Case In Point

An Intriguing Diagnosis

Young Woman With Abdominal Pain, Eosinophilia, and Ascites

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A 20-year-old woman presents with lower abdominal pain of 9 months' duration. The pain is bilateral in the lower quadrants, dull, constant, and nonradiating. No factors aggravate or relieve the pain. She has had night sweats for 2 months and increased abdominal girth for 1 month, and she has lost an unknown amount of weight.

The patient is a Gambian immigrant; she has been in the United States for 2 years. She denies nausea, vomiting, diarrhea, dysuria, fever, and abnormal vaginal discharge. Her last menses was 3 weeks earlier. She has no significant medical or surgical history and is not taking any medication.

Vital signs and head and neck, cardiovascular, and lung findings are normal. No lymphadenopathy is noted. The abdomen is diffusely distended, with shifting dullness and fluid thrill; there is no hepatosplenomegaly. No tenderness, guarding, or rigidity is noted. Musculoskeletal findings are normal.

A complete blood cell count reveals a normal total white blood cell (WBC) count, with eosinophilic leukocytosis. The erythrocyte sedimentation rate; results of urinalysis, cul-

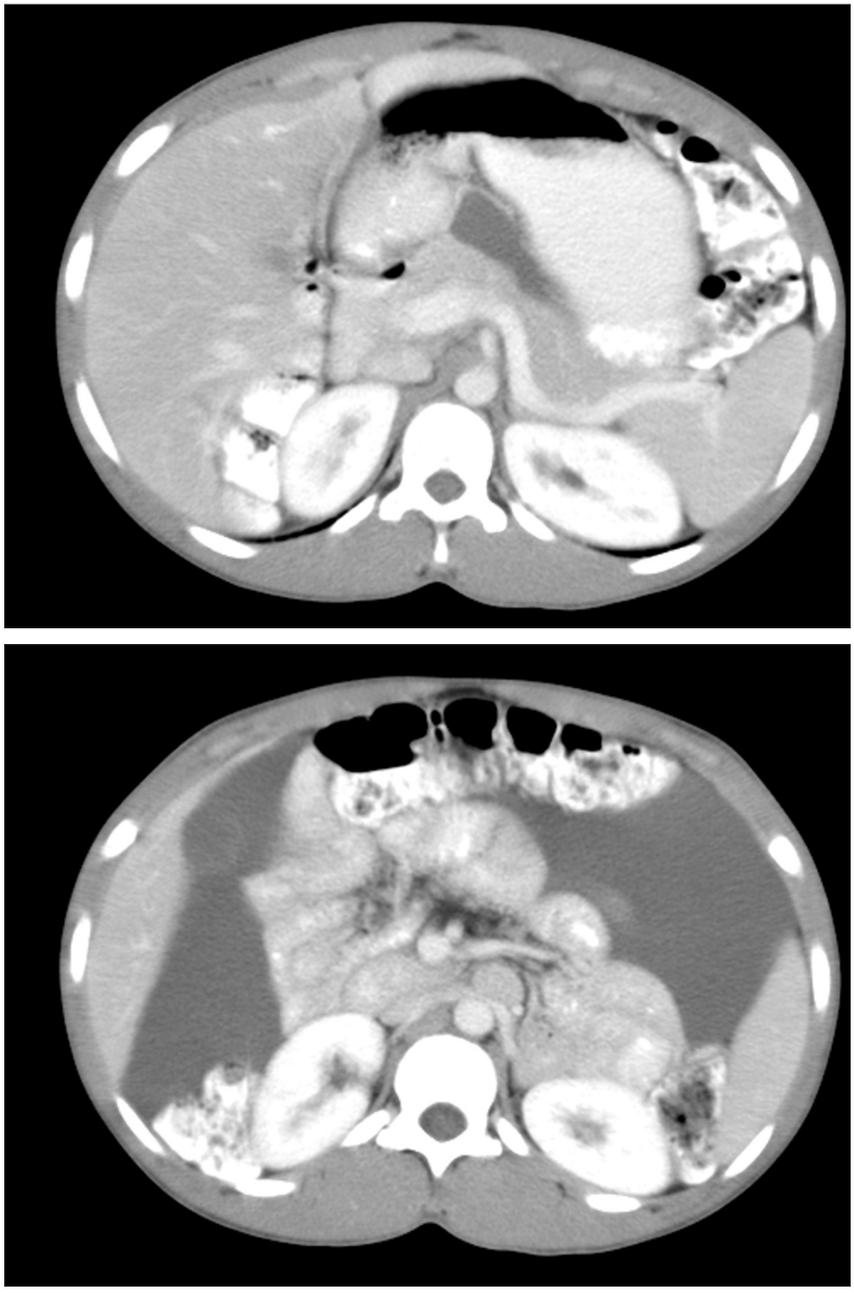

Figure 1 – CT scans of the abdomen and pelvis show ascites—a manifestation of chronic schistosomiasis.

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tures of stool for ova and parasites, and liver function tests; and serum levels of electrolytes, blood urea nitrogen, and creatinine are all normal. A urine pregnancy test is negative.

*A chest radiograph is unremarkable. CT scans of the abdomen and pelvis reveal a significant amount of free fluid (**Figure 1**). There is no evidence of portal hypertension. The adnexa are unremarkable. Paracentesis reveals bloody fluid, with 23,000 red blood cells per microliter and 21 WBCs per microliter (34% neutrophils, 52% lymphocytes, 7% monocytes, and 7% eosinophils). The serum-ascites albumin gradient is less than 1.1 g/dL.*

Results of a peritoneal biopsy reveal fibrosis, mild chronic inflammation, and calcified structures that are strongly suggestive of Schistosoma *eggs (**Figure 2**). Serologic test results are sent to the CDC. Enzyme-linked immunosorbent assay (ELISA) is positive for* Schistosoma mansoni. *However, an immunoblot assay is positive for* Schistosoma haematobium *and negative for* S mansoni, *which is interpreted as* S haematobium *infection. The immunoblot assay has a higher specificity than ELISA because it uses species-specific antigens; it is considered the confirmatory test. Calcification causes difficulties during mounting of the specimen and does not permit species identification based on morphologic criteria.*

The patient is treated with praziquantel (3 doses, 20 mg/kg each, 6 hours apart) and is discharged. Three months later, she is symptom-free.

A POTENTIALLY DEBILITATING DISEASE

Schistosomiasis is a major parasitic infection of humans worldwide, with the exception of the United States. The 5 species that infect humans are *S mansoni, Schistosoma japonicum, S haematobium, Schistosoma mekongi,* and *Schistosoma intercalatum.*[1] *S haematobium* is the only species that causes genitourinary disease. The other species cause GI tract disease. *S mansoni* and *S japonicum* also cause hepatic disease.

Three clinical syndromes are associated with schistosomiasis:

- **Dermatitis.** A maculopapular skin lesion may develop at the site of entry of the cercariae (free-swimming larvae) up to a week after exposure.[2] The dermatitis is similar to, but less severe than, swimmer's itch, which develops in sensitized persons when they are reinfected by schistosomes that do not colonize humans (typically, those that colonize birds).[3]
- **Acute schistosomiasis (Katayama fever).** This serum sickness–like syndrome is common in primary, heavy infections and is most severe after *S japonicum* infections.[4] It is characterized by fever, chills, headache, cough, lymphadenopathy, hepatosplenomegaly, and eosinophilia. Symptoms and signs usually resolve in a few weeks.
- **Chronic schistosomiasis.** Chronic disease results from the host's immune response to schistosome eggs and the granulomatous reaction evoked by the antigens they secrete.[5] GI manifestations include colicky abdominal pain, diarrhea, occult blood in feces, and colonic polyposis. Severe disease may also cause colonic or rectal stenosis. Eggs of *S japonicum* and *S mansoni* embolize to the liver and cause presinusoidal inflammation and periportal fibrosis—referred to as pipestem fibrosis—which ultimately leads to portal hypertension, ascites, splenomegaly, hypersplenism, varices, and variceal bleeding.[2]

Urologic manifestations of *S haematobium* infection include hematuria, dysuria, proteinuria, bladder calcifications, ureterectasia, hydronephrosis, renal failure, and bladder cancer.[6] *S haematobium* causes genital disease in approximately one third of affected women.[6,7] Vulvar and perineal disease may be hypertrophic, ulcerative, fistulous, or wart-like and may be mistaken for other genital infections.[8] Late complications may include tubal infertility and ectopic pregnancy.[2,9]

Neurologic complications can also occur. *S japonicum* eggs may

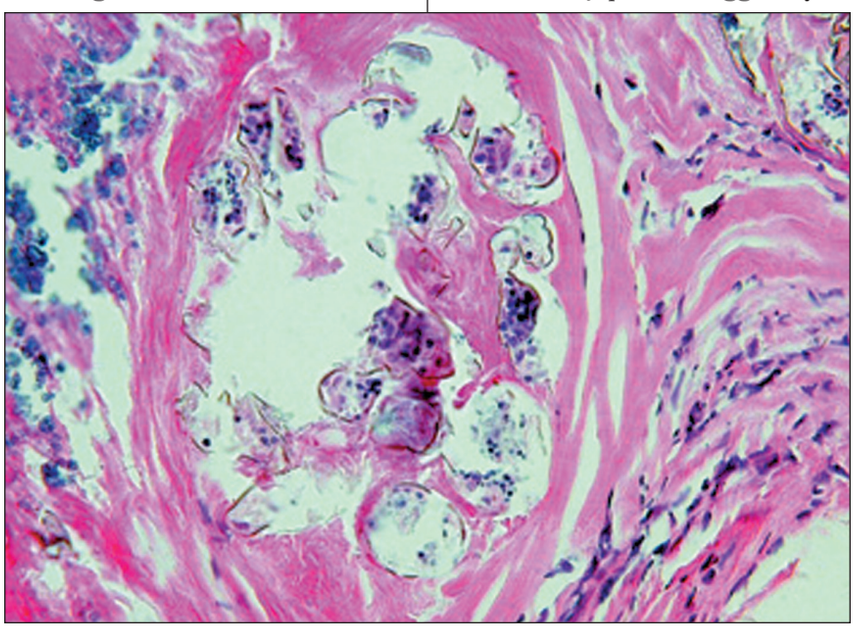

Figure 2 – The multiple calcified structures in this peritoneal biopsy specimen are *Schistosoma* eggs. Other findings include fibrosis and mild chronic inflammation.

embolize through the vertebral venous plexus and cause focal neurologic deficits and seizures.[10] *S haematobium* and *S mansoni* may cause transverse myelitis.

In our patient, the manifestation of schistosomiasis was highly unusual. She had peritonitis without other end-organ involvement—ie, no evidence of hepatic or genitourinary involvement.

TRANSMISSION

Schistosomiasis is acquired via contact with fresh water, which contains infectious, free-living, cercarial larvae. Once cercariae penetrate the intact skin of humans, they shed their forked tail and become schistosomula. From the skin, they migrate through the blood and lymph vessels to the heart and lungs and into the arterial circulation. They eventually reach the liver, where they mature into adult worms in 1 to 4 weeks.

The adult forms migrate against portal blood flow to the lumen of the mesenteric venules of the small intestine (*S japonicum* and *S mekongi*), the mesenteric venules of the colon (*S mansoni* and *S intercalatum*), or the vesical venous plexus (*S haematobium*). Adult worms grow to 1 to 2 cm and remain attached to the blood vessel wall with suckers, in permanent copulation. They usually survive for 5 to 7 years but can persist for a maximum of 30 years.

Like most helminths, adult schistosomes do not replicate within the host. After 1 to 3 months, the female worm begins to produce 100 to more than 3000 eggs per day, depending on the species. The eggs can travel hematogenously to other sites or can traverse the vascular space through host tissues to the lumen of the intestine or urinary bladder. The eggs are then variably excreted in the feces (*S mansoni, S japonicum, S intercalatum,* and *S mekongi*) or in the urine (*S haematobium*).

Key Points for Your Practice

- Consider schistosomiasis in an immigrant or traveler from an area where the disease is endemic, who presents with GI, hepatic, genitourinary, or neurologic symptoms.
- Praziquantel is the mainstay of treatment; it is easy to administer and has a considerably high cure rate.

Schistosoma species tend to appear in specific geographic locations:

- *S mansoni* prevails in certain tropical and subtropical areas of sub-Saharan Africa, the Middle East, South America, and the Caribbean.
- *S haematobium* is most common in North Africa, sub-Saharan Africa, the Middle East, and India.
- *S japonicum* is typically found in Asia (particularly in China, the Philippines, Thailand, and Indonesia).
- *S intercalatum* occurs in central and west Africa.
- *S mekongi* is limited to Cambodia and Laos.

TREATMENT

The mainstay of treatment is praziquantel. It reliably cures 60% to 90% of infected patients and substantially decreases worm burden and egg production in those who are not cured. Patients in whom the worms continue to shed viable eggs should be re-treated with the same dosage; the second treatment is often successful.[2]

Corticosteroids may be a useful adjuvant therapy for patients who have cerebral disease associated with radiologic features of surrounding edema and for those with severe Katayama fever.[10] Oxamniquine is the only alternative drug for *S mansoni* infection. However, in a study of 106 patients, praziquantel was significantly more effective than oxamniquine in treating *S mansoni* infection.[11] ■

REFERENCES:

1. Mahmoud AAF. Trematodes (schistosomiasis) and other flukes. In: Mandell GL, Bennett JE, Dolin R, eds. *Principles and Practice of Infectious Disease.* 5th ed. New York: Churchill Livingstone; 2000: 2950-2953.
2. Ross AG, Bartley PB, Sleigh AC, et al. Schistosomiasis. *N Engl J Med.* 2002;346:1212-1220.
3. Warren K. The pathology of schistosome infections. *Helminthol Abstr Ser [A].* 1973;42:590-633.
4. Sasa M. A historical review of early Japanese contributions to the knowledge of *Schistosoma japonica.* In: Yokogawa M, ed. *Researches in Filariasis and Schistosomiasis 2.* Baltimore: University Park Press; 1972:235-261.
5. Boros DL, Warren KS. Delayed hypersensitivity-type granuloma formation and dermal reaction induced and elicited by a soluble factor isolated from *Schistosoma mansoni eggs. J Exp Med.* 1970; 132:488-507.
6. King CH. Disease in schistosomiasis haematobia. In: Mahmoud AAF, ed. *Schistosomiasis.* London: Imperial College Press; 2001:265-295.
7. Poggensee G, Feldmeier H. Female genital schistosomiasis: facts and hypotheses. *Acta Trop.* 2001; 79:193-210.
8. Goldsmith PC, Leslie TA, Sams V, et al. Lesions of schistosomiasis mimicking warts on the vulva. *BMJ.* 1993;307:556-557.
9. Ekoukou D, Luzolo-Lukanu A, Mulard C, et al. Peritoneal and tubal *Schistosoma hematobium* bilharziasis. Two case reports [in French]. *J Gynecol Obstet Biol Reprod (Paris).* 1995;24:819-824.
10. Fowler R, Lee C, Keystone JS. The role of corticosteroids in the treatment of cerebral schistosomiasis caused by *Schistosoma mansoni:* case report and discussion. *Am J Trop Med Hyg.* 1999;61:47-50
11. Ferrari ML, Coelho PM, Antunes CM, et al. Efficacy of oxamniquine and praziquantel in the treatment of *Schistosoma mansoni* infection: a controlled trial. *Bull World Health Organ.* 2003;81:190-196.