Ömür Gündağ https://orcid.org/0000-0002-6448-3318
Yasemin Kırık https://orcid.org/0000-0001-5952-0180
Zekiye Çatak https://orcid.org/0000-0003-1973-3645

RESEARCH ARTICLE / ARAŞTIRMA
DOI: 10.4274/mjima.galenos.2025.25535.8
Mediterr J Infect Microb Antimicrob 2026;15:25535.8
Erişim: http://dx.doi.org/10.4274/mjima.galenos.2025.25535.8

A Five-Year Single-Center Experience with *Fasciola hepatica* Infection

Fasciola hepatica Enfeksiyonu ile İlgili Beş Yıllık Tek Merkez Deneyimi

Gündağ et al. *Fasciola hepatica* Infection and Our Experience

Ömür Gündağ[1], Yasemin Kırık[1]*, Zekiye Çatak[2]

[1]Elazığ Fethi Sekin City Hospital, Department of Infectious Diseases and Clinical Microbiology, Elazığ, Türkiye
[2]Elazığ Fethi Sekin City Hospital, Department of Medical Biochemistry and Clinical Biochemistry, Elazığ, Türkiye

Yasemin Kırık MD, Elazığ Fethi Sekin City Hospital, Department of Infectious Diseases and Clinical Microbiology, Elazığ, Türkiye
dryasmin44@yahoo.com
0000-0001-5952-0180

Cite this article as: Gündağ Ö, Kırık Y, Çatak Z. A five-year single-center experience with *Fasciola hepatica* infection. Mediterr J Infect Microb Antimicrob.

04.07.2025
08.12.2025

Epub: 08.01.2026
Published:

Abstract
Introduction: *Fasciola hepatica* infection (fascioliasis) is an uncommon zoonotic parasitic disease in humans that primarily involves the hepatobiliary system. It may present with a broad spectrum of clinical manifestations, ranging from obstructive jaundice and cholangitis to chronic biliary inflammation and cirrhosis. This study aimed to describe the clinical, laboratory, and radiological characteristics of fascioliasis cases diagnosed over a five-year period in a tertiary care center and to highlight its relevance in differential diagnosis.
Materials and Methods: We conducted a retrospective review of adult patients diagnosed with *Fasciola hepatica* infection between 2020 and 2025 at Elazığ Fethi Sekin City Hospital. Hospital records, electronic files, and discharge summaries were examined. Clinical presentations, laboratory parameters, and radiological findings at initial admission and at one-month follow-up were evaluated. Analyses were performed using SPSS version 25, and appropriate statistical tests were applied according to data distribution.
Results: Twenty-six patients met the inclusion criteria (mean age: 51 ± 10.93 years; 73% female). Most patients lived in rural areas (61.5%). Abdominal pain was reported in 50% of cases, and peripheral eosinophilia was documented in all patients. Ultrasonography, computed tomography, and magnetic resonance imaging frequently suggested malignancy (69.2%); however, these lesions regressed after treatment with triclabendazole. Significant reductions were observed in alkaline phosphatase (ALP), lactate dehydrogenase (LDH), eosinophil percentage, and leukocyte count, while serum albumin levels increased after treatment ($p < 0.001$). Stool microscopy was performed in two patients but failed to detect parasitic eggs.
Conclusion: Fascioliasis should be considered in the differential diagnosis of hepatic lesions, particularly in patients from rural settings who present with eosinophilia and abdominal pain. Early diagnosis can be achieved through a combination of serology, imaging modalities, and strong clinical suspicion. ALP, LDH, and eosinophil levels are valuable, non-invasive indicators for monitoring treatment response.
Keywords: Eosinophilia, *Fasciola hepatica*, hepatic lesions, parasitic infection, triclabendazole

Öz
Giriş: Fasiyoliyazis, insanlarda nadir görülen bir paraziter enfeksiyon olup, safra yollarını etkileyebilir ve obstrüktif sarılık ile kolanjitten siroza kadar geniş bir klinik yelpazede bulgu verebilir. Bu çalışmanın amacı, üçüncü basamak bir sağlık merkezinde beş yıl içinde tanı konulan fasiyoliyazis vakalarının klinik, laboratuvar ve radyolojik bulgularını tanımlamak ve ayırıcı tanıdaki yerine dikkat çekmektir.
Gereç ve Yöntem: Elazığ Fethi Sekin Şehir Hastanesi'nde 2020–2025 yılları arasında *Fasciola hepatica* tanısı alan erişkin hastaların dahil edildiği retrospektif bir çalışma yürütüldü. Hastane kayıtları, dosyalar ve taburcu özetleri incelendi. Başvuru anındaki ve birinci ay takiplerindeki klinik, laboratuvar ve radyolojik bulgular SPSS v25 programı ile değerlendirildi. Verilerin dağılımına göre uygun istatistiksel testler uygulandı.

Bulgular: Çalışmaya 26 hasta dahil edildi (ortalama yaş: 51 ± 10,93 yıl; %73'ü kadın). Hastaların çoğu (%61,5) kırsal bölgelerde yaşamaktaydı. %50'sinde karın ağrısı mevcutken, tüm vakalarda eozinofili saptandı. Görüntülemelerde hastaların %69,2'sinde malignite şüphesi oluşmuş, ancak triklabendazol tedavisini takiben lezyonlarda gerileme gözlenmiştir. Tedavi sonrası alkalen fosfataz (ALP), laktat dehidrogenaz (LDH), eozinofil ve lökosit düzeylerinde anlamlı azalma, albümin seviyelerinde ise artış saptandı (p<0,001). Dışkı mikroskopisinde yumurta iki hastada araştırılmış, ancak saptanamamıştır.
Sonuç: Fasiyoliyazis, özellikle eozinofili ve karın ağrısı olan ve kırsal kökenli hastalarda hepatik lezyonların ayırıcı tanısında dikkate alınmalıdır. Klinik şüpheyle birlikte serolojik testler ve görüntüleme yöntemleri erken tanıyı kolaylaştırır. ALP, LDH ve eozinofil düzeyleri tedavi yanıtının izlenmesinde faydalı, invaziv olmayan parametrelerdir.
Anahtar Kelimeler: Eozinofili, *Fasciola hepatica*, hepatik lezyon, paraziter enfeksiyon, triklabendazol

Introduction

Fascioliasis is a neglected tropical disease caused by *Fasciola hepatica* and *Fasciola gigantica*, and it poses a significant global public health concern, particularly in endemic regions. Approximately 50% of infected individuals remain asymptomatic[1]. The prevalence of foodborne zoonotic trematode infections may reach up to 21% in tropical and subtropical areas, and fascioliasis disproportionately affects rural communities. An estimated 180 million people worldwide are at risk of infection. The parasite primarily invades the hepatic and biliary systems of mammals—including humans and livestock—resulting in substantial pathological damage. Although ruminants such as sheep, goats, and cattle serve as the main hosts, humans become infected as accidental hosts. *Fasciola hepatica* is a leaf-shaped trematode measuring approximately 2–4 cm in length[1].

Human infection occurs through ingestion of water or aquatic plants contaminated with metacercariae, the infective larval stage[3]. After passing through the stomach, the larvae penetrate the duodenal wall, migrate into the peritoneal cavity, and then traverse the liver capsule to reach the biliary tree[4]. Human fascioliasis progresses through two distinct clinical stages: the hepatic and biliary phases. The hepatic phase typically begins 1–3 months after ingestion of metacercariae and involves larval migration from the liver parenchyma into the bile ducts[1,4,5]. Common manifestations during this stage include abdominal pain, fever, eosinophilia, and elevated liver function test results[4,6,7,8,9–11]. The biliary phase commonly presents with intermittent right upper quadrant pain, with or without features of cholangitis or cholestasis[12–14].

Extrahepatic manifestations may also occur during the acute phase, likely mediated by immunologic or allergic mechanisms. Reported findings include Löffler syndrome, right-sided pleural effusion with eosinophilia, urticaria associated with pruritus and dermatographism, and, rarely, pericarditis, cardiac conduction abnormalities, meningeal symptoms, focal neurological deficits, or seizures[12–14].

In non-endemic settings, diagnosis is frequently delayed because of the disease's rarity and its overlapping clinical features with other hepatobiliary conditions[1,4]. Serological testing is particularly valuable for early diagnosis because assays typically yield positive results during the early migration phase—before eggs are detectable in stool samples. These tests include indirect hemagglutination, complement fixation, counterimmunoelectrophoresis, immunofluorescence, and enzyme-linked immunosorbent assay. Although serological tests demonstrate high sensitivity, their specificity remains suboptimal. Imaging modalities such as computed tomography (CT) and magnetic resonance imaging (MRI) aid diagnosis in the hepatic phase, whereas ultrasonography (USG) is more informative during the biliary phase[8,9]. Nevertheless, definitive diagnosis should be supported by both serological and parasitological evidence.

Triclabendazole is the treatment of choice for fascioliasis. When triclabendazole is unavailable or when patients fail to respond to therapy, alternative agents—such as nitazoxanide, albendazole, or bithionol—may be considered[2].

Although fascioliasis is considered uncommon, it is encountered more frequently in rural regions of our country where pastoral lifestyles and livestock exposure are prevalent. In clinical practice, the disease may be radiologically misinterpreted as a hepatic tumor, metastatic lesion, or cholecystitis/cholestasis. In this study, we aimed to increase clinical awareness of fascioliasis and to highlight that patients from rural areas who present with eosinophilia and are initially evaluated for malignancy or biliary pathology may, in fact, have underlying *Fasciola* infection.

Materials and Methods

This retrospective study included adult patients diagnosed with *Fasciola hepatica* infection between 2020 and 2025 at**.....**

Patient information was collected from the hospital information system, medical records, and discharge summaries. Laboratory investigations comprised complete blood count, aspartate aminotransferase (AST), alanine aminotransferase (ALT), lactate dehydrogenase (LDH), gamma-glutamyl transferase (GGT), total and direct bilirubin, serum albumin, coagulation parameters, and *Fasciola hepatica* indirect hemagglutination assay (IHA) tests. Stool examinations were not performed in all patients due to the limited sensitivity of egg detection in chronic infection and because some patients presented during the acute phase when eggs are not yet detectable.

Abdominal USG was performed in all patients as the primary imaging modality. Patients with suspicious lesions on USG underwent further evaluation with MRI or CT. One patient presenting with clinical features of cholestasis underwent diagnostic endoscopic retrograde cholangiopancreatography (ERCP). All patients were followed from initial presentation up to six months after treatment.

The study was approved by the Elazığ Fethi Sekin City Hospital Non-Interventional Research Ethics Committee (approval number: 268525027, dated: 06.02.2025).

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 20.0 (IBM Corp., Armonk, NY, USA). Normality of variable distributions was assessed using visual inspection and analytical tests (Kolmogorov–Smirnov and Shapiro–Wilk tests). Normally distributed continuous variables were analyzed using the paired-samples t-test, whereas non-normally distributed variables were analyzed using the Wilcoxon signed-rank test. Categorical variables were evaluated using the McNemar test. Non-parametric variables are reported as median and interquartile range. A p-value < 0.05 was considered statistically significant.

Results

In this study, 26 patients were diagnosed with *Fasciola hepatica* infection. The mean age was 51 ± 10.9 years, and the female-to-male ratio was 19:7, indicating a higher prevalence among females (73.1%). Most patients resided in rural areas (61.5%, n = 16), whereas 38.5% (n = 10) were from urban regions (Table 1).

Abdominal pain was reported in 13 patients (50%), while nausea and weight loss were each observed in 4 patients (15.3%). Jaundice was present in only one patient, and another experienced intermittent diarrhea for one month. Physical examination revealed mild right upper quadrant tenderness in 12 patients (46.2%) and hepatomegaly in 3 patients (11.5%).

All patients had a positive IHA test. Radiological imaging (MRI, CT, or ultrasound) suggested a "tumor/metastasis?" in 69.2% of cases (n = 18), whereas only 28.7% (n = 7) were reported as "suspected *Fasciola hepatica*" (Figure 1). Lesions initially interpreted as tumors or malignancies resolved after treatment, a difference that was statistically significant ($p < 0.001$). Imaging studies were normal in 8 patients. One patient was diagnosed during ERCP, where the parasite was directly visualized; this patient also tested positive by IHA and had been initially hospitalized with a preliminary diagnosis of cholecystitis.

Eosinophilia was present in all patients upon admission. Pre- and post-treatment laboratory values during the first month are presented in Table 2. Alkaline phosphatase (ALP), LDH, GGT, AST, eosinophil count, and leukocyte count significantly decreased after treatment, whereas albumin levels increased (all $p < 0.001$). No significant changes were observed in ALT, total or direct bilirubin, coagulation parameters, or platelet count between admission and post-treatment assessments.

Microscopic stool examination was performed in only two patients; *Fasciola hepatica* eggs were not detected in either case.

All patients received a single oral dose of triclabendazole (10–12 mg/kg), repeated after two weeks. No adverse effects were reported. Patients in the hepatic phase did not receive antibiotics, whereas one patient in the biliary phase was treated with ceftriaxone for seven days due to an initial diagnosis of cholecystitis.

Clinical improvement, resolution of eosinophilia, and reduction in hepatic lesion size were observed in all patients at the one-month follow-up. Complete clinical and laboratory recovery was achieved in all patients by six months.

Discussion

Fascioliasis is an infectious disease caused by the liver flukes *Fasciola hepatica* and *Fasciola gigantica*, primarily affecting ruminants such as sheep, goats, and cattle, with humans serving as incidental hosts[4]. In most human cases, the clinical course is mild. The incidence of *Fasciola hepatica* infection has increased since the 1980s, and several geographic regions have been identified as endemic for human fascioliasis[5,6]. In our country, research has predominantly focused on animals, with limited studies involving humans; consequently, the true prevalence of human fascioliasis remains unknown[16,17]. A separate study in our province reported a seroprevalence of *Fasciola hepatica* immünoglobulin G of 2.78%[18].

Diagnosis of fascioliasis can be challenging in non-endemic areas due to its rarity and potential confusion with other hepatic or biliary diseases, often resulting in delayed identification. Traditionally, diagnosis relies on detection of parasite eggs in stool samples; however, this method is unreliable because of typically low egg output[4,7]. Serological tests, which generally become positive during the early hepatic migratory phase before eggs are detectable in stool, are valuable for early diagnosis. Although these tests demonstrate good sensitivity, their specificity is limited due to potential cross-reactivity with other parasitic infections[4,7,18,19]. In our study, all patients tested positive for *Fasciola hepatica* using the IHA test, while stool examinations conducted in two patients did not detect parasite eggs.

In endemic regions, very young children and women are more frequently affected by fascioliasis. Studies from Türkiye have also reported a female predominance[20,21], which is consistent with our findings.

Eosinophilia was present in all patients (n = 26) at initial presentation. The mean eosinophil count decreased from 5,896.9/μL at admission to 1,168.9/μL post-treatment, a statistically significant reduction. These results support the use of eosinophil count as a reliable laboratory parameter for both suspecting and monitoring fascioliasis.

The mean leukocyte count at presentation was 12,746.2/μL, which decreased to 8,656.2/μL after treatment. At admission, 61.5% of patients (n = 16) had leukocyte counts above 11,000/μL (reference range in adults according to Tietz: $4.5–11.0 \times 10^9$/L), which declined to 15.4% (n = 4) following treatment. This difference was statistically significant ($p < 0.001$). The elevated leukocyte counts at baseline were primarily due to eosinophilia, and levels decreased in parallel with eosinophil counts after treatment.

The mean albumin level increased from 40.1 mg/dL at admission to 42.6 mg/dL at follow-up. Although baseline albumin levels were within the normal range in all patients, the increase was statistically significant ($p < 0.001$), suggesting that fascioliasis may transiently impair hepatic albumin synthesis due to hepatocellular involvement.

In fascioliasis, elevated ALP is thought to reflect hepatocellular and biliary injury[19,22]. In our study, the mean ALP level at presentation was 167.96 mg/dL (range: 69–296), which decreased to 110.6 mg/dL (range: 50–206) post-treatment. This reduction was statistically significant ($p < 0.001$), supporting the use of ALP as a marker for evaluating treatment response.

Elevated LDH in fascioliasis likely reflects hepatocellular damage. The mean LDH level at presentation was 238.85 mg/dL (range: 16–383), decreasing to 206.96 mg/dL (range: 144–291) after treatment, with a statistically significant difference ($p < 0.001$). No significant changes were observed in GGT, bilirubin, or coagulation parameters before and after treatment.

Triclabendazole, an imidazole derivative, is effective against all developmental stages of *Fasciola* spp. It is typically administered as a single dose of 10 mg/kg, repeated after 2–4 weeks; in severe cases, a dose of 20 mg/kg may be used. Treatment efficacy exceeds 90% in most cases[17]. Response is monitored by reductions in eosinophil counts, disappearance of eggs in stool, decreased antibody titers, and regression in radiological findings[23–25]. Stool examinations were not performed in all patients due to the low sensitivity of egg detection in chronic fascioliasis.

Conventional imaging modalities such as MRI and CT are commonly used for diagnosis[20]. ERCP has recently gained prominence, particularly in diagnosing biliary-phase fascioliasis. In our country, Tuna et al.[24] reported a 44-year-old patient diagnosed via ERCP who presented with abdominal pain, nausea, and vomiting. In our cohort, 18 patients had liver lesions suspicious for tumors or metastases on abdominal CT or MRI. One patient was diagnosed via ERCP, highlighting the utility of this technique in selected cases. In contrast, only seven patients had imaging findings suggestive of *Fasciola hepatica*. These observations emphasize that fascioliasis should be included in the differential diagnosis of hepatic masses or suspected metastases, particularly in patients presenting with abdominal pain and eosinophilia.

Conclusion

Fascioliasis is an underdiagnosed yet treatable parasitic infection. In regions with rural populations, it should be considered in patients presenting with eosinophilia, hepatic lesions, or abdominal pain. Non-invasive biomarkers, including ALP, LDH, and eosinophil counts, are useful for monitoring treatment response. Our findings contribute to the growing body of literature on fascioliasis and underscore the value of serological and imaging tools for early diagnosis.

Ethics

Ethics Committee Approval: The study was approved by the Elazığ Fethi Sekin City Hospital Non-Interventional Research Ethics Committee (approval number: 268525027, dated: 06.02.2025).
Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: Ö.G., Z.Ç., Concept: Ö.G., Y.K., Design: Ö.G., Y.K., Data Collection or Processing: Ö.G., Y.K., Z.Ç., Analysis or Interpretation: Ö.G., Y.K., Literature Search: Ö.G., Z.Ç., Writing: Ö.G., Y.K., Z.Ç.
Conflict of Interest: No conflict of interest was declared by the authors.
Financial Disclosure: The authors declared that this study received no financial support.

References

1. Singh AK, Dhar J, Sinha SK, Samanta J. A curious case of walking cholangitis in a nonendemic region: hepatobiliary fascioliasis. ACG Case Rep J. 2025;12(5):e01700.
2. Henao-Martínez AF, Celis-Salinas JC, Casapia-Morales M, Ramirez-García EA, Chastain DB, Hidron A, Franco-Paredes C, Agudelo Higuita NI, Marcos LA. Characterization of the clinical features, laboratory findings, and outcomes of human fascioliasis in a global network: a retrospective multicenter study. Ther Adv Infect Dis. 2025;12:20499361251365508.
3. Rohloff L, Neumayr V, Concu M, Ruf MT, Thimme R, Serr A, Rieg S. Fascioliasis acquired in Central Asia. J Travel Med. 2025;32(3):taaf021.
4. Lim JH, Mairiang E, Ahn GH. Biliary parasitic diseases including clonorchiasis, opisthorchiasis and fascioliasis. Abdom Imaging. 2007;33:157–65.
5. Parkinson M, O'Neill SM, Dalton JP. Endemic human fasciolosis in the Bolivian Altiplano. Epidemiol Infect. 2007;135:669–74.
6. Mas-Coma MS, Esteban JG, Bargues MD. Epidemiology of human fascioliasis: a review and proposed new classification. Bull World Health Organ. 1999;77:340–6.
7. Koç Z, Ulusan S, Tokmak N. Hepatobiliary fascioliasis: imaging characteristics with a new finding. Diagn Interv Radiol. 2009;15:247–51.
8. Kabaalioğlu A, Cubuk M, Senol U, Cevikol C, Karaali K, Apaydin A, Sindel T, Lüleci E. Fascioliasis: US, CT, and MRI findings with new observations. Abdom Imaging. 2000;25:400–4.
9. Salahshour F, Tajmalzai A. Imaging findings of human hepatic fascioliasis: a case report and review of the literature. J Med Case Rep. 2021;15(1):324.
10. Teichmann D, Grobusch MP, Göbels K, Müller HP, Koehler W, Suttorp N. Acute fascioliasis with multiple liver abscesses. Scand J Infect Dis. 2000;32:558–60.
11. Aksoy DY, Kerimoğlu U, Oto A, Ergüven S, Arslan S, Ünal S, Batman F, Bayraktar Y. Fasciola hepatica infection: clinical and computerized tomographic findings of ten patients. Turk J Gastroenterol. 2006;17(1):40–5.
12. Bektaş M, Dökmeci A, Cinar K, Halici I, Oztas E, Karayalcin S, Idilman R, Sarioglu M, Ustun Y, Nazligul Y, Ormeci N, Ozkan H, Bozkaya H, Yurdaydin C. Endoscopic management of biliary parasitic diseases. Dig Dis Sci. 2010;55(5):1472–8.
13. Ozer B, Serin E, Gumürdülü Y, Gür G, Yilmaz U, Boyacioğlu S. Endoscopic extraction of living Fasciola hepatica: case report and literature review. Turk J Gastroenterol. 2003;14:74–7.
14. Gulsen MT, Savas MC, Koruk M, Kadayifci A, Demirci F. Fascioliasis: a report of five cases presenting with common bile duct obstruction. Neth J Med. 2006;64:17–9.
15. Azab M el-S, el Zayat EA. Evaluation of purified antigens in haemagglutination test (IHA) for determination of cross-reactivities in diagnosis of fascioliasis and schistosomiasis. J Egypt Soc Parasitol. 1996;26:677–85.
16. Boşnak VK, Karaoğlan I, Sahin HH. Evaluation of patients diagnosed with fascioliasis: a six-year experience at a university hospital in Turkey. J Infect Dev Ctries. 2016;10(4):389–94.
17. Graham CS, Brodie SB, Weller PF. Imported Fasciola hepatica infection in the United States and treatment with triclabendazole. Clin Infect Dis. 2001;33(1):1–5.
18. Kaplan M, Kuk S, Kalkan A, Demirdağ K, Ozdarendeli A. Fasciola hepatica seroprevalence in the Elazığ region. Mikrobiyol Bul. 2002;36(3–4):337–42.
19. Ersoy O. Evaluation of elevated liver enzymes. Ankara Med J. 2012;12(3):129–35.
20. Tunç N. Fasciola hepatica infection: demographic, radiological, laboratory findings and their role in acute and chronic differentiation. FLORA. 2019;24(4):369–76.
21. Binici İ. Retrospective analysis of cases diagnosed with Fasciola hepatica infestation. Van Tıp Derg. 2023;30(1):99–104.
22. Centers for Disease Control and Prevention (CDC). DPDx: Fascioliasis [Internet]. Atlanta: CDC; [cited 2020 Nov 11]. Available from: https://www.cdc.gov/dpdx/fascioliasis/index.html
23. Yılmazer G, Kırık SY, Demir NA, Sümer Ş, Kılınçer A. PS-150: Karın ağrısı etiyolojisi ile araştırılan Fasciola hepatica olgularımız. Mediterr J Infect Microb Antimicrob. 2022;11(Suppl 1):238–239.

24. Tuna Y. Endoscopic management of biliary fasciolosis. Cumhuriyet Med J. 2011;33:469–72.
25. Sağmak Tartar A, Aşan MA, Bozdağ A, Bahçecioğlu İH, Akbulut A, Demirdağ K. Fasciola hepatica diagnosis: clinical and laboratory clues from a university hospital experience. Turkiye Parazitol Derg. 2025;49(2):58–62.

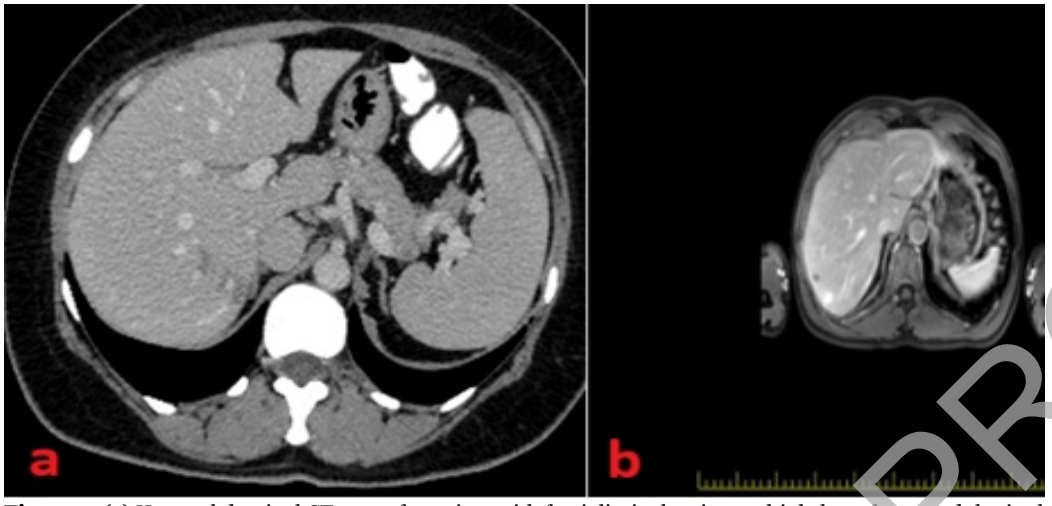

Figure 1. (a) Upper abdominal CT scan of a patient with fascioliasis showing multiple hypodense nodules in the liver with a heterogeneous appearance, diffusely distributed but predominantly central. (b) Upper abdominal CT scan of a patient with fascioliasis demonstrating a heterogeneously hypodense nodule located peripherally in the liver.

Table 1. Demographic datas.

Parameter	Value
Age (mean ± SD)	51 ± 10.94
Sex (F/M)	19 (73%)/7 (27%)
Rural/urban	16 (61.5%)/10 (38.5%)

Table 2. Laboratory parameters before and after treatment.

n = 26 patients	Pre-treatment (mean)	Post-treatment (mean)	p-value
ALP	167	110	<0.001
LDH	238	206	<0.001
Eosinophil	5896	1168	<0.001
Leukocyte	12746	8656	<0.001
Albumin	40	42	<0.001