CANADIAN WILDLIFE HEALTH COOPERATIVE

E. MULTILOCULARIS – CHANGING EPIDEMIOLOGY WARRANTS ATTENTION

SUMMARY

E. multilocularis is a potential emerging public health issue in Canada. Changing contact between wild or domestic canids and people, an expanding geographic distribution plus the recent detection of a more virulent European strain of this parasite in animals and a person in Canada sets the stage for changing epidemiology and impact of this parasite. There are concerns that alveolar echinococcosis is under-reported in people and animals, reducing our knowledge of the true extent of public health risk. Public outreach and awareness campaigns to high risk occupations, veterinarians and physicians can help better understand the scope of this disease and encourage low-threshold interventions to reduce risk.

OVERVIEW OF THE DISEASE

Echinoccocus multilocularis is a zoonotic tapeworm. Human *E. multilocularis* infection can lead to alveolar echinococcosis, a chronic infection of the liver that, if untreated, can result in death. Human cases may go unrecognized. The disease has a long incubation period (5-15 years) during which people are mostly asymptomatic or can be misdiagnosed as hepatic neoplasia or cirrhosis. Annual incidence of echinococcosis has been estimated to be 0.14 cases per 100 000 people, which is likely an underestimate due to under-diagnosis and under-reporting. Human case reports submitted to the Canadian Institutes for Health Information between 2002 and 2011 documented 315 cases; 48 associated with *E. granulosus*/*E. canadensis*, 16 with *E. multilocularis*, and 251 cases of echinococcosis for which species was not identified. Alveolar echinococcosis has been confirmed in clinical cases in people in Manitoba, Alberta and Ontario. Ontario has made *E. multilocularis* infection in domestic dogs and humans reportable but as of July 2019 it was not reportable elsewhere in Canada. Locally acquired, as opposed to travel related, human alveolar echinoccosis in North America has always been considered very rare.

E. multilocularis infects wild and domestic canids such as coyotes, foxes, and dogs. Rodents, ruminants and other small mammals can serve as intermediate hosts for Echinococcus spp. The adult parasite resides in the canid's intestine and its eggs are shed via the animal's feces. These eggs then contaminate the environment where they are ingested primarily by intermediate hosts. People can become infected due to accidental ingestion of the eggs. This parasite has been detected in Canada in the Northern Tundra Zone, Alberta, Saskatchewan, Manitoba, Ontario and British Columbia.

THE ISSUE

Alveolar echinococcosis is emerging and remerging in Europe, Africa, and Asia. Increased prevalence or distribution of the tapeworms in wildlife host reservoirs appears to be driving this emergence in some areas. Recent studies suggest a similar phenomenon may be occurring in Canada. Ontario, once thought free of this parasite now list this as a reportable human disease. CWHC-associated research confirmed that *E. multilocularis* has become established in coyote and fox populations across southern Ontario. *E. multilocularis* has been confirmed elsewhere including in coyote feces in the metropolitan area of Winnipeg, Calgary and Edmonton. Prior to 2009, *E. multilocularis* had not been diagnosed in a dog in Canada but since has been found 8 dogs in BC, Ontario, Alberta and Manitoba. None of the 8 dogs had contact histories with each other nor travel history outside of Canada. Six had lived their entire lives in provinces where *E. multilocularis* had never been previously diagnosed. The BC dog case signaled the detection in of a European strain in western Canada, with subsequent research finding the strain circulating in nearby wildlife. This strain has also been found in rodents and canids in Alberta as well as a human case. European strains of *E. multilocularis* appear to have greater potential to cause human alveolar hydatid disease. The changing epidemiology plus the presumption of under detection or misdiagnosis of human cases indicates a need to heighten awareness of this disease in the infectious disease community.

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RISK MANAGEMENT

The predominant role of wildlife hosts in this parasite's lifecycle precludes eradication. Reducing the prevalence of infection in wild or domestic canids through the use of anthelmintic is possible but the cost-benefits of this approach has not been established and may be unwarranted given the current human disease incidence. Owners of animals in frequent contact with rodents in known endemic areas may, however, benefit from regular deworming. The advisability of more widespread chemotherapeutic interventions in animals could change if surveillance revealed an upward trend in canid infections, especially in urban areas. However, there is no targeted and ongoing surveillance for this disease, preventing reliable trend analysis of animal cases. People in high risk occupations as well as hunters and trappers targeting canids should be recipients of health protection messaging about the lifecycle of the parasite and how to reduce the risks of exposure to *E. multilocularis* eggs through personal protection measures. Veterinarians should be updated on the distribution of this infection to advise dog owners to reduce their pets' contact with wild rodents and on an appropriate deworming schedule. Physician awareness campaigns on the existence and risk factors for this disease would assist in enhanced reporting and case detection.

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