

# Fascioliasis: A challenging differential diagnosis for radiologists

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## ABSTRACT

We report a case of a 39 year old male who presented with nausea and right upper quadrant pain. Marked eosinophilia and a hypoechoic liver lesion on ultrasound were identified. The differential diagnosis included neoplasms, infectious diseases and hepatic abscess. Indirect hemagglutination test using purified adult *Fasciola hepatica* f1Ag confirmed serologic diagnosis of fascioliasis. Radiologists should keep in mind the importance of correlating imaging, clinical and laboratory findings in order to reach the correct diagnosis.

## CASE REPORT

### CASE REPORT

A 39 year old Caucasian male presented with nausea and pain in the right upper quadrant of the abdomen radiating to the right shoulder. The patient's history was unremarkable and negative for recent drug use and allergies. He recalled a recent holiday trip to a mountainous area in southern Greece. Clinical examination revealed positive Murphy's sign and mild tenderness in the upper abdomen. Blood count showed remarkable eosinophilia with normal values of the rest series. Hematocrit 48.1% (normal value 39-52), white blood cell count 9.1 K/ml (4.0-9.5), neutrophils 54.5% (40-75), lymphocytes 27.7% (20-40), monocytes 7.5% (2-10), eosinophils 10% (1-6), basophils 1.8% (0-2). Liver function tests were normal. Laboratory investigations included albumin 4.6 gr/dl (3.4-5.0), total bilirubin 0.82 mg/dl (0.10-1.10), alkaline phosphatase 70 U/l (39-117), total protein 6.94 g/dl (6.4-8.7), alanine aminotransferase 17 U/l (5-43), aspartate aminotransferase 20 U/l (<32U/l). Tumor serum markers were

also negative, alpha-fetoprotein 2.6 ng/ml (<10) and carcinoembryonic antigen 1.6 ng/ml (<5).

### *Imaging Findings*

An abdominal ultrasound (US) was performed and showed a 4.3 cm hypoechoic lesion in the right lobe of the liver with ill-defined margins and without vascularity on Doppler ultrasound (fig. 1). Subsequently, a computed tomography (CT) scan was ordered, which confirmed the finding and revealed a 4.2 x 3 cm hypodense region, probably consisting of small clustered lesions in liver segments V and VI with mild contrast enhancement (fig. 2). Normal enhancing liver tissue is seen within the lesion.

There were no obvious signs of biliary or vascular invasion. The CT imaging characteristics of the lesion were non-specific, therefore magnetic resonance imaging (MRI) and positron emission tomography (PET) were performed for further evaluation of the lesion. MRI revealed clustered lesions

in liver segment V with a maximum diameter of 2.7 cm, with low signal intensity on T1W and high signal intensity on T2W images, with peripheral enhancement after contrast administration and restricted diffusion (fig. 3-5). Mild perifocal oedema and transient hepatic attenuation difference (THAD) were also depicted. These findings suggested liver abscesses as the most probable diagnosis, although the possibility of cholangiocarcinoma or an infectious disease could not be excluded. Whole body FDG PET CT depicted the lesion in the right hepatic lobe with increased uptake of 18F-FDG (maxSUV 4.1) (fig. 6).

#### Management

With a differential diagnosis of an infectious disease based on eosinophilia and history of holiday trip, indirect hemagglutination test (IHAT) for *Leishmania*, *Lambli*a *guardia* and Amebiasis were negative. A specific IHAT using purified adult *Fasciola hepatica* f1Ag (Laboratoires Fumuze Diagnostic) was used for serologic diagnosis. The result was positive at 1/2560 (normal <1/160). Drug therapy with triclabendazole was administered to the patient.

#### Follow-up

The medication was well tolerated and a month later the levels of eosinophils were normalized.

## DISCUSSION

#### Etiology & Demographics:

Fascioliasis is a trematode infection caused by two species of hepatic flukes, *Fasciola hepatica* or *Fasciola gigantica*. *Fasciola hepatica* is a parasite that infects mainly the liver of various mammals, including humans. Although extremely rare in Western Europe, it is often observed in developing countries. Infection is endemic in Central and South America, as well as across Europe and Asia. Humans are infected as incidental hosts by drinking contaminated water, eating freshwater plants (lettuce, mint, parsley) grown in sheep raising areas or by consuming contaminated raw animal's liver.

#### Clinical Findings & Course of the disease:

The disease is divided in two different periods: the first period, extending from 3 to 11 weeks after infection, when the parasites migrate in the liver parenchyma, is known as the hepatic phase. It may present as acute illness characterized by fever, right upper quadrant pain, hepatomegaly, anorexia, nausea, vomiting and myalgia. The second period, when the parasites invade the biliary tract, is known as the biliary phase and may present as chronic disease, mainly consisting of epigastric and right upper quadrant pain, hepatomegaly, malaise, waisting and jaundice. In rare cases, fascioliasis may involve other organs and present as an ectopic disease involving the skin, lung, heart, brain, gastrointestinal tract and the eye. Extra-hepatic symptoms such as pleural effusion, pericarditis, cardiac conduction abnormalities and neurologic symptoms may also occur and are likely related to immunologic or allergic mechanism. Peripheral eosinophilia is almost always present [1-4]. We report a case of a hepatic

mass that was initially thought to represent a liver abscess or even a cholangiocarcinoma.

#### Imaging Findings:

US findings in the early phase include focal hypoechoic or hyperechoic lesions and, less commonly, diffuse involvement of the liver. Ductal ectasia and wall thickening may be observed after eight weeks. Occasionally, US can demonstrate mobile fluke in the dilated bile ducts and gallbladder [3-5]. CT findings of hepatic fascioliasis include multiple small, round or oval clustered hypodense lesions with peripheral contrast enhancement, as in our case. In addition, CT may demonstrate subcapsular, low attenuation hepatic lesions. As the disease progresses to affect the biliary tree, CT demonstrates dilated biliary ducts with periportal tracking. Worms can rarely be observed in the bile ducts [5, 6]. MRI can also be used to establish liver parenchymal involvement. On T2W images the penetrating area of the parasite can be demonstrated as capsular hyperintensity. Parenchymal clustered lesions with low signal intensity on T1W and high signal intensity on T2W, with peripheral enhancement after contrast administration [7], as in our case. PET CT may show a lesion with increased 18F-FDG uptake, however it is not a mandatory examination for the diagnosis of fascioliasis.

#### Treatment & Prognosis:

Orally administered anthelmintic drugs are used to treat fascioliasis, with triclabendazole and bithionol being the most common ones. If patients do not respond to conservative therapy, ERCP and flushing of the biliary system has proved to be a successful alternative option.

#### Differential Diagnosis:

Because of the low incidence of *Fasciola hepatica* infection in Western Europe, as well as its vague clinical presentation and overlapping imaging findings, diagnosis poses a challenge. Key points to consider are patients' history of visiting endemic regions or consuming specific products such as flatworm infests. Eosinophilia in the peripheral blood count can always raise the suspicion of a parasitic infection in the differential diagnosis. More specifically, when this disease is suspected, diagnosis can be established by direct parasitological techniques, such as identification of eggs in stool or bile aspirates, by serological examination (ELISA, complement fixation, immunofluorescence assays), in combination with biochemical markers (elevated serum aspartate aminotransferase, alanine aminotransferase and lactate dehydrogenase) [7-8]. Imaging findings are not specific because of overlapping with cholangiocarcinoma and hepatic abscess but they are very important in order to narrow the differential diagnosis. Cholangiocarcinoma presents also as a subcapsular lesion of low attenuation on CT and high T2 signal on MRI with peripheral contrast enhancement but, in contrast to *Fasciola*, it shows gradual enhancement centrally. On US it appears as an homogeneous mass of intermediate echogenicity with a peripheral hypoechoic halo of compressed liver tissue. As far as hepatic abscess is concerned, it is also a hypoattenuating mass with peripheral enhancement on CT with or without gas bubbles and low T1 signal on MRI with restricted diffusion, enhancement of the capsule and perilesional oedema. Low signal centrally or heterogeneous on

T1W images and high signal on T2W images with perilesional edema and enhancement of the capsule.

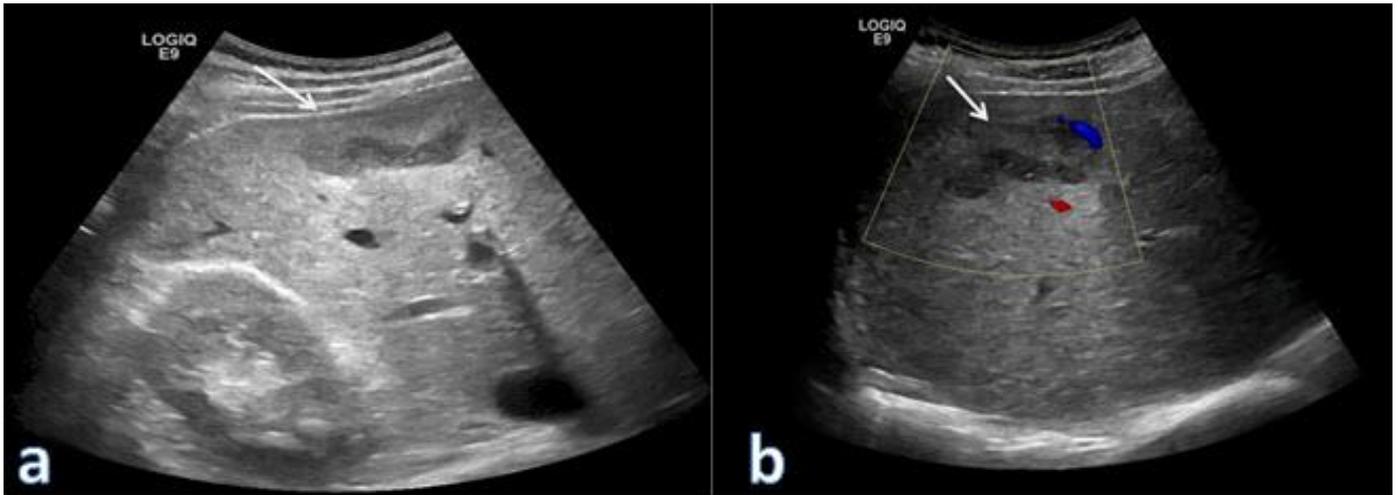
#### TEACHING POINT

Fascioliasis is an uncommon disease in Western Europe and radiologists should be aware of this condition and help the clinicians to conclude to the right diagnosis. They have to keep in mind Fascioliasis when certain imaging findings such as multiple small, round or oval clustered hypodense, peripherally enhancing lesions are combined with clinical and laboratory findings (such as eosinophilia) indicative of an infectious disease.

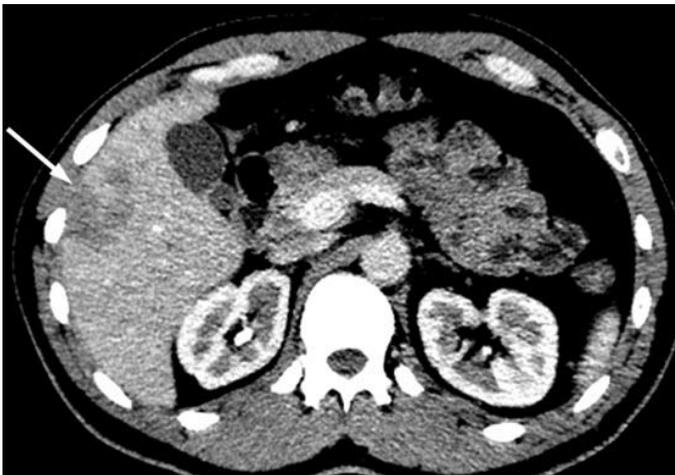
#### REFERENCES

1. Van Beers B, Pringot J, Geubel A, Trigaux JP, Bigaignon G, Doms G. Hepatobiliary fascioliasis: noninvasive imaging findings. *Radiology* 1990; 174(3 Pt 1): 809-810. PMID: 2406786.
2. Aroonroch R, Worawichawong S, Nitiyanant P, Kanchanapitak A, Bunyaratvej S. Hepatic Fascioliasis due to *Fasciola hepatica*: A Two-Case Report. *J Med Assoc Thai* 2006; 89 (10): 1770-1774. PMID: 17128857.
3. Maeda T, Yamada H, Akao N, Iga M, Endo T, Koibuchi T, Nakamura T, Odawara T, Iwamoto A, Fujii T. Unusual Radiological Findings of *Fasciola Hepatica* Infection with Huge Cystic and Multilocular Lesions. *Intern Med* 2007; 47(5): 449-452. PMID: 18310981.
4. Dülger AC, Küçüköğlü ME, Yılmaz H, Avcu S, Kemik Ö, Bartın MK. Acute Cholangitis and Hepatitis Caused By *Fasciola Hepatica*: A Case Report. *Van Tıp Dergisi* 2010; 17(2): 50-53.
5. Yılmaz B, Köklü S, Gedikoglu G, Avcu S, Kemik Ö, Kadir Bartın MK. Case Report: Hepatic Mass Caused by *Fasciola Hepatica*: A Tricky Differential Diagnosis. *Am J Trop Med Hyg* 2013; 89(6): 1212–1213. PMID: 24080633.
6. Losada H, Hirsch M, Guzmán P, Fonseca F, Hofmann E, Alanís M. Fascioliasis simulating an intrahepatic cholangiocarcinoma-Case report with imaging and pathology correlation. *HepatoBiliary Surg Nutr* 2015; 4(1): E1-E7. PMID: 25713810.
7. Patel NU, Bang TJ, Dodd GD 3rd. CT findings of human *Fasciola hepatica* infection: case reports and review of the literature. *Clinical Imaging* 2016; 40: 251–255. PMID: 26995582.
8. Lin D, Wang X, Wang Z, Wei Li, Zang Y, Li N. Diagnosis and management of hepatic fascioliasis mimicking intrahepatic cholangiocarcinoma: a case report. *Int J Clin Exp Med* 2017; 10(1):1385-1392.

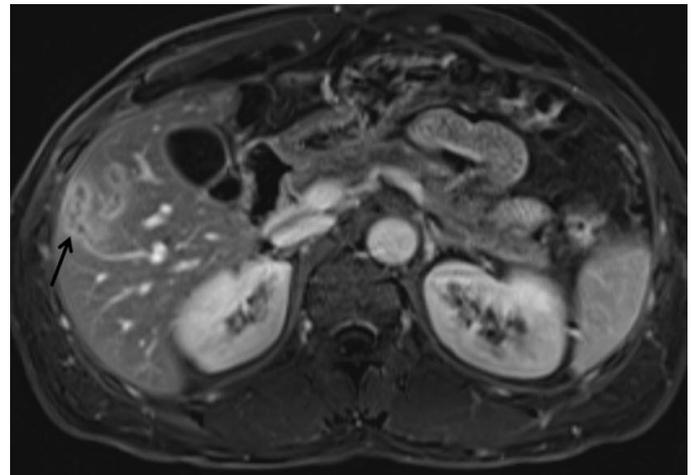
FIGURES



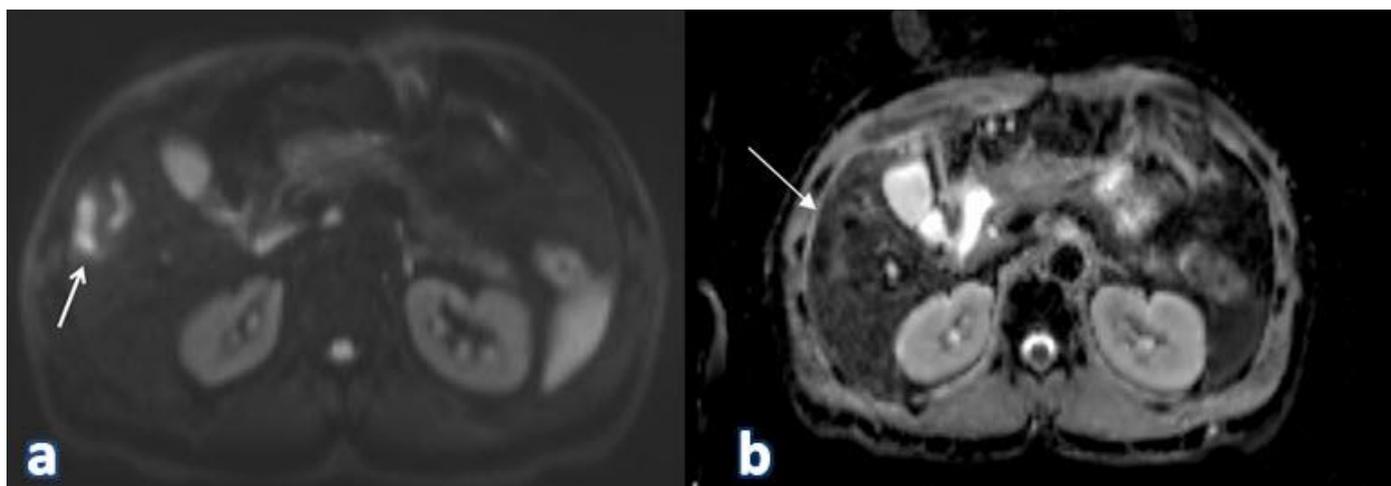
**Figure 1:** A 39 year old male with fascioliasis.  
Technique: Ultrasound performed on GE LOGIC E9 with a 4C-RS transducer at a frequency of 4.0 MHz.  
Findings: a) A sagittal gray scale ultrasound demonstrates a 4.3 cm ill defined hypoechoic lesion in the periphery of the liver. b) A sagittal Doppler ultrasound demonstrates the lesion without vascularity.



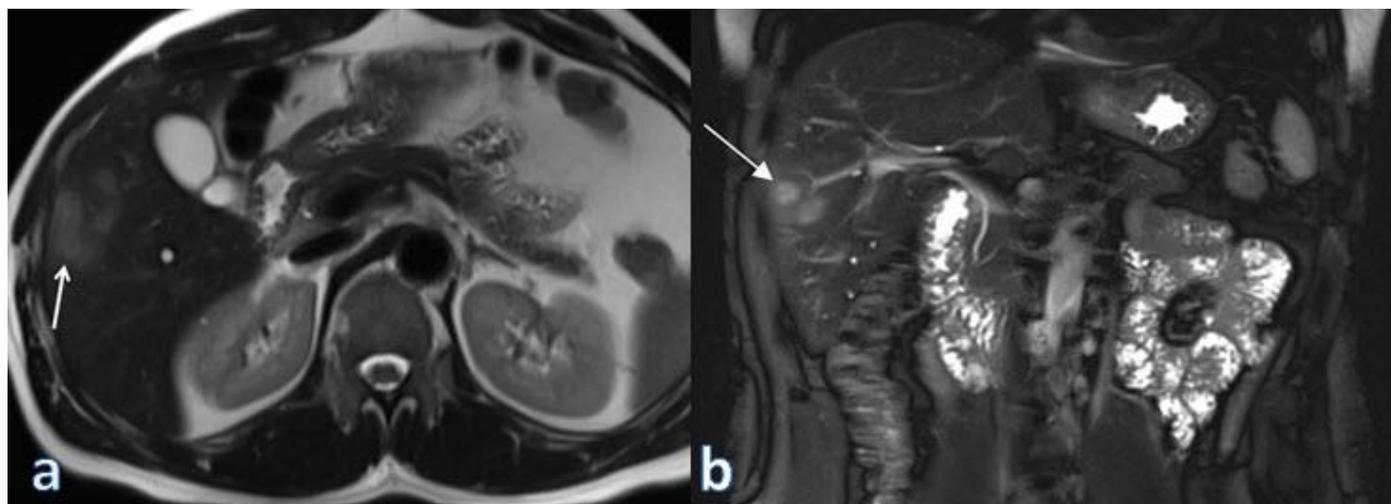
**Figure 2:** A 39 year old male with fascioliasis.  
Technique: (Philips, Brilliance 64) Abdomen CT scan with intravenous injection of contrast material 95 ml Xenetix™ (iobitridol) (120 Kvp, 17 mAs, 3 mm slice thickness).  
Findings: An axial abdomen CT scan with intravenous injection of contrast material (portal venous phase) demonstrates a 4.2 x 3 cm ill-defined hypodense lesion (arrow) in the periphery of the liver with mild enhancement. Normal enhancing liver tissue is seen within the lesion.



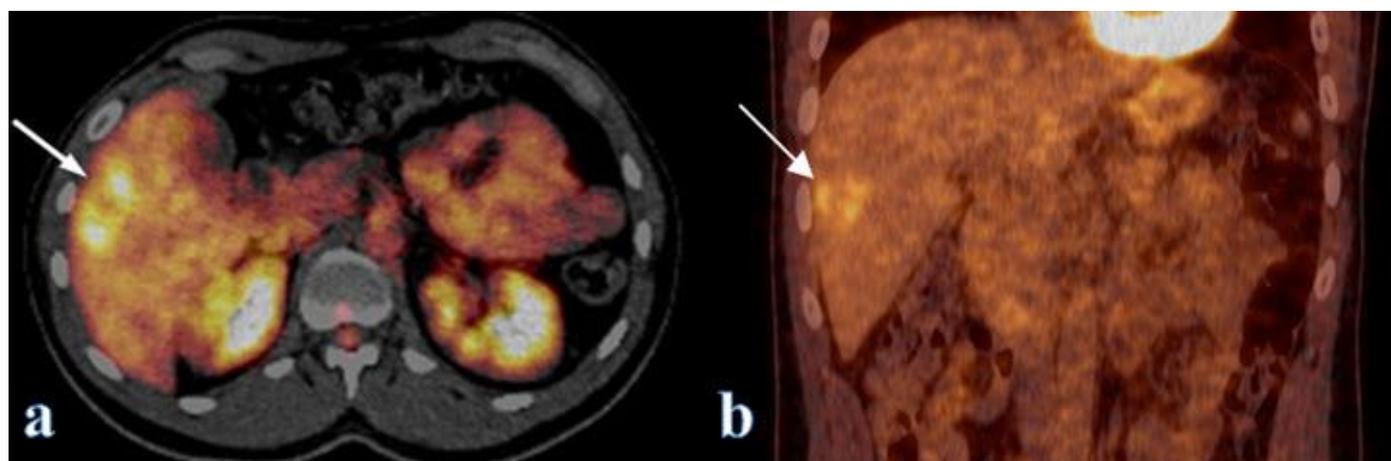
**Figure 3:** A 39 year old male with fascioliasis.  
Technique: (Siemens Magnetom Skyra 3 Tesla) MRI T1W fat suppressed axial with intravenous injection of contrast material 20 ml Dotarem™ (Gadoteric acid) (TE = 1900 ms, TR= 3900 ms; 5.1 mm slice thickness).  
Findings: An axial fat suppressed T1 weighted image after contrast administration reveals clustered lesions with a maximum diameter of 2.7 cm and peripheral enhancement (arrow).



**Figure 4:** A 39 year old male with fascioliasis.  
Technique: (Siemens Magnetom Skyra 3 Tesla) MRI a) DWI axial and b) ADC map (TR 4600 ms, TE 60 ms; 7.0/1.4 slice thickness).  
Findings: a) Diffusion Weighted Imaging (DWI) and b) ADC map of the upper abdomen show restricted diffusion of the lesion (arrow).



**Figure 5:** A 39 year old male with fascioliasis.  
Technique: (Siemens Magnetom Skyra 3 Tesla) MRI T2W a) axial and b) coronal (TR 900 ms, TE 97 ms; 7.0/1.4 slice thickness).  
Findings: a) Axial and b) coronal T2 weighted images of the upper abdomen reveal mild high signal intensity of the lesion with mild perifocal oedema (arrow).



**Figure 6:** A 39 year old male with fascioliasis.  
Technique: PET CT image acquisition one hour after injection of 365 MBq (9.8 mCi) 18F-FDG.  
Findings: a) Axial and b) coronal 18F-FDG PET CT images show increased uptake (SUVmax 4.1) in the lesion (arrow).

<b>Etiology</b>	Trematode infection caused by two species of hepatic flukes ( <i>Fasciola hepatica</i> or <i>Fasciola gigantica</i> )
<b>Incidence</b>	Endemic in Central and South America Extremely rare in Western Europe
<b>Course of the disease</b>	First period: parasites migrate in the liver parenchyma Second period: parasites invade the biliary tract
<b>Clinical findings</b>	Fever, right upper quadrant pain, hepatomegaly, anorexia, nausea, vomiting and myalgia Extrahepatic: pleural effusion, pericarditis, cardiac conduction abnormalities and neurologic symptoms
<b>Findings on imaging</b>	US: focal hypoechoic or hyperechoic lesions CT: multiple small, round or oval clustered hypodense lesions MRI: clustered lesions with mild hyperintensity on T2W and hypointensity on T1W images
<b>Risk factors</b>	Contaminated water, freshwater plants
<b>Treatment</b>	Anthelmintic drugs (triclabendazole and bithionol)
<b>Prognosis</b>	Good response to conservative therapy, otherwise ERCP and flushing of the biliary system
<b>Age predilection</b>	none
<b>Gender ratio</b>	1/1

**Table 1:** Summary table of Fascioliasis.

Differential Diagnosis	US	CT	MRI
<b>Fascioliasis</b>	Focal hypoechoic or hyperechoic lesions, ductal ectasia and wall thickening	Multiple small, round or oval clustered hypodense lesions with peripheral contrast enhancement, mainly subcapsular	Parenchymal clustered lesions with mild low signal intensity on T1W and high signal intensity on T2W, with peripheral enhancement after contrast administration
<b>Cholangiocarcinoma</b>	Homogeneous mass of intermediate echogenicity with a peripheral hypoechoic halo of compressed liver tissue	Homogeneously hypointense on non-contrast scans, with heterogeneous minor peripheral enhancement and gradual central enhancement	High signal intensity on T2W images, with heterogeneous minor peripheral enhancement and gradual central enhancement
<b>Hepatic abscess</b>	Poorly demarcated with a variable appearance, ranging from predominantly hypoechoic (with some internal echoes) to hyperechoic with or without gas bubbles	Peripherally enhancing, centrally hypoattenuating lesions, may appear solid or contain gas	Low signal centrally or heterogeneous on T1W images and high signal on T2W images with perilesional edema, restricted diffusion and enhancement of the capsule

**Table 2:** Differential diagnoses table of Fascioliasis.

#### ABBREVIATIONS

ADC: Apparent Diffusion Coefficient  
 CT: Computed Tomography  
 DWI: Diffusion Weighted Imaging  
 ELISA: Enzyme-linked Immunosorbent Assay  
 ERCP: Endoscopic Retrograde Cholangio-Pancreatography  
 FDG PET: Fludeoxyglucose Positron Emission Tomography  
 IHAT: indirect hemagglutination test  
 MRI: Magnetic Resonance Imaging  
 THAD: Transient Hepatic Attenuation Difference  
 US: Ultrasound

#### KEYWORDS

Fasciola; Abdominal CT; Abdominal MRI; Fascioliasis; Eosinophilia; Parasite; Liver

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