Practical Tips for Paediatricians

Raccoon roundworm infection: What a child health care practitioner in Canada needs to know about a rare but important zoonotic helminth infection

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INTRODUCTION

Raccoons (*Procyon lotor*) are ubiquitous animals living in close proximity to humans in urban environments in North America. *Baylisascaris procyonis* is a roundworm found primarily in raccoons and rarely in other mammals. The adult roundworm resides in the gastrointestinal tract of raccoons and sheds millions of eggs into the raccoon feces. Raccoons typically defecate in communal latrines, which may be in yards or playgrounds (1). Approximately 50 to 60% of raccoons in British Columbia, Ontario, and Quebec carry *B. procyonis* (2).

If eggs are ingested by humans, a serious and often fatal meningoencephalitis can occur. Given the fecal-oral route of transmission and the propensity of children to both play outside and put things in their mouth, children are at greatest risk of infection (1). While few cases of baylisascariasis have been documented in Canada (2,3), the need for prompt recognition and treatment is vital given the serious complications that can result. However, primary care practitioners are often unfamiliar with the risk associated with exposure to raccoon feces. The objective of this article is to increase awareness and provide primary care practitioners with tips to identify those at risk, diagnose, prevent and treat baylisascariasis.

TIP #1: CLINICAL ASSESSMENT

B. procyonis causes three forms of clinical disease: neural larva migrans (NLM), ocular larva migrans (OLM), and visceral larva migrans (VLM). Risk factors for infection include age

<4 years, pica or geophagia, contact with raccoon latrines, and male sex (4). The majority of patients with NLM present with an acute fulminant meningoencephalitis. Early clinical features are subtle and nonspecific; low-grade fever, lethargy, irritability, often in the absence of meningismus. Within a few weeks, neurological deterioration ensues with regression of developmental milestones, seizures, extensor posturing, paresis, coma, and in one third of the cases death (1).

OLM can occur in isolation or in association with NLM and results from larval migration within the eye. Fundoscopic examination may reveal chorioretinitis, optic neuritis, optic atrophy and occasionally motile larvae migrating within the subretinal space (1). Clinical symptoms include sudden decreased vision and photophobia which can progress to blindness in the affected eye (4).

VLM involves larval migration to visceral tissues such as the heart, pleura, lungs, intestinal tract, liver, and spleen (1,4). Clinical features of VLM include a nonspecific macular rash predominantly on the face and trunk, pneumonitis and hepatosplenomegaly (1).

TIP #2: LABORATORY ASSESSMENT

The first clue to the diagnosis of baylisascariasis is eosinophilia on a complete blood count. A case series of 22 patients with NLM and/or VLM found that 95% of patients had peripheral eosinophilia at the time of diagnosis (4). In cases of NLM, cerebrospinal fluid (CSF) analysis typically demonstrates a pleocytosis with eosinophilic predominance (1). Neuroimaging is nonspecific

but may show diffuse, deep white matter abnormalities within the periventricular areas and cerebellum (4). Definitive diagnosis can be made by identification of larvae on biopsy or autopsy specimens. However, given the invasiveness of a biopsy, the diagnosis of *B. procyonis* is typically made by serology. Antibodies to *B. procyonis* may be demonstrated in CSF and serum by an antigen-based enzyme-linked immunosorbent assay. Demonstration of antibodies in serum and CSF in the setting of an appropriate history and clinical presentation is diagnostic (1,5). Turnaround time for serology can be up to 42 days as samples are sent to the National Reference Centre for Parasitology in Montreal (6), thus treatment must be based on clinical suspicion.

TIP #3: TREATMENT AND PREVENTION

Simple preventive measures can be reinforced to parents during routine health visits such as hand hygiene after playing outside and avoidance and if possible, decontamination of raccoon latrines. Raccoon latrines can be found at bases of trees and in elevated locations such as garages and rooftops (1,4). Whenever *B. procyonis* infection or exposure is suspected, consultation with an infectious disease specialist should be sought. A laboratory confirmation is not required to initiate treatment which should start as soon as the diagnosis is suspected (1,4). Treatment typically consists of albendazole (25 to 50 mg/kg/day for 10 to 28 days) and systemic corticosteroids (to decrease the eosinophilic inflammatory response (1,4)). Early recognition and aggressive treatment have demonstrated favourable outcomes in a few cases (3,4). Given the increasing numbers of raccoons in many Canadian urban centres and high rates of carriage of *B. procyonis* in these animals, if a child is thought to have ingested raccoon feces or contaminated soil, many experts would recommend a course of albendazole (25 to 50 mg/kg/day for 10 to 20 days) given up to 3 days after the ingestion as post exposure prophylaxis (4,7). As albendazole is not an approved drug in Canada, physicians must work with the Special Access Programme through Health Canada to ensure timely access (8).

SUMMARY OF TIPS

- Young children are at increased risk of baylisascariasis.
- Baylisascariasis should be considered in a child with an eosinophilic meningitis or peripheral eosinophilia and possible ingestion of raccoon feces or contaminated soil.
- When infection is suspected, consult an infectious disease specialist to advise on urgent treatment.
- If a child is known or thought to have ingested raccoon feces or contaminated soil, a course of albendazole may be started up to 3 days after ingestion as postexposure prophylaxis.

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