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CASE REPORT
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# Primary hepatic peripheral T-cell lymphoma mimicking hepatocellular carcinoma: a case report

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Peripheral T-cell lymphomas (PTCLs) are aggressive neoplasms which may involve the liver. The imaging manifestations of hepatic lymphoma are highly variable and show overlapping appearances of numerous other hepatic diseases. As the management and prognosis of lymphoma differ markedly from those of other malignant diseases, prompt diagnosis and early effective treatment are very important. Here, we report an atypical case of primary PTCL not otherwise specified involving the liver that exhibited a solitary hepatic mass mimicking hepatocellular carcinoma (HCC) on CT. Liver biopsy is not commonly recommended in highly suspicious cases of HCC. However, in a patient without risk factors for HCC, consideration of other diagnostic possibilities is required and needle biopsy may be a more rational choice. An imaging approach, based on a careful review of clinical and laboratory findings is essential to prevent false-positive diagnosis of HCC and subsequent invasive treatment.
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**Key Words:** Lymphoma, Liver, Hepatectomy, Hepatocellular carcinoma

## INTRODUCTION

Peripheral T-cell lymphomas (PTCLs) are aggressive neoplasms that account for less than 15% of all non-Hodgkin lymphomas (NHLs) in adults. PTCL not otherwise specified (PTCL-NOS) is a heterogeneous group comprised of predominantly nodal T-cell lymphomas that do not satisfy the criteria for the other subtypes of PTCLs [1]. Most cases of PTCL-NOS are often associated with generalized lymphadenopathy with or without extranodal disease, which involves the gastrointestinal tract, liver, spleen, skin, oropharynx, nasopharynx, sinuses, nasal cavity, tonsils, and bone marrow [2]. Most patients with hepatic lymphoma have been reported to have variable imaging findings, ranging from single or multiple small nodules to diffuse infiltration [3,4]. Here, we report an atypical case of primary hepatic PTCL-NOS that exhibited a solitary hepatic mass mimicking hepatocellular carcinoma (HCC).

## CASE REPORT

A 50-year-old male patient presented with a month history of general fatigue and weakness. He did not have fever, weight loss, or night sweating. Physical examination of the patient was unremarkable with no peripheral lymphadenopathy. The patient had no notable past medical history. Laboratory studies conducted on admission showed the following results: WBC, 13.12 × $10^9$/L (normal range, 4-10 × $10^9$/L); AST, 91 IU/L (normal range, 0–40 IU/L); ALT, 138 IU/L (normal range, 0–40 IU/L); γ-GT, 97 IU/L (normal range, 8–73 IU/L); LDH, 1,430 IU/L (normal range, 240–480 IU/L); ESR, 43 mm/hr (normal range, 0–9 mm/

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hr). All values were higher than the normal range. Values for hemoglobin, total bilirubin, α-FP, albumin, creatinine, and PT were within normal limits. CEA was slightly elevated at 5.7 ng/mL (normal range, ≤5.0 ng/mL), and other tumor markers, such as α-FP and CA 19-9, were within normal ranges. Serologic tests including human immunodeficiency virus, syphilis antibody, and hepatitis C and B viruses were negative.

Diagnostic imaging was performed using abdominal CT (Brilliance CT 64 Channel, Philips Medical, Eindhoven, the Netherlands). Prior to contrast material injection, abdominal CT revealed a well circumscribed, round, homogeneous, and low-density mass that measured 65 mm × 60 mm in the largest diameter located in segment V of the liver. Dynamic contrast-enhanced CT revealed a well-defined mass with moderate enhancement in the arterial phase and washout of contrast media in the portal venous phase and delayed phase. Peripheral rim-enhancement was observed and was more obvious in the delayed phase (Fig. 1). The enhancement patterns of hepatic mass appeared suspicious for hypervascular hepatic tumor, such as HCC, despite the patient having no risk factors for HCC. Contrast-enhanced abdomen CT also revealed multiple enlarged mesenteric and retroperitoneal lymph nodes with homogeneous enhancement, and this finding suggested a malignant lymphoproliferative disorder such as lymphoma (Fig. 1E). Most cases of hepatic lymphoma have been reported to have variable imaging findings, ranging from single or multiple small nodules to diffuse infiltration. However, these patterns did not correlate with our imaging findings of the hepatic mass.

As the radiologic features of the lesion were more indicative of HCC, right hepatectomy was undertaken. Grossly, the surgical specimen exhibited a grey-white mass, measuring 70 mm × 50 mm × 50 mm in segment V of the liver. The mass was firm and well demarcated from the surrounding tissue (Fig. 2A). The patient had multiple intra-abdominal enlarged lymph nodes, but no tumor cells were found on frozen biopsy. Microscopic examination of the mass revealed a diffuse infiltration of medium-sized monotonous lymphoid cells surrounded by peritumoral fibrosis and ductular reaction (Fig. 2B). The lymphoid cells demonstrated positive reaction to CD3, CD4, CD5, and CD8, and negative reaction to CD20 and cyclin D1 in immunohistochemical staining. Additionally, tumor cells stained positive for CD31, which is known to be an endothelial marker of microvessels (Fig. 2C). The molecular pathological evaluation for the Epstein-Barr virus showed a negative result. Based on the histological and immunohistochemical findings, the diagnosis of hepatic mass was confirmed as primary hepatic PTCL-NOS.

The patient then underwent treatment with a total of 6 cycles

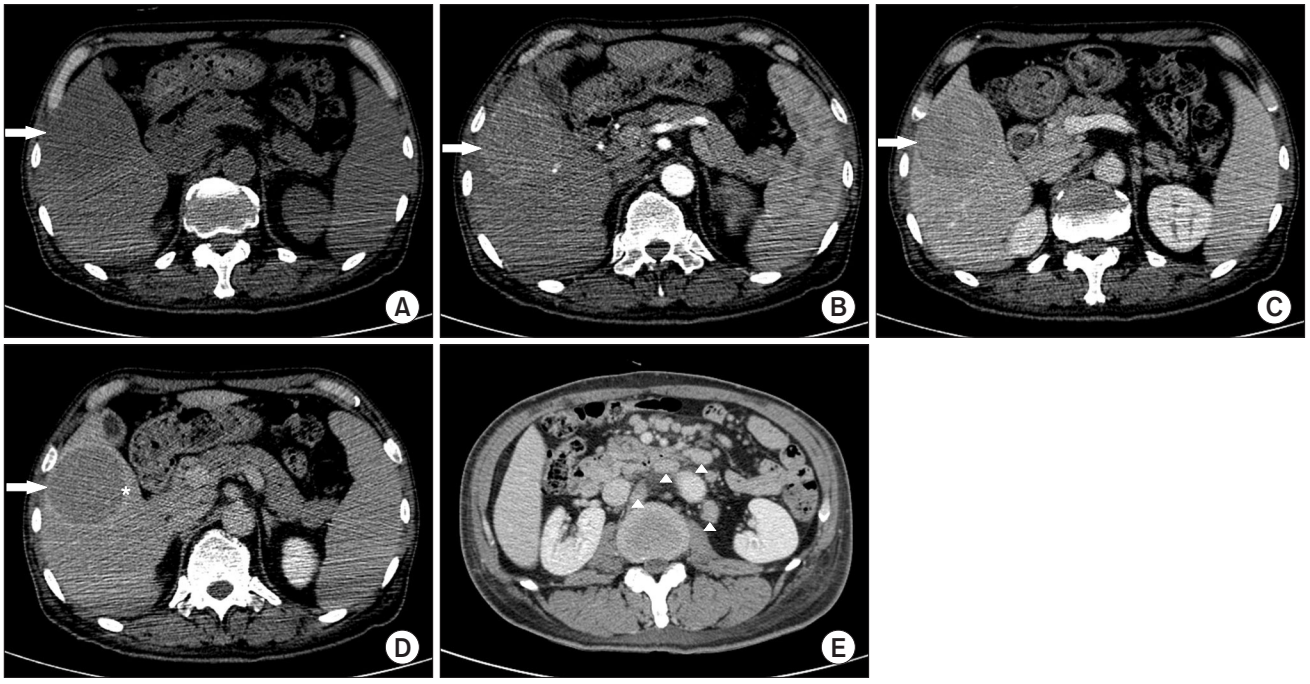


**Fig. 1.** A 50-year-old male patient with primary peripheral T-cell lymphoma, not otherwise specified involving the liver. Prior to contrast material injection (A), CT revealed a well circumscribed, round, homogeneous, and low-density mass (arrow) that measured 65 mm × 60 mm in the largest diameter located in segment V of the liver. Dynamic contrast-enhanced CT revealed a welldefined mass with moderate enhancement (arrow) in the arterial phase (B) and washout of contrast media (arrow) in the portal venous phase (C) and delayed phase (D). (D) Peripheral rim-enhancement (asterisk) was observed and was more obvious in the delayed phase. (E) CT also revealed multiple enlarged mesenteric and retroperitoneal lymph nodes (arrowheads) with homogeneous enhancement, and this finding suggested a malignant lymphoproliferative disorder such as lymphoma.

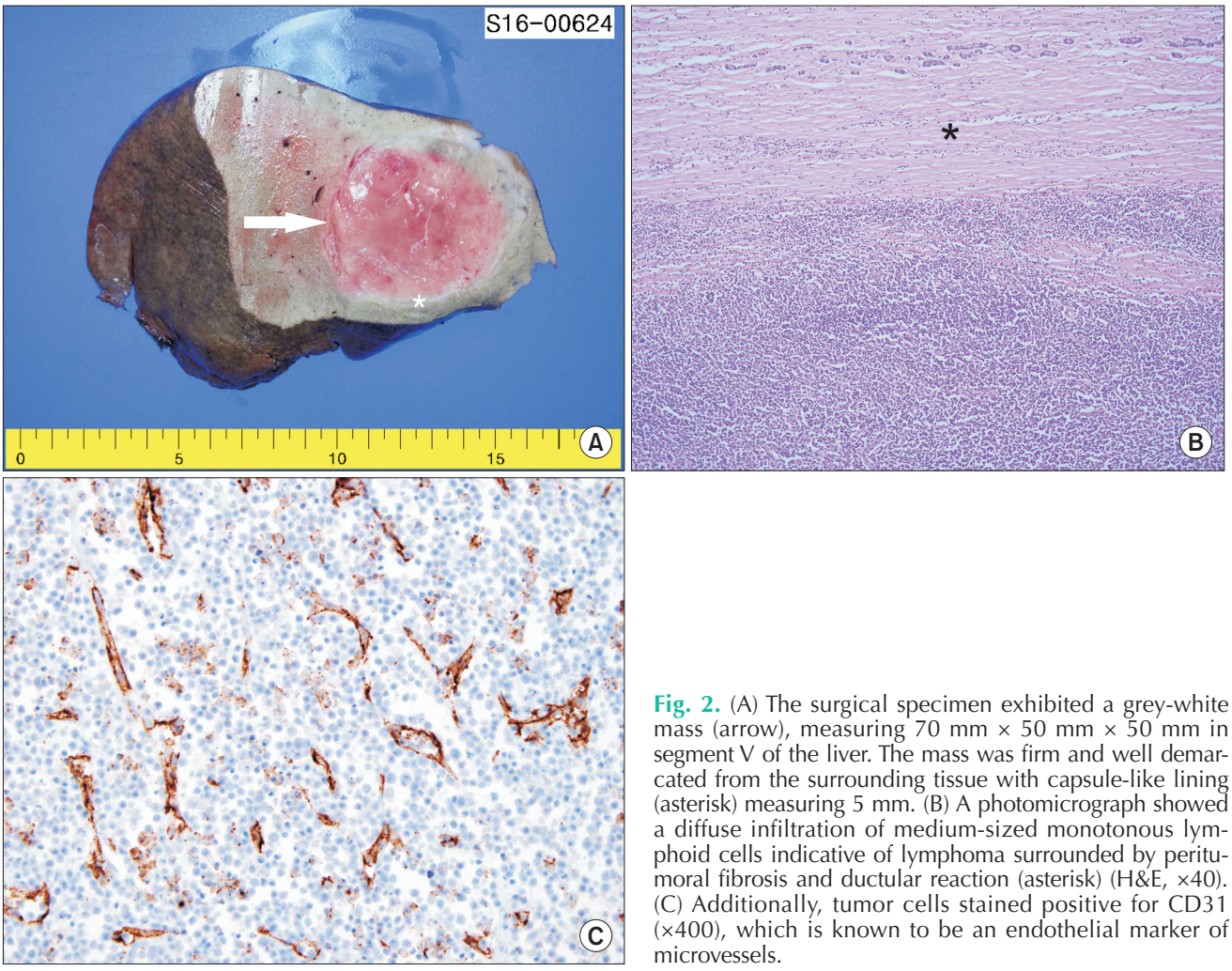


**Fig. 2.** (A) The surgical specimen exhibited a grey-white mass (arrow), measuring 70 mm × 50 mm × 50 mm in segment V of the liver. The mass was firm and well demarcated from the surrounding tissue with capsule-like lining (asterisk) measuring 5 mm. (B) A photomicrograph showed a diffuse infiltration of medium-sized monotonous lymphoid cells indicative of lymphoma surrounded by peritumoral fibrosis and ductular reaction (asterisk) (H&E, ×40). (C) Additionally, tumor cells stained positive for CD31 (×400), which is known to be an endothelial marker of microvessels.

of chemotherapy (cyclophosphamide, doxorubicin, vincristine, and prednisolone). However, after 7 months of operation, local recurrence was suspected on follow-up CT and positron emission tomography CT. In addition, increased size of several enlarged lymph nodes was observed in the abdomen. Although recurrence was observed, the patient withdrew from further treatment because of financial difficulties and underwent conservative management.

## DISCUSSION

PTCLs are highly aggressive diseases and constitute 5%–15% of all NHL. PTCL-NOS is a heterogeneous group comprised of predominantly nodal T-cell lymphomas that do not satisfy the criteria for other subtypes of PTCLs [1]. The median age at diagnosis is 60 years, and the disease is relatively more common in men (approximately 2:1). Approximately 35% of patients of PTCLs have systemic B symptoms (fever, night sweats, weight loss). Half of patients are associated with an elevated LDH level and 14% of patients have hypergammaglobulinemia [2]. In the present case, the patient did not have any B symptoms, but the LDH level was elevated at 1,430 IU/L.

PTCL-NOS often affects the systemic lymph nodes and extranodal sites, which involve the gastrointestinal tract, liver, spleen, skin, oropharynx, nasopharynx, sinuses, nasal cavity, tonsils, and bone marrow [2]. According to the criteria by Caccamo et al. [3], primary hepatic lymphoma (PHL) is defined as a lymphoma with involvement of only the liver at presentation. Six months after the diagnosis, other tissues can be involved, including the spleen, lymph nodes, peripheral blood, bone marrow, or other tissues. PHL is very rare; it constitutes 0.4% of extranodal NHLs, and only 0.016% of all cases of NHLs. Imaging findings of hepatic lymphoma vary. PHL typically appears in one large nodule with clear boundaries, whereas secondary hepatic lymphoma can vary in appearance, from one or multiple nodules to diffuse infiltration [4]. The lesion usually shows a homogeneously hypodense appearance on non-contrast-enhanced CT imaging. Upon administration of an intravenous contrast agent, lymphomatous nodules commonly enhance to a lesser degree than the hepatic parenchyma on

arterial, portal venous, and delayed phase images, indicating the hypovascular nature of lymphoma. The lesions may exhibit hemorrhage, necrosis, or a rim-enhancement pattern [4-6]. In the present case, dynamic contrast-enhanced CT revealed a well-defined mass with moderate enhancement in the arterial phase, and washout of contrast media in the portal venous phase and delayed phase, accounting for the characteristic enhancement pattern of HCC. Castañeda-Zuñiga and Amplatz [7] reported a hepatic lymphoma with the presence of neovascularity, stretching, narrowing of arteries, and dense staining during the parenchymal phase of hepatic angiography. This hypervascular angiographic appearance, which is highly unusual for hepatic lymphoma, might be concordant with the CT finding of moderate enhancement on the arterial phase in our case. In the present case, tumor cells stained positive for CD31, which is known to be endothelial marker of microvessels [8]. We hypothesized that hyperproliferation of microvessels might influence relative hypervascularity of this tumor and show moderate enhancement on the arterial phase CT imaging. However, to the best of our knowledge, the mechanism of the unusual hypervascular pattern of hepatic lymphoma has not yet been discussed.

The other pattern of peripheral rim-enhancement of the hepatic lymphoma reported in previous studies [5,6] was consistent with our finding. The presence of a fibrous tumor capsule is the characteristic feature of HCC and is found in 24%–90% of Asian and 12%–42% of non-Asian patients with HCC [9]. Mean thickness of tumor capsule was 0.3–1.4 mm (0.87 ± 0.59 mm) in pathological measurement, and thin rim enhancement (less than 2 mm) was shown in 98% of them on imaging finding [10]. Nevertheless, our case showed the peripheral enhancement measuring approximately 5.5 mm, which was thicker than that seen in typical HCC. We hypothesized that the rim-enhancement pattern of the hepatic lymphoma does not indicate a true tumor capsule, but rather peritumoral fibrosis and ductular reaction, likely caused by effect of the mass.

Although recent studies have shown improved detection of hepatic lesions, there exists a risk of misdiagnosis of HCC as incidental benign lesion or nonhepatocellular malignancy. Liver biopsy is not commonly recommended in highly suspicious cases of HCC, in clinical routine processes. However, when radiological findings show a typical appearance of HCC in a patient without risk factors for HCC, consideration of the other diagnostic possibilities is required. In this case, a needle biopsy may be a more rational choice.

Treatment for hepatic lymphoma usually consists of chemotherapy dictated by the histologic subtype. Therefore, suggesting a diagnosis of hepatic lymphoma rather than HCC, metastasis, or infection facilitates appropriate management because surgery or liver-directed therapy for HCC and metastasis or antibiotic administration and drainage for infection may be precluded.

In conclusion, we presented an atypical case of primary hepatic PTCL-NOS with a solitary mass mimicking HCC. We did not perform liver biopsy because we believed the hepatic mass was HCC. However, consideration of the other differential diagnoses is required, particularly when serum AFP is normal and a patient has no risk factors for HCC, and needle biopsy should be performed before operation. An imaging approach, based on a careful review of clinical and laboratory findings is essential to prevent false-positive diagnosis of HCC and subsequent invasive treatment.

## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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