

Zoonotic Importance of *Ancylostoma caninum* and Its Preventive Measures

Sunkara Jairam^{1*}, Gali Mounika¹, A. Sai Chandu¹, S. Naveen Kumar¹, C. Mathivathani², C. Angeline Felicia Bora²

¹BVSc & AH, Department of Veterinary Parasitology

²Assistant Professor, Department of Veterinary Parasitology

<https://doi.org/10.5281/zenodo.8218469>

Abstract

Dogs play an important role in the transmission of zoonotic nematodes such as *Ancylostomum spp*, by excreting eggs directly into the human environment, without the involvement of vectors or intermediate hosts. *Ancylostoma caninum* remains a hazard despite the availability of effective anthelmintics for dogs. A good understanding of the biology of these parasites and the risk factors that lead to their transmission to humans is required for effective prevention strategies. In this respect, the significance of anthelmintics to prevent and treat parasitic infections, the maintenance of high-quality continuing education for veterinarians, and the provision of suitably presented information to pet owners are of priority importance.

Introduction

The dog population in India is about 11.67 million (19th livestock census). The canine hookworm, *Ancylostoma caninum*, is one of the most pathogenic gastrointestinal parasites of dogs and in addition, poses a significant public health risk to humans (Kopp *et al.*, 2007). The eggs of this parasite are shed in the feces of infected animals and can end up in the environment, contaminating the ground where the animal defecated. People become infected when the zoonotic hookworm larvae penetrate unprotected skin, especially when walking barefoot or sitting on contaminated soil or sand (Prociv *et al.*, 1996). This can result in a disease called cutaneous larva migrans (CLM) when the larvae migrate through the skin and cause inflammation.

Zoonotic Importance and Awareness

Ancylostoma caninum is also zoonotic, which means it can be transmitted to humans. Eggs of these parasites passed out in the dog's feces and can contaminate the soil in the environment. The eggs hatch into larvae, and people become infected when the zoonotic hookworm larvae penetrate



unprotected skin, especially when walking barefoot or sitting on contaminated soil or sand. This can result in a disease called cutaneous larva migrans (CLM) which causes severe itchiness, red twisting lesions, swelling, and discomfort. rarely hookworm may infect the intestine and cause abdominal pain, discomfort, and diarrhea. Prevalence of Ancylostomiasis in Dogs and Humans in southern and northern regions of India (Brahmbhatt *et al.*, 2015).

Region	Dogs (%)	Humans (%)
South India	72	36
North India	64	56

Lifecycle

Definitive host (Dog) → Egg passes in feces → Environment → First stage larvae develop in the egg → Third stage larvae (infective stage) → Skin penetration to humans.

Ancylostomum caninum, infection occurs in four ways

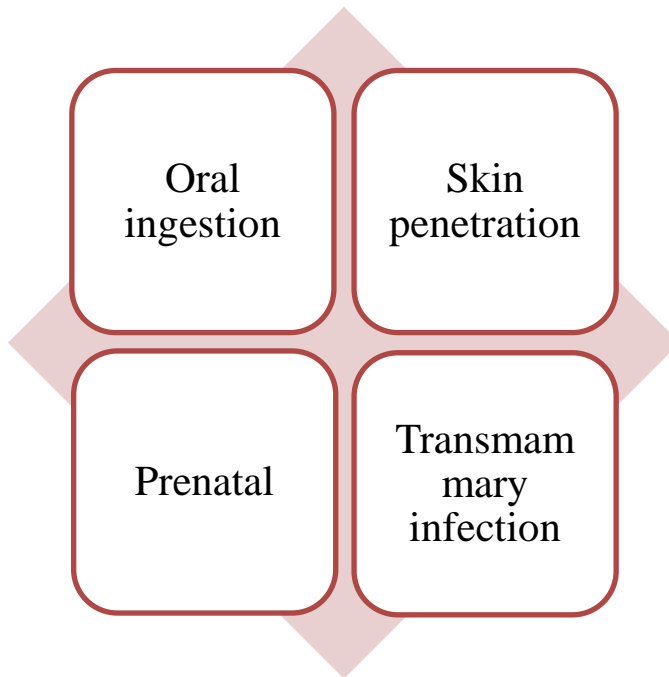


Fig 1: Different ways of transmission of *Ancylostomia caninum* in dog

- Oral ingestion
- Skin penetration
- Prenatal
- Trans mammary infection



Oral ingestion and skin penetration

Ingested larvae will move to the dog's intestinal tract to complete their lifecycle. A few larvae may make their way into the trachea (windpipe) and are then coughed up and swallowed. The larvae may also burrow into the skin if the dog walks or lies on contaminated ground. Once in the host's body, the larvae migrate to the lungs and trachea. The dog will then cough up and swallow the larvae which then migrate to the intestinal tract, where they mature and complete their life cycle. Part of the hookworm lifecycle involves migration through muscle tissues, where they may become dormant.

Prenatal

In the pregnant bitches dormant larvae are activated by hormonal influence. These activated larvae enter the fetus via placental circulation. The worms do not mature until the birth of the pups. They mature within 30 days of the birth of pups and eggs can be seen in faeces. Prenatal infection is common in pups.

Trans mammary infection

The larvae passed to pups through colostrum directly develop into adults without any migration.

Clinical signs

An acute normocytic, normochromic anemia followed by hypochromic, microcytic anemia in young puppies is the characteristic, and often fatal, clinical manifestation of *Ancylostomum caninum*. The mucous membrane will be pale, diarrhea with bloody mucous, and pass tarry red-colored feces. In dogs, dermatitis due to larval invasion of the skin may be seen with any of the hookworms but has been seen most frequently in the interdigital spaces. Hypoproteinemia is characteristic in puppies.

Diagnosis

The characteristic thin-shelled, oval eggs are easily seen on the microscope(10x) by the flotation technique of fresh feces from infected dogs (Fig 2)

Treatment

All commonly used antihelminthics are Mebendazole, Tetramisole, Fenbendazole, and Praziquantel. When anemia is severe chemotherapy may have to be supported by blood transfusion or iron suppleme

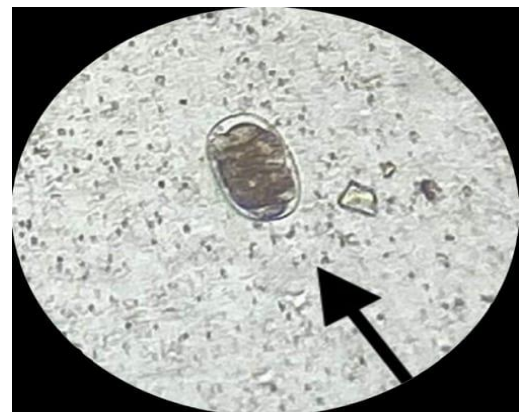


Fig 2: *Ancylostomum caninum* in dog fecal sample under a microscope (10x).



until hemoglobin level is normal.

Control and preventive measures

Routine veterinary care of dogs and cats, including regular deworming, will reduce environmental contamination with zoonotic hookworm eggs and larvae. Hygienic maintenance of kennels. The floor of the kennels should be treated with common salt or sodium borate solution. Prompt disposal of animal feces prevents eggs from hatching and contaminating soil, which makes it important for control of this parasitic infection.

To prevent infection with *Ancylostoma caninum*, it is important to keep your pets clean and free from parasites, this can be done through regular deworming and by keeping your pet's environment clean and infection can be prevented by practicing good hygiene, avoiding walking barefoot in contaminated soil and avoiding contact with contaminated water. Additionally, it is important to seek treatment if you suspect you may have been infected.

References

- Prociv. P. and Croese. J. 1996. Human enteric infection with *Ancylostoma caninum*: hookworms reappraised in the light of a “new” zoonosis. *Acta tropica*, 62(1): 23-44.
- Kopp. S. R. Kotze. A. C. McCarthy. J. S. and Coleman. G. T. 2007. High-level pyrantel resistance in the hookworm *Ancylostoma caninum*. *Veterinary Parasitology*, 143(3-4), 299-304.
- Brahmbhatt. N. N. Patel P. V. Hasnani. J. J. Pandya. S. S. and Joshi. B. P. 2015. Study on prevalence of ancylostomosis in dogs at Anand district, Gujarat, India. *Veterinary World*, 8(12), 1405.

