Imported Human Rabies—California, 2008

Compared with rabies in developing countries, human rabies is rare in the United States, but animal rabies is common.1,2 In the United States, most human rabies cases are associated with rabid bats, whereas in developing countries, dogs are the most common reservoir and vector species. In March 2008, a case of imported human rabies in a recently arrived, undocumented Mexican immigrant was laboratory confirmed by public health officials in California. The rabies virus isolated from the patient was a previously uncharacterized variant most closely related to viruses found in Mexican free-tailed bats (Tadarida brasilienensis). The molecular and phylogenetic characterizations of this rabies virus variant have been described previously.3 This report summarizes the epidemiologic investigation and the ensuing public health response. A total of 20 persons, mostly household contacts, received postexposure prophylaxis (PEP) because of potential exposure to rabies virus from the patient. The findings underscore the difficulties encountered in the diagnosis and epidemiologic investigations of imported human rabies cases and the importance of a coordinated public health response across multiple international jurisdictions.

Case Report

On March 17, 2008, a male aged 16 years who had recently entered the United States from Oaxaca, Mexico, was brought by his family to an emergency department (ED) in Santa Barbara County, California, with sore throat and a recent history of not eating or drinking. The ED physician obtained a history with assistance from a translator. The patient’s vital signs were remarkable for a mild temperature elevation (100.6°F [38.1°C]) and tachycardia (140 beats per minute). He was awake and alert but agitated and crying. His examination was notable for mild abdominal tenderness. Laboratory studies included a complete blood count, electrolytes, liver function tests, and urinalysis. Results were normal except an elevated blood urea nitrogen value of 20 mg/dL (normal range: 7-18 mg/dL). The patient was given intravenous fluids and discharged with the diagnosis of pharyngitis and abdominal pain.

Several hours later, the patient was brought by his family to the same ED with nausea, vomiting, fever, and sore throat. He was mildly febrile (99.1°F [37.3°C]) with tachycardia (164 beats per minute) and was noted to be agitated and uncooperative. He refused to take fluids and was observed to spit frequently. Because of the patient’s agitated behavior and his refusal to take oral fluids, the ED physician suggested that psychiatric consultation might be needed. The patient was again given intravenous fluids for dehydration. He was discharged to his aunt’s home with the diagnosis of viral pharyngitis, depression, and anorexia.

The next day, on March 18, the patient experienced vomiting and shaking and then collapsed at his aunt’s home. When paramedics arrived, the patient was not breathing and was unresponsive. Resuscitation efforts were not successful.

After the patient’s death, the possibility of rabies as a cause of his illness was considered by the ED physician because (1) the patient exhibited hydrophobia and aggressive behavior, and (2) the patient had come to the United States from a canine rabies enzootic region in Mexico only the day before his presentation at the ED.

Public Health Investigation

The Santa Barbara County Public Health Department and health officials in Mexico interviewed family members and friends of the patient regarding potential rabies exposures. Through these interviews, two potential animal bite exposures were identified. Both occurred in Oaxaca, Mexico. In December 2007, the patient was bitten by a dog while tending sheep. In the same month, he was bitten by a fox. Several other persons who were bitten by the fox received rabies PEP, but the patient did not.

Brain tissue obtained from the patient postmortem was sent to the Santa Barbara Public Health Laboratory. On March 21, rabies virus antigen was identified in the brain tissue by the direct fluorescent antibody test. Brain tissue was forwarded to the California Viral and Rickettsial Disease Laboratory (VRDL) and CDC for viral characterization. After antigenic typing and genetic sequencing on March 27, VRDL and CDC identified a rabies virus variant most closely related to viruses found in Mexican free-tailed bats, rather than a canine rabies virus variant.

On March 21, by request of the California Department of Public Health, CDC’s San Diego Quarantine Station assisted in contacting Mexican federal and local public health authorities to notify them of the case and seek further information regarding the patient’s exposures in Mexico. In addition, an investigation was begun by the Santa Barbara County Public Health Department in conjunction with the local hospital’s infection control staff and the Ventura County Public Health Department. The investigation was complicated by the patient’s undocumented status in the United States, his long-distance travel, and linguistic and cultural barriers.

Investigation determined that the patient had departed Oaxaca, Mexico, on March 10 and traveled through Mexico with others by foot and car before making unauthorized entry into the United States. Upon arrival near Santa Barbara, the patient’s family brought him to the ED. The patient received rabies PEP, but the patient did not. On March 17, the patient was brought to the same ED with sore throat and recent history of not eating or drinking.

On March 19, the patient was discharged from the ED with the diagnosis of viral pharyngitis, depression, and anorexia. On March 21, the patient was brought by his family to the same ED with nausea, vomiting, fever, and sore throat. He was mildly febrile (99.1°F [37.3°C]) with tachycardia (164 beats per minute) and was noted to be agitated and uncooperative. He refused to take fluids and was observed to spit frequently. Because of the patient’s agitated behavior and his refusal to take oral fluids, the ED physician suggested that psychiatric consultation might be needed. The patient was again given intravenous fluids for dehydration. He was discharged to his aunt’s home with the diagnosis of viral pharyngitis, depression, and anorexia.

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States on or shortly before March 16. One of his traveling companions was his brother-in-law, who traveled with him from Oaxaca to the United States. After the patient’s arrival in the United States on March 16, he remained at a family residence in Santa Barbara County, California, until the onset of his illness the following day.

Mexican health officials interviewed contacts and family members in the patient’s home town; none received PEP because the patient was not considered to be infectious before his departure for California. Intensive efforts to locate the brother-in-law and other traveling companions were not successful. Because the patient had remained at one family residence after his arrival in the United States, contact exposures in the United States were limited to household members, ED staff, and health department personnel.

Assessments of potential exposure were made in accordance with Advisory Committee on Immunization Practices recommendations. Of 29 possible contacts identified, 20 were deemed to be potentially exposed and received PEP. Sixteen of those 20 were household members. All received PEP because of exposure of mucous membranes or nonintact skin to the patient’s saliva as a result of the patient’s frequent spitting and excessive salivation while at the family residence. Four persons who received PEP were health-care providers. Two ED physicians reported exposures to the patient’s saliva. A microbiologist and veterinarian technician, who were previously vaccinated and assisted with the specimen preparation, received booster doses of rabies vaccine. To date, all known contacts of the patient in the United States have no evidence of rabies.

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CDC Editorial Note: The case described in this report is the first case of human rabies imported into the United States that has not been associated with a canine rabies variant. The patient described in this report was infected with a variant most closely related to rabies viruses found in Mexican free-tailed bats. During 2000-2008, a total of 27 cases of human rabies were reported in the United States. Of these, six were imported cases, including the case described in this report. With the exception of the case described in this report, all were associated with either (1) a history of dog exposure in a canine rabies enzootic country, or (2) a canine rabies virus variant that was enzootic in the patient’s country of origin. How the patient described in this report was infected with rabies virus remains unclear. Transmission might have occurred either through a bat bite directly or by secondary infection through the bite of a rabid carnivore infected with a bat rabies virus variant (i.e., the dog or fox bites identified in the investigation). Travelers should be aware of the local status and epidemiology of rabies at their destination and how to prevent exposures by avoiding stray animals and wildlife. Patients who have potential exposures to rabies virus should seek medical evaluation immediately.

The patient’s mode of travel to the United States likely hindered more immediate prevention efforts by local health officials in his home jurisdiction. The undocumented status of the patient might have led to the patient and his family not readily disclosing complete information to health-care providers or officials, thereby delaying consideration of a rabies diagnosis. Nevertheless, a disoriented, salivating, and dehydrated patient who avoids water should prompt a consideration of rabies in the differential diagnosis, irrespective of a documented history of animal exposure. Health-care providers should consider rabies in patients with acute progressive encephalitis. In particular, rabies should be included in the differential diagnosis where a travel history or immigration status has indicated time spent in a canine rabies endemic country.

The investigation described in this report highlights the importance of cooperation between the United States and Mexican public health agencies for the complete investigation of infectious disease cases that cross international borders. Sharing information about the rabies death in this Mexican national enabled officials from Mexico and the United States to conduct timely and coordinated disease surveillance, assess prevention efforts, and accurately document consequent mortality.

This case also demonstrates the need for improved international coordination in the control of infectious disease. CDC, the Mexico Secretariat of Health, and state epidemiology officials from both countries have drafted Guidelines for U.S.–Mexico Coordination on Epidemiologic Events of Mutual Interest, which addresses the issue of such binational cases and disease outbreaks to ensure systematic communication for public health purposes. The guidelines were drafted because such binational public health situations between the United States and Mexico are relatively frequent, particularly in border regions. The 2005 International Health Regulations encourage such bilateral agreements to address common disease control issues and public health events in border regions and beyond, because most issues, such as this imported rabies case, do not meet the World Health Organization’s definition of a public health emergency of international concern (PHEIC). Pilot implementation of operation protocols for the proposed U.S.–Mexico guidelines is ongoing.

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REFERENCES

7 Available.

*PHEIC must meet two of the following four criteria: (1) seriousness of the public health impact of the event, (2) unusual or unexpected nature of the event, (3) potential for the event to spread internationally, and/or (4) the risk that restrictions to travel or trade might result because of the event.

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