

ORIGINAL ARTICLE

Medicine Science 2021;10(3):779-82

Radiological imaging findings of the hepatic tuberculosis

 Mustafa Koc*Firat University, Faculty of Medicine, Department of Radiology, Elazig, Turkey*

Received 25 February 2021; Accepted 12 March 2021

Available online 09.08.2021 with doi: 10.5455/medscience.2021.02.060

Copyright@Author(s) - Available online at www.medicinescience.org

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



Abstract

This study aims to investigate the radiological findings of hepatic tuberculosis. Imaging findings of 8 patients diagnosed with biopsy-proven hepatic tuberculosis from January 2015 to March 2021 were retrospectively reviewed. The diagnosis of these cases was confirmed by ultrasound-guided biopsy. The patients were between the ages of 24-72. Four patients had only parenchymal tuberculosis and eight patients had mixed parenchymal and bile duct involvement. Parenchymal tuberculosis patients showed hypoechoic nodules in Ultrasonography (US). In Computed Tomography (CT), poorly contrasted hypodense nodules with central calcification adjacent dilated intrahepatic ducts were seen. Magnetic Resonance Imaging (MRI) findings were correlated with CT. Most patients had more than one lesion. Two patients with a single lesion. The sizes of the lesions varied between 0.5 and 6 cm. Seven patients with bile duct involvement showed hilar stenosis involving the intrahepatic ducts and common bile duct. Parenchymal atrophy was seen in 5 patients. Pulmonary and other organ involvement of tuberculosis was seen in 5 patients. In conclusion, Hepatic tuberculosis should be kept in mind multiple lesions in the liver, including calcification, accompanied by atrophy and bile duct enlargement especially in the presence of active pulmonary tuberculosis.

Keywords: Liver, tuberculosis, ultrasonography, computed tomography

Introduction

Tuberculosis (TB) has affected humanity and has been associated with poverty, malnutrition, overcrowding, and immunosuppression. It is a common disease seen especially in low socioeconomic groups in underdeveloped and developing countries. First, the diagnosis is confirmed, patients are usually treated with anti-TB therapy, and the prognosis is good.

TB appears as a systemic disease frequently. Hepatic TB is rare [1,2]. It is difficult to diagnose due to clinical findings that are not specific to hepatic TB. Also, imaging findings are non-specific. Indirect findings are thought in the first clinical and radiological evaluations [3]. Histopathological tissue sampling and microbiological evaluation are required for definitive diagnosis [4].

Radiological imaging can be done by ultrasonography (US), computed tomography (CT), and magnetic resonance imaging (MRI). Besides, endoscopic ultrasonography (EUS) and endoscopic retrograde cholangiography (ERCP) can be used to aid diagnosis [3].

Different classifications are proposed for hepatic TB. Some of them classify hepatic TB into the parenchymal type and sero-hepatic type. TB cholangitis is considered as a separate radiological/pathological entity. Some classify TB cholangitis as part of parenchymal hepatic TB. Parenchymal type is the most common type. It can also sub-divided into the nodular, military, and mixed types [5,6].

If the radiological imaging (US, CT, MRI) features of hepatic TB have been defined, also these lesions are not specific for hepatic TB. The cases are required for histopathological or bacteriological information.

The present study evaluated radiological findings of hepatic TB with the review of contemporary literature.

*Corresponding Author: Mustafa Koc, Firat University, Faculty of Medicine, Department of Radiology, Elazig, Turkey
E-mail: mkoc44@yahoo.com

Materials and Methods

Imaging findings of 8 patients diagnosed with biopsy-proven hepatic tuberculosis from February 2015 to November 2020 were reviewed retrospectively. Ethics committee approval received from the Institutional Ethics Committee of Firat University (number and date: 29/05/2020, 392147). The diagnosis of the patients was confirmed by a US-guided biopsy.

The average age of patients was 23-71 (mean age is 42 years). There were four males and four female patients. The patients were referred to the abdomen radiology department to investigate intraabdominal mass.

The eight patients who have CT, US, MRI, MR cholangiopancreatography (MRCP) images reviewed retrospectively. The radiological imaging findings of them were evaluated with the diagnostic value.

Toshiba Aquilion 128 slice CT scanner was used to achieve CT images of the cases. 1.5T MRI device (Philips Ingenia, USA) was used for MRI scanning. B0, B100 and B600 (mm²/s) values were used in Diffusion MRI. For hepatic lesions, US-guided biopsy was performed.

Results

Five patients having parenchymal TB were observed. Three patients had a parenchymal and biliary duct involvement. Most of the patients had multiple focuses on the liver. There was a single lesion in two patients. The sizes of the lesions varied between 0.6 and 7.2 cm. Five patients showed hilar stenosis with intrahepatic and common bile duct involvement. Parenchymal atrophy was seen in 5 patients. Pulmonary and other organ involvement of tuberculosis was seen in 5 patients. In parenchymal tuberculous patients, multiple hypoechoic nodules were noted in the US (Figure 1). On CT, the lesions were seen with multiple hypodense

nodules. Also, the lesions had a poor rim enhancement, central calcifications, with adjacent dilated intrahepatic bile ducts (Figure 2a, b). On MRI imaging, they were seen hypointense on T1-weighted (W) and hyperintense on T2W sequences (Figure 3a, b). Lesions did not show contrast enhancement on dynamic contrast-enhanced MRI (Figure 4a, b). Diffusion restriction was noted in the lesions in diffusion MRI (Figure 5a, b).

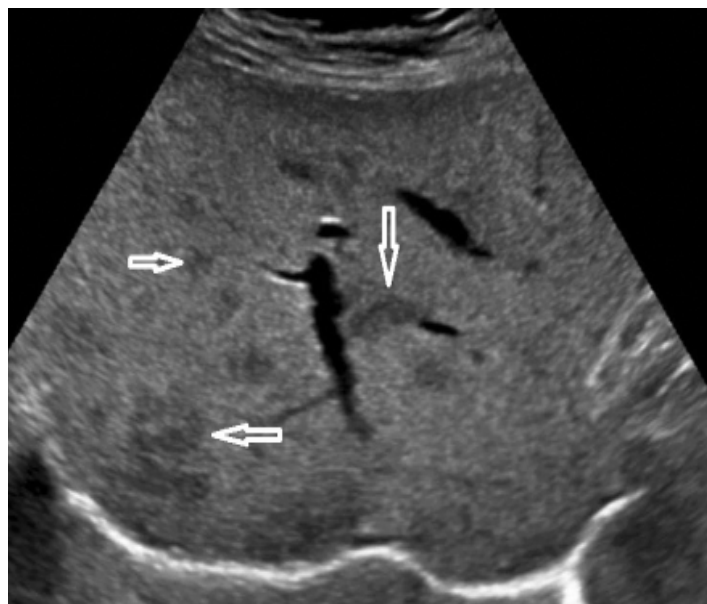


Figure 1. In parenchymal tuberculous patients, multiple hypoechoic nodules were seen on the US (arrows)

Extrahepatic TB should be investigated in patients with hepatic TB. In our cases, 4 patients had pulmonary TB. One of the patients had TB of the tibia bone. Splenic involvement was observed in two patients. Four patients had lymphadenopathy in the abdomen. One patient had ascites. One patient had adrenal and right kidney involvement. Also, two patients had vertebral TB.



Figure 2 a-b. Upper abdominal CT with I.V. contrast enhancement showed hypodense nodules with poor rim enhancement in liver and spleen (a), central calcification, and adjacent dilated intrahepatic ducts (b) (arrows)

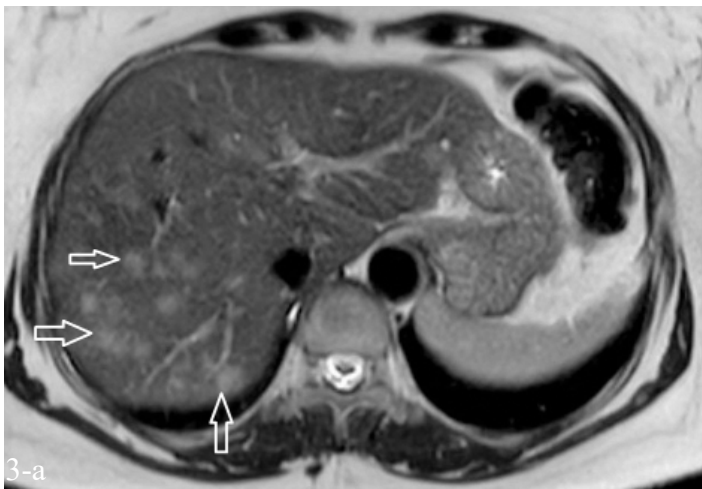


Figure 3 a-b. Liver tuberculosis is hyperintense on axial T2 weighted MRI sequences (a) with fat saturation (b) (arrows).

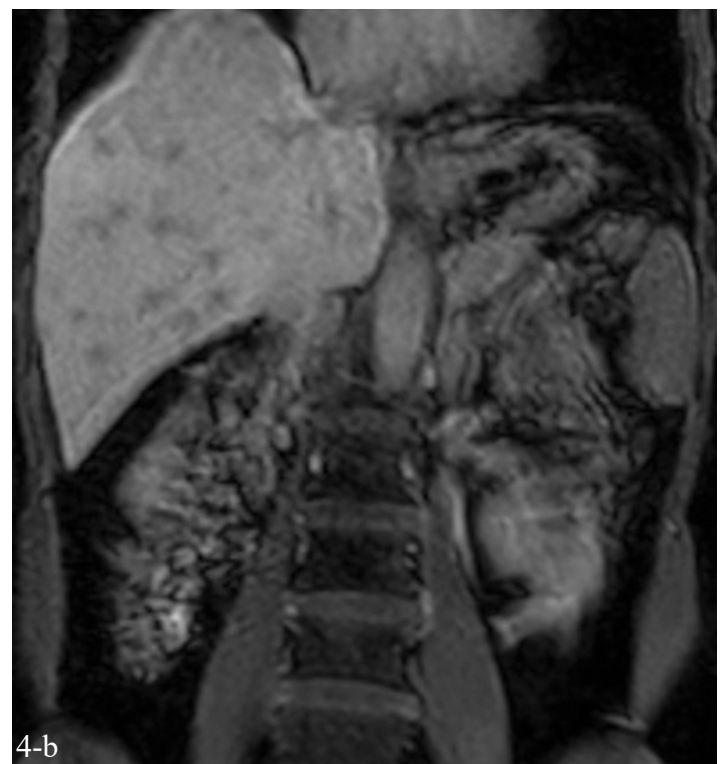
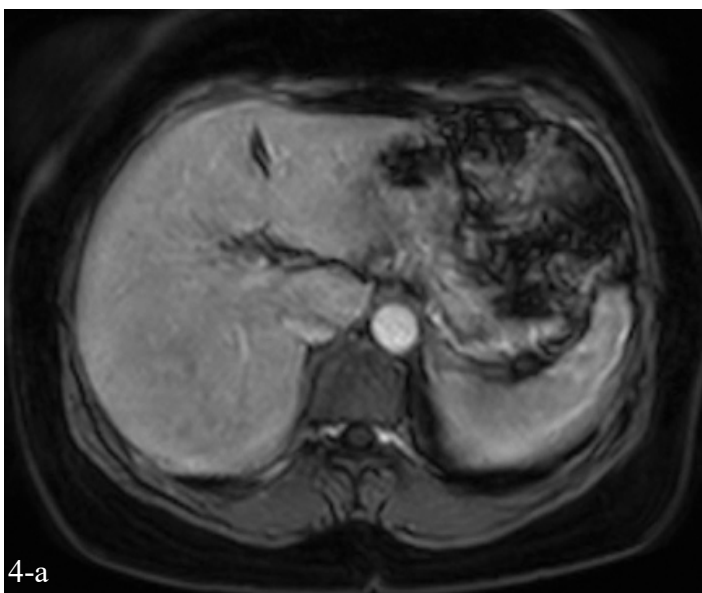


Figure 4 a-b. Lesions did not show contrast enhancement on dynamic contrast-enhanced liver MRI, axial (a), coronal (b)

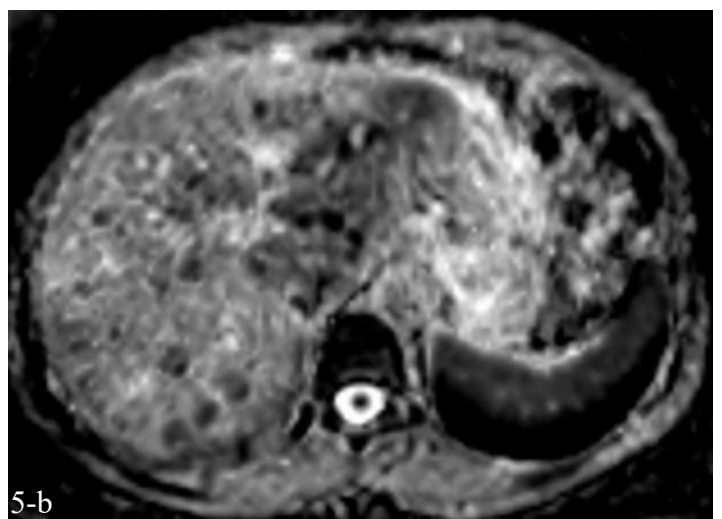
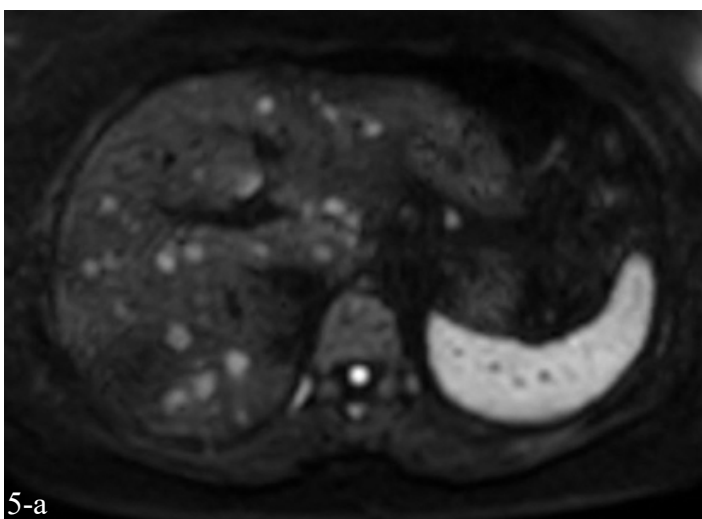


Figure 5 a-b. Diffusion restriction was noted in the lesions with diffusion MRI (a), on ADC map (b)

Discussion

Tuberculosis is a common disease all over the world, especially in developing countries. Despite public health advances and effective treatments, still, TB is caused significant morbidity and mortality. The outbreak of intravenous drug abuse, an acquired immunodeficiency syndrome (AIDS), and an increase in the number of immune-deficiency patients increase the incidence of TB [7].

Extrapulmonary involvement in TB generally refers to the involvement of the gastrointestinal organs, spleen, pancreas, hepatobiliary, and abdominal lymph nodes. The small intestine is the most frequently affected area followed by the peritoneum, large intestine, liver (14.6 %) [1,3].

Primary hepatic TB is rare. It usually develops as a result of a miliary spread from the tuberculosis focus in another part of the body. Often causes jaundice and hepatomegaly [8]. Primary liver tuberculosis and tuberculoma are rarely reported in the literature, and the vast majority have been described as abscesses or small round tubercles. Macronodular tuberculomas a few cm in diameter, especially non-calcified forms, have been reported rarely [9].

Hepatic TB is most frequently located in the liver, for parenchymal organs in the upper abdomen. The liver is a suitable organ for granulomatous infection due to its rich blood volume. Its incidence is also increasing. Cholangitis with the biliary obstruction or if biliary strictures develop, they become symptomatic [10,11]. Hence, hepatic TB is likely underdiagnosed. In general, it appears in the young age average, diagnosis with early treatment is necessary to reduce mortality and morbidity.

Jaundice and hepatomegaly, are common clinical signs and symptoms [10]. Other signs of liver TB include low-grade fever, abdominal pain, night sweats, fatigue, and weight loss. Anemia, abnormal hepatic function, increased erythrocyte sedimentation rate, a positive tuberculin test, hypercalcemia are other laboratory signs [12].

The most common type is the parenchymal type, which can also be subdivided into nodular, miliary, and mixed TB. The parenchymal form also is the dominant type.

Imaging findings of nodules were hypoechoic in the US. Parenchymal lesions in our case showed weak peripheral enhancement. These findings were evaluated in accordance with the granulation tissue surrounding the developing central caseous necrosis. Calcifications ranging from small isolated or coarse calcification were observed in our series. Parenchymal tuberculosis macro nodules generally appear hypodense on CT and show mild peripheral enhancement. Differential diagnoses should be made with metastasis, pyogenic abscesses, or lymphoma due to their appearance. Intrahepatic dilated ducts and nodal or coarse calcification can suggest the diagnosis of hepatic TB. MRI lesions were hypointense on T1- and hyperintense on T2-weighted images. diffusion restriction may appear in Diffusion MRI and Apparent Diffusion Coefficient (ADC) map. The contrast enhancement is similar to CT [1,3].

Hepatobiliary TB is a difficult condition to treat as it can have reactivation. Early diagnosis and treatment options to reserved

liver function. Detailed knowledge and awareness of the spectrum of symptoms are important because the timely diagnosis of extrapulmonary TB is delayed. First, clinical suspicion is required for TB; however, histopathological examination with biopsy gives a definitive diagnosis [4]. Delaying for treatment can lead to liver failure. Often looking at the involvement of other organs while evaluating imaging findings. It should be kept in mind that malignancies and other diseases can be seen together.

Anti-TB treatment is effective in early diagnosed patients. The prognosis for the liver is generally good with early diagnosis and treatment. Rifampicin, isoniazid, ethambutol, and pyrazinamide are anti-TB drug. Recommended medical treatment for at least 1 year. Surgical procedures may include liver segmentectomy, enucleation, local excisions, abscess, and biliary drainage.

In conclusion, radiological modalities (US, CT, MRI, MRCP) can contribute to the diagnosis of liver TB. Although the miliary patterns or calcifications are characteristic, there is no pattern pathognomonic completely. Definitive diagnosis depends on histopathological and microbiological tests. Especially in risk groups, the presence of characteristic imaging findings may encourage reaching a diagnosis.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

All authors declare no financial support.

Ethical approval

Ethics committee approval received from the Institutional Ethics Committee of University (29/05/2020 2020/08-34).

References

- Schinina V, Albarello F, Cristofaro M, et al. Diagnostic imaging of hepatic tuberculosis: case series. *Int J Tuberc Lung Dis.* 2018;22:779-87.
- Pang L, Wu S, Kong J. Hepatic hilar mass in an adolescent: a rare case of hepatobiliary tuberculosis. *BMC Infect Dis.* 2019;19:217-9.
- Ch'ng LS, Amzar H, Ghazali KC, et al. Imaging appearances of hepatic tuberculosis: experience with 12 patients. *Clin Radiol.* 2018;73:321-6.
- Freitas M, Magalhaes J, Marinho C, et al. Looking beyond appearances: when liver biopsy is the key for hepatic tuberculosis diagnosis. *BMJ Case Rep.* 2020;13:e234491.
- Alvarez SZ. Hepatobiliary tuberculosis. *J Gastroenterol Hepatol.* 1998;13:833-9.
- Bandyopadhyay S, Maity PK. Hepatobiliary tuberculosis. *J Assoc Physicians India.* 2013;61:404-7.
- Hickey AJ, Gounder L, Moosa MY, et al. A systematic review of hepatic tuberculosis with considerations in human immunodeficiency virus co-infection. *BMC Infect Dis.* 2015;15:209-15.
- Suthar PP, Bumiya RG, Patel K, et al. Incidental diagnosis of liver tuberculosis in a patient with jaundice. *BMJ Case Rep.* 2015;2:e206866.
- Harbi H, Chaabouni A, Kallel R, et al. Nodular hepatic tuberculosis masquerading as a seminoma liver metastasis. *Arch Iran Med.* 2018; 21:180-2.
- Prabhudesai R, Lawande D, Gondal G, et al. Primary hepatic tuberculosis masquerading as intrahepatic cholangiocarcinoma. *Indian J Tuberc.* 2019;66:310-3.
- Shera IA, Shawl MR, Rajan P, et al. Primary hepatic tuberculosis masquerading as cholangiocarcinoma: A clinical nugget. *Turk J Gastroenterol.* 2019;30:764-6.
- Arrais Morais M, Cardoso Teixeira LL, de Sousa Brandao Torres D, et al. Localized hepatic tuberculosis presenting as severe hypercalcemia. *Indian J Tuberc.* 2018;65:172-4.