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Sonographic Findings of Human Fascioliasis

Background/Objective: Ultrasonography is an imaging modality which is easy to use and less expensive than other imaging methods. It is becoming more widely available in regions of the world where *Fasciola hepatica* infestation is prevalent. In this report, we described the sonographic findings of hepatic lesions in patients with fascioliasis.

Patients and Methods: In this cross-sectional study, 248 patients with confirmed hepatic fascioliasis from Guilan province who were referred by internists or infectious disease specialists to private sonographic offices were studied. Abdominal sonography was performed in supine and left decubitus positions using an Aloka 288 scanner and a 3.5 MHz transducer.

Results: Out of 176 hepatobiliary involvement, the right lobe of liver and the periportal area with echoic or hypoechoic lesions, had the most involvement (45.2%). There were lesions in the gallbladder of 34 (13.7%) and biliary tracts of 17 (7%) patients. There was coincident involvement of both liver and biliary tracts in 13 (5.2%) patients.

Conclusion: Sonography is a useful method to confirm hepatobiliary lesions in human fascioliasis and can facilitate the diagnosis of this condition, particularly in areas where it is endemic.

Keywords: fascioliasis, diagnosis, ultrasonic imaging

Introduction

Fascioliasis, a common zoonosis of ruminants occurring worldwide, is caused by the liver flukes, *Fasciola hepatica* or *Fasciola gigantica*. Humans may ingest the infective larva (metacercariae) by eating contaminated aquatic vegetables (especially watercress), by drinking contaminated water or by washing vegetables and kitchen utensils with metacercariae-carrying water.^{1,2} Human disease is endemic in many developing countries in relation to particular alimentary habits and/or poor hygienic conditions where there is a lack of access to safe water and the presence of outdoor defecation.¹

Epidemic outbreaks have primarily been reported in Iran, the Far East, Egypt, South America, and the Caribbean.¹⁻⁴ Recent environmental changes and modifications in human behavior have increased the risk in many populations.^{1,2,5} In Europe, infections related to the consumption of wild watercress occurs sporadically, most frequently in France, Spain, and Portugal.^{1,2,6} In the United Kingdom, fascioliasis has been identified in imported vegetables kept moist during transport.⁷ The metacercariae penetrate the intestines, circulate inside the body, and migrate through the liver, settling in the biliary system where the hermaphrodite flukes mature and start ova-positon.⁸ Patients are classified according to the duration of their symptoms and the ultrasonographic findings. An acute stage (≤ 4 months) is characterized by fever, eosinophilia, and hepatosplenomegaly which coincides with the invasion of the liver by the larvae; a chronic stage (> 4 months) in which symptoms (e.g. biliary colics and obstruction, intermittent jaundice, intercurrent cholangitis, gallstone) are induced by the presence of the adult flukes in the biliary system within 2-3 months.⁶

Serology is highly sensitive and specific both in the acute and chronic phases.

Sometimes, moving parasite within the gallbladder or biliary ducts may be observed by ultrasound; this finding per se is diagnostic for fascioliasis. Sonography is more sensitive than computed tomography (CT) in the biliary phase since thickening of the major bile ducts, motile or dead parasites within the ducts or gallbladder, mild dilatation and edema of the biliary ducts are readily detected by sonography.⁹ In 1989, there was an outbreak of human fascioliasis in Guilan, a northern province of Iran. About 10,000 to 15,000 human infestations were estimated in this area. A second outbreak occurred in 1999 and 30,000 people were infested.^{10,11}

Ultrasonography is an imaging modality, which because of being easy to use and less expensive than other exact methods is becoming more widely available in regions of the world where *Fasciola hepatica* infestation is prevalent.^{12,13} In this report, we described the sonographic findings of hepatic lesions in 248 patients with fascioliasis.

Patients and Methods

In this cross-sectional study, our target population was some conscious patients with suspicious diagnosis of hepatic fascioliasis residing in Guilan province, aged between 18 and 52 years. They were included, if they had a positive anti-fasciola antibody. They were referred by internists or infectious disease specialists to a private radiologic/sonographic practice during September 1997 to March 1999. The Research Ethical Committee of our University approved this study.

Abdominal sonography was performed in supine and left decubitus positions using an Aloka 288 scanner and a 3.5 MHz transducer. Sonography of each case lasted about 5–15 minutes. There was no exclusion until the end of the study. Data were analyzed by SPSS v10 software using χ^2 and *Student's t* tests.

Results

Overall, 248 (170 female and 78 male) patients were enrolled into this study. All had symptoms relevant to fascioliasis. The mean \pm SD age was 40 \pm 2 (range: 18–52) years; 29 (11.7%) patients aged under 20, 113 (45.6%) aged 20–40, and 106 (42.7%) aged over 40 years. These patients were investigated from two to

12 months after the diagnosis of hepatic fascioliasis was made. Fascioliasis was more prevalent in females than males.

Sonographic findings included liver parenchymal, gallbladder and biliary tract involvements (Table 1). Echogenic foci without posterior shadow caused dilatation of proximal common bile duct (CBD) with/without parasite in it in 7.2% of cases. Biliary tract involvement was more common in those aged over 40 years (4%). Gallbladder involvement, including echogenic leaf-like lesions without posterior shadow, was more prevalent in females (10.1%) than males (3.6%); most of these patients aged >40 years (6.9%) (Figure 1). Liver parenchyma was the most frequently involved site; the posterior segment of the right lobe of the liver had the highest involvement (22.2% of patients). This included some echogenic foci with hypoechoic halo which were like metastasis or hypoechoic lesions with ill-defined border adjacent to portal vein (Figure 2, Table 2). Considering the above, sonographic findings were obtained from 176 patients (71%).

Discussion

Sonography can show two types of lesions in the acute phase of fascioliasis. One type usually consists of multiple (occasionally single) non-specific round lesions of variable echogenicity located in both hepatic lobes; sometimes it may have an ill-defined border. These nodular lesions, particularly, if hypoechoic, are not distinguishable from abscess or neoplasm with central necrosis. They vary in size (5–25 mm), occur more frequently in the right than the left hepatic lobe, and are observed in subcapsular locations. After successful treatment, these lesions are decreased in number and size and finally become disappear. The second type of lesion is composed of tunnel-like branching spaces that are better defined after

Table 1. Sonographic findings of fascioliasis

Site	n (%)
Liver Parenchyma	112 (45.2)
Gallbladder	34 (13.7)
Biliary Tracts	17 (7)
Liver and Biliary Tracts	13 (5.2)
No Involvement	72 (29)
Total	248 (100)

injection of contrast medium in CT. These peripherally-located tortuous lesions are caused by migration of parasites through the liver.¹⁴ In some instances, massive intra-hepatic necrosis with sub-capsular hematoma, rupture of a vessel by a penetrating parasite into liver with subsequent hemoperitoneum, well-defined hyperechoic necrotic granuloma of the liver with a peripheral echogenic rim, or hepatic abscesses larger than 6 cm have been reported.¹⁵⁻¹⁸ In the chronic phase of fascioliasis, typical sonographic findings are multiple sites of floating or mobile echogenic material in the gallbladder or biliary tree with no acoustic shadowing.^{16,19} Other non-specific findings are dilatation and irregular wall thickening of the bile ducts.²⁰ Similar findings have been described in sclerosing cholangitis and acquired immunodeficiency syndrome (AIDS)-related cholangitis.²¹

In a sonographic study by Bassily on seven patients with fascioliasis, five had abnormal changes in the biliary tract; in four patients, there was a linear echogenic pattern in the gallbladder. There was biliary tract dilatation and a linear echogenic pattern in the CBD in two and one of them too.²² Richter et al. studied 76 patients with fascioliasis. There was biliary tract abnormality in 52 patients with crescentic parasites in 11 of them.²³ In a study by Cosme on seven patients with acute phase of fascioliasis, sonography revealed some poorly-delimited non-nodular areas of increased echogenicity in the right lobe of the liver of two patients. Sonograms in four patients demonstrated round hypoechoic lesions, 5–25 mm in diameter, in both lobes; 70%–80% of which were located in the right hepatic lobe. In the remaining one, sonography revealed a 5–7 cm complex mass with ill-defined borders, located in the right hepatic lobe, consistent with an abscess.¹⁴

In our study, both hypo- and hyper-echoic lesions were found in the liver of patients. So far, only 25 patients with CBD obstructed by liver fluke have been reported.^{24,25} In another study on patients with fascioliasis, ultrasonography of the upper abdomen showed a fluke density in the gallbladder of 22.2% in children aged 5–14 years as compared to a density of 8.1% in adults.²⁶ In a case report of necrotic granuloma of the liver by human fascioliasis, the sonogram showed a well-circumscribed hyperechoic mass with an echogenic rim which mimicked an organized ab-

cess. Therefore, the possibility of hepatic fascioliasis should be included in the differential diagnosis of organized liver abscess in areas endemic for fascioliasis.¹⁷

In a study by Orhan on patients with fascioliasis, the most common sonographic finding was dilation of

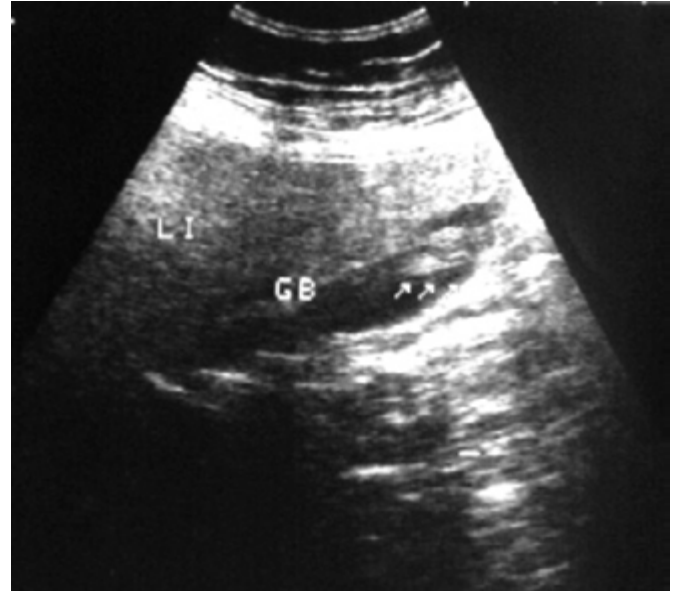


Fig 1. Fasciola in gallbladder.



Fig 2. Multiple hypoechoic lesions of fasciola in liver.

Table 2. Liver parenchyma involvement in different age groups

Age(Yrs)	Site of involvement (%)			
	Ant. Segment	Post. Segment	Left Lobe	Total
< 20	7(2.8)	4(1.6)	2(0.8)	13(4.4)
20–40	14(5.6)	37(12.5)	11(4.4)	56(22.5)
> 40	18(7.3)	20(8.1)	5(2)	43(17.4)
Total	39(15.7)	55(22.2)	18(7.3)	112(45.2)

bile ducts followed by thickening of the bile duct wall, peripheral hypoechoic nodular lesions, and hyperechoic non-shadowing materials filling the CBD.²⁷ However, in our study the most involved region was the parenchymal area, especially in the posterior segment of the right lobe and around the portal vein. Biliary tract and gallbladder involvement was variable; in some patients, there was only dilatation of CBD and *fasciola hepatica* was not seen, probably due to passage of parasite from CBD, though its stimulating effect remains for some days.

We found echogenous foci without posterior shadow in patients with coincident CBD dilatation and presence of fasciola parasite in it. It can be differentiated from stone by the lack of posterior shadow. Of course, in some instances, the parasite was attached to the wall of the gallbladder and its differentiation from cholestrous or adenomatous polyps of echogenous foci without posterior shadow was difficult. Some parasites were mobile and could be easily differentiated from stone or cholestrous/adenomatous polyps. Coincident involvement of liver and biliary tracts was considerable. Some sonographic findings, like mobile echogenous foci without posterior shadow in the gallbladder and biliary tracts, considering the characteristic leaf-shape appearance, are very helpful; especially, in endemic areas where the diagnosis of fascioliasis must be the first impression. In the presence of liver parenchymal involvement, especially in posterior segment of the right lobe and periportal area, we must also consider this diagnosis, although it is less specific.

Since in our study most of the lesions were in the posterior segment of the right lobe of the liver and periportal area, for all patients with these sonographic findings, laboratory tests for the diagnosis of fascioliasis should be requested. Since the disease can be present with mild and atypical symptoms, we believe that it is often left unrecognized and its incidence and health impact may therefore, be underes-

timated.

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