A 16-Year-Old Female With Right Lower Quadrant Abdominal Pain
(See page 1129 for the Photo Quiz.)

Diagnosis: *Enterobius vermicularis* appendicitis.

The appendectomy specimen showed an intraluminal parasite with lateral alae characteristic for *Enterobius vermicularis* (Figures 1 and 2). The appendix showed submucosal lymphoid hyperplasia but no acute inflammation. Postoperatively, the patient and her family members received a course of albendazole.

Appendicitis is the most common abdominal surgical emergency [1]. Appendectomy is not always the final cure for this condition and some specific postoperative treatment might be warranted. Fecaliths and submucosal inflammation, believed to be caused by viruses, account for 80%–95% of cases [1]. Less common causes for inflammation of the vermiform appendix include foreign bodies, neoplasm, and inspissated barium from radiological studies. Fruit seeds, parasites, and calculi are considered foreign bodies and account for about 4% of all cases of appendicitis.

Parasitic appendicitis requires a high index of suspicion and can easily be overlooked in low-prevalence regions [2]. It is usually diagnosed intraoperatively or on histopathological examination. The most commonly reported causative parasites are *E. vermicularis*, *Ascaris lumbricoides*, *Entamoeba histolytica*, and Giardia species [2].

The prevalence of the pinworm *E. vermicularis* infestation ranges between 0.6% and 13% [3]. Children are most commonly affected [4]. Persons at risk include those in direct contact with infected individuals and institutionalized subjects.

Colonization begins with the ingestion of parasitic eggs from contaminated meals, contact with colonized individuals, or fomites [3]. The eggs can survive in open environments for approximately 15–20 days and are resistant to chlorinated water (eg, swimming pools). This resiliency permits eggs’ survival in places such as fingernails, clothing, house dust, and other surfaces [3]. Following ingestion, hatching occurs upon the eggs’ reaching the duodenum, and the worms molt twice before they migrate to the cecum and ascending colon. They develop into an adult worm in 5–6 weeks and live for 1 month.

Upon mating, gravid females migrate to the rectum; during the night, egg-laden females exit the anal canal and deposit...
up to 17,000 eggs in the perianal skin and die [3]. These eggs mature and become infective within 6 hours. Pinworm infestation typically causes perianal itching; scratching gathers eggs onto the hands, promoting autoinfection, reinfection, and transmission to others. Humans are the only natural host of pinworm.

When enterobiasis is suspected, adhesive tape can be pressed against the perianal skin, removed, and subsequently examined for trapped parasitic eggs [4]. The eggs measure 30 µm × 60 µm, have a thin shell, and appear flattened on one side. Up to 5 examinations are needed to diagnose infestation [4]. Eggs are usually not encountered in stool. Pinworms are small white worms measuring 1 cm in length; therefore, they can be seen by the naked eye but are easily mistaken for debris or cloth threads. Enterobiasis is usually not associated with eosinophilia.

Most pinworm infections are asymptomatic. When present, perianal itch is the most common symptom [5]. Parasite migration into the vagina can cause ectopic granulomas in the cervix, pelvis, and the peritoneum, which can be mistaken for a pelvic inflammatory disease [6]. *Enterobius vermicularis* appendicitis is a rare manifestation of this infection and it is rarely diagnosed preoperatively [7]. It is difficult to differentiate from other causes of appendicitis. However, multiple episodes of right iliac fossa pain leading to hospitalization, called “appendicitis syndrome,” correlates with pinworm-associated opposed to fecalith-associated appendicitis [7, 8].

The relationship between pinworm infection and appendicitis is not clear [9]. Histologically, *E. vermicularis* appendicitis rarely causes inflammatory changes or mucosal invasion [7]. Common histopathological findings include transmural eosinophilic and neutrophilic infiltrate of the muscularis propria, lymphoid hyperplasia, and granulomas. These histopathologic changes are caused, in part, by the pinworm obstructing the appendiceal lumen.

Surgical treatment of parasitic appendicitis must be followed by medical therapy because appendectomy only treats one manifestation of the problem. Medical management of enterobiasis includes oral mebendazole or albendazole, both of which are highly effective [3]. A second dose is given 2 weeks later to treat possible reinfection or autoinfection. All family members in close contact with the patient should be treated. Strict hygiene is essential to prevent reinfection.

### Note

**Potential conflicts of interest.** All authors: No reported conflicts. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

---

**Eduardo Sandoval, 1 Muhammad Nazim, 1 Ruba A. Halloush, 2 and Faisal A. Khasawneh* 3

1Department of Surgery, Texas Tech University Health Sciences Center; 2Amarillo Pathology Group; and 3Section of Infectious Diseases, Department of Internal Medicine, Texas Tech University Health Sciences Center, Amarillo

### References


**Correspondence:** Faisal A. Khasawneh, MD, Section of Infectious Diseases, Department of Internal Medicine, Texas Tech University Health Sciences Center, 1400 S Coulter St, Amarillo, TX 79106 (faisal.khasawneh@ttuhsc.edu).

**Clinical Infectious Diseases** 2014;58(8):1194–5

© The Author 2014. Published by Oxford University Press on behalf of the Infectious Diseases Society of America. All rights reserved. For Permissions, please e-mail: journals.permissions@oup.com.

DOI: 10.1093/cid/ciu008