ABSTRACT

Aim: Fasciola hepatica (FH) is sporadically found in the human and causes disease by involving the bile ducts. However, it is rarely localized ectopically in the lungs; typical and atypical involvement of lung have been shown. The aim of this study is to investigate pulmonary findings for clinical, radiologic and laboratory in patients with fascioliasis.

Materials and methods: All patients included in this study were diagnosed with fascioliasis. Diagnosis of fascioliasis was made by IgG antibody detection with ELISA, detection of parasite eggs with stool examination, radiologic images and clinical findings and laboratory parameters. Diseases involving in the differential diagnosis of lung involvement were individually evaluated when an abnormality was detected on chest radiography. Additional biochemical and microbiologic tests were performed. Thoracic computed tomography (CT), fiberoptic bronchoscopy and thoracentesis were performed. When other diseases were eliminated, the patient was diagnosed with fascioliasis.

Results: Lung involvement was detected in 3 out of 56 patients (5.35%). The most prominent symptoms were right hypochondrial pain, chest pain, cough and dyspnea. Hepatomegaly and pulmonary rales were the most common physical examination findings. On radiologic imaging of the lung, ground-glass densities were detected in one patient, infiltration in one and pleural effusion was detected in the other.

Conclusion: Although Fasciola hepatica may only affect the lungs rarely, the presence of respiratory symptoms and physical examination findings in the acute period of diagnosis should suggest lung abnormality.

Key words: Fascioliasis, lung findings, lung radiography.

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Introduction

Fasciola hepatica (FH) is a parasite that commonly causes disease in the sheep, goats and cattle. It is found infrequently in the humans and rarely causes fascioliasis. Humans are contaminated with fasciola through metacercariae by consumption of raw and inadequately washed contaminated water plants. Larvae come out of the cyst in the duodenum to penetrate through the intestinal wall and reach the peritoneum. Larvae proceed to the liver capsule and parenchyma and ultimately to the bile ducts(1,2). Parasites may rarely locate ectopically in the lungs, skin, heart, brain, stomach, eyes and lymph nodes through hematologic, lymphatic route or direct invasion(3-8). On the other hand, even without a parasite localized in chest cavity, pulmonary abnormalities such as infiltrates and pleural effusions (atypical lung involvement) may occur indirectly through parasitic infection, especially in acute fascioliasis.

When we reviewed the literature, we did not encounter publications, except a few case reports, regarding lung involvement of FH(9-12). Indeed, because FH is localized in the liver, signs and symptoms associated with the disease of this organ are forefront. Therefore, the findings associated with lung and other organs may be ignored by clinicians. Therefore, lung abnormalities associated with FH are not investigated with chest radiography in routine clinical practice. The aim of this study is to investigate lung radiologic findings in fascioliasis.
patients, to determine patients with associated FH symptoms, and to evaluate clinical, radiologic and laboratory outcomes of these persons.

Material and method

A total of 56 patients with fascioliasis who were followed up in Dicle University Medical Faculty between January 2010 and June 2011 were included in the study. Diagnosis of fascioliasis was made by detection of parasite eggs in stool examination [native and midi Parasep® Fecal Parasite Concentrator (Diasys Company)], sedimentation or clinical findings, investigation of positive ELISA IgG antibodies (DRG International Inc., USA), coexistence of clinical, laboratory and radiologic findings. In ELISA, the result was read photometrically at 450nm (TECAN SUNRISE micro ELISA). The excretory/secretory antigens have been used for immunodiagnosis of fascioliasis in the kit (values greater than 11.0 DRG Units=DU/ml are interpreted as seropositive, cut-off value 10).

Age, gender, symptoms and physical examination findings of patients were recorded. Simultaneous abdominal ultrasonography and chest radiographies were performed. Radiographs were evaluated by three pulmonologists and one radiologist. As routine laboratory tests, complete blood cell count, sedimentation rate (ESR), aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP) and bilirubin levels were obtained. Differential diagnosis of other pulmonary diseases was performed individually, when an abnormality was detected on chest radiography. Additional biochemical and microbiologic tests were performed. If needed, a thoracic computed tomography (CT) scan, fiberoptic bronchoscopy or thoracentesis were performed. As a result of all tests, other diseases that may cause the lung pathology were eliminated from our differential diagnosis and the patient was diagnosed with a lung abnormality associated with FH and administered triclabendazole. The accuracy of our diagnosis was verified with detection of clinical and radiologic improvement on follow up exams.

Results

Of the patients, 12 were males and 44 were females. Pulmonary radiography findings associated with fascioliasis were detected in 3 out of 56 patients (5.35%) diagnosed with fascioliasis.

Table 1: Demographic features and symptoms of patients with lung abnormality.

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Gender</th>
<th>Place of residence</th>
<th>Symptoms</th>
<th>Physical examination findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35</td>
<td>Female</td>
<td>Rural</td>
<td>RUQP,C,D,F</td>
<td>Hepatomegaly, bilateral rales and crackles</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>Female</td>
<td>Rural</td>
<td>RUQP,CP,C,D,F</td>
<td>Hepatomegaly, crackles on right thorax inferior-middle zone</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>Female</td>
<td>Urban</td>
<td>RUQP,CP,C,D</td>
<td>Hepatomegaly, percussion dullness on right thorax inferior zone</td>
</tr>
</tbody>
</table>

These three patients were young females and living in rural areas. Right hypochondrium pain was the most prominent finding accompanied by chest pain, cough and dyspnea. The most prominent physical examination findings were hepatomegaly and pulmonary rales. Demographic features of the patients with lung abnormalities are given in Table 1.

Fig. 1: Bilateral subpleural ground-glass densities in Case 1’s thoracic CT.
On routine laboratory tests, sedimentation rate and white blood cell count of all three patients were in normal ranges, however liver enzymes were mildly elevated. There was significant eosinophilia in Case 1 and mild anemia in Case 2. Laboratory results of the patients with lung abnormalities are shown in Table 3. All of three patients had lung results including limited radiological findings and weak clinical symptoms. For these reason, other pulmonary diseases were excluded, we considered that these findings were associated with FH and we gave specific anti FH treatment.

Clinical, radiologic and laboratory outcomes of three patients, who have lung findings in chest radiography, have been evaluated in detail individually.

Case 1 was considered to be eosinophilic lung disease (ELD) due to eosinophilia and ground-glass appearance. The most commonly known causes in this group include: drug reactions, eosinophilic pneumonias (acute-chronic), Churg-Strauss Syndrome and idiopathic hypereosinophilic syndrome. However, evaluation of all of these diseases excluded them. The patient was given only specific fascioliasis treatment (triclabendazole) as a Loeffler pneumonia like involvement, one of the most common causes of ELD, was suggested and the patient was followed up. The lesions were found to fully improve on twenty day after specific treatment.

In Case 2, there was an infiltrating lesion in right middle zone. White blood cell count and sedimentation rate were normal. No microorganisms were detected in gram staining and acid-resistant bacteria staining of sputum. No pathologies were detected on fiberoptic bronchoscope and microbiologic and cytological examination of lavage fluid. The patient was administered specific fascioliasis treatment due to concurrent detection of fascioliasis and followed up. Lesions were seen to fully improve in two weeks.

In Case 3, there was a pleural effusion. The fluid was exudative and eosinophil count (1.5%) was mildly elevated. In microbiologic examinations of the obtained fluid, no pathogens were detected. There was no malignancy detected via cytology. Adenosine deaminase levels were normal in the fluid. Collagen tissue panel markers were negative. Nonspecific pleuritis was detected in a pleura biopsy. The lesions were observed to improve following fascioliasis treatment after ten days.

<table>
<thead>
<tr>
<th>Patient No</th>
<th>ESR (mm/h)</th>
<th>Hb gr/dl</th>
<th>WBC (/mm3)</th>
<th>Eosinophilia (%)</th>
<th>ALT (IU/L)</th>
<th>AST (IU/L)</th>
<th>ELISA IgG (DRG Units = DU/ml)</th>
<th>Stool examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>21</td>
<td>12.1</td>
<td>6300</td>
<td>50.1</td>
<td>67</td>
<td>73</td>
<td>18</td>
<td>Negative</td>
</tr>
<tr>
<td>Case 2</td>
<td>10</td>
<td>10.7</td>
<td>7100</td>
<td>0.7</td>
<td>71</td>
<td>64</td>
<td>29</td>
<td>Negative</td>
</tr>
<tr>
<td>Case 3</td>
<td>18</td>
<td>11.8</td>
<td>7880</td>
<td>2</td>
<td>86</td>
<td>35</td>
<td>25</td>
<td>Negative</td>
</tr>
</tbody>
</table>

**Table 3:** Laboratory findings of patients who have lung abnormalities associated with FH.

**ESR:** Erythrocyte sedimentation rate  **Hb:** Hemoglobin  **WBC:** White blood cells  **AST:**
Discussion

Fascioliasis develops as a result of FH being located within bile ducts, thus the main symptoms are related within this region. However, our study indicated that the lungs may also be affected, with the presence of clinical findings dominated by respiratory symptoms.

Clinical findings lead to acute or chronic clinical appearance depending on the phase of life cycle of the parasite. The acute form may be classified as typical, atypical and ectopic fascioliasis(13). The acute phase includes a three week period, in which FH penetrates the liver capsule and migrates to biliary system. Typical findings of this period are fever, right upper quadrant pain, hepatomegaly, eosinophilia and urticaria. Fatigue, loss of appetite and weight loss are common. There was right upper quadrant pain, fatigue and hepatomegaly in three patients with a lung abnormality. High eosinophilia was detected in one case.

Patients with respiratory symptoms in the foreground are evaluated as atypical fascioliasis(13). Cough, hemoptysis and chest pain may be seen in these patients(14,15). Some patients have eosinophil-rich sputum discharge and dyspnea and they are erroneously treated as asthma(16,17). In various studies, complaint of cough was found as 14%, 15% and 33% in the acute phase(13,18,19). Arigona et al. reported chest pain and dyspnea in 3 out of 20 fascioliasis patients(13). In the studies conducted in our country, dyspnea was reported in 33.3% of the patients in Van and chest pain was reported in 16.6% of patients in Antalya(19,20). In our study, respiratory symptoms were detected in 10 patients (17.9%) and three patients with lung involvement belonged to this group. We detected cough in 14.2% patients, dyspnea in 12.5%, chest pain in 8.9% and sputum in 3.6%. Co-existence of cough, dyspnea and chest pain in two out of three patients is striking. Simultaneous chest radiographs were not obtained in other studies, thus lung involvement or presence of primary pulmonary disease that may have been a component of fascioliasis could not be evaluated. Whereas in our study, diseases involved in the differential diagnosis of lung involvement were evaluated individually and diagnosis was verified with improvement following specific treatment of fascioliasis.

Pulmonary signs and symptoms are considered to be related with hepatic destruction caused by larvae and inflammatory response. The severity of symptoms has been reported to vary according to number of parasites, location, immune response of host against parasite and especially eosinophil level(10). Only one of our patients had peripheric eosinophilia (50.1%). However symptom severity, clinical course and response to therapy were not different in these patients compared to others.

Larvae were reported to ectopically locate in the lungs, skin, heart, brain, stomach, epididymis, eyes and lymph nodes(3-8). Ectopic fascioliasis appears as masses and abscesses with eosinophilic and mononuclear infiltrations develop due to tissue injury in these organs(21). How parasites migrate to ectopic tissues is not known. However, different theories suggest that migration may occur through hematogenous, lymphatic or direct route(22,23). A nodule was detected in the thoracotomy of a subject in whom a pneumothorax developed in left lung, who did not respond to standard therapy, FH was detected microscopically(12). Larvae were detected in the lungs of our cases neither radiologically nor bronchoscopically. Thus, our cases seem to be atypical fascioliasis rather than an ectopic location. Presence of larvae in the thorax may only be detected with thoracoscopy and biopsies and these procedures are not recommended for definite diagnosis due to their invasive nature.

Physical examination findings of the lungs vary according to the pathology caused by FH. Usually the rales are presence when cough is in the foreground. Dullness on percussion, is detected when a pleural effusion develops and a tympanic sound is detected in the presence of a pneumothorax. A decrease is detected in respiratory sounds on auscultation. Bronchial sounds and rales may be heard when infiltration and consolidation develop. Physical examination findings of our cases with pleural effusion and infiltration were consistent with these observations.

Lung involvement may be seen in different forms in radiologic evaluation. Loeffler syndrome-like displacing parenchymal infiltrates and pleural effusion are the most common radiological findings(9,24,25). However, publications are available reporting pneumothorax development(12).

Routine laboratory test results of the patients who developed lung abnormalities (white blood count, ESR, ALT, AST, ALP and bilirubin levels) were similar to those of the patients without lung abnormality. An eosinophilic reaction may be shown in the fluid obtained in presence of pleural
effusion and pericarditis\(^{(13,26)}\). We detected eosinophilia in the pleural fluid of the patients who developed effusion. We did not detect additional laboratory findings suggestive of lung involvement.

In conclusion, although FH may affect the lungs rarely, the presence of respiratory symptoms and physical examination findings in the acute period should suggest a lung abnormality. Routine tests done for diagnoses of fascioliasis do not show lung abnormality, thus further tests like chest radiography should be performed.

References

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