

Case Report

Eosinophilic Infiltration in the Liver: Unusual Manifestation of Hepatic Segmental Involvement

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Eosinophilic infiltration in the liver is not a rare disease and it is usually presented as multiple, small, ill defined, oval or round, low attenuated lesions on portal phase of computed tomography. We reported case of hepatic eosinophilic infiltration in the liver, as an unusual manifestation of segmental involvement.

Index words : Liver, magnetic resonance imaging · Liver inflammation, eosinophil

INTRODUCTION

Histopathologically, eosinophilic infiltration in the liver (or focal eosinophilic liver disease) includes eosinophilic infiltration in the periportal space, eosinophilic abscess, and eosinophilic granuloma. Eosinophilic infiltration in the liver is related common and is often associated with various eosinophil-related conditions. It is almost correlated with eosinophilia (defined as 500 eosinophils/ μ l in the peripheral blood) and incidentally discovered on radiologic examinations, such as ultrasonography or computed tomography, and is usually demonstrated as multiple, small, poorly defined, round or oval nodular lesions (1-4). However, in patients with a history of malignancy, it sometimes may mimic hepatic metastases and unnecessary biopsy or surgery were performed. In this case, we described that eosinophilic infiltration in the liver presented as an unusual segmental involvement.

CASE REPORT

A 68-year-old Asian female who had undergone mastectomy due to breast cancer 9 years prior to presentation at our clinic complained of fever and

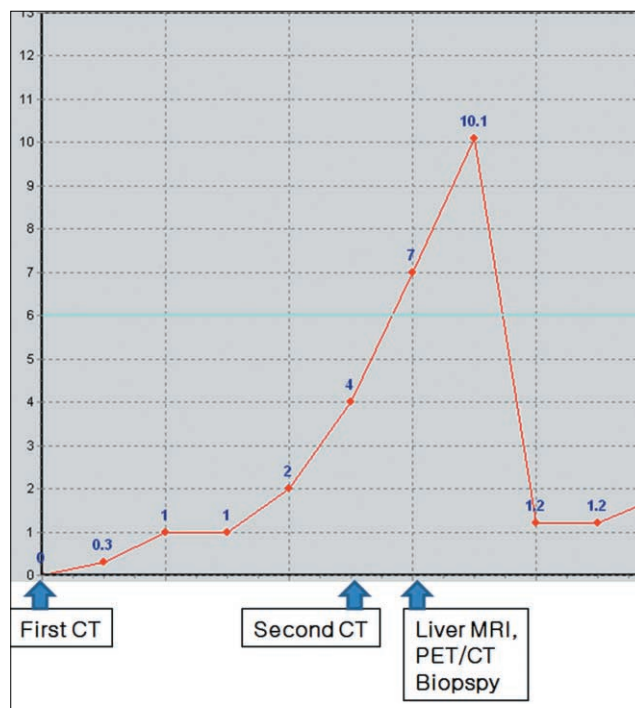


Fig. 1. The diagram reveals changes of peripheral eosinophils, according to the radiologic exams. The x-axis presents percentage of peripheral eosinophils.

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right upper abdominal pain that had persisted for 3 days. On clinical examination, there was mild tenderness of the right upper abdomen. The patient's white blood cell count was $11.29 \times 10^9/L$ with 92% neutrophils, 8% lymphocytes and 0% eosinophils (Fig. 1). Portal phase of contrast enhanced abdominal Computed Tomography (CT) was performed and it showed focal low attenuated lesions in the liver (Fig. 2a). The clinician observed an early phase abscess in the liver, and empirical antibiotics were administered. However, the patient's symptoms did not improve, and follow-up CT, obtained two weeks later, revealed progression of the lesion (Fig. 2b). The patient's white blood cell count was $6.48 \times 10^9/L$ with 65% neutrophils, 18% lymphocytes, 11% monocytes and 4% eosinophils (Fig. 1). For further evaluation, F-18 2-fluoro-2deoxyglucose (FDG) - positron emission tomography/CT (PET/CT) (Fig. 3) and liver Magnetic Resonance Image (MRI) (Fig. 4) were performed. And ultrasonography (US) guided percutaneous gun biopsy was also performed in the posterior segment of the right lobe of the liver. Microscopically, there were eosinophilic infiltrations and microabscesses (Fig. 5). The patient had a history of ingestion of uncooked goat meat. She received conservative treatment and was discharged from the hospital.

DISCUSSION

Focal eosinophilic infiltration in the liver is relatively common and is associated with various eosinophil-

related conditions such as parasitic infestation, allergic reaction, connective tissue disease, hypereosinophilic syndrome and internal malignancy (1-5). Although the mechanism of focal eosinophilic infiltration in the liver is not clearly understood, eosinophils may infiltrate the liver tissue, causing damage related to the chemical products of eosinophils. Histopathologic findings of eosinophilic infiltration in the liver demonstrate that eosinophils mainly invade the periportal space with or without necrotic foci (3, 4). Direct parasite invasion to the liver may cause eosinophilic infiltration, and *Toxocara canis* larval infection is associated with focal eosinophilic infiltration in the liver. Uncooked cow, pig, lamb, and chicken

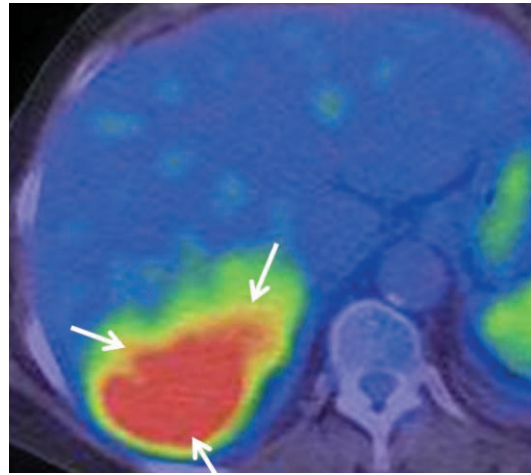


Fig. 3. PET/CT was obtained during the same period as liver MRI. PET/CT demonstrates intense FDG uptake in the posterior segment of the right lobe of the liver (standardized uptake value [SUV] = 12.6) (arrows).

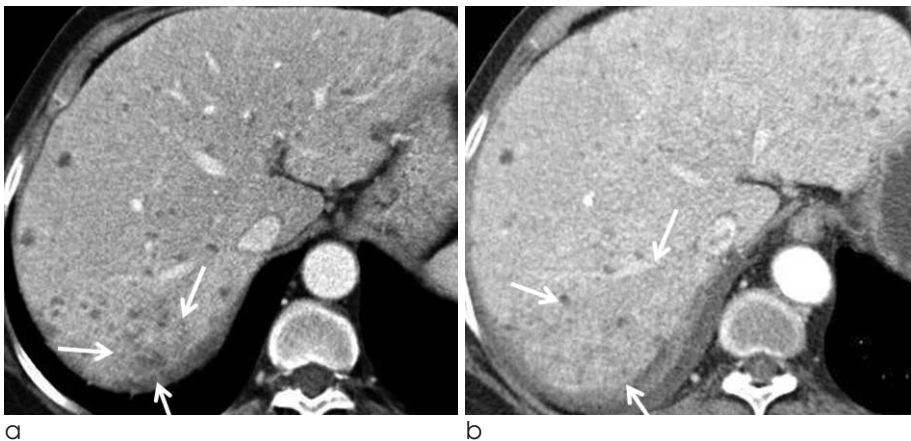


Fig. 2. a. Axial portal phase of contrast enhanced CT scan shows ill-defined low attenuated lesions in the posterior segment of the right lobe of the liver (arrows).

b. Follow-up axial portal phase of contrast enhanced CT scan was obtained two weeks later. Previously observed low attenuated lesions progress in the posterior segment of the right lobe of the liver and the lesion is well delineated in the same area of the liver (arrows).

PS. Innumerable small low attenuated lesions in the liver on previous follow-up studies, as known biliary hamartomas without interval change.

liver are known sources of infection (4). In this case, the patient had a history of ingestion of uncooked goat meat, which may have caused eosinophilic infiltration in the liver. Focal eosinophilic infiltration in the liver is mostly asymptomatic, but sometimes fever, abdominal pain, easy fatigue or weight loss develop. Focal eosinophilic infiltration in the liver is almost correlated with peripheral eosinophilia. However, our patient's peripheral eosinophil count slowly rose after her

symptoms developed (Fig. 1) (1, 4, 5).

The imaging findings of focal eosinophilic infiltration in the liver are well known. On US, focal eosinophilic infiltration is usually demonstrated as multiple, small, poorly defined, round or oval hypoechoic nodules (1, 2). CT, especially portal phase, revealed multiple, small, round or oval, low attenuated nodular lesions with fuzzy margins in the liver (1, 2, 5). On MRI, these lesions revealed iso- or slightly low signal

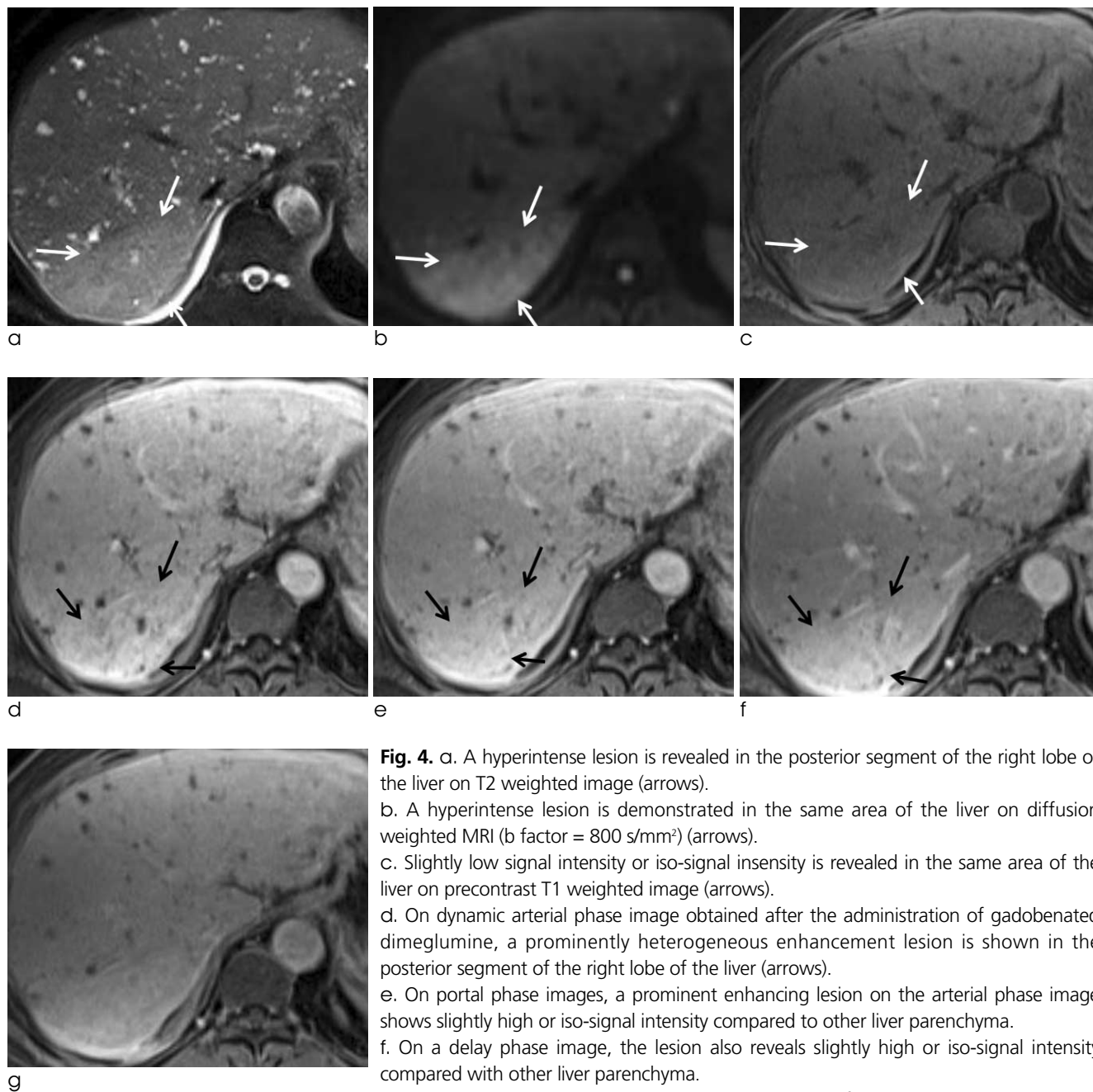


Fig. 4. a. A hyperintense lesion is revealed in the posterior segment of the right lobe of the liver on T2 weighted image (arrows).
 b. A hyperintense lesion is demonstrated in the same area of the liver on diffusion weighted MRI (b factor = 800 s/mm²) (arrows).
 c. Slightly low signal intensity or iso-signal intensity is revealed in the same area of the liver on precontrast T1 weighted image (arrows).
 d. On dynamic arterial phase image obtained after the administration of gadobenated dimeglumine, a prominently heterogeneous enhancement lesion is shown in the posterior segment of the right lobe of the liver (arrows).
 e. On portal phase images, a prominent enhancing lesion on the arterial phase image shows slightly high or iso-signal intensity compared to other liver parenchyma.
 f. On a delay phase image, the lesion also reveals slightly high or iso-signal intensity compared with other liver parenchyma.
 g. On the hepatobiliary phase image taken 90 minutes after gadobenated dimeglumine injection, there is no prominent hypointensity lesion in the posterior segment of the right lobe of the liver.

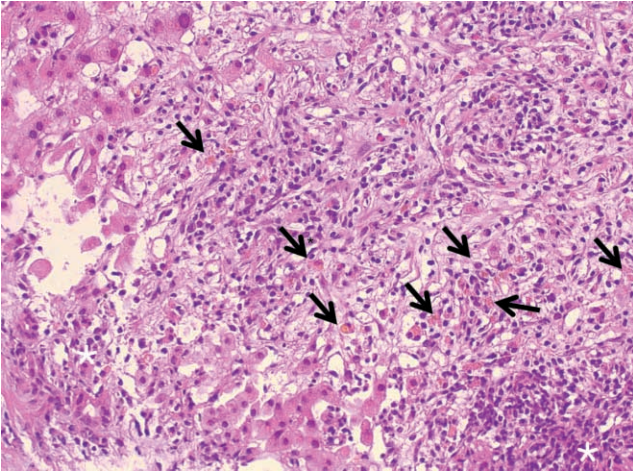


Fig. 5. Photomicrograph of biopsy specimen shows widespread inflammatory cell infiltration at hepatic parenchyma, predominantly composed of eosinophils (arrows) and microabscesses (asterisks) (hematoxylin and eosin stain, $\times 200$).

intensity on T1 weighted images and high signal intensity on T2 weighted images. Dynamic MRI more easily demonstrated lesion enhancement on arterial and delayed phases than did dynamic CT (3, 5). On PET/CT, about 20% of focal eosinophilic infiltration in the liver showed increased FDG uptake (6). In our case, it was difficult to differentiate hepatic metastasis from inflammatory conditions on CT and PET/CT. MRI revealed signal intensities and enhancement patterns typical of focal eosinophilic infiltration in the liver, however, segmental involvement of eosinophilic infiltration was not usual finding. A study using gadobenate dimeglumine for eosinophilic infiltration in the liver revealed that the hepatic eosinophilic infiltration showed intermingled low signal intensity and iso-signal intensity (67%) and homogenous low signal intensity (24%) (7). In this case, eosinophilic infiltration in the liver showed no prominent hypointensity lesion (iso-signal intensity) on hepatobiliary phase using gadobenate dimeglumine.

In hypereosinophilic syndrome, hepatic involvements are common (40–90%) and radiologic appearance of hypereosinophilia with hepatic involvement, characterizing the hepatic lesions as small and focal.

Lim et al. (8) reported CT finding of unusual lobar or segmental hepatic involvement in hypereosinophilic syndrome and they supposed that this may be related to periportal infiltration of eosinophils and portal venous thrombophlebitis, thereby resulting in decreased portal venous blood flow. We also suggested that posterior segmental branch of right portal vein was transient narrowing by eosinophilic infiltration in this case.

CONCLUSION

Radiologic imaging findings of focal eosinophilic infiltration in the liver show usually multiple, small, oval or round, and ill-defined nodules. But unusual segmental involvement of eosinophilic infiltration in the liver rarely appears, as in this case.

References

1. Lee WJ, Lim HK, Lim JH, Kim SH, Choi SH, Lee SJ. Foci of eosinophil-related necrosis in the liver: Imaging findings and correlation with eosinophilia. *AJR Am J Roentgenol* 1999;172: 1255-1261.
2. Yoo SY, Han JK, Kim YH, Kim TK, Choi BI, Han MC. Focal eosinophilic infiltration in the liver: radiologic findings and clinical course. *Abdom Imaging* 2003;28:326-332
3. Kim YK, Kim CS, Moon WS, Cho BH, Lee SY, Lee JM. MRI findings of focal eosinophilic liver diseases. *AJR Am J Roentgenol* 2005;184:1541-1548
4. Lim JH, Lee KS. Eosinophilic infiltration in Korea: Idiopathic? *Korean J Radiol* 2006;7:4-6
5. Yu JS, Yoon SW, Park MS, Lee JH, Kim KW. Eosinophilic hepatic necrosis: magnetic resonance imaging and computed tomography comparison. *J Comput Assist Tomogr* 2005;29: 765-771
6. Kim WH, Kim SH, Kim YH, et al. Fluorine-18-FDG PET findings of focal eosinophilic liver disease: correlation with CT and/or MRI, laboratory, and pathologic findings. *Abdom Imaging* 2010;35:437-446
7. Park MS, Kim MJ, Lim JS, et al. Metastasis versus focal eosinophilic infiltration of the liver in patients with extrahepatic abdominal cancer: an evaluation with gadobenate dimeglumine-enhanced magnetic resonance imaging. *J Comput Assist Tomogr* 2009;33:119-124
8. Lim JH, Lee WJ, Lee DH, Nam KJ. Hypereosinophilic syndrome: CT findings in patients with hepatic lobar or segmental involvement. *Korean J Radiol* 2000;1:98-103

비전형적인 간 분절 호산구 침윤: 증례 보고

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간 내 호산구 침윤은 드문 질환이 아니며 문맥기의 컴퓨터 단층촬영에서 대게 작고, 다수며, 형태가 명백하지 않으며 타원형 혹은 둥근 형태의 낮은 감쇠 병변으로 발견된다. 저자들은 간 내 호산구 침윤의 비특이적 소견의 간 분절침윤 형태의 소견을 보고하고자 한다.

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