The parasite that wasn't

A case of mistaken identity

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Intestinal parasites can cause substantial mortality and morbidity and are common in primary care. The 2 main types of intestinal parasites are helminths and protozoa. Helminths are generally visible to the naked eye in their adult stages, whereas protozoa are single-celled organisms. Common intestinal helminth parasites include *Enterobius vermicularis* (the pinworm), *Ancylostoma duodenale* (the Old World hookworm), *Necator americanus* (the New World hookworm), *Taenia saginata* (the beef tapeworm), and *Ascaris lumbricoides* (the giant roundworm). All of these intestinal parasites and their eggs can pass through the digestive system and be found in the stool. The pinworm is the most common intestinal parasite, followed closely by the hookworm.[1,2] Diagnostic clues regarding intestinal parasites can be found in the patient's clinical history, hygiene status, and history of recent travel to endemic areas.[3] However, microscopic visualization and identification of the parasite are necessary for definitive diagnosis and guidance of treatment.[1-3]

At presentation, it is not uncommon for patients to have noticed changes in their stools, particularly objects in the stool contents. These contents are sometimes given directly to a reluctant primary care provider to determine the diagnosis.

Case description

An anxious but healthy 32-year-old male physician presented to the family medicine clinic with a sample of suspected parasites from his stools, which had been retrieved from the toilet that same day. Having a background in clinical health sciences, he had a number of questions and concerns regarding the stool contents and intestinal parasites. Upon questioning, the patient reported traveling to India 2 years before. Soon after the trip he experienced an episode of extreme gastrointestinal upset involving nausea and diarrhea that lasted 2 weeks before resolving. He also had a long-standing history of loose stools and difficulty gaining and maintaining weight. In addition, the patient noted that he had eaten Chinese food the night before.

The patient was otherwise asymptomatic, and results of physical examination were normal. After examining the stool samples (**Figures 1** and **2**), and in the light of his travel history and symptoms, a possible diagnosis of hookworms was considered. The sample was sent to the microbiology laboratory for further analysis.

Later that day, the microbiology physician called to report positive identification of *Vigna radiata* (previously known as *Phaseolus aureus*) in the stool sample.

In common parlance, *Vigna radiata* is a bean sprout. Native to China, India, and Pakistan, sprouts of this type are germinated from mung beans. The technique of bean germination involves water and controlled ratios of light and dark, specifically plenty of water and only several hours of light per day.

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EDITOR'S KEY POINTS

- Intestinal parasites, such as hookworms, roundworms, pinworms, and tapeworms, can cause substantial morbidity and mortality, including severe gastrointestinal distress.
- Clinical and laboratory examination of stool samples and the patient's clinical history, personal hygiene practices, and travel history are all necessary to make an accurate diagnosis.
- Some parasites are visually comparable to undigested foods that can appear in the stool, namely germinated bean sprouts; physicians should not only be mindful of such similarities, but should also take a full dietary history and consider any such correlations before requesting microbiologic analysis.

POINTS DE REPÈRE DU RÉDACTEUR

- Les parasites intestinaux, comme les ankylostomes, les nématodes, les oxyures et les ténias, peuvent causer une morbidité et une mortalité considérables, y compris une grave détresse gastro-intestinale.
- Un examen clinique et en laboratoire des échantillons de selles, ainsi qu'un bilan clinique du patient, de ses pratiques d'hygiène et de ses antécédents de voyage sont tous nécessaires pour poser un diagnostic exact.
- Certains parasites ressemblent, sur le plan visuel, à des aliments non digérés qui peuvent apparaître dans les selles, comme les fèves de soya germées; les médecins doivent être conscients de ces similitudes, et devraient toujours faire un bilan complet de l'alimentation du patient et envisager de telles corrélations avant de demander une analyse microbiologique.

Figure 1. Stool specimen in sample bottle as presented to the physician

Figure 2. Stool specimen in a Petri dish, with the scale indicating relative size. Each box is 1 cm.

The resultant bean sprouts (**Figure 3A**) are very common in Chinese cuisine. Other common sprouts are alfalfa sprouts (**Figure 3B**) and broccoli sprouts (**Figure 3C**).

Discussion

This case raises several important points surrounding diagnosis of intestinal parasites. Both Old World and New World hookworms are very common. Hookworm infections are rarely symptomatic,[4] although they can cause substantial anemia and other serious complications. Both species are similar in size, with *N americanus* being a little shorter at 10 to 12 mm for females; males are about half as long. The eggs of *N americanus* are much smaller, around 60 to 70 µm. Small larvae hatch from the eggs and enter human hosts by penetrating through the skin. Ultimately, the mature worm is found attached to the wall of the small intestine. Because of their life cycle, adult worms are rarely seen in the stool; diagnosis depends on finding and identifying microscopic worm eggs in the stool.[5,6] This makes a diagnosis of hookworms in the above case very unlikely.

A diagnosis of pinworms is similarly unlikely. The pinworm is a white, small, and delicate parasite, measuring 8 to 13 mm (with the smaller male 2 to 5 mm).[3,4,7] Affected individuals typically present with perianal itching, and diagnosis is made by observing female worms in the perianal area. Mung bean sprouts are much larger than pinworms (**Figure 2**); roundworms or tapeworms are much more comparable in size.

The roundworm, *A lumbricoides*, measures 20 to 50 cm (with the smaller male measuring 15 to 30 cm). While most cases are asymptomatic, when symptoms occur they are divided into early (larval migration) and late (mechanical effects) stages of infection. Early migration of larvae into the lungs can cause the classic eosinophilic pneumonia of Löffler syndrome. Intestinal and biliary tract obstructions—late-stage symptoms—are the most common serious sequelae.[3,4]

The tapeworm is also a sizable intestinal parasite. One of the most common tapeworms is the beef tapeworm. These parasites are quite large, usually 3 to 5 m long (but

Figure 3. Germinated sprouts common to cooking: *A)* Vigna radiata *or mung bean sprouts, mostly used in Chinese dishes; B) alfalfa sprouts; C) broccoli sprouts.*

can reach lengths of 20 m). Tapeworm infections are usually asymptomatic, but can cause many gastrointestinal symptoms and possible intestinal obstruction. Segments of tapeworm detach and are passed via the stool.[3,4]

Roundworms and tapeworms are visually comparable with mung bean sprouts; microbiologic analysis is required to confirm diagnosis, as evidenced in our case.

When analyzing stool contents, even if parasitic infections are suspected, taking a careful history of the patient's diet can help make a diagnosis. In this case, microbiologic analysis might have been avoided had a connection been made between the stool contents and the patient's dinner the night before. Knowledge of the different varieties of bean sprouts could also have aided in making the final diagnosis.

Last, it is vitally important to present findings (laboratory, physical examination, diagnostic imaging, etc) to the patient with clarity and sensitivity, regardless of the context or content.

Case resolution

The patient was called and gently but firmly informed of the diagnosis. Given the nature of the identified specimen, the information was presented in a nonjudgmental, respectful manner so as not to offend the sensibilities or sensitivities of the patient. The patient was informed that no treatment was necessary at this time and his anxieties and fears were allayed.

This case was unique in that the physician and patient were colleagues, adding further anxiety to the encounter on both sides. Our parting advice in a case of this nature would be as follows: unless the patient provides cues that it would be appropriate, as comical as the findings might seem, try not to laugh!

Parasitic infections require visual confirmation of diagnosis, so be aware of parasite mimics—namely, bean sprouts.

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Competing interests
None declared

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References

1. Kucik CJ, Martin GL, Sortor BV. Common intestinal parasites. *Am Fam Physician* 2004;69(5):1161-8.
2. Procop GW. Gastrointestinal infections. *Infect Dis Clin North Am* 2001;15(4):1073-108.
3. Neva FA, Brown HW. *Basic clinical parasitology.* 6th ed. Norwalk, CT: Appleton & Lange; 1996.
4. Bogitsh JB, Carter CE, Oeltmann TN. *Human parasitology.* 3rd ed. Burlington, MA: Elsevier Academic Press; 2005.
5. Spencer FM, Monroe LS. *The color atlas of intestinal parasites.* 2nd ed. Springfield, IL: Charles C. Thomas Publisher Ltd; 1982.
6. Katz DE, Taylor DN. Parasitic infections of the gastrointestinal tract. *Gastroenterol Clin North Am* 2001;30(3):797-815.
7. Goldmann DA, Wilson CM. Pinworm infestations. In: Hoekelman RA, Friedman SB, Nelson NM, Seidel HM, Weitzman ML, editors. *Primary pediatric care.* 3rd ed. St Louis, MO: Mosby; 1997. p.1519.