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A Peer-Reviewed Journal That Brings Together the Global Interests of Special Operations' First Responders

INFECTIOUS DISEASES

An Ongoing Series

Japanese Encephalitis

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Introduction

Japanese encephalitis is the main cause of encephalitis in many countries of Asia and the Western Pacific, and is the most common vaccine-preventable etiology of this type of disease in the region. It is caused by a single-stranded RNA virus of the genus *Flavivirus*, which is related to dengue virus and even more closely related to the West Nile virus. It is transmitted to humans through the bite of an infected mosquito, most commonly of the *Culex* species, which tends to bite during the cooler times of the day when the sun is setting or rising.

Humans are considered “dead-end hosts” because the virus is usually maintained in an enzootic cycle between mosquitoes and amplifying vertebrate hosts, usually pigs and “wading birds,” such as herons. When humans are infected, they most often do not develop viremia to the extent that feeding mosquitoes could then become infected. The disease is endemic to areas of Asia and the Western Pacific where rice growing or flooding occurs. Japanese encephalitis (JE) infections are seasonal in temperate areas, occurring during the warmer months of the year, but may be year-round in areas where frequent heavy rains occur or where fields are intentionally flooded for crop growth.

Clinical Presentation

JE is most often a disease of children in countries where it is endemic, because older members of the population often have acquired immunity through previous vaccination campaigns or via infection. Less than 1% of humans who are infected show evidence of clinical disease. The incubation period after the bite of an infected mosquito is between 5 and 15 days. The onset of symptomatic disease starts with sudden fevers, headache, nausea, and vomiting, followed by mental status changes, weakness, focal neurologic deficits, and, often, seizures. According to the Centers for Disease Control and Prevention, the classic description of JE includes “a

parkinsonian syndrome with masklike facies, tremor, cogwheel rigidity, and choreoathetoid movements.”

The case fatality ratio is between 20% and 30% of those infected who show symptoms. In these patients, one-third to one-half of the survivors will have significant neurologic, cognitive, or psychiatric disabilities. Patients may also have milder symptomatic infections manifesting as aseptic meningitis or a nonspecific febrile illness, but JE may often be an unrecognized source of infection in this population.

Diagnosis

Diagnosis in the field is challenging, but JE should be suspected in patients with meningitis, encephalitis, or acute flaccid paralysis who have recently been in areas where the disease is endemic. Other life-threatening diseases with potentially similar presentations such as bacterial meningitis and malaria must also be considered in the differential diagnosis. Laboratory diagnosis is most reliably made by sending serum or cerebrospinal fluid for JE virus-specific immunoglobulin-M-capture enzyme-linked immunosorbent assay, which can be detected in spinal fluid and serum in 4 days and 7 days after the onset of symptoms, respectively. Follow-up convalescent titers can serve to confirm the diagnosis.

Treatment

The treatment of symptomatic JEs infections is supportive and should be performed in a hospital for the proper management of complications. Again, other causes of illness must be considered.

Vaccination

The sole vaccine licensed in the United States is the inactivated Vero cell culture-derived vaccine IXIARO

(Valneva, <http://www.valneva.com>), which was approved for use in adults in 2009 and in children in 2013. It is a two-vaccine series with at least 28 days between administration; the second ideally given at least a week before any potential exposure. The Advisory Committee on Immunization Practices has recommended that travelers who are staying more than a month in areas endemic for JE be vaccinated. They also recommend that travelers who plan to spend less than a month in endemic areas but whose activities are considered “higher risk” for exposure (e.g., extensive outdoor activities, camping, hiking) also be vaccinated. For adult patients, if the IXIARO series was given more than a year earlier and re-exposure is expected, a booster dose is recommended.

Studies have been performed to see if those who previously received the mouse-brain-derived JE-Vax, which was widely used in the US military but is now not available, can obtain adequate protection from a single IXIARO “booster dose.” The results of these studies are preliminary, so the current recommendation is that anyone who previously received the JE-Vax series should receive the two-dose primary series of the IXIARO vaccine.

Importance in a Deployed Setting

JE is a risk to military forces deployed to large areas of Asia and the Western Pacific. Those at highest risk are Servicemembers deployed to rural areas where the disease is endemic, especially during the summer and fall in temperate areas, and during the monsoon season in semitropical and tropical regions. Wearing permethrin-treated uniforms and using DEET (*N,N*-diethyl-metoluamide)-containing insect repellents, coupled with appropriate vaccination, is key to the prevention of this potentially catastrophic disease.

Disclaimer

The views expressed in this publication are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the US Government.

Disclosure

The author has nothing to disclose.

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Recommended Internet Links

<http://www.cdc.gov/japaneseencephalitis/index.html>
http://www.who.int/immunization/diseases/japanese_encephalitis/en/

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Prevalence of Japanese Encephalitis



From <http://www.cdc.gov/japaneseencephalitis/maps/index.html>.