Japanese Encephalitis

Traveler Summary

Key Points

- Japanese encephalitis (JE)—a viral infection occurring in many areas of Asia and in a few areas of the western Pacific—is acquired through the bite of an infected mosquito.
- Risk is extremely low for short-stay travelers, persons staying in urban areas, or those with brief daytime rural exposures during typical tourist excursions. Risk is increased for long-stay travelers (with extensive unprotected outdoor, evening/nighttime exposures) going to rural areas in affected countries, especially during the JE virus (JEV) transmission season.
- Symptoms include sudden high fever, nausea, headache, and altered mental status.
- Consequences of infection may include convulsions, muscular paralysis, difficulty breathing, coma, and death.
- Prevention includes wearing long sleeves and long pants and observing personal protective measures effective against mosquito bites.
- JE vaccine (Ixiaro) is given as 2 doses to persons 2 months and older (interval between doses is 7 to 28 days, depending on age at administration) at least 1 week prior to potential exposure.
- Vaccine side effects are most commonly injection-site reactions, fever, headache, and muscle aches.
- Duration of vaccine protection is 10 years or longer following an initial booster (given at least 1 year after the initial 2 doses). No further booster dose is recommended.

Introduction

JE is a potentially severe viral infection occurring mainly in the local population throughout south-central, southeastern, and eastern Asia and in parts of the western Pacific and is transmitted via the bite of infected mosquitoes. JE is the leading cause of mosquito-borne encephalitis (brain inflammation) in local populations in rural farming areas of these countries. However, in countries with high vaccination coverage, JE occurrence is significantly reduced.

Risk Areas

JE occurs in a wide belt from Japan and northern coastal China, throughout southeastern Asia, and across India to Pakistan and more recently in Tibet and the mountain districts in Nepal. JE is also present throughout the Western Pacific islands, from Indonesia to Papua New Guinea and as far north as the Philippines.

Risk is highest in rural agricultural areas (and occasionally near/within urban centers) that are often associated with rice cultivation and flood irrigation.

Elevation and local variations in rainfall and temperature affect mosquito breeding and seasonality of transmission. In temperate areas of Asia, the occurrence of human JEV infection increases toward the end of the summer rains and usually peaks in the summer and fall. In the subtropics and tropics (including Indonesia, the Philippines, southern Thailand, and southern Vietnam), seasonality varies with monsoon rains and irrigation practices and may be prolonged or even occur throughout the year.

Fewer than 100 cases of JE have been reported in travelers from nonendemic countries going to affected areas of Asia since the 1970s (1973-2017). Most cases were acquired in Thailand (mainly in Phuket and the Chiang Mai valley) followed by Indonesia (mainly in Bali), China, and the Philippines (in descending order of incidence). No travel-related cases have been reported among business or short-stay travelers visiting only urban areas.

Among travelers from the US, the probability of JEV infection is equal among all age groups due to lack of prior exposure. Only 20% of US travelers going to Asia stay for more than 1 month, yet approximately two-thirds of cases in US travelers occurred in this group.

Transmission

JEV is mainly transmitted to humans through the bite of infected evening-biting and night-biting mosquitoes that breed in rice fields and feed most often outdoors. Mosquitoes acquire the virus when they bite pigs and wading birds (in rural farms) that carry JEV; domestic pigs are the main source of infection for mosquitoes that transmit JEV to humans.

Risk Factors

Risk is very low (but may vary based on destination, duration of travel, season, and activities) for short-stay travelers and persons who confine their travel to urbanized areas or who have brief daytime rural exposures during typical tourist excursions. However, cases may be sporadic and have been reported (albeit rarely) in short-stay visitors traveling out of season whose only rural travel had been to beach resorts.

Risk of JEV infection in travelers cannot be inferred from the incidence of JE among residents of JE-endemic countries, which may be lower due to vaccination rates or natural immunity acquired from previous infection among the population. However, expatriates and long-stay travelers who reside in rural areas for more than 1 month are likely at a similar risk to the susceptible (unvaccinated) resident population where JE is prevalent.

Persons with extensive unprotected outdoor, evening, or nighttime exposure (e.g., biking, hiking, camping, and certain occupational activities) in rural areas might be at high risk even if their trip is brief.

Symptoms

Symptoms most commonly appear approximately 5 to 15 days following exposure and include sudden high fever, abdominal pain, nausea, vomiting, headache, generalized weakness, altered mental status (confusion, poor concentration, disorientation, or inability to talk), and acute brain inflammation. Most infections are mild, with symptoms such as fever and headache; severe disease is rare and occurs in about 1 in 250 infections.

Consequences of Infection

JE can progress to convulsions, breathing difficulties, seizures, mild tremors, muscle paralysis or rigidity, impaired balance, and coma. Death occurs in about 20% to 30% of symptomatic cases. Infected children (younger than 10 years) have a greater risk of severe disease and death. Among survivors, 30% to 50% have serious neurological, cognitive, or psychiatric symptoms even years later.

Need for Medical Assistance

Travelers who develop symptoms (especially altered mental status) of JE during travel or within 15 days of leaving a risk area should seek urgent medical attention.

Prevention

Nonvaccine

Personal protective measures are the main prevention strategy. Mosquitoes that transmit JEV (***Culex*** spp.) are generally night biters but have peak biting activity at dusk and again at dawn. Regardless of vaccination status, travelers should be especially vigilant in applying repellent during peak biting activity times. Treat outer clothing, boots, tents, and sleeping bag liners with permethrin (or other pyrethroid) when traveling in a very high-risk area for JE. See ***Insect Precautions***.

Vaccine

An injectable vaccine (Ixiaro) is widely available in many countries and is approved for persons 2 months and older. Several single-dose live vaccines are available in risk areas of Asia as well as in Australia.

Side Effects

The most common side effects of Ixiaro in all age groups are injection-site reactions (pain, redness, warmth, and swelling). Fever, irritability, and diarrhea are most common in infants and children younger than 12 years, whereas headaches and muscle aches are most common in adults 18 years and older. Allergic reactions (both immediate and delayed) to the vaccine have occurred.

Persons with underlying medical conditions or those who have concerns about the vaccine should speak to their health care provider before vaccine administration.

Timing

Ixiaro vaccine is given to travelers as follows:

- Children aged 2 months through 17 years: 2 doses, given 28 days apart.
- Adults aged 18-65 years: 2 doses, given 7 to 28 days apart.
- Adults 65 years and older: 2 doses, given 28 days apart.

Doses should be completed at least 1 week before potential exposure.

A booster dose may be given at least 1 year after completion of the primary vaccination series if ongoing exposure or re-exposure to JEV is expected. Duration of protection is 10 years or longer.
