Answer

Perforated Schistosomal Appendicitis

This patient had schistosomal appendicitis. Appendiceal cryptosporidiosis has been reported in 1 case of a man who was human immunodeficiency virus positive and presenting with signs and symptoms of appendicitis.[1] He was later found to have well-developed cryptosporidiosis. In any elderly patient presenting with signs and symptoms of appendicitis, the diagnosis of cancer must be considered. A recent article[2] showed that 24% of patients aged 60 years or older had appendiceal cancer when presenting with signs and symptoms of acute appendicitis.

Schistosomiasis affects approximately 200 million people in 74 countries. Most affected people reside in sub-Saharan Africa where *Schistosoma mansoni, Schistosoma haematobium,* and *Schistosoma intercalatum* are endemic. *Schistosoma mansoni* is endemic in parts of South America and the Caribbean. *Schistosoma japonicum* is endemic in China, the Philippines, and Indonesia.[3] The life cycle involves skin penetration by cercariae that become schistosomula and migrate to the lung and then to the liver. The larvae mature in the liver and migrate to vessels of the bowel and bladder to lay eggs. Eggs are then retained in tissue or excreted in feces or urine. Diagnosis is confirmed by detecting eggs in urine or feces. *Schistosoma mansoni and S japonicum* accumulate eggs in the liver and intestine, whereas *S haematobium* accumulates eggs in the genitourinary system. Current treatment is 2 to 3 doses of praziquantel received 8 hours apart. Alternatives to praziquantel are oxamniquine and metrifonate. Reexamination of feces is performed 1 month later to assess treatment efficacy.[4]

Schistosomal appendicitis was first described by Turner in 1909.[5] The incidence has been reported to be from 0.175% to 2% in endemic areas.[6-8] The cause has been described as from 1 of 2 mechanisms. The first mechanism is schistosomal obstructive acute appendicitis believed to be a result of fibrosis around eggs leading to obstruction. This mechanism presents pathologically with no tissue eosinophils and granulomas seen more in the late stages of infection. The second mechanism is schistosomal granulomatous acute appendicitis believed to be a result of immunological granulomatous reactions to newly deposited eggs. This mechanism presents pathologically with tissue necrosis and eosinophilia seen more in the early stages of infection.[7] Appendiceal schistosomiasis is also described and can be a precursor lesion of schistosomal appendicitis.[7,9]

Most case reports and reviews have described *S haematobium* as the pathogen responsible for schistosomal appendicitis. Currently, an obstetric case from Maryland, 3 cases from Marseilles, France, 22 cases in a large review from Hong Kong, China, and 1 case from Hong Kong have reported *S japonicum* as the pathogen for schistosomal appendicitis.[6,10-12] In our case, the patient had schistosomal obstructive acute appendicitis as evidenced by the lack of granulomas and tissue eosinophils. He also likely had schistosomiasis chronically, further correlating with schistosomal obstructive acute appendicitis. The pathogen is *S japonicum*, which is to be expected given that the patient is from an area where *S japonicum* rather than *S haematobium* is endemic.

Although schistosomal appendicitis and appendiceal schistosomiasis are rare, it is becoming more common to encounter them in patients who have resided in or traveled to the endemic areas. Therefore, it is important that this diagnosis be considered especially in follow-up with appropriate antimicrobial therapy to eradicate the parasite.

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Correspondence: Sonia Ramamoorthy, MD, Department of Surgery, University of California, San Diego, Medical Center, 402 Dickenson Dr, Suite 260, San Diego, CA 92103 (sramamoorthy@ucsd.edu).
Author Contributions: *Study concept and design:* Garg, Bakhtar, and Ramamoorthy. *Acquisition of data:* Garg, Bakhtar, and Ramamoorthy. *Analysis and interpretation of data:* Garg, Bakhtar, and Ramamoorthy. *Drafting of the manuscript:* Garg, Bakhtar, and Ramamoorthy. *Critical revision of the manuscript for important intellectual content*: Garg, Bakhtar, and Ramamoorthy. *Administrative, technical, and material support:* Ramamoorthy. *Study supervision:* Ramamoorthy.
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REFERENCES

1. Oberhuber G, Lauer E, Stolte M, Borchard F. Cryptosporidiosis of the appendix vermiformis: a case report. *Z Gastroenterol.* 1991;29:606-608.
2. Todd RD, Sarosi GA, Nwariaku F, Anthony T. Incidence and predictors of appendiceal tumors in elderly males presenting with signs and symptoms of acute appendicitis. *Am J Surg.* 2004;188:500-504.
3. Chitsulo L, Loverde P, Engels D. Schistosomiasis. *Nat Rev Microbiol.* 2004;2:12-13.
4. Ross AG, Bartley PB, Sleigh AC, et al. Schistosomiasis. *N Engl J Med.* 2002;346:1212-1220.
5. Hodasi WM. Schistosoma appendicitis. *Trop Doct.* 1988;18:105-106.
6. Chan KW, Fu KH, Ling J. The pathology of the appendix in Hong Kong. *Br J Clin Pract.* 1988;42:241-244.
7. Satti MB, Tamimi DM, Al Sohaibani MO, Al Quorain A. Appendicular schistosomiasis: a cause of clinical acute appendicitis? *J Clin Pathol.* 1987;40:424-428.
8. Adebamowo CA, Akang EE, Ladipo JK, Ajao OG. Schistosomiasis of the appendix. *Br J Surg.* 1991;78:1219-1221.
9. Marks C. Schistosomiasis and its surgical sequelae. *Am J Surg.* 1966;111:805-812.
10. Moore GR, Smith CV. Schistosomiasis associated with rupture of the appendix in pregnancy. *Obstet Gynecol.* 1989;74:446-448.
11. Ricosse JH, Emeric R, Courbil LJ. Anatomopathological aspects of schistosomiasis: a study of 286 pathological specimens (author's transl) [in French]. *Med Trop (Mars).* 1980;40:77-94.
12. Lee JF, Chung CC, Lau WY. A case of schistosomal appendicitis. *Int J Clin Pract.* 1997;51:518-519.

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