

Popular Article

Japanese Encephalitis (JE) - A Major Public Health Concern

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Abstract

Several zoonotic diseases are serious issues for global public health, not only in India. Some of these have afflicted humanity for all of recorded time, while others have only recently become significant issues. Major public health concerns in India have included illnesses like the plague, Japanese encephalitis, leishmaniasis, rabies, leptospirosis and dengue fever, among others. These illnesses are significant because of the high morbidity and mortality rates they create among people.

Introduction

In Asia and the western Pacific, the Japanese encephalitis (JE) virus is the most common cause of vaccine-preventable encephalitis. The risk of JE is extremely low, although it varies depending on the place, duration of vacation, season, and activities. It is characterized by a quick onset of headache, high temperature, disorientation, coma, tremors, and convulsions, as well as inflammation of the brain (encephalitis). Approximately one out of every four cases are fatal.

Transmission

The flavivirus that causes Japanese encephalitis (JE) is closely linked to the viruses that cause West Nile and St. Louis encephalitis. Infected *Culex* species mosquitoes, particularly *Culex tritaeniorhynchus*, transmit the JE virus to humans by their bite. Mosquitoes and vertebrate hosts, mostly pigs and wading birds, keep the virus alive in a cycle. Humans are accidental or dead-end hosts because they do not have enough JE virus in their bloodstreams to infect feeding mosquitos. JE virus transmission occurs principally in rural agricultural areas, often accompanying with rice production and flooding irrigation. In temperate areas of Asia, JE virus transmission is seasonal. In the subtropics and tropics, transmission ensue over a year, often with a peak during the rainy season.

Symptoms

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- Less than 1% of people infected with Japanese encephalitis (JE) virus develop clinical illness.
- In persons who develop symptoms, the incubation period (time from infection until illness) is characteristically 5-15 days.
- Preliminary symptoms often include fever, headache and vomiting.
- Mental status changes, neurologic symptoms, weakness, and movement disorders might develop over the next few times.
- Seizures are common, especially among children.

Prevention

The virus that causes Japanese encephalitis is transmitted to humans by the bite of an infected mosquito. Mosquitos bite at all hours of the day and night. The easiest strategy to avoid getting infected with the Japanese encephalitis virus is to avoid mosquito bites. Before travelling, use bug repellent, wear long-sleeved shirts and pants, treat clothing and gear, and be vaccinated.

Surveillance Three main areas make up the component of Japanese encephalitis surveillance:

- (1) Sero-surveillance to identify populations at high risk and to track JE-specific antibodies in sentinel animals or birds as a sign of rising viral activity.
- (2) Vector surveillance in JE-prone locations to track vector behavior and population growth and deploy intervention strategies in good time.
- (3) clinical surveillance using the PHC system for JE patient early diagnosis and appropriate care.

Control

- (i) Transmission Interruptions Controlling vectors can stop transmission from happening. Before the start of the transmission season, residual insecticidal spraying with the right insecticide has been advised in all animal habitats for the effective control of vectors.
- (ii) Vaccination There are now three different JE vaccines manufactured and used globally. China produces inactivated and live attenuated primary hamster kidney cells, which are used in Japan, Korea, Taiwan, Thailand, Vietnam, PR China, and India. However, the JE vaccine created in a mouse brain is sold commercially and is accessible worldwide. In most areas of Asia, the mouse brain vaccine produced from the Nakayama strain is given subcutaneously in 2 doses of 0.5 ml, 1 to 4 weeks apart with a booster dose at 1 year and additional booster doses thereafter at 1 to 3 years intervals.

Management of cases

- a) For patients with JE, there is no specific curative therapy. Early identification, appropriate management, and symptomatic treatment serve to minimize related fatalities and neurological sequelae.
- b) Community involvement and health education the delay between the onset of symptoms and the start of therapy has been demonstrated to be directly correlated. The likelihood of death is significantly decreased when cases are handled right away. Making people aware of the disease encourages early reporting because it is more common in rural regions. Encouragement of personnel protection is aided by additional health education.

Vaccination

- The only JE vaccine licensed and available in the United States is the inactivated Vero cell culture-derived Japanese encephalitis (JE) vaccine (marketed as IXIARO). This vaccine was licensed for use in persons aged 17 and above in March 2009, and in children aged 2 months to 16 years old in May 2013. IXIARO is administered in a two-dose sequence separated by 28 days. Adults between the ages of 18 and 65 can receive the second dose as soon as seven days following the first. The final dose should be administered at least one week prior to departure.
- For adults and children aged 3 years or older, each dose of IXIARO is 0.5 ml. For children aged 2 months through 2 years, each dose is 0.25 ml.

Treatment

- No specific treatments have been found to benefit patients with JE, but hospitalization for gentle care and close observation is usually required.
- Treatment is symptomatic. Rest, fluids and use of pain reliefs and medication to reduce fever may let go some symptoms.

Outcome

- Among patients who develop encephalitis, 20% – 30% die.
- Although some symptoms improve after the acute illness, 30%-50% of survivors continue to have neurologic, cognitive, or psychiatric symptoms.

Reference

<http://www.who.int/wer/2015/wer9009.pdf?ua=1>

<https://www.cdc.gov/japaneseencephalitis/index.html>

Rabe IB, Miller ER, Fischer M, Hills SL. Adverse events following vaccination with an inactivated, Vero cell culture-derived Japanese encephalitis vaccine in the United States, 2009-2012. *Vaccine*. 2015;33(5):708-712.

Schuller E, Klingler A, Dubischar-Kastner K, Dewasthaly S, Müller Z. Safety profile of the Vero cell-derived Japanese encephalitis virus (JEV) vaccine IXIARO (®). *Vaccine*. 2011;29(47):8669-76.

Tauber E, Kollaritsch H, Korinek M, Rendi-Wagner P, Jilma B, Firbas C, et al. Safety and immunogenicity of a Vero-cell-derived, inactivated Japanese encephalitis vaccine: a non-inferiority, phase III, randomised controlled trial. *Lancet*. 2007;370(9602):1847-53.

Tauber E, Kollaritsch H, von Sonnenburg F, Lademann M, Jilma B, Firbas C, et al. Randomized, double-blind, placebo-controlled phase 3 trial of the safety and tolerability of IC51, an inactivated Japanese encephalitis vaccine. *J Infect Dis*. 2008;198(4):493-9.

Woolpert T, Staples JE, Faix DJ, Nett RJ, Kosoy O, Biggerstaff BJ, et al. Immunogenicity of one dose of Vero cell culture-derived Japanese encephalitis (JE) vaccine in adults previously vaccinated with mouse brain-derived JE vaccine. *Vaccine*. 2012;30(20):3090-3096.