes of Tick-Borne Encephalitis virus. The viruses are virtually identical but occur in different areas of the world. They are transmitted by different species of the *Ixodes* tick. The 3 types are:

1. European/Western TBE
2. Siberian TBE
3. Far Eastern TBE

The risk season runs from April to November with the Far Eastern subtype more common in the spring while the European/Western subtype is more common in the autumn.

Where do cases of Tick-Borne Encephalitis occur?

Cases occur in the following countries:

1. **European/Western TBE**: Found in the forested and mountainous areas of: Austria, Belarus, Croatia, Czech Republic, Denmark, Estonia, Finland (mainly the Åland archipelago and neighbouring coastline), France, Germany, Hungary, Italy, in Kazakhstan, Latvia, Liechtenstein, Lithuania, Norway, Poland, Romania, Slovakia, Slovenia, Sweden, Switzerland, western Russia and Ukraine.
It is thought that cases also occur in Albania, Bosnia and Herzegovina, Bulgaria, Greece, Moldova, Montenegro and Serbia, although there is very little data available for these countries.

2. **Siberian TBE**: Cases occur in Finland, Kyrgyzstan, Mongolia, far eastern Russia, Siberia and the Ural Mountains.

3. **Far Eastern TBE**: Cases occur in the spring and summer months in far eastern Russia and some countries in East Asia, particularly in forested regions of Northern China and Japan (Hokkaido).

Within these countries the areas of risk vary, but essentially, infected ticks are found on forest fringes with adjacent grassland, forest glades, riverside meadows and marshland and forest plantations with brushwood and shrubbery.

**What are the signs and symptoms of Tick-Borne Encephalitis?**

TBE symptoms usually appear 7-14 days after a bite from an infected tick, although the incubation period may range from 2-28 days in a minority of cases. TBE symptoms are more severe in adults than in children.

The first phase of symptoms usually lasts 1-8 days and results in a flu-like illness including fever, malaise, muscle ache, headache, nausea and/or vomiting. These symptoms affect two-thirds of infected patients. Some 1-20 days after these initial symptoms have subsided, a second phase of the disease occurs in 20-30% of patients and affects the central nervous system. During this phase symptoms of meningitis (e.g. high fever, headache, stiff neck) or encephalitis (e.g. drowsiness, confusion, sensory disturbances, muscular paralysis) and meningoencephalitis occur. In cases of Far Eastern TBE there is no gap without symptoms between the first and second phase of the illness. Those who contract this type of TBE are at a much higher risk of developing severe neurological conditions.

Patients may have to endure a long recovery period if affected by the second phase of TBE, with long-term and sometimes permanent neurological symptoms. TBE is fatal in 1-2% of cases of European/Western TBE, but in the case of Far Eastern TBE the fatality rate is 5-20%. The fatality rate in the more recently identified Siberian TBE is as yet unknown.

**Can Tick-Borne Encephalitis be transmitted from person to person?**

TBE cannot be transmitted from person to person.

**How might I become infected with Tick-Borne Encephalitis?**

Ticks live in the soil and on ground level vegetation where they search for a blood host (people or animals). Ticks are usually picked up off vegetation when humans or animals pass through grasses or by bushes along forest paths or when walking on lawns or in the garden. Those camping or picnicking in risk areas are at particular risk as a result.

**What should I do if I have been bitten by a tick?**

Ticks should be removed with a pair of pointed tweezers or a tick-remover. Place the tweezers as close as possible to the skin. Pull on the tick slowly, in a straight upwards action, ensuring the mouth parts are removed from the skin completely. Care needs to be taken not to squeeze the stomach contents into the site of the bite as this can increase the risk of infection. Ticks commonly attach themselves to the hairline, behind the ears, elbows, backs of knees, groin and armpits.
If you show any symptoms of TBE within 28 days of a tick bite you should seek medical advice promptly.

How is Tick-Borne Encephalitis treated?

There is no specific treatment for TBE. Patients with symptoms of TBE such as meningitis, encephalitis and meningoencephalitis require in-patient hospital treatment where supportive care based on the severity of the symptoms will be provided.

How can you avoid contracting Tick-Borne Encephalitis?

You can minimise your risk of contracting TBE by:

- Familiarising yourself with TBE risk areas and risk seasons. A map can be seen at https://www.tickalert.org/am-i-risk-tbe
- Wearing long trousers, tucked into socks, and long-sleeved tops. Treat clothing with an insecticide spray such as permethrin.
- Wear closed shoes.
- Using insect repellent on exposed areas of skin and reapplying it regularly.
- Covering the ground with a protective sheet before sitting down for a picnic.
- Checking yourself/friends/family for ticks regularly. Adult ticks, once they have fed and become engorged may reach the size of a coffee bean, however young ticks may only be the size of a poppy seed so it is necessary to look closely.
- Avoiding consumption of unpasteurised dairy products in areas of risk as infection may also be acquired by consuming unpasteurised dairy products from infected animals.
- Having the TBE vaccine which is available for travellers intending to visit high risk areas, or whose occupation puts them at higher risk.

**Tick-Borne Encephalitis vaccine**

InterHealth recommends the vaccine for those spending time in affected rural or outdoor settings during the spring, summer and early autumn. Those working as hunters, farmers and forestry workers as well as hikers and campers are at particular risk.

The full TBE vaccination course is 3 injections. Two doses are required before departure and should ideally be given 1-3 months apart. However, the second dose can be given 2 weeks after the first if time is short. The third dose is given 5-12 months after the second dose to complete the primary course. If at continued risk, a booster dose is given 3 years later, then every 3-5 years after that.

The TBE vaccine is available in adult and paediatric doses and can be given to children from 12 months of age.

It is important to remember that although the vaccine course will protect against TBE, there are other tick-borne diseases such as Lyme disease for which there is no vaccine, so tick bite avoidance is still vital.
The risk to those working internationally and their families

The risk of contracting Tick-Borne Encephalitis depends on a number of factors including:

- Travel destination
- Duration of travel in risk area
- Travel season
- Activities being carried out
- Density of ticks in the areas visited
- Traveller’s vaccination status
- Traveller’s likelihood of following preventative measures listed above

If you are travelling to a TBE risk area and are unsure of your level of risk, please contact InterHealth for further advice.

The risk period for infection ranges from April to November, with infection with the Far Eastern subtype more common in the spring and the European subtype more common in the autumn.

Sources

- Centers for Disease Control & Prevention [www.cdc.org](http://www.cdc.org)
- National Travel Health Network & Centre (NaTHNaC) [www.nathnac.org](http://www.nathnac.org)
- World Health Organisation [www.who.int](http://www.who.int)
- TRAVAX [www.travax.nhs.uk](http://www.travax.nhs.uk)
- European Centre for Disease Prevention & Control [www.ecdc.europa.eu](http://www.ecdc.europa.eu)
- Tick Alert [www.tickalert.org/](http://www.tickalert.org/)

InterHealth Authors

Emley Pine, Travel Health Nurse
Lynda Orchard, Travel Health Nurse
Cathy Travis, Health Communications Manager

Last reviewed: February 2017

Copyright © InterHealth

While InterHealth endeavours to ensure that the information published in this guidance note is correct, InterHealth does not warrant the accuracy and completeness of the material in this guidance note. The information in this guidance note is for information only and should not be used for self diagnosis or self treatment. Readers are always encouraged to seek medical help from a doctor or other competent professional health advisor.