INFORMATION FOR VETERINARIANS AND CLINICS

Echinococcus in dogs and cats

Key facts

- *Echinococcus* are small tapeworms (cestodes) of dogs that rarely infect cats
- This parasite is considered an emerging concern, particularly in cooler regions of N. America, Europe, and Asia
- Clinical signs in dogs are typically absent until severe abdominal distension is noted with *E. multilocularis* infection, i.e., alveolar echinococcus (AE). Prognosis is guarded in these patients
- Due to severe zoonotic risk (human concern) it is essential to differentiate *Echinococcus spp*. from *Taenia spp*
- Dogs can serve as sentinels for human risk
- Preventive care (AAHA), companion animal parasite council (CAPC), Canadian Parasitology Expert Panel (CPEP) evidence and expert based fecal guidelines exist for puppies, kittens, adult dogs, and cats
- KeyScreen™ GI Parasite PCR for tapeworm diagnosis, identification, and differentiation from *Echinococcus*, along with 20 other parasites, and the *Giardia* zoonosis and hookworm resistance markers
- One Health, drug stewardship considerations

What is it and who gets it?

Echinococcus granulosus and *E. multilocularis* are small tapeworms of dogs (domestic and wild), cats are rarely infected.[1]

How common is it?

E. multilocularis is considered an emerging parasite in N. America, Europe (central), and Asia.

Prevalence varies with geography (region) livestock (e.g., sheep), and wild canid (coyote, fox) exposure.

In one recent global analysis, prevalence was estimated between 0 to 41%[2], and in one endemic region of China, the prevalence of *E.multilocularis* eggs in domestic dogs was 20%.[3]

Risk factors for this tapeworm infection in dogs are related to wild canid (coyote, fox) and livestock (e.g., sheep) exposure.[1-4]

Where is it?

Regional prevalence appears to vary, and it is an emerging parasite in the cooler regions of N. America, Europe, and Asia.

How is it transmitted (spread)?

Pathogenesis
Wild canids (fox, coyote, wolves) are the definitive host for *Echinococcus spp*. (including *E. granulosus*), but domestic dogs (or cats) can be in the domestic cycle for *E. multilocularis*. It is important to note that wild canids can be present in urban areas.

Definitive hosts infected with adult *Echinococcus* tapeworms, which live in the small intestine, shed eggs in their feces. These are ingested by an intermediate host (rodent, small mammal) and cysts (hydatid) develop. Transmission occurs in dogs (and cats) after direct ingestion of an infected intermediate host (prey, hunting behaviour).

E. granulosus can cause hydatid cyst disease in humans but is not known to cause significant disease in dogs or cats. However, dogs and humans can develop alveolar cystic disease after infection with *E. multilocularis*. This can occur after tissue migration of the larval stage and subsequent lesions form, i.e. alveolar echinococcus (AE). These cyst or tumour-like lesions are most commonly noted in the liver but can occur in other abdominal organs or the thorax.

What are the clinical signs in dogs and cats?

Subclinical disease (no or mild signs) is most common. Severe abdominal distension can occur with *E. multilocularis* is alveolar echinococcus (AE), or a cyst-like lesion may be incidentally observed. Enteric infections may also occur with either *Echinococcus spp*.

How is it diagnosed?

Diagnosis is made by a combination of history, clinical signs, and fecal testing (direct fecal, fecal centrifugal flotation, KeyScreen GI Parasite PCR). If eggs are noted on fecal or fecal flotation, they are strongly advised to be differentiated from *Taenia spp* with PCR, particularly in endemic regions and in dogs who travel to these. If an abdominal mass is noted, differentiation from neoplasia with biopsies, cytology or PCR is indicated. Please contact an internal medicine consultant to discuss the case if a positive result is detected.

Note — Echinococcus may be reportable in some regions, connecting with the local public health department is advised.

What is the treatment?

Treatment with milbemycin/praziquantel is indicated for enteric infections, despite an apparent lack of clinical signs.[4] Repeated treatment may be indicated, and confirmation of resolution is critical due to zoonotic risk.

Treatment for AE is surgical excision, when possible, and adjunctive treatment with albendazole long-term or life-long.[4] Care must be taken to monitor with serial CBCs due to bone marrow suppression concerns with albendazole.

Routine (monthly) praziquantel treatment is advised for animals in endemic regions, particularly for hunting dogs due to lifestyle risk.

Environmental decontamination and removal of feces to reduce risk of re-infection is needed, along with reduced exposure to wild dog (coyote, fox) feces, livestock, and rodents as practical.

Other goals of patient management include easing pet-owner concerns surrounding zoonosis (and raising awareness of risk if present), along with potentially reducing veterinary liability concerns by providing zoonotic risk information.[5]

Monitoring?

Re-testing fecal samples
Fecal re-testing (KeyScreen™ GI Parasite PCR)[6] is important for detected cases to assess for continued infection, confirm resolution, determine if further therapy is indicated, identify zoonotic risk and reassure or communicate risk to pet-owners, and identify environmental re-infection.

At the clinic level, efforts to quickly identify re-infection and persistent infection (e.g., KeyScreen™ GI Parasite PCR) may assist in limiting environmental contamination, subsequent zoonotic risk, and aid in drug selection for treatment.

What is the prognosis?

Prognosis with enteric infection and prompt treatment is good in most cases. Clients should be counselled that re-infection (environmental), is a risk, as animals do not develop immunity after infection.

Prognosis is guarded with alveolar echinococcus as surgical excision may not be possible, reoccurrence appears common, and treatment does not typically result in cure.[1-4]

What is the prevention? What can I do to stop this happening to dogs?

Following existing evidence- and expert-based guidelines (CAPC, CPEP) for prevention testing, monitoring and therapy is indicated for puppies, kittens, and adult animals. Puppies and kittens should have 3-4 fecals in their first year of life, and adult dogs twice annually (as determined based on risk assessment), and routine deworming schedules followed as per CAPC and CPEP, along with monthly treatment in endemic regions and with higher risk.

Environmental cleaning (pick up poop), decontamination (infection control) and provision of good nutrition, clean water sources and appropriate housing (i.e., low stress) can reduce infection (and re-infection) risk and limit the development and geographic spread.

“An ounce of prevention is worth a pound of cure” – Ben Franklin

Is this a One Health concern (zoonotic (human), animal, drug stewardship and environment)?

Yes, *Echinococcus* is a severe zoonotic threat and all suspected *Taenia* should be confirmed by PCR. This can be done through testing with the KeyScreen™ GI Parasite PCR test.[6] Dogs can serve as sentinels for human risk.

Maybe- At this time there are no reported concerns of resistance; however, due to the rising concern of anti-parasitic resistance this concern cannot be dismissed.

Yes- this is environmental concern as we work to reduce the parasite burden by ensuring parasite clearance (re-testing and effective treatment) and ‘pick up the poop’ messaging.

Your preventive care contribution in the clinic assists:
- The individual pet (puppy, kitten, adult dog or cat)
- Pet-owner
- One Health
- Education of self, staff, and pet-owner to follow appropriate fecal and deworm plan supported by CAPC, CPEP and AAHA evidence- and expert-based guidelines

How does Antech provide veterinary and clinic support?

Provision of diagnostic options that:
Follow existing evidence- and expert-based guidelines (CAPC, CPEP, AAHA-AAFP, Infectious disease in dogs in group setting.

KeyScreen™ GI Parasite PCR is a stable, single sample test with a fast turnaround time (TAT), provides reliable and accurate results, and is backed by scientific support.

- Quickly identifies tapeworms and differentiates *Echinococcus spp*
- Reduces zoonotic risk to humans
- Limits environmental contamination and subsequent worsening of re-infection concern
- Allows for infectious disease surveillance, identification of 'hot spots' and risk mapping
- Environmental stewardship-reduce burden due to parasite clearance re-assessment, supports pick up poop messaging.

Provision of medical support

Internal Medicine Consultant team access, clinical pathologist, radiologist, others.

Vet team and pet-owner resources (visual aids graphs of labs, lifestage, breed, parasite and protocol, tidbits that are fun and individualized), technician training (Preventive care modules).

Webinar (RACE approved), case studies, FAQ on disease, pathogen, etc. (IM consultants), visual aids for prevention (trends of labs, parasite checks, body weight based on species-breed and lifestage).

Resources

Companion Animal Parasite Council (CAPC), As accessed August 2022.

Canadian Parasitology Expert Panel (CPEP), As accessed August 2022.

Canine (2019) and Feline (2021) Life stage Guidelines, AAHA, AAHA/AAFP, As accessed August 2022.

American Animal Hospital Association (AAHA) Infectious disease in dogs in group setting (Stull, 2016, As accessed August 2022.

References

1. Weese JS, Evason ME. 2020. A Colour Handbook, Infectious Diseases of the Dog and Cat. CRC Press.
2. Toews E, et al, 2021. A global assessment of Echinococcus multilocularis infections in domestic dogs: proposing a framework to overcome past methodological heterogeneity. International Journal for Parasitology. 51(5):379-392.
3. Liu CN, et al, 2018.Estimating the prevalence of Echinococcus in domestic dogs in highly endemic for echinococcosis. Infect Dis Poverty. 7 (77)
4. Cvejic D, et al, 2016. Efficacy of a single dose of milbemycin oxime/praziquantel combination tablets, Milpro(®), against adult Echinococcus multilocularis in dogs and both adult and immature *E. multilocularis* in young cats. Parasitol Res. 115(3):1195-202.
5. Marsh AE, et al, 2015. Legal implications of zoonotic disease transmission for veterinary practices. Vet Clin North Am Small Anim Pract. 2015 Mar;45(2):393-408.
6. Leutenegger CM, 2022. How molecular testing is reshaping the way parasites can be detected. Vet Pract News. March.

Antech is committed to supporting veterinary care teams with a flexible, can-do spirit resulting in healthy pets, happy pet parents, and a high-performing practice.
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