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Trichuris vulpis Recovered from a Patient with Chronic Diarrhea and Five Dogs

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We report a case of human infection with the whipworm of dogs, *Trichuris vulpis*, in a woman with duodenal ulcer disease, chronic diarrhea, and close contact with dogs. Morphologically, *T. vulpis* ova resemble those of the human whipworm (*T. trichiura*) but are nearly twice their size.

CASE REPORT

A 49-year-old woman presented with epigastric and right upper quadrant abdominal pain associated with some nausea and vomiting of about 5 days' duration. She also complained of poor appetite but had no history of substantial weight loss. Evaluation revealed that she had gastric outlet obstruction because of previous duodenal ulcer disease, and she underwent a vagotomy and pyloroplasty 2 weeks later. Postoperatively the patient did well. Dicyclomine hydrochloride (Bentyl; Merrell; 20 mg before every meal and at bedtime) was prescribed for "dumping syndrome," characterized by loose stools following meals. One month following surgery, she began to experience increasingly explosive diarrhea described as very loose stools occurring 11 to 12 times per day, refractory to calcium polycarbophil (Fibercon; Wyeth; two tablets twice a day), and associated with mild epigastric pain and nausea. She had no hematemasis, hematochezia, fever, chills, or lower-abdominal discomfort. Her medical history included multiple laparoscopies, an appendectomy, and a complete hysterectomy. Medications included imipramine, levothyroxine sodium (Synthroid; Knoll), calcium polycarbophil, and dicyclomine hydrochloride. There was no history of alcohol or tobacco abuse.

On physical examination she appeared to be in no acute distress. She had a flat affect, and her responses to questions were slow. Vital signs and temperature were normal. The head, ears, eyes, nose, and throat exam was normal. Lungs were clear, and the cardiac exam revealed a regular rate and rhythm with no murmurs, rubs, or gallops. The abdomen was soft and tender to palpation in the epigastric region without rebound or guarding. The surgical wound was clean, dry, and intact. There were no hepatosplenomegaly, masses, or hernias. The remainder of the examination was normal.

A drug combining atropine sulfate and diphenoxylate hydrochloride (Lomotil; Searle; two tablets after each loose bowel movement), prochlorperazine maleate (Compazine; SmithKline Beecham; 10 mg orally [p.o.] every 6 h for nausea), and metronidazole hydrochloride (Flagyl; SCS; 250 mg p.o. four times a day) were added to the regimen. The patient was instructed to submit a stool sample so that it could be examined for *Clostridium difficile* toxin, ova and parasites, and fecal leukocytes. The patient did not comply with the request until a few weeks later, when she continued to have severe diarrhea. The *C. difficile* toxin test was negative, and there were no fecal leukocytes. The patient's stool was preserved in routine specimen collection containers containing 10% formalin and polyvinyl alcohol and sent to the Associated Regional University Pathologists (ARUP) parasitology laboratory for ovum and parasite examination. Both preserved specimens were concentrated by using Para-Pak SpinCon (Meridian Bioscience, Cincinnati, Ohio) and examined following standard laboratory protocols. An iodine wet mount and permanent trichrome slide were prepared from the 10% formalin and polyvinyl alcohol specimens, respectively, and examined under a light microscope. Examination of the iodine wet mount under low power (magnification, ×100) revealed the presence of helminth ova resembling *Trichuris* spp. (approximately two per field). Using the ocular micrometer on high power (magnification, ×400), the approximate size of the eggs was found to be 90 μm in length and 40 μm in width (Fig. 1A). No additional organisms were identified in the iodine wet mount or trichrome slide. Based on these findings, the routine ovum and parasite exam was reported as positive for *Trichuris vulpis*.

Given these findings, the patient was subsequently questioned about exposure to dogs. She has five dogs, three of which roam outside. The patient was treated with mebendazole (Vermox; Janssen; 100 mg p.o. twice a day) for 4 days. Three weeks later, the frequency of the diarrhea was reduced to two to three times per day and the nausea was much improved, allowing her to discontinue the prochlorperazine maleate. The patient continues to do well from a gastrointestinal standpoint. Follow-up stool exams have been negative for *T. vulpis*, and all of the patient's dogs were referred to a local veterinarian for treatment of canine whipworm.

T. vulpis, the whipworm of dogs, has been recovered infrequently from humans. This may be related to the relatively low frequency of carriage by the canine population or the possibil-

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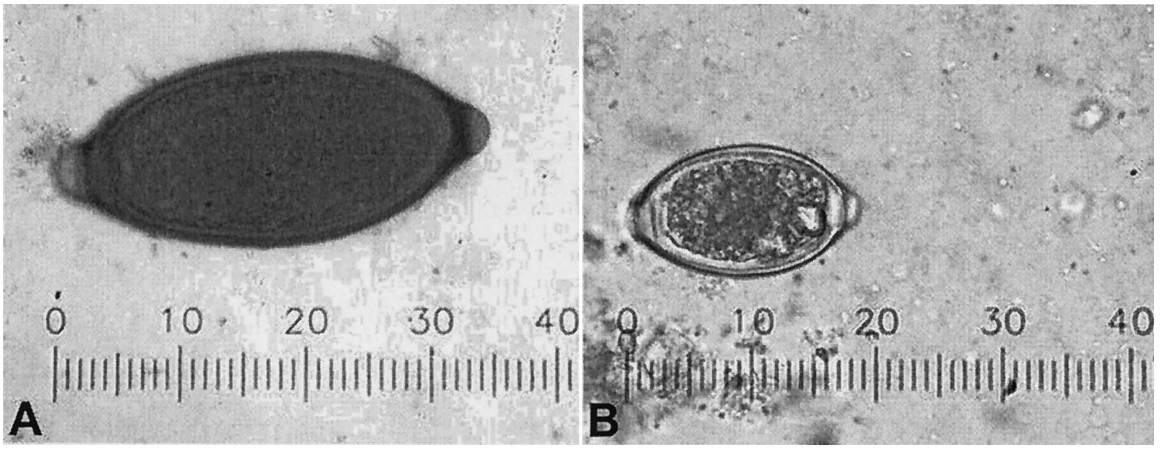

FIG. 1. Iodine wet mount of *T. vulpis* ovum detected in patient's stool (A) and a separate sample containing *T. trichiura* (B). Magnification, ×400.

ity that these organisms are misidentified on routine examination due to their morphological similarity to *Trichuris trichiura. T. vulpis* has been recovered from up to 10% of canine fecal samples from both stray and cared-for dog populations in several countries (6, 9). *T. vulpis* has also been recovered from soil samples surrounding playgrounds and fecal matter from other public places (4, 8).

Most reported cases of *T. vulpis* infection in humans have occurred with children and institutionalized patients (1, 2, 5). Symptoms of *T. vulpis* infection may resemble those associated with *T. trichiura* and range from asymptomatic carriage to diarrhea or even dysentery. *T. vulpis* has also been reported as a causative agent of visceral larva migrans in both children and an adult (3, 7). While the diagnosis was established serologically in the two pediatric cases, *T. vulpis* ova were recovered from stool samples of the family dog as well as environmental samples collected from areas of human habitation (7). In the adult patient, diagnosis was confirmed serologically and by histologic examination of a pulmonary mass that demonstrated parasites with morphological characteristics compatible with *Trichuris* spp. (3).

Although measurement of ova in fecal samples is typically performed, laboratorians may be quick to report *T. trichiura* without use of the ocular micrometer because of its unique morphological characteristics which differentiate it from other human intestinal parasites. Human whipworm ova typically measure 50 to 56 μm by 21 to 26 μm, whereas *T. vulpis* ova are nearly twice as large, with dimensions of 72 to 89 μm by 37 to 40 μm (compare Fig. 1A and B). Both species have the prominent, clear, mucoid plugs at both ends of the egg. It has been reported that a very small percentage of *T. trichiura* ova may be somewhat larger than is typical (10). These large eggs are generally longer (up to 78 μm) and slightly wider (up to 30 μm). Dog whipworm ova may also be confused with these larger *T. trichiura* ova although *T. vulpis* ova are generally wider and more barrel-shaped. In the case described here, the *T. vulpis* ova were consistently >86 μm in length and >38 μm in width.

Misidentification of *Trichuris* spp. can occur with casual microscopic inspection of stool preparations without proper determination of ovum size. Although treatment for *Trichuris* spp. is the same, correct identification of *T. vulpis* in human clinical specimens is important to ensure that the canine source(s) of infection is treated appropriately or that contact with dogs is avoided. Further infections or reinfections in both humans and animals should be prevented with the accurate reporting of *T. vulpis*.

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