

# Radiological Findings in Hepatobiliary Fascioliasis

## Hepatobiliyer Fasioliyaziste Radyolojik Bulgular

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**ABSTRACT Objective:** In this study, radiological findings of 24 relatives were evaluated who were diagnosed with hepatobiliary fascioliasis with serologic testing and examination of family members. **Material and Methods:** Twenty-four patients were evaluated by abdominal ultrasonography (US), 23 patients by computed tomography (CT) and 4 patients by magnetic resonance cholangiopancreatography (MRCP). Liver function tests, routine biochemistry, IgE and eosinophil levels were analysed in all patients. **Results:** Abdominal US detected pathology in 13 patients and no pathology in 11. CT was performed in 23 patients, and hepatobiliary lesions were detected in 20. Of the 6 cases with biliary dilatation, 4 peripheral enhancements of the bile ducts were noticed on CT examination. Mild biliary dilatation was observed in all of the 4 patients who were evaluated with MRCP and filling defects in the bile ducts were found in 2 of them. ELISA test for *Fasciola hepatica* was positive in all 24 patients. IgE level was elevated in 19 patients, and eosinophil level was elevated in 17 patients, Leucocyte level was elevated in 14 patients, and alcatene phosphatase level was elevated in 10 patients. **Conclusion:** In acute phase, CT is and high IgE and eosinophil levels with typical CT findings are significant in the diagnosis. The peripheral enhancement of extrahepatic bile ducts may be a clue for biliary involvement of the disease. MRCP is a useful method in demonstrating biliary dilatation and intraluminal filling defects, which correspond to parasites.

**Key Words:** *Fasciola hepatica*, fascioliasis, biliary, computed tomography

**ÖZET Amaç:** Bu çalışmada, birbiriley akrabalığı bulunan, aile araştırması ve serolojik testler sonucunda hepatobiliyer fasioliyazis tanısı alan 24 hastanın radyolojik bulguları değerlendirilmiştir. **Ge-reç ve Yöntemler:** Yirmi dört hasta abdominal ultrasonografi (US), 23 hasta bilgisayarlı tomografi (BT) ve 4 hasta manyetik rezonans kolanjiyopankreatografi (MRKP) ile değerlendirildi. Bütün hastalarda karaciğer fonksiyon testleri, rutin biyokimya, IgE ve eozinofil düzeyleri analiz edildi. **Bul-gular:** Abdominal US ile 11 hastada bulgu elde edilmezken, 13 hastada patoloji saptandı. Yirmi üç hastada abdominal BT incelemesi yapıldı ve bunların 20'sinde hepatobiliyer lezyonlar tespit edildi. BT'de safra yollarında dilatasyon saptanan 6 hastanın 4'ünde safra yollarında çevresel kontrastlanma dikkati çekti. MRKP incelemesi gerçekleştirilen 4 hastanın hepsinde safra yollarında hafif genişleme ve 2'sinde safra yollarında dolum defektleri saptandı. *Fasciola hepatica* için yapılan ELISA testi 24 hastanın tamamında pozitif. IgE 19 hastada, eozinofil düzeyi 17 hastada yüksek bulundu. Lökosit seviyesi 14 hastada, alkalin fosfataz seviyesi 10 hastada normalden yüksek bulundu. **Sonuç:** Hepatobiliyer fasioliyazisin akut evresinde BT US'den daha etkili bir teşhis yöntemidir ve tipik BT bulguları ile birlikte yüksek IgE ve eozinofil düzeyleri tanıda önem arz etmektedir. Ekstrahepatik safra yollarının çevresel kontrastlanması hastalığın biliyer tutulumu açısından bir ipucu olabilir. MRKP safra yollarındaki genişlemeyi göstermede ve parazitlere karşılık gelen lümen içi dolum defektlerini saptamada önemli bir görüntüleme yöntemidir.

**Anahtar Kelimeler:** Fasioliyazis; biliyer; *Fasciola hepatica*; bilgisayarlı tomografi

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**F**ascioliasis is a hepatobiliary system disease caused by the liver fluke "*Fasciola hepatica*". It infects human beings by contaminated water and green vegetables, especially watercress. The disease consists of

hepatic and biliary phases. Serology is used as a basic diagnostic modality.

Radiological findings of the disease have been reported in the last decade. Although the disease has some radiologically significant findings, it may manifest with different patterns. CT is a very efficient diagnostic modality in hepatic phase of the disease and helps with the diagnosis in 90% of the patients with acute fascioliasis. It shows multiple, small, hypodense lesions with irregular borders, as well as branching foci of microabscesses and subcapsular localization of the lesions, which are the characteristic CT findings of the disease. In contrast, US is more effective than CT in biliary phase of the disease. Mixed parenchymal echogenities with irregular borders, curvilinear, oval, leaf-like or conglomerate hyperechogenities without acoustic shadowing in the gallbladder, or moving parasites within the dilated lumen may be seen with US.<sup>1-4</sup>

Most of the studies on fascioliasis involved sporadic cases that were diagnosed after presentation to the hospital with various symptoms. In this study, radiological findings in hepatobiliary fascioliasis of 24 relatives were evaluated who were diagnosed after family investigation.

## MATERIAL AND METHODS

After the radiological and serological diagnosis of hepatobiliary fascioliasis in two patients with a history of eating watercress recently, family investigation was performed in 79 relatives who had a similar history. Of the 79 relatives, 24 cases were included in this study, which were verified as fascioliasis serologically using the ELISA test. Three of the patients were male and the remaining cases were female. The mean age of the patients was 23 (range 5-64).

All patients were evaluated by abdominal US (Philips HD 11, Bothell, Washington, USA), 23 patients by contrast enhanced abdominal CT (Siemens Sensation 4, Erlangen, Germany), and 4 cases by MRCP (Siemens Symphony, Erlangen, Germany). One of the patients was pregnant and could not be evaluated by CT. Liver function tests, routine biochemistry, IgE and eosinophil levels we-

re analysed in all patients. All the radiological findings were documented and were compared with clinical and laboratory findings. Informed consent was obtained from all patients.

## RESULTS

All cases were detected for family investigation and none of them had any serious symptoms. Most of them had non-specific symptoms such as abdominal discomfort, nausea, lack of appetite, weakness, fatigue, and headache for the last few months.

Laboratory data of the 24 cases revealed that IgE was high in 19, and eosinophilia was detected in 17. Parasites were detected in stool only in 11 cases. All the laboratory findings were summarized in Table 1.

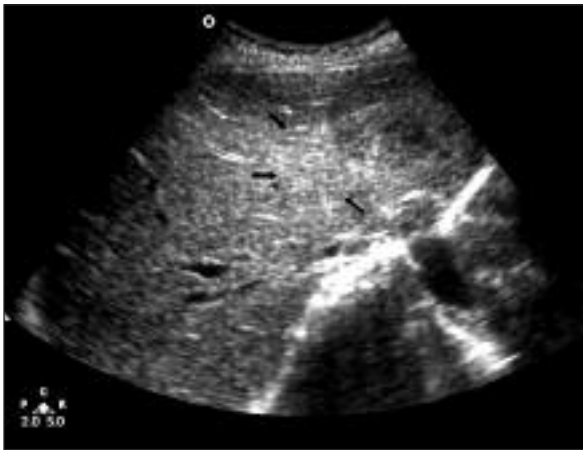
Abdominal US was available in all patients and detected pathology in 13 patients and did not in 11. Hepatomegaly, minimal parenchymal irregularity, geographic hypoechoic foci of lesions that could not be differentiated easily from the normal liver parenchyma mostly located at peripheral and subcapsular areas were the main sonographic findings (Figure 1).

Abdominal CT was performed in 23 patients and hepatobiliary lesions were detected in 20. There was no any pathology in 3 cases. The most evident finding on CT was low attenuated nodular masses with irregular margins of different sizes

**TABLE 1:** Laboratory findings according to number of patients.

Laboratory findings	Number of patients
ELISA (+)	24
Leucocyte (WBC) ↑	14
GGT ↑	5
LDH ↑	8
ALP ↑	10
IgE ↑	19
Eosinophile ↑	17
ALT ↑	7
AST ↑	6
Parasite in stool	11

ELISA: Enzyme-linked immunosorbent assay, WBC: White blood cell, GGT: Gamma glutamyl transferase, LDH: Lactate dehydrogenase, ALP: Alkaline phosphatase, IgE: immunoglobulin E, ALT: Alanine aminotransferase, AST: Aspartate aminotransferase.



**FIGURE 1:** Geographic hyperechoic foci (arrows) of lesions that could not be differentiated easily from the normal liver parenchyma, and nonhomogeneous liver parenchyma.



**FIGURE 2:** Focal hypodense lesions especially in the right lobe that tend to fuse peripherally in the subcapsular localization.

showing conglomeration likely to be abscess formation located peripherally and subcapsularly especially in the right lobe (Figure 2). There were also tract line fashion lesions in the parenchyma among the hypodense nodular areas. The lesions did not show prominent contrast uptake or a little peripheral enhancement was detected in some of them after administration of intravenous contrast medium (Figure 3). Other findings were hepatomegaly, biliary pathology, periportal lymph nodes and splenomegaly. All the CT findings were summarized in Table 2.

Of the 6 cases with biliary dilatation, 4 peripheral enhancements of the main bile ducts were noticed on CT examination (Figure 4a, b). Mild biliary dilatation was observed in all of the 4 patients who were evaluated with MRCP and filling defects in the bile ducts were found in 2 of them (Figure 5a, b).

Triclabendazole treatment was given to all patients. All patients are still under clinical follow-up and we plan to repeat radiological examinations.

## DISCUSSION

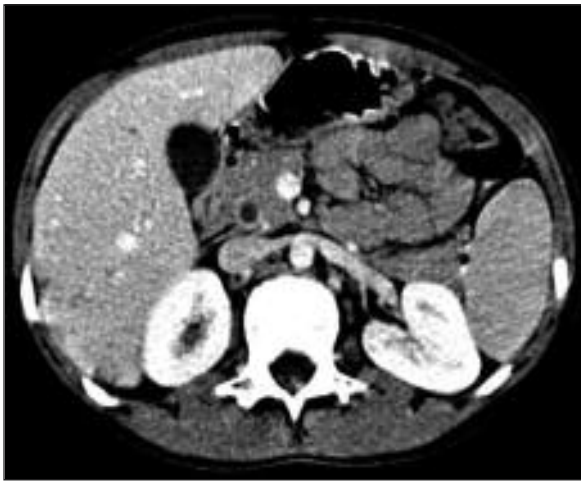
Although fascioliasis infection has been well documented in all aspects, diagnosis and treatment could be delayed because it is usually not considered in the differential diagnosis. Another reason of late diagnosis or misdiagnosis is that the radiological characteristics of the disease were delineated in the last and are still unclear in some aspects. Radiological findings depend on the phase of the disease, the he-



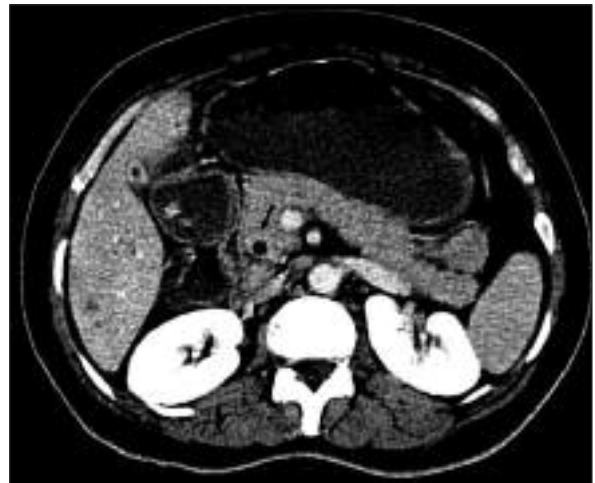
**FIGURE 3:** Hypodense lesions like moth-bitten appearance that do not enhance after contrast media injection and remind microabscess formations that tend to be confluent.

**TABLE 2:** CT findings according to number of patients.

CT findings	Number of patients
Multifocal hypodense lesions in the liver	16
Tract line fashion lesion	13
Hepatomegaly	11
Hilar lymphadenopathy	7
Intrahepatic biliary dilatation	6
Peripheral enhancement of the common bile duct	4
Splenomegaly	2



a



b

FIGURE 4a,b: Peripheral enhancement (arrows) of the bile ducts (a,b).



a



b

FIGURE 5a,b: (a) Mild biliary dilatation and (b) filling defects (arrow) in the bile ducts (b) on MRCP.

patic and biliary phases, which show different symptoms and radiological findings. After ingestion of the contaminated material with fasciola hepatica, the metascercariae penetrate into the intestinal wall, peritoneal cavity and the liver capsule, and lodge within the biliary system passing through the liver parenchyma. This period takes nearly 3-4 months and forms the acute or the hepatic phase. After 4 months, the biliary or chronic phase begins in which egg producing starts and parasites or their

eggs are seen in stool during this period. All of our cases were in acute or early biliary phase.

Most of the studies about hepatobiliary fascioliasis involved sporadic cases diagnosed after the patients attending the hospital with some symptoms. In this report, only two cases had presented to our hospital and the others were detected after family investigation without any serious complaint. Another important point is that our study inc-



cludes 11 pediatric cases under age 15, which is the most widest series in the literature to the best of our knowledge.

Investigation of the parasite or its eggs in stool or duodenal aspirate is the main diagnostic method. However, they are often difficult to detect in stool and parasites do not produce ova in hepatic stage. We detected ova in stool only in 11 cases. This result also showed that our cases could be in the acute phase. Eosinophilia, high IgE levels and liver function tests are the other laboratory abnormalities. In our series, eosinophilia and high IgE levels were the most significant tests. There was no relationship between radiological pattern and laboratory findings and between pediatric and adult patients. Serological tests were considered the main diagnostic method and ELISA was used to confirm the diagnosis.

Radiological methods that may be used for diagnosis are US, CT and MRI. The primary radiological method is US. However, although it is non-invasive and inexpensive, US may not be diagnostic in the hepatic phase because of the heterogeneity of the liver parenchyma due to the poorly defined nodules. In our study, US demonstrated liver lesions in 11 cases and there was no significant liver abnormality in 13 cases. Thus, it cannot be considered a reliable modality in the radiological diagnosis of fascioliasis especially in the acute phase. However, it is more useful in the biliary phase of the disease, which reveals irregular thickening of the CBD wall and biliary dilation.<sup>5-8</sup> US may reveal mixed echogenities with irregular borders.<sup>1,2</sup> Mobile, curvilinear, oval, and leaf-like or conglomerate hyperechogenic vermiform structures without acoustic shadowing within the gallbladder and in the bile ducts, which represent worms might be specific in the diagnosis of the disease.<sup>3,4,7,8</sup> Sonographically we observed suspicious echogenic material in one case within the lumen proving intraluminal parasites and it was verified with MRCP examination.

CT is a much more useful diagnostic modality than US in the hepatic phase of the disease. It helps with the diagnosis in 90% of the patients with acu-

te fascioliasis. Multiple, small, hypodense lesions with irregular borders, as well as branching foci of microabscesses and subcapsular localization of the tract line fashion lesions are the characteristic CT findings of the disease.<sup>2</sup> Increase in IgE and eosinophil levels with typical CT findings is significant for the diagnosis. Most of the cases in our study were in the acute phase and CT showed various lesions in 20 out of 23 cases, which was superior to US. Periportal and hilar lymphadenopathy was prominent in 7 cases, which was very infrequently reported in the literature.<sup>5</sup> It is important to keep in mind that hilar lymphadenopathy and liver lesions may be misdiagnosed as metastases such as the two patients presenting to our clinic with a presumptive diagnosis of hepatic metastasis clinically.

We also demonstrated biliary dilatation in 6 cases which was seen both in US and CT. Herein another important finding is peripheral enhancement of dilated biliary ducts which was seen in 4 cases with biliary dilation. Pericholedochal enhancement was obviously in the portal phase, which was concordant with other reports in the literature. This appearance probably depends on the metabolites which irritate the mucosa of the bile duct, or ductal hyperplasia and hypertrophy of the duct epithelium resulting in thickening of the duct wall and periductal fibrosis.<sup>9,10</sup>

MRI including MRCP is another important modality for hepatobiliary fascioliasis. MRI can demonstrate hepatic lesions clearly in detail. Biliary ducts can be best evaluated with MRCP. In 4 cases with biliary dilatation, MRCP depicted biliary dilatation in all and also demonstrated intraluminal filling defect in 2 of them.

Diagnosis may be delayed because of the wide spectrum of the differential diagnosis and low incidence of the *F. hepatica* infection. Similar abnormal US and CT findings may represent viral hepatitis, liver abscess, malignancy, cholecystitis, sclerosing cholangitis and AIDS-related cholangitis, ruptured hydatid cyst, and parasites such as ascariasis and clonorchiasis.<sup>11-14</sup> *F. hepatica* infestation was reported to resemble hepatic mass lesion on US and to be associated with hepatic eosinophi-

lic granuloma.<sup>15,16</sup> With adequate knowledge on the history, clinical manifestations, laboratory data and radiological pattern, the diagnosis of the disease is not difficult.

As a result, in hepatobiliary fascioliasis, radiologically significant signs may be seen even though clinical findings do not appear. CT is more effective

than US especially in acute phase and it can be diagnostic if evaluated in correlation with laboratory findings. Peripheral ductal enhancement may be an important sign of biliary involvement of the disease. MRCP is a useful method in demonstrating biliary dilatation and intraluminal filling defects, which correspond to parasites.

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