Cerebral Larva Migrans in a Raccoon (*Procyon lotor*)

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**Abstract.** During 1997, gross and histopathologic examinations were performed on an adult female raccoon (*Procyon lotor*) that was live-trapped in Corvallis, Oregon. Multifocal eosinophilic granulomas indicative of neural and visceral larva migrans were observed. However, within these granulomas, the presence of parasitic larva was seen only in the cerebrum. Morphologic characteristics indicated that the nematode was an ascarid larva. However, it was smaller than the larva of *Baylisascaris* sp. This appears to be the first documented case of cerebral larva migrans in a raccoon.

**Key words:** Ascarid nematode; cerebrum; larva migrans; *Procyon lotor*; raccoons.

Neural and visceral larva migrans have been documented in a large number of domestic and wild animal species. The common roundworm, *Baylisascaris procyonis*, of raccoons appears to be a frequent etiologic agent responsible for severe central nervous system disease in paratenic hosts. Other nematode species known to cause neural and visceral larva migrans include *Toxocara* spp., *Angiostrongylus* spp., and *Strongyloides* spp. In raccoons, a form of visceral larva migrans associated with a trematode (*Phagicola* sp.) has been described. We describe here a case of verminous encephalitis associated with an ascarid larval nematode in a raccoon. To our knowledge, this condition does not appear to have been reported in this species.

During October 1997, an adult female raccoon (*Procyon lotor*), a nuisance animal, was live-trapped (Tomahawk #207 traps, Tomahawk Live Trap Company, Tomahawk, WI) in a residential area in Corvallis, Oregon (44°34’N, 123°16’W) and was euthanatized by a local wildlife control officer. The carcass was submitted for necropsy to the Veterinary Diagnostic Laboratory at Oregon State University in Corvallis, Oregon.

At necropsy, gross lesions were confined to the liver and the mesenteric lymph node. Both had small (1–2 mm in diameter), randomly distributed white nodular foci. Representative samples of the heart, diaphragm, tongue, masseter muscle, lung, liver, kidney, pancreas, skin, spleen, mesen-
The lymph node, stomach, intestines, trachea, thyroids, esophagus, aorta, adrenal glands, urinary bladder, ovaries, uterus and anal sacs and the whole brain were fixed in formalin for histologic examination. The fixed brain was cut in 4-mm wide, transverse sections and three areas (cerebrum, cerebellum, and brain stem) were selected for histopathologic examination.

Microscopically, the most significant lesions were present in the brain. In the cerebrum, there were a few vessels with moderate numbers of eosinophils in the perivascular areas (Fig. 1). In the adjacent neuropil, there was a large area infiltrated by epithelioid macrophages, which were surrounded by moderate numbers of lymphocytes (Figs. 1, 2). Several cross-sections of a larval nematode were seen within this granuloma (Figs. 2, 3). A similar focus of granulomatous inflammation (without the nematode) was also present within the granular layer of the cerebellum.

The nematodes were 23–32 μm in diameter, with inconspicuous bilateral single alae. The structure and size of the larvae were consistent with those described for early third-stage larvae of Ascaris lumbricoides. Larvae of Baylisascaris are considerably larger (55–70 μm). Larvae of Toxascaris leonina are similar in size to those in this case, but they have larger, relatively prominent lateral alae. Other Toxocara species are either smaller or have prominent excretory columns.

In the present case, unequivocal identification of larvae (as to species) is not possible. Species identifications may be inferred from known host and parasite associations when certain morphologic features are present. In this case, the limited information fits the description of A. lumbricoides larvae and of A. suum larvae. Since there are rural areas within and surrounding the city of Corvallis, it is more likely...
that the larvae present in the brain of this raccoon were *A. suum* from swine.

There were vacuolar changes in some of the neurons of the pontine nuclei of the brain stem. The changes were bilateral but not symmetrical. These changes were confined to the neuronal perikaryon and consisted of one or more variable-sized vacuoles. The surrounding neuropil was normal, and no gliosis or inflammatory cellular infiltrate was seen. These neuronal changes have recently been described in raccoons and were not associated with the parasitic encephalitis.

Findings in other organs included moderate numbers of eosinophilic granulomas in the mesenteric lymph node, liver, and the lungs. However, at none of these sites were any parasites detected within the granulomas. A few *Sarcocystis kirkpatricki* were present in the muscles of the tongue, and moderate numbers of a *Capillaria* species were in the anal sacs. The latter two conditions are considered to be caused by incidental background parasites of raccoons in the USA.

Although in North America, cerebral larva migrans is a well-documented entity in wild and domestic animals, to our knowledge it has not been reported in the raccoon. This is largely because a majority of the reported cases have been the result of the large roundworm of raccoons, *B. procyonis*. Because other nematodes, such as *Toxocara* spp., other ascarids, gnathostomes, *Strongyloides* spp., and others are also capable of causing larva migrans, a case of cerebral visceral migrans in a raccoon associated with a nematode other than *B. procyonis* is not surprising.

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