HEPATIC CAPILLARIASIS IN MAINE PRESENTING AS A HEPATIC MASS

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Abstract. We report the first case of hepatic capillariasis in Maine. The patient was a 54-year-old male carpenter who presented with a subacute history of severe abdominal pain, fevers, and weight loss. Initial diagnostic studies suggested a hepatic mass associated with para-aortic lymphadenopathy. The patient underwent open laparotomy for resection of the mass. He was found to have an eosinophilic granuloma in the liver; further evaluation revealed degenerating Capillaria hepatica. The exact route of infection in this case is unknown but is most likely due to accidental ingestion of soil contaminated with mature capillaria eggs. This patient had a low parasite burden and did not exhibit significant peripheral eosinophilia. After treatment with thiabendazole, he recovered uneventfully.

CASE PRESENTATION

The patient, a 54-year-old man previously in good health, presented to a local emergency room with a 3-week history of worsening abdominal pain. After initial evaluation, he was transferred to Maine Medical Center for further evaluation and treatment. He described his pain as “rolling” and “achy,” originating in the right upper quadrant and radiating to the suprapubic region and the testes bilaterally. The pain was cyclical in intensity but constant.

Additionally, he noted decreased appetite before the abdominal pain began. He reported a 15-pound weight loss within the past 6 weeks. Fevers and chills developed 2 weeks prior to admission, and he began to have regular night sweats in the week prior to admission.

His medical history includes depression and chronic back pain. He has a history of alcohol dependence, which is in sustained remission. He was taking paroxetine and rofecoxib at the time of presentation.

He and his family keep goats, cats, and a dog. They drink from a dug well that is 10 feet deep. He smokes three packs of cigarettes daily. He has a remote travel history, including South America and Southeast Asia during his college years.

Three months prior to admission, he began an on-site carpentry job on a previously uninhabited island off of the coast of Maine. As a part of his job, he would stay on the island during the work week, in a trailer, without running water. He drank bottled water on these trips.

He was febrile, with a temperature of 38.4°C. He was mildly tachycardic with a heart rate of 119 beats per minute. His blood pressure was 169/88 mm of Hg, and his respiratory rate was 16 breaths per minute, with an oxygen saturation on room air of 98%. He was mildly cachectic. He rocked back and forth on the gurney. The examination of the heart and lungs was unremarkable. The abdomen was soft, without palpable mass or organomegaly. The abdomen was nontender and not distended. He had no costovertebral angle tenderness. The rectal examination was negative for occult blood. His extremities were without clubbing or edema. Examination of the skin revealed a darkly pigmented irregular mole measuring 1 cm in diameter on the upper back.

Initial laboratory testing revealed a white blood cell count of 14,300, with 94% neutrophils and 1% eosinophils. His hematocrit was 32.5%, with a normal mean corpuscular volume. The urinalysis revealed 50–100 red blood cells per high-powered field. The chemistries, including liver function tests, were within normal limits, with the exception of a serum bicarbonate of 30 meq/L.

The patient underwent contrast-enhanced computed tomography (CT) of the abdomen and pelvis (Figure 1). A right posterior hepatic mass was visualized, with aortocaval lymphadenopathy, extending from the renal arteries to the aortic bifurcation. Many of the lymph nodes demonstrated central clearing.

Further laboratory testing demonstrated negative enzyme-linked immunosorbent assay (ELISA) for human immunodeficiency virus 1 and 2, normal flow cytometry, normal alpha fetoprotein, prostate specific antigen, and beta-human chorionic gonadotropin levels.

CT-guided needle biopsy of the hepatic mass was nondiagnostic. The patient underwent open laparotomy. The abnormal area of the posterior right hepatic lobe was resected.

PATHOLOGY

Pathologic examination of the segmental liver resection specimen revealed a 2.5 cm, irregular serpiginous focus of necrotizing granulomatous inflammation (Figure 2).
granulomata contained numerous eosinophils and was surrounded by chronic inflammation with minimal fibrosis (Figure 3). Rare sections of small degenerating roundworms were identified within the granulomata. A section of the anterior portion of one of the worms demonstrated the banded esophageal stichosome (Figure 4), which allowed identification of the parasite as *Capillaria hepatica.* No eggs were present. Stains for acid-fast organisms and fungi were negative. The sampled lymph nodes demonstrated reactive hyperplasia.

**DISCUSSION**

*Capillaria hepatica* (also known as *Calodium hepaticum*) is a parasite found worldwide in the liver of mammals. Adult worms mature in mammalian livers, where the female worm lays her eggs. The adult worms are destroyed by the inflammatory process of the host, but the eggs remain viable in the hepatic tissue until it is ingested by a predator or scavenger. The eggs will then pass through this, the intermediate host’s, alimentary canal, at which time they are disseminated to the soil, where they undergo embryonation, a process that may take 2 to 5 weeks. Alternatively, the eggs may be disseminated to the soil as the result of the death of the host and the subsequent decay, with release to the soil. Infection occurs when a mammalian host ingests water or food contaminated...
with mature eggs. Once mature eggs are ingested, they will hatch in the small intestine, freeing larvae. The larvae migrate via the portal system to the liver parenchyma, where they will mature to the adult form, a process that takes approximately 4 weeks. Rodents, especially rats, are the main reservoir for *C. hepatica*.

*Capillaria hepatica* will elicit granuloma formation and fibrosis in the liver parenchyma.1–3 There are typically numerous areas of focal liver parenchymal destruction and eosinophilic granulomas consisting of large numbers of mononuclear cells and eosinophils. However, in very early cases, there may be only immature worms without eggs. Advanced cases will have adult worms and eggs throughout the liver with a heavy inflammatory burden, with granulomatous reactions. The adult worms will disappear over time, and the parenchyma will be replaced by local inflammation and fibrosis.

*Capillaria hepatica* belongs to the superfamily Trichinelloidea. Other members of this superfamily that have significance in humans are the species *Trichuris* (whipworm) which causes intestinal infections, and *Trichinella*, whose larvae infects skeletal muscle.

These worms are identified by the presence of the stichosome, a glandular structure surrounding the esophagus. The stichosome is composed of a row of distinctive cells, the stichocytes. This is the hallmark characteristic of *C. hepatica*.

There have been fewer than 30 cases worldwide described in the literature. The reported cases include an age span of 14 months to 78 years. Children less than 3 years of age constitute a large proportion of infected humans.2 This is thought to be secondary to soil ingestion. *C. hepatica* is a significant etiology of eosinophilic granuloma of the liver, although *Toxocara canis* is the most common cause.3

The infection has been reported in temperate and tropical zones and on all of the continents, with the exception of Australia. Previous studies have demonstrated almost ubiquitous infection rates in house rats in Korea and Baltimore, Maryland.4 Five cases have been reported previously in the continental United States,5–10 and one case has been reported in Hawaii.11

We report the first case in New England. This patient likely acquired *C. hepatica* infection by accidental ingestion of contaminated soil. The disease presentation may be mistaken for granulomatous disease or neoplasm and likely is underdiagnosed.

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