Pulmonary Paragonimiasis: The Detection of a Worm Migration Track as a Diagnostic Clue for Uncertain Eosinophilic Pleural Effusion

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Abstract

A 38-year-old woman with sustained right chest pain was referred to our hospital. She showed pleural effusion and peripheral blood eosinophilia. Thoracentesis revealed eosinophilic pleural effusion in which the smear, culture and cytological examinations were all negative. Although she had no notable dietary history, chest CT revealed linear opacities, which suggested the migration tracks of paragonimiasis. The diagnosis was confirmed using enzyme-linked immunosorbent assays, which showed elevated Paragonimus westermani and Paragonimus miyazakii antibody levels. After the initiation of praziquantel therapy, all clinical findings were promptly improved. The detection of a migration track may therefore be useful in the diagnosis of paragonimiasis.

Key words: eosinophilia, pleural effusion, worm migration track, Paragonimus westermani, Paragonimus miyazakii

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Introduction

Eosinophilic pleural effusion is caused by various conditions consisting of infectious and non-infectious diseases. The former includes tuberculosis, nontuberculous mycobacterial infection and paragonimiasis infection, and the latter includes eosinophilic granulomatosis with polyangiitis, pulmonary infarction and malignant lymphoma. Regarding these infectious diseases, because the clinical course and the laboratory findings are similar in several aspects, a possibility of misdiagnosis cannot be avoided.

We herein report a case of paragonimiasis presenting eosinophilic pleural effusion and peripheral blood eosinophilia whose radiological finding of a worm migration track was an important finding for the diagnosis.

Case Report

A 38-year-old Korean woman went to a local doctor due to a one-month history of right chest to lateral abdominal pain during inspiration. At this admission, right pleural effusion and peripheral blood eosinophilia was noted. Thoracentesis revealed brownish exudative pleural effusion with an increased level of eosinophils (90%). The results of the interferon gamma releasing assay (Quantiferon-TB gold In-tube) were indeterminate. She was then referred to our hospital for further investigation and treatment.

She had a previous medical history of mastopathy and surgery of cholelithiasis, and had an unremarkable family history. She immigrated to Japan from Korea 6 years previously and had been working as a homemaker. A physical examination revealed no hypoxia or a fever. Auscultation of the lungs showed no abnormal sounds. Superficial lymphadenopathy and hepatosplenomegaly was not detected. A

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unclear, a paragonimiasis infection was suspected although a history of eating freshwater crab or wild boar was considered to be worm migration tracks. Eventually, findings were anatomically different from the bronchovascular bundles. The features of paragonimiasis infection on high-resolution CT findings consist of worm cyst, peripheral density, bronchial wall thickening, centrilobular nodules, mass and infiltrative opacity (1-3). However, these findings are non-specific, and therefore not useful in the differential diagnosis. In contrast, a worm migration track is one of the most characteristic radiological findings in paragonimiasis. The track is defined as a band-like opacity extending from the pleura to the lung parenchyma (4), which runs differently from the bronchovascular bundles. The features of worm migration tracks are commonly observed in patients with pleural effusion, suggesting that flukes penetrate into the lung through the interposition of the pleural fluid. Kuroki et al. reported that worm migration tracks were visible in 4 of 8 cases of P. westermani infection on high-resolution CT (5). Pleural effusion was seen in both P. westermani and P. miyazakii infections. However, the migration tracks were mostly observed with P. westermani infections compared to P. miyazakii infections. The reason for this difference may be due to the host incompatibility of humans against P. miyazakii (6). In our patient, the location of the worm migration tracks had changed over time. Thus, it may be useful to evaluate the time-dependent changes when band-like opacities are not evident. Eosinophilia in the blood or pleural effusion and the elevation of IgE levels may also be useful for diagnosing acute phase, but not always chronic phase, paragonimiasis. The present case was positive for all of these findings, indicating an acute phase of the disease. A recent case of paragonimiasis which showed no peripheral blood eosinophilia and a high level of ADA in the pleural fluid was misdiagnosed as smear-negative tuberculosis pleuritis (7). Microscopic demonstration of parasite eggs in the stool, sputum and BAL fluid are important findings in the diagnosis of paragonimiasis. However, the detection of these findings may be relatively low (as low as 50%), and they were also negative in our patient. In contrast, an ELISA serologic test has been demonstrated to have a sensitivity of 99-100%, implying that this analysis may be a gold standard for the diagnosis.

Paragonimiasis has been considered to be an endemic dis-
Before admission                  After admission

Figure 2. Chest CT obtained 20 days before admission revealed right pleural effusion (A, B) and a non-tortuous linear opacity in the right lower lobe (B: arrowheads), whereas no lung opacities were observed in the right upper lobe (A). Contrast CT obtained on admission showed a linear opacity adjacent to a small nodule, which ran differently from the bronchovascular bundles (C: arrowheads). The density of the linear opacity in the right lower lobe was decreased after admission (D: arrowheads).

Figure 3. A microplate ELISA analysis showed an elevation of *P. westermani* and *P. miyazakii* antibody levels.

ease limited to the Kyushu area of Japan, Korea and southeastern Asian countries. However, patients with paragonimiasis have now been reported nearly worldwide. The reason for the disease spread may be the increase of overseas trav-
elers and changes in the dietary habits of North American and European countries (8). When the cause of eosinophilic pleural effusion is uncertain, it is important to evaluate potential worm migration tracks using high-resolution CT. To the best of our knowledge, this is the first report to show the usefulness of time-dependent changes of worm migration tracks in the diagnosis of paragonimiasis. In conclusion, the detection of a worm migration track is one of the diagnostic clues for infection with paragonimiasis.

The authors state that they have no Conflict of Interest (COI).

References


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