

Rabies

Traveler Summary

Key Points

- | Rabies is an acute, fatal, viral infection of the brain occurring worldwide, transmitted via saliva through penetrating bites, licks, or scratches from rabid dogs, bats, and other mammals.
- | Risk is low for travelers but becomes significant after a potential bite exposure.
- | Symptoms are initially mild and include tingling at the site of the bite, fever, muscle aches, anxiety, depression, irritability, and sometimes respiratory or gastrointestinal symptoms.
- | Consequences of infection are paralysis and coma, which is always fatal once the rabies virus reaches the brain from the site of the bite or wound.
- | Prevention includes avoiding any contact with dogs and other biting mammals (including bats and wildlife) in countries with a high risk of rabies.
- | Rabies vaccine for prevention prior to any exposure or potential bite is given in 3 doses: 1 each on days 0, 7, and 28. Following a potential rabies exposure, persons not previously vaccinated need 4 doses of vaccine (days 0, 3, 7, and 14-28) plus rabies immune globulin on the first day, while previously vaccinated persons need only 2 doses of vaccine (days 0 and 3).
- | Vaccine side effects are most commonly injection-site reactions and fever, headache, dizziness, and abdominal pain.
- | Duration of vaccine protection is limited to the time interval until any subsequent rabies exposure, at which time postexposure vaccination will be required. Travelers do not require routine boosters.

Introduction

Rabies is an acute, progressive, and fatal viral infection of the central nervous system that is vaccine preventable. Transmission is predominantly via saliva through the bite of rabid animals worldwide. Almost all rabies deaths are due to dog or bat bites. Tens of millions of human exposures and tens of thousands of deaths may occur each year due to rabies.

Risk Areas

Rabies is found on all continents except Antarctica. Canine rabies is most prevalent in Africa and Asia, has limited distribution in parts of Central and South America, and is absent from Australia, Japan, Western Europe, and many small island countries. Bat rabies occurs worldwide, except in New Zealand. In the U.S., bats that feed on insects (notably silver-haired bats) are the most common cause of human rabies cases. In Central and South America, rabies transmitted by vampire bats causes significant death in cattle and occasional outbreaks in humans. Rabies virus of this type can also be found in cats, foxes, raccoons, and skunks in the U.S. and in jackals and mongooses in southern Africa, the Caribbean islands, and Central America.

Transmission

Rabies is transmitted to humans via saliva through penetrating bites of rabid animals that may not exhibit features of the disease (especially carnivores and bats). Rabies virus is introduced through intact skin (e.g., by a bite or scratch) or licked onto preexisting nonintact skin or mucous tissue, where it then travels through the nerves to the brain. Dogs and bats are the most important vectors because they bite readily and may have daily contact with humans. Bat rabies is transmitted by bat bites or scratches (which may not be noticed) or, more rarely, by inhalation of aerosolized bat saliva in caves where numerous bats congregate. However, all mammals are susceptible to rabies, including but not limited to coyotes, foxes, jackals, mongooses, racoons, skunks, and wolves. Monkeys are a potential but uncertain source; nevertheless, monkey bites must be treated as a potential rabies risk. Human-to-human transmission or human rabies due to rodent bites have never been reported.

Risk Factors

Risk is low for travelers and, although rare, rabies is a high-impact disease. A bite, scratch, or lick from a dog or other mammal in a rabies-endemic country or a bite or scratch from a bat anywhere in the world presents a risk of rabies to an unvaccinated traveler.

Risk of developing rabies increases with severity (number and depth) of bites and proximity to the head. Timely vaccination is protective when given before and/or after exposure, to neutralize the rabies virus before it reaches the brain. Bites to the face carry an especially high risk and require more urgent initiation of treatment following exposure.

Symptoms

Symptoms most commonly develop 20 to 60 days (but could occur 5 days to several years) after exposure (depending on the severity and site of the bite) and include tingling (at the site of the bite) followed by fever, headache, muscle aches, anxiety, depression, irritability, and sometimes respiratory or gastrointestinal symptoms.

Consequences of Infection

Patients with furious rabies, which is common after dog bites, are terrified of water and develop severe spasms of the breathing muscles, which may lead to suffocation, generalized convulsions, coma, and death (in approximately 5 days).

Patients with paralytic rabies, which is common after bat bites, become lethargic, dribble saliva, and develop loss of muscle tone and paralysis, progressing to coma and death in about 13 days.

Need for Medical Assistance

A traveler who has been bitten, scratched, or licked by a mammal in a rabies-endemic country or by a bat anywhere in the world should urgently seek medical advice on receiving a postexposure vaccination series. Bites to the face require urgent medical attention. Any potential rabies exposure, even from months earlier, warrants immediate initiation of appropriate medical evaluation. National, state, or local health authorities should be consulted by the traveler or medical provider for recent information on rabies risk according to the particular exposure.

Prevention

Nonvaccine

Preexposure

Preventive measures include the following:

- | Avoid contact with all dogs and other biting mammals in countries with canine rabies.
- | Avoid provoking domestic animals.
- | Avoid contact with all wild mammals, especially those that are behaving abnormally, in countries with rabies in wild mammals (e.g., mongooses, raccoons, or skunks).
- | Avoid touching or feeding monkeys, especially those in temples and national parks, because they often show little fear of humans.
- | Avoid any caves that are possibly bat-infested.
- | Be especially vigilant with children because they are at high risk for exposure and may not report bites, scratches, or other incidents that might occur.

Postexposure

The following measures are recommended:

- | Immediately cleanse all wounds thoroughly with copious amounts of soap and water (under a running tap if possible) for a minimum of 15 minutes and urgently seek care.
- | Use a virucidal agent (such as povidone-iodine) if available to irrigate the wounds and destroy the virus.
- | Have deep wounds explored, cleaned, and irrigated in a hospital (under an anesthetic if necessary); these wounds are usually not closed or sutured.

Vaccine and/or Vaccine and Rabies Immune Globulin

Preexposure

Rabies vaccine can be given before travel for travelers going to any country with rabies (especially canine rabies) to simplify the postexposure vaccine schedule and eliminate the need for rabies immune globulin (RIG), which is often very difficult to obtain abroad.

Preexposure exposure prophylaxis (PrEP) is recommended for:

- | Long-stay travelers to high-risk destinations
- | Travelers with likelihood of repeat travel to risk areas
- | Shorter-stay travelers in high-risk destinations if more than 24 hours from a reliable source of modern cell-culture rabies vaccine and RIG
- | Travelers with extensive outdoor exposure (occupational or adventure) in high-risk destinations where immediate access to appropriate medical care may be limited, regardless of length of stay
- | Risk-averse travelers going to high-risk destinations, especially those engaging in high-risk activities

Postexposure

Vaccine without RIG is given to persons who have previously completed a primary series at any time.

Vaccine with RIG is given to persons without a complete PrEP series (3 or more doses of rabies vaccine). Human rabies immune globulin (HRIG) provides rapid, passive, short-term immunity.

Postexposure prophylaxis (PEP), with or without RIG (depending on PrEP status; see below), is recommended for:

- | Bite exposures that include any penetration of the skin by the teeth of a potentially rabid animal
 - | PEP does not need to be initiated if a biting cat, dog, or ferret is healthy and available for 10 days observation following the date of the bite. If PEP has been initiated and the animal remains healthy, PEP can be discontinued.
 - | Coyotes, foxes, raccoons, skunks, and most carnivores in countries with known wildlife rabies should be considered rabid unless proven negative by testing.
 - | Bites caused by livestock, small and large rodents (beavers, gerbils, guinea pigs, hamsters, mice, rats, and woodchucks), and lagomorphs (hares, rabbits) almost never require initiation of PEP.
- | Nonbite exposures, including scratches or contamination of open wounds, abrasions, or mucous membranes with saliva or other potentially infectious material
- | Bat exposures from anywhere in the world (all bats should be considered potentially rabid):
 - | PEP is recommended for all bat-bite exposures.
 - | PEP is recommended if it is not reasonably certain that exposure did not occur, even if evidence of exposure is not visible.
 - | PEP is not indicated for bat exposures if it is reasonably certain that exposure did not occur or if the bat is available for testing and is negative for rabies virus.

Side Effects

The most common vaccine side effects are mild local reactions, which can include pain, redness, swelling, or itching at the injection site. Fever, headache, dizziness, abdominal pain, and gastrointestinal symptoms may also occur. Neurological complications have been reported, albeit rarely.

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

Timing

Preexposure vaccination consists of 3 doses administered intramuscularly, 1 each on days 0, 7, and 28 (the third dose may be given as early as day 21 if time is limited).

Duration of vaccine protection is limited to the time interval until any subsequent rabies exposure, at which time postexposure vaccination will be required. Regular boosters are recommended only for persons at continuous or frequent risk (e.g., occupational exposures to rabies virus, animals, or bats), but not for travelers.

Postexposure vaccination, with or without RIG (depending on preexposure vaccination status; see below), is recommended for:

- | Persons who have received the complete preexposure vaccine series or a prior postexposure series. Rabies vaccine only:

2 doses administered intramuscularly, 1 each on days 0 and 3.

- | Persons who have not received the complete preexposure vaccine series or a prior postexposure series. Rabies vaccine plus RIG: 4 doses of rabies vaccine administered intramuscularly, 1 each on days 0, 3, 7, and 14-28, plus 1 dose of RIG (within 7 days of the first vaccine dose) injected into and around the bite or exposure site to ensure as much contact with areas of saliva contamination as possible.

Preexposure and postexposure regimens can also be administered intradermally. Returned travelers may have been started on one of these regimens in the exposure country, but public health agencies in the traveler's home country may not recognize these regimens and may recommend restarting a full standard postexposure series.

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