Scrub typhus encephalitis

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Background

Scrub typhus encephalitis is a serious neurological complication of scrub typhus, an infectious disease caused by the bacterium *Orientia tsutsugamushi* which itself is transmitted by larval mites (also called 'chiggers' or 'harvest mites'). The mites carry the bacteria and pass the infection to humans through their bite. Mite larvae feed by inserting their mouthparts into the host's hair follicles, injecting bacteria when they feed.

The injected bacteria enter the brain by disrupting the blood-brain barrier, which normally protects the brain from blood-borne infections. After this, it infects and damages brain cells and alters the immune response, leading to symptoms of encephalitis.

Where is it found?

The disease is mainly found in the 'tsutsugamushi triangle', an area covering parts of Japan, the Philippines, northern Australia, India, Pakistan, Afghanistan, and southern Russia. Around one billion people are at risk, and there are an estimated one million cases every year. The risk of death can be up to 50%.

The World Health Organization has cautioned that the disease is emerging as a public health problem in rural Southeast Asia, particularly in Myanmar, Indonesia, Thailand, India, Pakistan, Maldives, Sri Lanka, and Nepal. There is therefore a need for enhanced surveillance, early diagnosis, effective treatment, and preventive strategies to control the disease.

What are the symptoms?

Symptoms generally appear 10-12 days after the bite, and include:

- Fever
- Severe headache
- Vomiting
- Drowsiness
- Congested eyes
- Cough
- Muscle pain
- Shin pain
- Deafness
- Enlargement of liver and spleen

The characteristic sign, called 'eschar', is a blackish ulcer found at the feeding site of the mite, mainly in the groin, armpits, genitalia, and neck.

How is it diagnosed?

Diagnosis of scrub typhus encephalitis is made by brain scan (MRI/CT scan) and lumbar puncture. A lumbar puncture is conducted by inserting a needle in between vertebrae and withdrawing cerebrospinal fluid (CSF) which circulates around the brain and spinal cord.

Diagnosis is confirmed by evidence of bleeding, raised levels of inflammatory cells, elevated antibodies against *Orientia tsutsugamushi*, and polymerase chain reaction (PCR) detection of *Orientia tsutsugamushi* in the CSF.

How is it treated?

The illness can be treated by administering an easily available antibiotic called Doxycycline. Severely ill people require hospitalisation, intensive care, anti-seizure medications for control of seizures, and administration of intravenous fluids. They also need to be closely monitored for complications such as seizures, brain swelling, electrolyte imbalance, abnormal breathing, and choking.

How can it be prevented?

The first step towards prevention is to reduce exposure to mites. It is important to wear protective clothing, such as long sleeves, long trousers, and closed shoes when visiting areas where this infectious disease is endemic. Applying insect repellents containing DEET onto skin and clothing can also help prevent infection.

If possible, one must avoid known endemic areas and avoid sitting or lying directly on grassy or bushy areas. New settlements after clearing forests, riverbanks, and grassy areas have been observed to provide suitable settings for infected mites to cause disease transmission.

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