Schistosomiasis and Acute Appendicitis

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Acute appendicitis is one of the leading reasons for surgical admissions [1], especially in children. Although appendectomy is one of the basic operations taught and practiced by residents, it is sometimes challenging even for the experienced surgeon. The accepted pathogenesis of the inflammation begins with obstruction of the appendix's lumen either by debris or due to compression of hypertrophied lymphatic tissue in its wall [2]. Rarely do other causes lead to the disease, such as carcinoid tumor or intestinal worm [2]. In this report we describe a patient who suffered from acute appendicitis due to infection with *Schistosoma haematobium*.

Patient Description

A 14 year old boy presented to our emergency department due to abdominal pain for 2 days, accompanied by nausea and vomiting. His past medical history was unremarkable. His family had emigrated from Ethiopia 8 months previously. His pulse was 116 beats per minute and his temperature 39°C. His abdomen was not distended but had local tenderness and rigidity at the right lower quadrant. Laboratory tests showed leukocytosis with 18,000 white blood cells/ml and 80% granulocytes. Urinalysis was within normal limits. Owing to the diagnosis of acute appendicitis he was taken immediately for an appendectomy and no further studies were performed.

The operative findings included a perforated appendix encircled by the cecal wall, with surrounding inflammatory mass covered by fibrin adhesions. Following appendectomy, the patient was treated with intravenous antibiotics according to our protocol for perforated appendicitis. The histopathologic results, received on the fourth postoperative day, demonstrated acute appendicitis due to infection with *Schistosoma haematobium* [Figure]. Microscopic examination of fresh stool and urine samples were negative for schistosomal eggs and the patient was treated with two doses of praziquantel. The postoperative course was uneventful and the patient was discharged after 6 days.

Comment

Schistosoma species cause disease in 200 million people around the world, mostly in endemic areas [3]. Schistosomiasis is caused by parasite trematode worms. Five species of these parasites are known to infect humans: *S. mansoni*, *S. japonicum*, *S. mekongi*, *S. intercalatum and S. haematobium*. One of these species (*S. haematobium*) is involved in diseases of the urinary tract, while others cause disease of the hepatoportal system. The life cycle of the parasite involves penetration of the skin by cercariae, entrance to the blood capillaries and lymphatics, spread to the lungs, and then migration to the portal venous system and the vesical plexus veins draining the lower urinary tract. Six weeks following infection the worms produce eggs that pass through the blood vessel lumen to adjacent tissues (intestinal tract and urinary tract) and are shed in the feces or the urine, respectively. The pathogenesis of schistosomiasis is due to induction of the host's immune response towards the schistosome eggs, resulting in granulomatous formation and fibrosis.

Schistosomal appendicitis is a specific trait of infection with *S. haematobium* [4]. The pathogenesis is most probably due to a peri-appendicular granulomatous inflammatory reaction of the host against the schistosome [5]. Inflammation and repair cause scarring and structural deformation of the appendiceal wall, leading to luminal obstruction and acute appendicitis. The treatment of schistosomal appendicitis consists of the combination of appendectomy and administration of praziquantel (two doses of 20 mg/kg). Praziquantel is a highly active agent against schistosomes. Its mechanism of action is unclear, although there are several theories regarding its antischistosomal action. These include: preventing adherence of the parasite to the host's cells due to changes in its intracellular calcium levels, exposing the parasite surface antigens to the host's antigen-presenting cells, and alteration of the parasite glucose metabolism. Side effects include diarrhea, headache and pruritus [1].

When confronting immigrants or visitors from endemic areas, the surgical approach demands special attention. The differential diagnosis of abdominal pain in these patients should include parasitic infections [4]. In patients with peritoneal irritation, laparotomy should be performed without delay. Additional diagnostic procedures should be initiated according to the surgical findings and histopathologic results.

References

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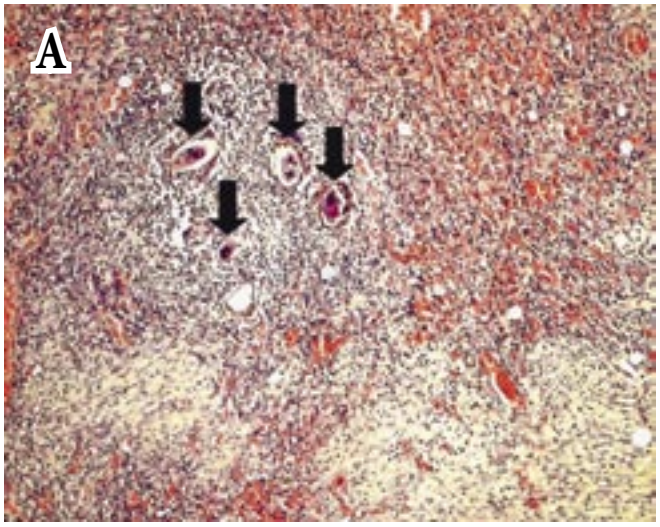
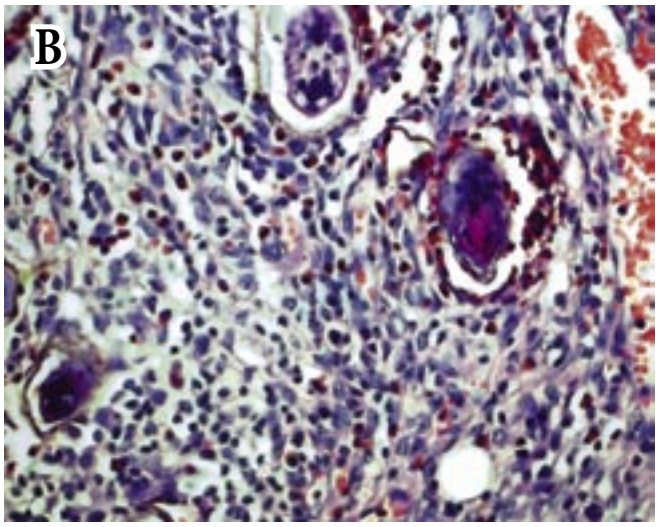


[A]. Low power view of the inflamed appendix, showing *S. haematobium* eggs embedded in the appendiceal wall (black arrows).



[B]. High power view of the *S. haematobium* egg encircled by numerous scattered eosinophils.

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Capsule

The origins of lung cancer

Lung cancer is the leading cause of cancer deaths in the United States. Most patients are diagnosed at an advanced stage of the disease, which has hampered research into its molecular and cellular origins. Consequently, only 15% of patients who are diagnosed today with the most common subtype of lung cancer will survive for 5 years. To identify genes that play a role in the pathogenesis of the distinct subtypes of lung cancer, Tonon et al. (*Proc Natl Acad Sci USA* 2005;102:9625) studied human tumors by comparative genomic hybridization and expression profiling, two methods that, when integrated, provide a comprehensive picture of the critical genomic alterations that characterize each subtype. Interestingly, adenocarcinomas and squamous cell carcinomas (SCCs), two subtypes previously thought to have diverse etiologies because of their distinct histopathologic features, were found to have nearly identical genomic signatures, suggesting that they may in fact arise from a common stem/progenitor cell. The possible stem cell origin of lung cancer was the focus of independent work by Kim and collaborators (*Cell* 2005;121:823). Using a mouse model, they identified a population of cells, termed BASCs (bronchioalveolar stem cells), whose anatomic location and ability to self-renew and differentiate into multiple lung cell types are features consistent with those predicted for a lung stem/progenitor cell. Remarkably, BASCs were enriched in early-stage lung tumors in mice, and they expanded in response to oncogenic stimuli in cell culture, suggesting that they might play a role in tumorigenesis. Should future studies identify BASC counterparts with a causal role in human lung cancer, this could lead to new therapies that target the earliest stage of disease, a development that is desperately needed.

Eitan Israeli

Erratum

In the article "Laparoscopic nephrectomy: initial experience in Israel with 110 cases" by Nadu et al. in the July issue (page 431), the authors Juza Chen and Mario Sofer work in the Department of Urology at the Tel Aviv Sourasky Medical Center and not at Sheba Medical Center, Tel Hashomer, as printed.