



Urinary Schistosomiasis: Case Report and Review

Introduction

Urinary schistosomiasis is an infection primarily prevalent in Africa; however, it is encountered within the United States when citizens of Africa visit or migrate to this country. The following is a case report of a patient from West Africa, who was diagnosed with urinary schistosomiasis. A brief discussion of the disease follows.

Case Report

A 24-year-old male presented to the hospital with complaints of intermittent, painless hematuria ongoing for seven years. It was associated with occasional dysuria but no fevers, chills or pain. Although the patient initially noticed his symptoms while in Africa, he did not seek treatment until moving to the United States. He first sought medical attention at a different facility approximately four years ago. At this time he was administered oral medication which resolved his symptoms. No further details are available regarding the diagnosis or the medication. He was asymptomatic for six weeks. Following this time period his symptoms recurred and he sought treatment at our institution.

The patient's physical examination was unremarkable. He had no chronic underlying conditions and was on no medications. He had tested negative for HIV and a PPD skin test a few years ago. He was single, with no history of tobacco, alcohol or illicit drug abuse. Urine analysis showed gross blood, >100 RBC, nitrite, leukocyte esterase negative, normal WBC, no casts. A basic metabolic panel was done and was normal except for a creatinine of 1.3.

He was initially evaluated by the urology department and an intravenous pyelogram (IVP) was obtained, which demonstrated calcification of the bladder wall. A CT scan of the abdomen demonstrated similar findings. Cystoscopy was performed and the patient was found to have multiple yellow lesions on the bladder wall. The lesions were biopsied and histopathological

examination demonstrated eggs of *Schistosoma haematobium*. A urine exam for ova and parasites also demonstrated the eggs of *Schistosoma haematobium*.

The patient received treatment with praziquantel 60 mg/kg. A follow-up urinalysis three months later showed no evidence of the eggs.

Figure 1. CT scan of the abdomen showing bladder wall calcification in the upper left hand border



Differential Diagnosis

All cases of hematuria must be investigated. In patients over the age of 50, it is necessary to rule out the presence of bladder or kidney neoplasms. Additionally, a detailed family history must be obtained. In African Americans, sickle cell anemia should be considered. An IVP can aid in the diagnosis of polycystic kidney disease.

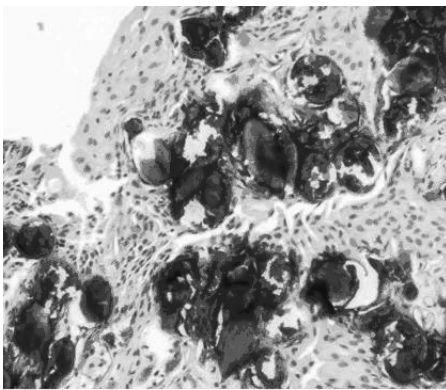
Practitioners should inquire about the patient's recent travel history which could help lead to the diagnosis of schistosomiasis, or a more serious condition such as tuberculosis. Additional investigative questions for the patient would include medications that might cause nephritis, or any recent trauma or strenuous exercise that could explain the hematuria. Associated dysuria can indicate a possible urinary tract infection, whereas flank pain can indicate pyelonephritis or renal calculi.

Finally, in women, the presence of endometriosis of the urinary tract should be considered.¹

Imaging

The choice of initial imaging study(s) may vary with the patient's age. Older patients should undergo ultrasonography or helical CT scan, which are sensitive at visualizing small renal tumors. An IVP is a reasonable first choice in young patients, since it can detect lesions such as medullary sponge kidney that may not be seen by ultrasonography.²

Figure 2. Biopsy of the bladder wall showing eggs of *S. haematobium*



The Life Cycle of Schistosomiasis

Caused by parasitic blood flukes, called schistosomes, *Schistosomiasis haematobium* primarily causes urinary bladder infections. The infection is typically acquired in North Africa, sub-Saharan Africa, the Middle East, Turkey and India. In endemic areas, the infection is often acquired in childhood. The prevalence and intensity of infection rises with age and peaks at approximately 15 to 20 years-of-age.³

Humans typically acquire schistosomiasis via contact with freshwater that contains infectious, free-living, cercarial larvae. The cercariae penetrate the intact skin of humans and, in the process, shed their forked tail to become schistosomulae. The schistosomulae then migrate from the skin into the blood and lymph vessels and are carried to the heart and lungs. From there they migrate through the pulmonary capillaries into the left side of the heart and into the arterial circulation. At this time they are carried to the mesenteric arteries, splanchnic arteries and portal veins, subsequently reaching the liver where they mature into adults over a period of one to four weeks.

The adult worms migrate against portal blood flow to the vesical venous plexus and remain in these blood vessels for the life of the patient residing in permanent

copulation and adhering to the wall of the blood vessels with suckers. While the worms typically survive for five to seven years they can persist for up to 30 years. After one to three months, the female worm begins to produce eggs, which can travel hematogenously to other sites or can traverse from the vascular space through host tissues to the urinary bladder. The eggs are then excreted in the urine.⁴

Infection of the disease cannot be acquired by direct contact with excreta from an infected person, since parasite development in a snail is required.

Acute Symptoms

The initial penetration of the skin by the cercariae may be asymptomatic or may cause the characteristic "swimmer's itch." This is a localized dermatitis that can result in a pruritic papular or urticarial rash at the site of larval entry, which is typically on the lower legs or feet. This is usually seen within one day of exposure and immediate tingling and itching at the site of entry may develop. This can be followed by an intensely pruritic papular eruption 12 to 24 hours later, which can last more than a week.

Katayama fever is a systemic hypersensitivity reaction against the migrating parasites, which occurs between two to eight weeks after exposure. This produces a sudden onset of fever, chills, myalgias, arthralgias, dry cough, diarrhea and headache.⁵

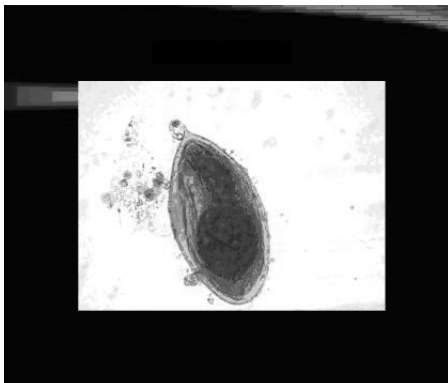
Lymphadenopathy and hepatosplenomegaly are also present. Additionally, patients may develop eosinophilia and patchy infiltrates on chest x-ray; however, these symptoms usually resolve spontaneously over a period of a few weeks.

Diagnosis of Urinary Schistosomiasis

Patients with urinary schistosomiasis may be asymptomatic or may display microscopic or macroscopic hematuria, dysuria and urinary frequency. As the disease progresses, fibrosis and calcification of the bladder and ureters is often present. Eosinophilia is common in acute cases. A urine dipstick will show hematuria.

While routine serology is unable to differentiate between acute and past infection, the finding of schistosomiasis haematobium eggs in the urine specimen or through bladder biopsy yields definitive diagnosis. Antigen tests are not commercially available. An x-ray and IVP may show calcification of the bladder wall and the IVP can illustrate urethral strictures of bladder. Cystoscopy may also help identify calcification and plaques and facilitates with bladder wall biopsies.

Figure 3. Egg in the urine specimen



Conclusion

All patients with evidence of infection should be treated, regardless of their symptoms, as adult worms can live for years. The treatment of choice for all schistosome species is praziquantel, which causes paralysis of adult worms and death. However, since praziquantel has no effect on immature worms or eggs, it is ineffective in the treatment of early infection. While approximately 80% of treated individuals are cured with the first course of therapy, some require a second course. The side effects of the drug can include mild headache, nausea, vomiting and pruritus. Follow-up screening for eggs in the urine should be done six weeks post treatment and again at three and six month intervals.⁶

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References

1. Case records of the Massachusetts General Hospital. Weekly clinicopathological exercises. Case 33-1992. A 34-year-old woman with endometriosis and bilateral hydronephrosis. *N Engl J Med* 1992;327(7):481-5.
2. O'Connor OJ, McSweeney SE, Maher MM. Imaging of hematuria. *Radiol Clin North Am* 2008;46(1):113-32, vii.
3. Mandell GL, Bennett JE, Dolin R. Principles and Practice of Infectious Diseases. 6th edition. Philadelphia: Elsevier Churchill Livingstone; 2004.
4. Arnon R. Life span of parasite in schistosomiasis patients. *Isr J Med Sci* 1990; 26(7):404-5.
5. Gryseels B, Polman K, Clerinx J, Kestens L. Human schistosomiasis. *Lancet* 2006;368(9541):1106-18.
6. Lucey DR, Maguire JH. Schistosomiasis. *Infect Dis Clin North Am* 1993;7(3):635-53.

CME Questions 5a-c

Please provide the correct answer for the following:

- 5a. Individuals can acquire schistosomiasis by fecal-oral route, ie by contact with feces of an infected individual.
 - a. True
 - b. False
- 5b. Asymptomatic individuals with an incidental finding of schistosomiasis need not be treated.
 - a. True
 - b. False
- 5c. Praziquantel is not able to eradicate the eggs of *Schistosoma haematobium*.
 - a. True
 - b. False