Imaging Findings of Splenic Paragonimiasis: Using Contrast-Enhanced Ultrasonography

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Splenic paragonimiasis is a very rare form of ectopic infestation caused by Paragonimus. We report a case of paragonimiasis presenting as splenic mass. Dynamic contrast-enhanced sonography revealed a hypoechoic mass consisting of multiple clustered cysts with persistently minimal enhancement of the wall in the spleen. This finding appears to be characteristic for splenic paragonimiasis and ectopic paragonimiasis should be included in the differential diagnosis of splenic mass.

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Introduction

Paragonimiasis is a parasitic infection caused by the lung fluke, Paragonimus westermani and related species, that is found worldwide but is endemic in areas of Asia [1,2]. Human infection is caused by ingestion of raw or incompletely cooked freshwater crabs or crayfish infected with juvenile worms (metacercariae). The parasites excyst in the small intestine, penetrate the intestinal wall, and enter the peritoneal cavity. They then proceed to the diaphragm, pleural cavity, and the lung, where they mature into adult worms [2,3]. For this reason, although the lung is the primary site of infection, ectopic infection may occur and most commonly involves the brain and subcutaneous tissue [3,4].

Ectopic paragonimiasis very rarely occurs in the spleen and, to our knowledge, there have been no prior reports describing the imaging features of splenic paragonimiasis. In this report, we describe grayscale and contrast-enhanced sonographic features in a case of pathologically proven paragonimiasis of the spleen.

Case report

A 44-year-old woman was admitted to the emergency room with severe left flank pain of 2 days’ duration. She had
a history of ingesting undercooked freshwater crabs. Physical examination revealed tenderness in the left upper quadrant of the abdomen. Laboratory tests revealed leukocytosis (12.5 × 10⁹/L) and peripheral eosinophilia (23%, 3.5 × 10⁹/L). Contrast-enhanced abdominal computed tomography (CT) showed a well-circumscribed mass composed of clustered cyst-like low attenuating lesions in the spleen and a small amount of fluid collection in the perisplenic space. The splenic mass was located in the subcapsular portion of the spleen. Also, there was a lobulated cystic lesion in the omentum (Fig. 1A). Chest CT did not yield an important feature in the lung parenchyma and pleura. Grayscale sonography showed a round heterogeneous hypoechogenic mass with multiple clustered anechoic cysts in the spleen. Dynamic contrast-enhanced sonography (SonoVue; Bracco Imaging, Milan, Italy) revealed a hypoechogenic mass with persistently minimal enhancement of the cyst walls, which was slightly lower than the enhancement of the splenic parenchyma (Fig. 1B). Our first diagnostic impression was primary splenic malignancy with peritoneal seeding. Splenic abscess rupture, lymphoma, and metastasis were also considered in the differential diagnosis. Ultrasound-guided biopsy was performed to obtain a more definite diagnosis. Photomicrograph of a specimen identified Paragonimus westermani eggs with surrounding chronic inflammation (Fig. 1C). A serum enzyme-linked immunosorbent assay for Paragonimus was positive. According to the histopathology and serum analysis, the final diagnosis was paragonimiasis of the spleen. The patient was treated with oral praziquantel 75 mg/kg/d for 3 days and gradually improved clinically.

Discussion

Paragonimiasis is a parasitic infectious disease caused by the Paragonimus spp., a lung fluke [1,2]. Paragonimiasis classically presents with pulmonary manifestations caused by the migration pattern of the larvae. The abdominal cavity is the pathway of migration after the larvae excyst in the small intestine. It is well known that P. westermani causes ectopic infestation at various and unexpected sites in human hosts. The most common ectopic location involves the brain and subcutaneous tissue [3]. Although the image shows a well-circumscribed mass composed of clustered cyst-like low attenuating lesions in the spleen (black arrow) and a small amount of fluid collection in the perisplenic space (yellow arrow). The splenic mass was located in the subcapsular portion of the spleen. Also, a well-circumscribed, lobulated cystic lesion (red arrow) is noted in the omentum. (B) Grayscale and dynamic contrast-enhanced ultrasonography show a round heterogeneous hypoechogenic mass (arrows) with multiple clustered anechoic cysts in the spleen. The mass shows persistently minimal enhancement of internal septal-like structures or cyst wall during dynamic study, which was slightly lower than the enhancement of the splenic parenchyma. (C) Photomicrograph of a specimen obtained by splenic biopsy reveals Paragonimus westermani eggs (arrow) with surrounding chronic inflammation (hematoxylin–eosin stain, 400×).
mechanism of infestation is not yet comprehensively understood, ectopic lesions seem to be produced by wandering adult worms residing in the abdominal cavity, intracranial cavity, and subcutaneous tissues [5]. The spleen is a very rare site of ectopic paragonimiasis. No imaging findings of paragonimiasis involving the spleen have been previously documented. There was one pathological report describing paragonimiasis involving the spleen in a dog [6], which presented as an enlarged spleen and cystic lesions within the splenic parenchyma. By contrast, for ectopic paragonimiasis involving intra-abdominal solid organs, liver involvement has been reported [3,4,7,8]. Hepatic paragonimiasis manifests as a cystic lesion with internal septations or multiple small low-attenuating lesions that is usually peripherally located, scattered or clustered. It might be expected that imaging findings of splenic paragonimiasis would be similar to those with hepatic involvement, including peripheral location and mass with clustered multiple cysts.

This is the first sonographic report for paragonimiasis of the spleen. In our case, splenic paragonimiasis manifests as a well-marginated hypodense mass in the spleen on CT scan. Although the internal texture of the mass was suspected as clustered cystic lesions, it was difficult to conclude whether the mass was cystic or solid. Grayscale and contrast-enhanced sonography clearly demonstrated that the splenic mass consisted of clustered small cyst-like anechoic lesions with minimal enhancement of the cyst wall or septa-like structures. The differential diagnosis of splenic mass can include primary splenic malignancy, lymphoma, metastasis, inflammatory pseudotumor, hamartoma, and vascular neoplasm. It was difficult to diagnose Paragonimus infection of the spleen, when the diagnosis was based only on CT findings of the splenic lesion. Ancillary findings in our case, such as perisplenic fluid collection and soft tissue-density or cystic lesions in the peritoneal cavity, would be helpful to determine the diagnosis. Moreover, a history of eating undercooked freshwater crabs, leukocytosis, and peripheral eosinophilia were important clues leading to the presumptive diagnosis of splenic paragonimiasis. Also, sonography including grayscale and contrast-enhancement improved characterization of the lesion.

In conclusion, ectopic paragonimiasis can appear as a well-circumscribed, hypoechoic mass that consists of multiple clustered cysts with minimal enhancement of the cyst in the spleen on contrast-enhanced sonography. The patient may not have the symptoms or signs of pulmonary paragonimiasis. Ectopic paragonimiasis should be included in the differential diagnosis of splenic mass in clinically suspicious situations.

References