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Public Health
Acute Communicable Disease Control
Special Studies Report 2000

**A CASE OF BAYLISASCARIS PROCYONIS (RACCOON ROUNDWORM)
MENINGOENCEPHALITIS, LOS ANGELES, 2000**

In January 2000, a 17 year old male with severe developmental delay and a history of pica was admitted to a local hospital in a coma. Two days prior to admission, he had become progressively drowsy with a decreased appetite. Upon admission he was diagnosed with eosinophilic meningoencephalitis and was treated with broad spectrum antibiotics, antiparasitic and antiviral drugs with no improvement. Two MRI scans revealed multiple abnormalities. A brain biopsy was consistent with *Baylisascaris procyonis* infection. Serum and spinal fluid were positive for *Baylisascaris procyonis* by IFA. The case-patient lived in a group home in the southern, urban part of Los Angeles County. Prior to his hospitalization, attendants at the group home noticed a raccoon in the neighborhood.

Acute Communicable Disease Control, with Veterinary Public Health, the Public Health Laboratory, and consultants from San Jose State University, initiated a public health investigation of this case to determine the source of the BP infection and to develop appropriate public health recommendations.

METHODS

We consulted with Animal Control about complaints of raccoons in the neighborhood where the patient lived. We made a thorough inspection of the four sites where the patient spent time in the 6 weeks before becoming ill. These included his permanent group home; a second, temporary group home; his mother's home; and the school that he attended Monday through Friday. We looked for evidence of raccoon activity including paw prints, scratches on trees, and raccoon latrines (sites raccoons use repeatedly to defecate). We collected raccoon feces, sand, and soil from where the case-patient was known to play for microscopic analysis.

RESULTS

The permanent group home was located on the edge of a residential neighborhood adjacent to an industrial and commercial area. Animal Control did not record any complaints of raccoons in the neighborhood during the 6 months prior to the patient's illness. Of the 4 places investigated, only patient's group home backyard and the adjoining backyard had evidence of raccoon activity including feces and raccoon tracks. Old raccoon feces were found in 2 sandboxes in the group home backyard and on the cement fence which enclosed the backyard. Multiple fresh raccoon latrines and fresh racoon tracks were found in the backyard adjacent to the group home.

Two sand and fecal samples were collected from the sandboxes, a soil sample was collected from the ground around the swingset, and 12 fecal samples were collected from the adjacent backyard and the top of the cement fence. All soil, sand and fecal samples from the yard where the case-patient played were negative. Infective-stage eggs were found by microscopic examination in 3

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fecal samples from the adjacent backyard.

DISCUSSION

This is the first report of BP neural larva migrans in a semi-urban area and in an area previously unknown to local health authorities to have a raccoon problem. BP neural larva migrans is rare but should be considered whenever the diagnosis of eosinophilic meningoencephalitis is made, especially in young children or in those with developmental delay. Raccoon contact should be asked about. Clinicians may call the health department for help in obtaining the appropriate tests for BP. There have been no reports of successfully treating someone who is already symptomatic with neural BP; however, based on animal data, it may be possible to prevent such infections with antihelminthic treatment given a few days after exposure to infected raccoon feces.

Baylisascaris procyonis (BP) is a common roundworm of raccoons. It lives in the intestines of raccoon and lays millions of eggs daily that are passed in the raccoon feces. After approximately 2 to 4 weeks in the outside environment the eggs embryonate into infective larva. If humans ingest raccoon feces after this time they may develop visceral, ocular or neural larva migrans. All of these are syndromes in which larvae travel throughout the body, eyes, or central nervous system respectively. Neural larva migrans is especially noteworthy due to its eosinophilic meningoencephalitis and peripheral eosinophilia. Thus far, there have only been 7 confirmed and 2 presumptive cases of BP neural larva migrans reported in the English medical literature. Five of the confirmed and one presumptive case were in children less than 18 months. One case occurred in a 21-year-old with developmental delay and pica, much like this case. The medical outcomes have been uniform: developmental delay among the infants, neurologic disability, or death. All case-patients resided in rural or suburban neighborhoods.

Since the consequences of infection are so severe and pharmaceutical prevention is untested, the primary public health responsibility must be in preventing exposure to raccoon feces. As the population of Los Angeles County grows and as people build homes in new areas, contact with wild animals is inevitable. Raccoons are ubiquitous and cannot be eliminated so people must minimize their exposure to raccoons and raccoon feces. Raccoons should not be kept as pets. Food for animals should not be left outside and garbage containers should be tightly closed with latches that will prevent raccoons from taking off the lids. Children and anyone with developmental disabilities should be kept away from raccoons and areas where raccoons are prevalent. Sandboxes should be kept covered when not in use. Sixty to 80% of raccoons are infected with BP so raccoon feces must be assumed infective. Raccoon feces, which can be identified by the presence of undigested grain or paper or shiny, man-made objects, and raccoon latrines, often found in the forks of trees, or on raised surfaces such as woodpiles, a collection of rocks, or on walls or fences, should be collected and either burned or taken to a landfill. Care must be taken not to contaminate oneself; gloves should be used and clothes promptly washed. Fresh raccoon feces, distinguished by its shiny appearance, is not infective and should be disposed of immediately before the BP eggs become infective larva (in 2-4 weeks). Other contaminated surfaces may be treated with boiling

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water.

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