

# Vaccination Still Vital in Human Rabies Exposure

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SCOTTSDALE, ARIZ. — Despite the first known survival of an unvaccinated rabies patient, prophylaxis still is the only proven defense after rabies exposure, Dr. L. Barry Seltz told physicians at a pediatric update sponsored by Phoenix Children's Hospital.

"There is no established, effective treatment," Dr. Seltz of the University of Arizona in Tucson warned in a talk that addressed misconceptions about human rabies risk and why current thinking discourages vaccination in the gluteal area.

The treatment that saved the Wisconsin teenager (*N. Engl. J. Med.* 2005;352:2508-14) needs to be duplicated, according to Dr. Seltz. Vaccination can be before or after exposure, he said, but it must be done whenever there is reason to suspect exposure to the rabies virus.

Exposure is not always easy to document, however. For Dr. Seltz, a key lesson from the survival of the 15-year-old girl is the importance of taking a good patient history. "She said she had been bitten by a bat. She didn't think anything of it," he said, crediting careful questioning by the

teenager's primary care physician with unearthing this crucial piece of information after the patient became ill. She had not previously reported the bite.

Despite public fear of rabid dogs and widespread rabies in wild raccoons on the Eastern seaboard, Dr. Seltz said that most human rabies cases in the United States involve bats.

From 1990 to 2004, he said there were 47 total U.S. cases, including 10 cases acquired abroad. Of the 37 infections that

originated within this country, 34 were determined to involve a bat variant of the rabies virus. Only one came from a raccoon.

"Bat bites are not dramatic. You may not recognize them when they occur," Dr. Seltz said, warning that bat bites also can be difficult to verify. As examples of patients he would vaccinate in the absence of certain exposure, Dr. Seltz cited the person who was asleep when a bat flew into a room or a young child who cannot give a reliable history.

Other than a bite from a rabid animal, he said virus transmission can occur via "contamination of nonintact skin or mucous membranes with saliva from a rabid animal." Cornea transplantation or solid organ transplantation from an infected donor also can transmit the virus.

"Petting a rabid animal is not an exposure. Contact with blood, urine, or feces of an infected animal is not exposure," Dr. Seltz said.

The virus has a 20 to 60-day incubation

## U.S. Dogs Eclipsed As a Rabies Source

Dogs are the first animal that comes to mind when most people think about rabies, but Dr. Seltz said they are not much of a threat in the United States.

In 2004, only 94 rabid dogs were reported in this country, according to Dr. Seltz. Among domestic animals, there were more cases of rabid cats and rabid cattle: 281 and 115 animals, respectively.

Dog bites do account for most of the 50,000 human rabies cases worldwide each year, he said. In the United States, however, 92%-94% of animal rabies comes from wild animals.

The largest concentration of infected animals has been identified to date on the East Coast, Dr. Seltz reported. Nationwide, in 2004, there were 2,400 rabid raccoons, 1,800 skunks, and 1,300 bats.

Although rabid bats are far fewer than rabid raccoons, Dr. Seltz said they are more dispersed and more likely to come in contact with people. Hence, they are most often implicated in human infections. Squirrels are rarely found to be rabid, he said, as they generally do not survive the initial attack of a rabid animal.

In Arizona, where Dr. Seltz practices and the meeting took place, he said there were 169 cases of animal rabies in 2005—the most ever recorded.

These rabid animals included 84 bats, 67 skunks, 12 foxes, 2 bobcats, and 1 raccoon.

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- The most frequently reported adverse events in patients aged 1 to 11 years were constipation (5%) and headache (3%). In patients aged 12 to 17 years, the most frequently reported adverse events were headache (7%), abdominal pain (5%), nausea (3%), and dizziness (3%). The adverse events profile in children and adolescents resembled that of adults taking PREVACID, where the most common adverse events were diarrhea (3.8%), abdominal pain (2.1%), and nausea (1.3%). Symptomatic response to therapy does not preclude the presence of gastric malignancy. PREVACID formulations are contraindicated in patients with known hypersensitivity to any component of the formulation.

See adjacent page for brief summary of prescribing information.

**References** 1. Rudolph CD, Mazur LJ, Liptak GS, et al. *J Pediatr Gastroenterol Nutr.* 2001;32(suppl 2):S1-S31. 2. PREVACID Complete Prescribing Information. 3. Aciphex® (rabeprazole sodium) Complete Prescribing Information. 4. Nexium® (esomeprazole magnesium) Complete Prescribing Information. 5. Prilosec® (omeprazole) Complete Prescribing Information. 6. Protonix® (pantoprazole sodium) Complete Prescribing Information. 7. Zegerid™ (omeprazole) Complete Prescribing Information.

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period, but Dr. Seltz said one long-term case has been reported. That involved a boy who became ill 6 years after he emigrated from the Philippines. The rabies strain came from a dog native to the Philippines.

Ten days is adequate for observation of a dog that appears healthy after it has bitten someone in the United States, according to Dr. Seltz. If the dog has been infected, the virus will present itself quickly.

All told, six patients have survived after the onset of rabies worldwide, he said. Five had been vaccinated.

To control rabies in humans, he urged preexposure vaccination of veterinarians, animal handlers, laboratory workers, peo-

ple moving to areas where dog rabies is common, and those who engage in activities that bring them in frequent contact with wildlife.

The postexposure protocol is three-pronged, he said: local wound care, active immunization, and passive immunization with immune globulin. "Cleaning [the wound] is critically important," he said. "Animal studies show that wound cleaning



can reduce the risk of rabies by 50%."

The three vaccines currently available in the United States are all inactivated viruses. Dr. Seltz advised that they should be given in five doses on days 0, 3, 7, 14, and 28. These should not be injected in the gluteal area, he warned, as this method has been associated with lower response and prophylaxis failure.

**DR. SELTZ**

Exposed patients should receive a 20-

IU/kg dose—no more, no less—of immune globulin prepared from the plasma of immunized human donors, Dr. Seltz added. "Do not give more," he said. "It will inhibit antibody response."

In five cases of children who died despite receiving the full postexposure protocol for multiple bites, their wounds were not sufficiently infiltrated with immune globulin, according to Dr. Seltz. If a child has multiple wounds, he said to dilute the 20-IU/kg dose in normal saline solution and use the extra volume to make sure all the wounds are infiltrated.

"You spread it around," he said. "Do as much as you can." ■

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