Case Report: Zoonotic Ancylostoma ceylanicum Infection Detected by Endoscopy

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Abstract. We report a case of Ancylostoma ceylanicum infection detected by endoscopy. It was diagnosed and confirmed using polymerase chain reaction (PCR) and DNA sequencing. The patient is a 58-year-old Malaysian woman who lives in a rural area, where uncontrolled populations of stray and semidomesticated dogs live in close proximity with humans.

Hookworms are one of the most common parasitic nematodes that infect both humans and animals. The two primary species of hookworm infecting humans are Ancylostoma duodenale and Necator americanus.1 The public health impact of human hookworm infections is extensive, infecting an estimated 600 million people worldwide and resulting in up to 135,000 deaths annually.2 Other than the two anthropophilic species of human hookworms, cat and dog hookworms, such as A. ceylanicum, A. braziliense, and A. caninum, are also able to cause zoonotic disease in humans. The symptoms caused by zoonotic hookworms include creeping eruption, eosinophilic enteritis (EE), and, less frequently, symptoms such as localized myositis, erythema multiforme, and ophthalmological manifestations.3 A. ceylanicum, however, is the only species of animal hookworm known to produce patent infection in humans.

A. ceylanicum is the only zoonotic hookworm species of dogs and cats. It is known to be endemic and widely distributed in Asia, especially southeast Asia.5 It is a neglected parasitic zoonotic nematode. Additional history revealed that the patient lives in a rural village, where uncontrolled populations of stray and semidomesticated dogs live in close proximity to human populations. In these rural settings, the close relationship shared with dogs, lack of veterinary attention, poor hygiene, and overcrowding contribute to a high risk of acquiring this zoonotic disease.6,7 A. ceylanicum is the only zoonotic species of hookworm known to infect humans, which was shown experimentally and naturally. Its contribution to human morbidity remains largely unexplored. It has always been regarded as a rare and uncommon parasitic infection. In fact, recent molecular-based surveys conducted mainly in southeast Asia, which included Malaysia,8 Thailand,9 and Laos,10 showed A. ceylanicum to be the second highest hookworm species infecting humans.

There have been several clinical manifestations of A. ceylanicum infection in humans, and they were recently reviewed and summarized by Traub.5 In experimental infection of humans, clinical symptoms mimic the descriptions produced by anthroponotic hookworm species, including ground itch, abdominal pain, and GI discomfort. Although there are increasing reports of natural infections of A. ceylanicum in humans, unfortunately, in most of these cases, clinical information is limited or not available. Much like anthroponotic hookworm infections, patent infection with A. ceylanicum is capable of producing chronic infections, such as blood loss, and in high worm burden, it could lead to iron deficiency anemia.

In recent years, the development and advancement in capsule endoscopy technologies that allow gastroenterologists...
Moreover, the patient also suffered GI bleeding from a stomach ulcer. If it had not been for the ulcer-associated melena, the adult hookworm may have been overlooked because of the asymptomatic nature of low-intensity hookworm infections. This report calls attention to the fact that, in areas where *A. ceylanicum* occurs, this worm can reach maturity in humans and in heavy infections, may perhaps produce hookworm disease. Often, this information is forgotten by practitioners who assume that all adult hookworms reported from humans are either *N. americanus* or *A. duodenale*.

Whether *A. ceylanicum* is capable of producing classical hookworm disease in human remains uncertain, and this largely forgotten zoonotic species has been frequently discovered and reported in humans using several advance clinical and diagnostic tools. Because our knowledge in the clinicopathology of patent *A. ceylanicum* infection in humans is lacking, future investigation combining the use of modern diagnostic tools with a detailed study on pathogenicity and clinical features will shed additional light on its role as a human pathogen.

In our case, although the laboratory results showed that hemoglobin was slightly below the normal limit, it may not have been caused by *A. ceylanicum* infection, because only a single worm was observed and recovered during endoscopy.

In Figure 1, the OGDS image shows an adult blood-filled worm that measures about 8 mm in length moving on the patient’s duodenal mucosa.

Figure 1. The OGDS image shows an adult blood-filled worm that measures about 8 mm in length moving on the patient’s duodenal mucosa.

In Figure 2, the microscopic image shows the buccal capsule (mouthpart) of the nematode parasite, which is suggestive of hookworm.

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REFERENCES


