Case Report

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Periportal hepatic involvement of non-Hodgkin lymphoma: a rare case report with magnetic resonance imaging findings

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Abstract

Lymphoma with hepatic involvement can present with three morphological patterns: diffuse infiltrative, nodular, and mixed infiltrative–nodular. However, lymphoma with periportal infiltrative hepatic involvement is rare. There have been a few reports of cases with this type of hepatic involvement including ultrasound or computed tomography (CT) findings. In this case report, we present CT, magnetic resonance imaging (MRI), and diffusion-weighted MRI findings together with the histopathological results for a patient with periportal hepatic lymphoma presenting with obstructive jaundice.

Keywords

Non-Hodgkin lymphoma, periportal involvement, diffusion-weighted magnetic resonance imaging, magnetic resonance imaging, computed tomography, obstructive jaundice

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Introduction

Lymphoma with primary or secondary hepatic involvement includes three well-established morphological patterns: diffuse infiltrative, nodular, and mixed infiltrative–nodular.[1] However, lymphoma with hepatic periportal involvement is a rare condition, with few reported cases in the literature. Computed tomography (CT) and ultrasound imaging results were the most commonly discussed findings in these previous case reports.[2–6] In contrast, magnetic resonance imaging (MRI), and especially diffusion-weighted MRI findings, are lacking

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in patients with non-Hodgkin lymphoma (NHL) with periportal involvement.[7]

In this case report we describe the CT, MRI, and diffusion-weighted MRI findings in a patient with NHL and diffuse periportal hepatic involvement who presented with obstructive jaundice.

Case report

A 63-year-old man was admitted to the emergency clinic with complaints of fatigue, night sweats, nausea, vomiting, weight loss, and abdominal pain. Physical examination revealed abdominal tenderness. The results of laboratory analyses of serum were as follows: ratio of alanine aminotransferase to aspartate aminotransferase, 176/280 U/L (normal ranges 0–41/0–37); alkaline phosphatase, 5242 U/L (normal range 0–270 U/L); gamma-glutamyl transferase, 838.1 U/L (normal range 8–61 U/L); total bilirubin, 30.4 mg/dL (normal range 0–1 mg/dL); and direct bilirubin, 28.1 mg/dL (normal range 0–0.2 mg/dL). Other laboratory findings, including routine blood cultures and serologic tests for *Brucella*, hepatitis viruses A, B, and C, and human immunodeficiency virus, were all normal. The patient had no additional conditions that could cause liver dysfunction, such as chronic liver disease, or acute liver injury including drug reactions, drug overuse, or metabolic disorders.

Abdominal ultrasound revealed mild hepatomegaly and dilated intrahepatic ducts. Portal venous phase CT images showed marked dilatations of the intrahepatic bile ducts with a normal-caliber common bile duct, and linear, mildly hypodense areas surrounding the portal vein branches. There were also a few enlarged rounded lymph nodes in the right and left perigastric areas, with the largest measuring 2 cm × 1 cm (Figure 1A). There were no structural changes in the lymph nodes, such as necrosis or calcification. Abdominal MRI demonstrated periportal lesions that were mildly hyperintense in T2-weighted images and hypointense in T1-weighted images; however, these lesions were not visible in contrast-enhanced T1-weighted images (Figure 1B–D). Diffusion-weighted MRI with a b value of 800 s/mm^2 clearly revealed hyperintense signals in the periportal-lesion areas. These lesions were hypointense on apparent diffusion coefficient (ADC) maps (Figure 2). Diffusion restriction was also evident in the perigastric lymphadenopathy. The diffusion restriction in these periportal lesions observed on diffusion-weighted MRI, together with the CT and conventional MRI findings, suggested that the lesions could represent a malignant infiltrative process. Ultrasound-guided Tru-Cut biopsies were performed in the periportal area of the liver left lobe. Histopathological examination of the specimens showed atypical lymphoid cell infiltration of the liver, with destruction of the normal liver structure. The neoplastic cells were positive for CD20 on immunohistology, and the Ki-67 proliferation index was 50%.

According to the clinical and radiological findings, the patient was diagnosed with a high-grade diffuse large B-cell lymphoma and chemotherapy was started with the R-CHOP regimen (cyclophosphamide, doxorubicin, vincristine, and prednisone). The patient's abnormal liver tests and dilated intrahepatic bile ducts returned to normal after the first cycle of therapy. The patient received a total of six cycles of chemotherapy and remained in complete remission after 1 year of follow-up.

Written informed consent for publication of this case report was obtained from the patient. This case report did not involve any ethical issues and did not require review board approval.

Discussion

The term 'periportal region' commonly refers to the area surrounding the portal

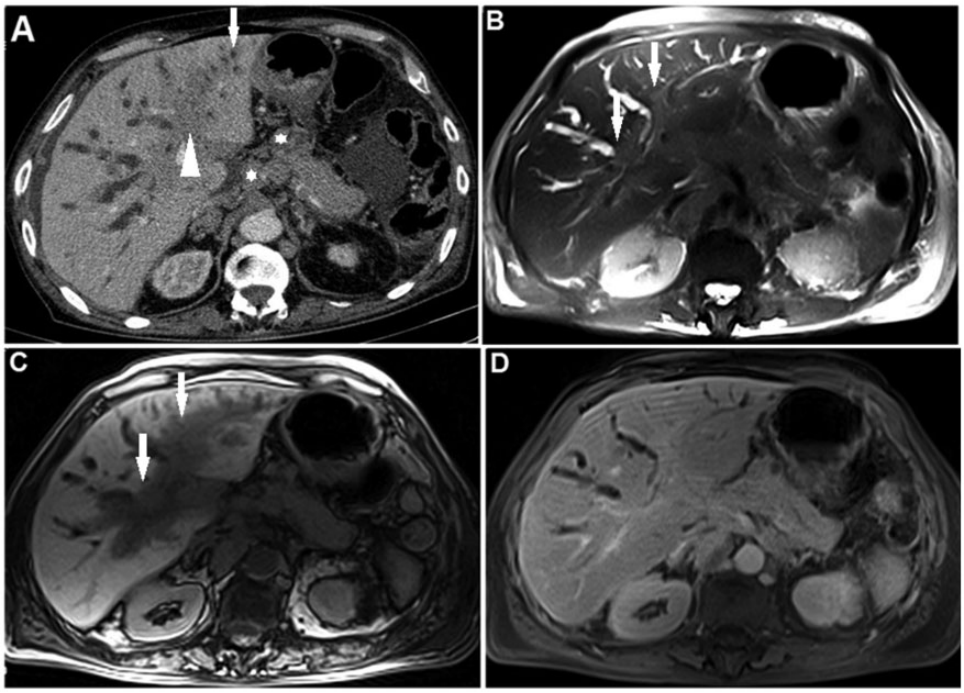

Figure 1. (A) Post-contrast portal venous phase axial CT image demonstrating mildly hypodense areas surrounding the portal vein branches and dilated intrahepatic bile ducts (arrow). A few enlarged lymph nodes (star) were visible in the right and left perigastric areas. (B) Area with periportal involvement was mildly hyperintense (arrow) on T2-weighted MRI and (C) hypointense (arrow) on T1-weighted MRI. (D) Areas with periportal involvement were not visible on post-contrast T1-weighted MRI.

vein and its branches. Lymphatic vessels are present in the periportal region, but are not visible in healthy subjects. However, various diffuse infiltrative processes may affect the periportal lymphatic vessels and periportal space, and hepatocellular carcinoma, which is a primary hepatic malignancy, is known to demonstrate periportal lymphatic involvement.[8]

Periportal mononuclear cell infiltration may be seen in post-transplantation lymphoproliferative disorders, while lymphoma and Langerhans cell histiocytosis may also affect the periportal region and be detected radiologically.[1,6–8] In contrast, primary hepatic lymphoma is extremely rare, and lymphoma with secondary hepatic involvement has only been found in 3%–4% of newly diagnosed patients and in 50%–80% of autopsy series.[5,9]

The radiological findings of hepatic lymphoma vary from a normal hepatic appearance to various nonspecific morphological changes. Nodular involvement of the liver may be detected as solitary or multiple focal liver lesions. These lesions are usually hypoechoic on ultrasound examinations, hypodense on CT imaging, and hyperintense on T2-weighted and hypointense on T1-weighted MRI. Although diffuse infiltrative involvement of the liver is common in lymphoma, CT imaging may reveal a normal hepatic appearance or hepatomegaly; however, hepatomegaly is not a

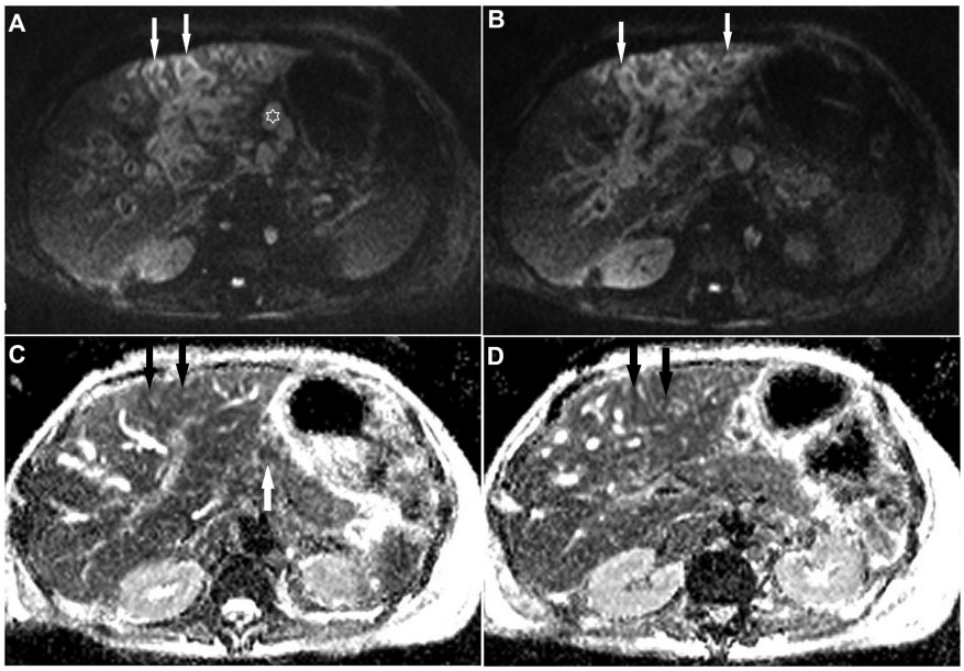

Figure 2. (A, B) Diffusion-weighted MRI sections showing the periportal involvement areas as markedly hyperintense (white arrow), in a linear or rim-like shape. Perigastric enlarged lymph nodes were hyperintense (star). (C, D) Areas with periportal involvement (white arrow) and enlarged lymph nodes (black arrow) were hypointense on ADC maps.

sufficiently sensitive or specific finding, and a normal appearance of the liver on CT and ultrasound imaging examinations cannot rule out hepatic involvement of lymphoma.[2] Furthermore, NHL may demonstrate simultaneous involvement of mixed infiltrative and nodular patterns.[9]

Coakley et al.[6] reported only two patients with periportal involvement on CT among a total of 1880 patients with NHL in their retrospective study. Hepatic periportal lymphoma has previously been described as hypoechoic on ultrasound and/or hypodense on CT imaging.[2,4–8] Furthermore, an earlier report described a case of lymphoma with periportal hepatic involvement presenting as a periportal hyperechoic mass on ultrasound imaging.[3] Pronounced homogenous enhancement of periportal masses during the hepatic arterial phase followed by a rapid washout of the contrast during the portal venous phase on contrast-enhanced ultrasonography imaging was reported in a patient with periportal hepatic lymphoma, while the masses remained devoid of contrast throughout the late phase.[2] In the present case, periportal involvement in the arterial (25th second) and late (3rd minute) phases was not visible in dynamic contrast-enhanced CT images, but appeared as mildly hypodense in the portal venous phase. The periportal involvement was mildly hyperintense on T2-weighted MRI relative to the normal liver parenchyma, while the periportal region, including the dilated intrahepatic

bile ducts and portal vein branches, appeared hypointense on T1-weighted MRI. Periportal involvement was not visible on post-contrast T1-weighted MRI.

Diffusion-weighted MRI reflects the movements of water protons. The increased size of malignant cells associated with their bigger nuclei and accumulation of macromolecular proteins, leads to restriction on diffusion-weighted MRI by narrowing the extracellular space. Several studies have evaluated the effectiveness of diffusion-weighted MRI for detecting and characterizing metastatic liver lesions. A meta-analysis of these studies reported that diffusion-weighted MRI was a highly sensitive technique for detecting hepatic metastases, regardless of the size of the lesion.[10] In addition, diffusion-weighted MRI is known to be valuable for the assessment of lymphoma involvement.[11] Although periportal involvement could not be clearly demonstrated on conventional MRI in the present patient, these lesions were detected as hyperintensities along the intrahepatic portal vein branches by diffusion-weighted MRI, while the same lesions were hypointense on ADC maps.

Non-Hodgkin lymphoma can rarely present with periportal involvement, leading to obstructive jaundice. A lack of contrast between regions with and without lymphoma may make it difficult to detect periportal lymphoma using conventional imaging methods. It is therefore important to note that functional tissue information provided by diffusion-weighted MRI and ADC maps may be useful for detecting periportal involvement of lymphoma.

Declaration of conflicting interest

The author declares that there is no conflict of interest.

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