Pulmonary Paragonimiasis with Pleural Effusion Containing Paragonimus Ova: Sonographical Appearance of Pleural Effusion

Kazuhito UCHIDA, Shigeo SEKIGUCHI, Yoshiyuki DOI and Hiroshi YAMAZAKI*

In the pleural effusion of a 46-year-old man with pulmonary paragonimiasis, numerous floating particles containing parasitic ova and granulation tissue were observed. The floating particles appeared as diffuse hyperechoic foci in the anechoic pleural effusion on ultrasonography. We concluded that rupture of the intrapulmonary paragonimiasis lesion into the pleural cavity caused the formation of these floating particles.

(International Medicine 34: 1178-1180, 1995)

Key words: cavity, ova, ultrasonography, echogenicity

Introduction

Paragonimus westermani infection is an important endemic disease in Asia; to date many immigrants and refugees with paragonimiasis have been reported in the United States (1, 2). This infection is acquired through ingestion of raw freshwater crayfish or crabs containing the larvae of these parasites. A wide variety of radiographic abnormalities, including segmental and diffuse infiltrates, cavities, nodules, and pleural effusions are observed (2). We report a case of paragonimiasis with pleural effusion in which numerous hyperechoic foci were observed on the ultrasonogram. To the best of our knowledge this is the first report describing the sonographic appearance of the pleural effusion in paragonimiasis.

Case Report

A 46-year-old Japanese man was admitted to our hospital complaining of cough with massive bloody sputum and shortness of breath for two weeks. Chest radiographs and CT revealed massive left pleural effusion and ill-defined consolidation with irregularly shaped cavities in the left upper field (Fig. 1). Numerous hyperechoic foci were found in the pleural effusion on ultrasonography, and respiration was associated with swirling movements of these echogenic structures (Fig. 2). The pleural effusion was yellowish and cloudy, and contained a great number of floating particles. These particles precipitated when allowed to stand. The pleural fluid pH was 7.16, lactate dehydrogenase level was 1,791 IU/l, total protein 6.0 g/dl, glucose value less than 1 mg/dl, adenosine-deaminase 75.4 IU/l, carcinoembryonic antigen 3.0 ng/ml, white blood cell count 2,700/mm³ with 14% eosinophils, and IgE level 6,358 IU/ml. No acid-fast bacilli or other bacteria were found in the sputum or pleural effusion. Several operculated Paragonimus ova were found in the pleural effusion by the direct smear method. The complement fixation titers for Paragonimus westermani in the serum and pleural effusion were positive at a dilution of 1:1,600 and 1:3,200, respectively. A cell block of the pleural effusion contained thick-shelled operculated ova and necrotic inflammatory tissue with eosinophil infiltration (Fig. 3). The sputum was positive for operculated Paragonimus ova but the stools were negative. A diagnosis of pulmonary paragonimiasis was made. The patient’s history revealed that he had eaten some broiled freshwater crabs from certain rivers in Fukushima Prefecture, Japan, 18 months prior to admission.

The patient was treated with praziquantel, 1,200 mg twice daily for two days, and his symptoms were subsequently resolved. A chest X-ray examination three months after treatment revealed resolution of the pneumonic shadow, but persistence of the irregular-shaped cysts in the left upper field and a small pleural effusion.

Discussion

The pleural fluid in paragonimiasis in an exudate with a low glucose level, low pH, high lactate dehydrogenase level and...
A Case of Pulmonary Paragonimiasis

Figure 1. Posteroanterior chest radiogram on admission showing massive pleural effusion on the left side and consolidation (arrow) in the upper left field.

Figure 2. Chest CT showing a cavitory lesion in the left upper lobe. There is no evidence of pneumothorax.

Figure 3. Sonogram of the chest showing massive pleural effusion with numerous internal hyperechoic foci (arrow). E: pleural effusion.

Figure 4. Pathological pleural fluid sediment. An ovum (large arrow) in a cluster of necrotic cells, granulation tissue (arrowhead) and fibrin clots (small arrow) are seen (HE stain, ×200, bar=50 μm).

increased eosinophil count (1, 2). The present patient exhibited the same pleural fluid characteristics as well as other findings, including detection of Paragonimus ova with granulation tissue and the ultrasonographic features of pleural effusion. In paragonimiasis, ova are normally deposited in the lung parenchyma, and are detected in the sputum, or are swallowed and subsequently found in the stool. It is rare for Paragonimus ova to be detected in the pleural effusion (1–3).

The ultrasound appearance of pleural effusion in paragonimiasis has not been reported. In the present case, numerous internal hyperechoic foci were noted in the anechoic pleural effusion. Pleural effusions, especially transudates, are generally echo-poor on ultrasonograms (4). However, internal
echogenicity may be present in exudates that are rich in protein (5). The internal echogenicity of pleural effusions is classified into four patterns: anechoic, complex nonseptated, complex septated and homogeneously echogenic (4). In the present case, there were diffuse internal echogenic foci in the pleural effusion but no fibrin strands or septae. Therefore this echogenicity appears to belong to the complex nonseptated category. These hyperechoic foci represent the floating particles containing the ova, necrotic cells, fibrin clots and granulation tissue. These particles are believed to be components of the granulomatous lesions produced in the lung parenchyma. It is not clear how these particles were formed, however, the following observations allowed us to draw some conclusions: 1) Granulation tissue and parasitic ova, the principal components of the paragonimiasis lesions in the lung parenchyma, were clearly observed in the pleural effusion of the infected patient, 2) The onset of dyspnea due to retention of pleural fluid occurred at the same time as the hemoptysis, and 3) The particles noted on admission precipitated in the pleural cavity and were no longer observed to be floating one month after admission. On the basis of these observations, we concluded that rupture of the intrapulmonary infectious foci into the bronchi and pleura caused portions of their contents to enter the pleural space. We speculated that the particles in question were formed by fibrin adhering to fragments of granulation tissue which served as the structural core of these particles.

Acknowledgements: We thank Dr. Kunioki Araki, Department of Public Health Microbiology of the Institute of Public Health, for determining the Paragonimus westermani complement fixation titers.

References