Space Occupying Lesion in the Liver Caused by Hepatic Visceral Larva Migrans: A Case Report

Kye-Yeung Park,¹ Hoon-Ki Park,^{1*} Hwan-Sik Hwang,¹ Jae-Sook Ryu,² Kyeong-Geun Lee,³ and Ki-Seok Jang⁴

¹Department of Family Medicine, Hanyang University College of Medicine, Seoul, Korea; ²Department of Environmental Biology and Medical Parasitology, Hanyang University College of Medicine, Seoul, Korea; ³Department of Surgery, Hanyang University College of Medicine, Seoul, Korea; ⁴Department of Pathology Hanyang University College of Medicine, Seoul, Korea

Abstract. Visceral larva migrans (VLM) is one of the clinical syndromes of human toxocariasis. We report a case of hepatic VLM presenting preprandial malaise and epigastric discomfort in a 58-year-old woman drinking raw roe deer blood. The imaging studies of the abdomen showed a 74-mm hepatic mass featuring hepatic VLM. Anti-*Toxocara canis* immunoglobulin G (IgG) was observed in enzyme-linked immunosorbent assay (ELISA) and western blot. Despite anthelmintic treatment, the patient complained of newly developed cough and skin rash with severe eosinophilia. Hepatic lesion increased in size. The patient underwent an open left lobectomy of the liver. After the surgery, the patient was free of symptoms such as preprandial malaise, epigastric discomfort, cough, and skin rash. Laboratory test showed a normal eosinophilic count at postoperative 1 month, 6 months, 1 year, and 4 years. The initial optical density value of 2.55 of anti-*T. canis* IgG in ELISA was found to be negative (0.684) at postoperative 21 months. Our case report highlights that a high degree of clinical suspicion for hepatic VLM should be considered in a patient with a history of ingestion of raw food in the past, presenting severe eosinophilia and a variety of symptoms which reflect high worm burdens. Symptom remission, eosinophilia remission, and complete radiological resolution of lesions can be complete with surgery.

INTRODUCTION

Human toxocariasis is mainly an infection with the larvae of *Toxocara canis* or *Toxocara cati* which lives in their hosts, dogs, or cats, respectively. These larvae are nonhuman host species. Human infection occurs when humans ingest food contaminated with eggs found in soil or encapsulated larvae in the raw tissues of paratenic hosts, such as cows, sheep, or chickens.¹ There are three clinical syndromes associated with human toxocariasis: visceral larva migrans (VLM), ocular larva migrans (OLM), and covert toxocariasis. Visceral larva migrans is a systemic disease presenting with fever, abdominal pain, headaches, pulmonary manifestations, and hepatomegaly.² Patients with VLM may present with marked eosinophilia in the peripheral blood and eosinophilic inflammatory lesions in the liver and/or lungs.³ Herein, we report a patient who had hepatic VLM complaining of a variety of symptoms caused by infection with *T. canis* after drinking raw roe deer blood. The study was approved by the Institutional Review Board on Human Subjects Research and Ethics Committees of the Hanyang University Hospital (2018-07-010), and the patient provided informed consent.

CASE REPORT

A 58-year-old woman presented to the department of family medicine in a single university hospital complaining of preprandial discomfort. The discomfort was accompanied by general weakness and trembling on hunger before meals which decreased rapidly after food ingestion. She was not taking any medications and had no relevant medical history such as diabetes. The patient lived in rural Paju of Northern Gyeonggi-do in Korea, where she worked as a farmer. On admission, her body temperature was 36.5°C and physical examination was unremarkable. Laboratory evaluation

disclosed a white blood cell count of 12,800 cells per mm³ with marked (28%) eosinophilia of 2,440 cells per mm³. Her C-reactive protein level was within the normal limit. Liver function tests, serum glucose, and electrolytes were normal. She did not have a similar discomfort event during hospital stay, even after 24 hours of fasting. Imaging study was performed. Abdominal computed tomography with contrast enhancement showed a 74-mm low-attenuated mass with internal hypodense conglomerations in the hepatic lateral segment mimicking cholangiocarcinoma. Abdominal ultrasound followed. It revealed an ill-defined hypoechoic mass with peripheral hyperechoic rim in the left lobe of the liver. T2-weighted magnetic resonance imaging demonstrated an ill-defined high-signal intensity lesion on the left lobe of the liver, and this lesion showed internal hypointense conglomerations with subtle perilesional enhancement on a 10-minute delayed image using gadolinium contrast (Figure 1). She had been consuming a cup of raw roe deer blood as health food every year over the last 30 years. The last intake was 2 months ago. Under clinical suspicion of helminthic infection, ultrasound-guided liver biopsy of the lesion was conducted. Histological analysis showed an eosinophilic abscess with central fibrinoid necrosis, containing degenerating eosinophils. Tumoral process was absent. The optical density (OD) of anti-*T. canis* immunoglobulin G (IgG) was 2.55 (cutoff value < 1.0) on enzyme-linked immunosorbent assay (ELISA) (Bordier Affinity Products, Crissier, Switzerland). The patient's serum displayed a characteristic banding pattern of toxocariasis at 24–35 kDa in the confirmatory western blot (LDBIO, Lyon, France). Serological antibody testing for various invasive helminthic infections, such as *Clonorchis sinensis*, *Paragonimus westermani*, *Cysticercus*, and *Sparganum*, showed negative results. This resulted in the conclusive diagnosis of hepatic VLM of *T. canis*. She was managed with albendazole 400 mg two times a day for 2 weeks. During the follow-up period, the patient still complained of epigastric malaise on hunger along with newly developed cough and sputum. Chest X-ray showed normal findings and there was no peripheral pulmonary infiltrates in the chest computed tomography. The hepatic mass showed an increase in size in the imaging study. An increase in the blood eosinophil level of

* Address correspondence to Hoon-Ki Park, Department of Family Medicine, Hanyang University College of Medicine, 222, Wangsimni-ro, Seongdong-gu, Seoul 04763, Korea. E-mail: hoonkp@hanyang.ac.kr

FIGURE 1. (A) Abdominal computed tomography with contrast enhancement shows a 74-mm low-attenuated mass with internal hypodense conglomerations in hepatic lateral segment. (B) Abdominal ultrasound reveals an ill-defined hypoechoic mass with peripheral hyperechoic rim in the left liver. (C) T2-weighted magnetic resonance image demonstrates an ill-defined high-signal intensity lesion on the left liver. (D) This lesion showed internal hypointense conglomerations with subtle perilesional enhancement on 10-minute delayed image using gadolinium contrast.

6,610 cells per mm^3 (58.8%) along with leukocytosis of 12,200 cells per mm^3 was observed. She also complained of skin rashes on the central part of the face. For both confirmatory diagnosis and further treatment, she underwent an open left lobectomy of the liver and cholecystectomy. The outer surface of the liver specimen was grossly unremarkable. On serial sectioning, the cut surface showed multiple necrotic lesions, ranging from 0.5 cm to 4 cm in size. The pathologic findings of the mass were consistent with the eosinophilic abscess of the liver (Figure 2). The patient was discharged without any complications on the seventh postoperative day. The eosinophil level in the peripheral blood decreased to 181 cells per mm^3 (2.2%), with no significant leukocytosis at postoperative 1 month. Serum eosinophil level and white blood cell count were found to be normal also at postoperative 6 months. She was free of symptoms such as preprandial discomfort, cough, sputum, and skin rashes. The initial OD value of anti-*T. canis* IgG in ELISA decreased to 1.811 at postoperative 1 month and 1.523 at postoperative 6 months, and appeared negative (0.684) at postoperative 21 months. She has been followed up for 2 years without peripheral eosinophilia or recurrence.

DISCUSSION

Toxocara canis is the intestinal parasite of dogs in which it lives as adult within the lumen of the small intestine. Humans are the accidental host of *T. canis*. Human infection occurs by ingestion of embryonated eggs found in the soil, by eating encapsulated larvae in raw animal tissue, or via contaminated hands.¹ Human infection is aberrant and usually asymptomatic, defined as covert toxocariasis. However, severe clinical

manifestations, that is, VLM or OLM syndromes, are observed.² The severity of clinical manifestation occasionally depends on the direct invasion of specific target organs, such as the liver, lungs, and eyes.⁴ The full-blown VLM can present with malaise, fever, pruritus, pulmonary symptoms, hepatomegaly, abdominal discomfort, and extreme eosinophilia (greater than 50% of white cells in the peripheral blood).^{4,5}

Although toxocariasis is one of the most common zoonotic infections worldwide, seroprevalence of *Toxocara* infection is randomly distributed demographically.⁵⁻⁷ In Korea, seropositivity to *T. canis* antigen was reported to be as high as 5% in apparently healthy residents in Gangwon-do.⁸ The main risk factor for toxocariasis in adults is the ingestion of raw food. In persons with a history of ingestion of raw food, the prevalence of toxocariasis was 7.8 times higher than that in those with no history of ingestion of raw food.⁹ In our case, the patient had a history of ingestion of raw roe deer blood. In Korea, there is a report of cerebral infarction caused by toxocariasis in an adult with a history of ingestion of raw liver of deer.¹⁰ Similarly, in Japan, there is a report of fulminant eosinophilic myocarditis caused by VLM after eating raw deer meat.¹¹

Definitive diagnosis of human toxocariasis is a histological examination of infected tissues. However, obtaining the suitable biopsy material is an invasive procedure and it is often difficult to identify the parasitic structure in the tissue. Presently, an ELISA test using excretory-secretory antigens of *T. canis* L3 is used for the diagnosis of human toxocariasis. In conjunction with a relevant clinical history of ingestion of raw food, clinical manifestations, and peripheral eosinophilia, serological diagnosis by enzyme immunoassay is regarded as a useful tool for diagnosis.¹² In this case, we made the diagnosis of human toxocariasis with reference to the clinical history of

FIGURE 2. (A) The cut surface of the resected liver reveals multiple, ill-defined, irregularly shaped, grayish-white lesion with central necrosis. (B) The liver parenchyma shows multiple palisading granulomas with central necrosis, which is a typical pathologic finding of visceral larva migrans. (C) The palisading granuloma is surrounded by heavy infiltration of eosinophils and some lymphocytes. The central necrotic area consists of degenerated eosinophils and fibrinoid materials. This figure appears in color at www.ajtmh.org.

raw food ingestion, marked peripheral eosinophilia, and positive result in the ELISA and western blot tests.

Albendazole is known as the treatment of choice for toxocariasis. A dose of 400 mg of albendazole twice a day for 5 days

is the current recommended therapy.¹³ However, there is no agreement about the optimal duration of albendazole therapy.¹⁴ One study has reported that liver abscess caused by toxocariasis was usually accompanied by mild to moderate eosinophilia and the size of the lesion decreased in 3 months after 5 days of albendazole therapy.¹⁵ Interestingly, a recent report has on the usefulness of albendazole noted that only 6 (32%) of 19 patients were cured after a 5-day albendazole therapy.¹⁶ In this case, the patient showed an increase in eosinophil count despite anti-helminthic treatment and developed new symptoms such as cough, sputum, and skin rash over more than 3 months. A series of symptoms may be related to the space-occupying lesion in the liver.¹⁷ Also, it may reflect the effects of the larvae on various organs in the body. There are some reports that hepatic VLM was surgically cured when medical treatment failed or when eosinophilic infiltration possibly caused damage to multiple organs.^{18–21} In our case, definitive diagnosis and complete remission of eosinophilia were established in the patient after surgery and histopathological studies.

In conclusion, the present case report demonstrates clinical manifestations of hepatic VLM in the patient who had been consuming raw roe deer blood for a long time. Given that Asians, including Koreans, have the habit of consuming raw liver, muscle, and blood of herbivores as health food, diagnostic management of *Toxocara* infection can be established without delay when physicians are aware of the high seroprevalence of VLM. Various clinical symptoms with severe eosinophilia can be present. Also, clinicians should consider the possibility of VLM with hepatic infiltration in patients who used to ingest raw food in the past. Surgery is often considered for patients with severe toxocariasis, although they are usually treated with systemic anthelmintics.

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Authors' addresses: Kye-Yeung Park, Hoon-Ki Park, and Hwan-Sik Hwang, Department of Family Medicine, Hanyang University College of Medicine, Seoul, Korea, E-mails: kyeyeung@naver.com, hoonkp@hanyang.ac.kr, and fmhwang@hanyang.ac.kr. Jae-Sook Ryu, Department of Environmental Biology and Medical Parasitology, Hanyang University College of Medicine, Seoul, Korea, E-mail: jsryu@hanyang.ac.kr. Kyeong-Geun Lee, Department of Surgery, Hanyang University College of Medicine, Seoul, Korea, E-mail: hepafel@hanyang.ac.kr. Ki-Seok Jang, Department of Pathology, Hanyang University College of Medicine, Seoul, Korea, E-mail: medartisan@hanyang.ac.kr.

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