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CLINICAL CASE REPORT

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Tumor-Like Liver Abscess Mimicking Malignancy With Lung Metastases in a Patient With Acute Renal Failure

A Case Report

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Abstract: The worldwide incidence of *Klebsiella pneumoniae* liver abscess (KLA) is increasing. It is important to accurately diagnose this life-threatening disease to provide timely and appropriate treatment. Here we report the case of a 38-year-old man with acute renal failure and a tumor-like liver abscess and septic pulmonary embolism. Initially, his clinical symptoms, laboratory tests, and radiological findings presented equivocal results of malignancy with metastases. Fine needle aspiration of liver tumor was performed, which showed purulent material with a culture positive for *K pneumoniae*.

KLA symptoms are atypical, and radiological findings may mimic a malignancy with tumor necrosis. In some circumstances, liver aspiration biopsy may be necessary to confirm the real etiology, leading to prompt and timely treatment. Moreover, we should be alert for the impression of KLA when facing a diabetic patient with liver mass lesion and acute renal failure.

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Abbreviations: CT = computed tomography, KLA = *Klebsiella pneumoniae* liver abscess, PET = positron emission tomography, PLA = pyogenic liver abscess, SUV = standardized uptake value, WBC = white blood cell.

INTRODUCTION

Pyogenic liver abscess (PLA) has become a disease observed worldwide. *Klebsiella pneumoniae* is the most important cause of PLA, termed *Klebsiella pneumoniae* liver abscess (KLA), in the United States, Europe, and Asia.[1–3] It is also an emerging disease, so it is necessary to differentiate PLA from other liver lesions, including benign or malignant tumors and tumor necrosis. The diagnosis of PLA can be, however, difficult due to atypical clinical manifestations and radiological findings.

Here we report an interesting case of PLA presenting with a malignancy-like clinical presentation and radiological findings, which nearly led to a misdiagnosis of liver tumor with lung metastases.

Case Report

A 38-year-old Taiwanese man with a history of chronic hepatitis B and type II diabetes presented to our gastrointestinal department with chief complaints of epigastric pain lasting for 7 days and 5-kg weight loss within 1 month.

On admission, a physical examination revealed tenderness of the right upper quadrant and epigastric area, icteric sclera, and bilateral coarse breath sounds. His vital signs were as follows: body temperature, 36.2°C; pulse rate, 98 beats/min; and blood pressure, 103/66 mm Hg. Other physical findings were unremarkable. Laboratory investigations revealed leukocytosis with a white blood cell (WBC) count of 25500/μL (reference, 3800–10000/μL), segmented neutrophil level of 77% (reference, 35%–75%), and band level of 7.5% (reference, 0%–5%). The other major abnormalities were shown in Table 1, including abnormal liver function test, poor diabetic control (glycated hemoglobin, 11 g/dL), advanced renal impairment (creatinine level, 8.87 mg/dL), and hypoalbuminemia (albumin, 2.88 g/dL). Under the initial impression of leukocytosis due to sepsis, some imaging studies were performed; chest radiography revealed nodular lesions in both lung fields (Figure 1), and abdominal ultrasonography showed a liver tumor of size 5.9 × 5.7 cm in caudate lobe (Figure 2). We suspected a liver tumor with lung metastases. Noncontrast computed tomography (CT) was performed due to advanced renal failure, and it showed an uneven, fatty, possibly alcoholic liver, a liver tumor in S1 with regional nodal metastases, and multiple lung nodules (Figure 3). Nevertheless, liver abscess with septic emboli could not be ruled out due to the clinical signs of infection.

Because of the ambiguous diagnosis, positron emission tomography (PET) was performed, and it showed active infection with abscess formation involving the liver and abdominal cavity. Multiple hypermetabolic nodules in both lung fields were enlarged in comparison with the previous CT findings. Septic emboli were highly suspected. However, PET could not fully rule out uptake by a malignant tumor with central necrosis and abscess formation (Figure 4). Therefore, a diagnostic liver biopsy of fine needle aspiration was performed, and the pathological diagnosis was a core of hepatic tissue with an abscess

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TABLE 1. Laboratory Data During Admission

	Reference	Value
Hemoglobin (g/dL)	12–14	13.7
Blood urea nitrogen (mg/dL)	7–25	103
HbA1C (%)	4–6	11
Creatinine (mg/dL)	0.5–1.3	8.87
Sodium (meq/L)	133–145	127
Potassium (meq/L)	3.3–5.1	3.6
GPT (U/L)	10–50	65
GOT (U/L)	5–35	43
r-GT (U/L)	9–64	329
Total-bilirubin (mg/dL)	0.3–1.3	2.6
Direct-bilirubin (mg/dL)	0.03–0.18	1.4
Lipase (U/L)	11–82	66
Ammonia (ug/dL)	19–94	76
Albumin (g/dL)	3.5–5.7	2.88
HBsAg (g/dL)	3.5–5.0	3.3
AFP (ng/mL)	0–9	2.5
CEAC (ng/mL)	0–5	1.4
CA199 (ng/mL)	0–35	83.9

AFP = alpha fetoprotein, CA199 = carbohydrate antigen 19–9, CEA = carcinoembryonic antigen, GOT = glutamic oxaloacetic transaminase, GPT = glutamic pyruvic transaminase, HbA1C = glycated hemoglobin, HBsAg = hepatitis B surface antigen, r-GT = r-glutamyl transpeptidase.

FIGURE 1. Chest radiograph showing nodular lesions in both lung fields.

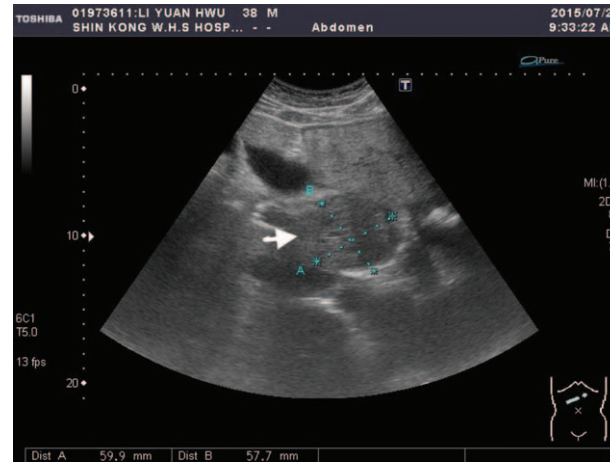

FIGURE 2. Abdominal ultrasound demonstrating a liver tumor of size 5.9 × 5.7 cm in hepatic caudate lob (arrow).

cavity walled off by inflamed granulation. Moreover, both of the aspirated pus and blood culture grew *K pneumoniae*.

Intravenous ceftriaxone (2 g/12 h) and metronidazole (500 mg/8 h) were administered for 1 month to control the liver abscess. The infection profile improved, with the WBC count declining to 5400/μL and a C-reactive protein level of 0.7 mg/dL. With regard to acute renal failure, his renal function normalized (Creatinine, 0.89 mg/dL) 10 days later. The patient's pain also gradually improved after serial abscess aspiration and continued antibiotics. Follow-up chest radiography showed the regression of nodules in peripheral lung fields. The patient was discharged in a relatively stable condition with oral cefixime (200 mg twice a day) and an outpatient follow-up appointment.

DISCUSSION

PLA is a life-threatening condition.[1] It is thus important to differentiate between a liver abscess and liver tumor. However, differentiating between KLA and liver tumor may be challenging. In this case, the patient presented with weight loss and a history of chronic hepatitis B. He remained afebrile most of the time, and the infection profile was inconsistent. Moreover, the serum laboratory tests revealed increased carbohydrate antigen 19–9 level. In addition to his clinical presentation, there were other reasons to believe that abscess was a malignancy, such as due to radiological findings. First, noncontrast CT showed a mass-like lesion that was iso-dense to the liver, suggesting it was likely a tumor. Generally speaking, an abscess is hypodendse to liver due to liquefaction.[4] However, in our case, the mass-like lesion was iso-dense to liver presumably because of the fatty liver, which would lead liver a hypodense appearance.[5] Second, there were multiple localized lymph nodes, suggesting lung metastasis.

Diabetic patients have a high propensity to develop KLA, and half of the KLA patients in one series were diabetic.[6–8] The common symptoms of PLA are fever, chills, and abdominal pain. However, the presentations of KLA are atypical and have vague clinical symptoms. The nonspecific symptoms include jaundice, diarrhea, nausea, vomiting, anorexia, and diarrhea.[1] Compared with other PLAs, KLA is also associated with a higher likelihood of developing metastatic infection by hematogenous spread.[3] Moreover, KLA patients with metastatic

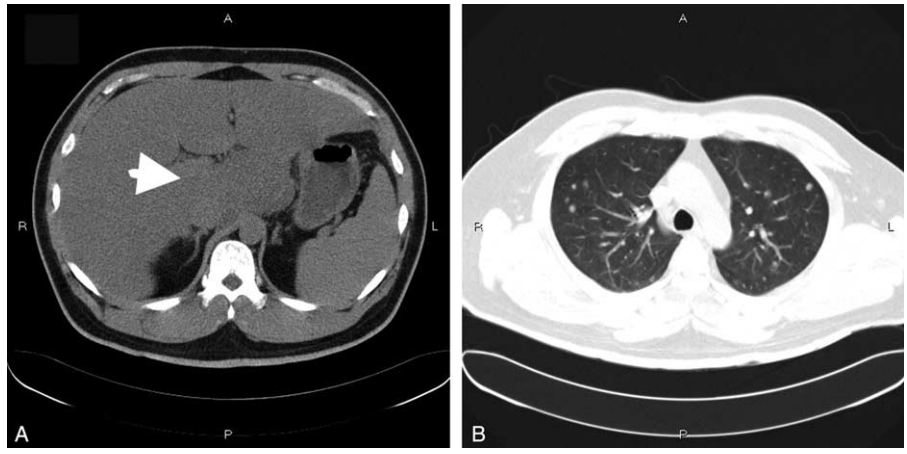

FIGURE 3. Noncontrast computed tomography showing (A) uneven fatty liver and an isodense hepatic tumor, measuring around 5.5 cm in size (arrow head) in hepatic caudate lobe with regional nodal metastases and (B) multiple lung nodules.

infections have significantly higher mortality than those without metastatic infections.[9,10] Abscess drainage and timely broad-spectrum antibiotics are the milestones of treatment for KLA.

Abdominal ultrasonography and CT are important diagnostic methods. Most patients with KLA had a solid appearance on sonography, unlike other PLAs.[4] Further imaging studies such as CT and PET may be needed. CT findings of hepatic neoplasm may appear similar to liver abscesses because some neoplasms may also present with tumor necrosis. A nonresolving liver abscess should be considered as a neoplasm.[11] Some hepatocellular carcinoma may present as PLA initially, which predicts a worse prognosis. Hepatitis B, C virus infection, liver cirrhosis, and old age ($\geq$65 years) were risk factors for hepatocellular carcinoma patient whose manifestation present as liver abscess initially. So physicians could not ignore the possibility of hepatocellular carcinoma in patients with risk factors of both pyogenic liver abscess and hepatocellular carcinoma.[12] Abscesses and neoplasms can both show increased [18F]fluorodeoxyglucose uptake on PET, making diagnosis difficult. The standardized uptake value (SUV) for abscesses is 7.7 ± 2.2, and this range is also seen for malignant lesions. The SUV of this abscess was higher than that of a primary liver tumor. It is not recommended to differentiate a liver abscess from malignancy by PET alone.[7,12] However, if segmental distribution of the lesions with biliary dilatation is seen on imaging, we should consider this lesion as infectious disease.[7]

In our case, limited imaging presented a diagnostic challenge. The acute renal failure prevented the use of contrast because the contrast medium used for CT could cause irreversible renal failure[13]; this resulted in insufficient data for image interpretation. In such cases, a diagnostic liver tumor aspiration may be necessary to differentiate an abscess from malignancy. Some patients may refuse liver aspiration because it is invasive and has risks such as bleeding, tumor seeding, or infection.[14] However, the timely diagnosis of liver tumors is essential to improve survival. A liver tumor aspiration was performed in our case because of the unclear diagnosis, and it showed purulent material, the culture of which was positive for *K pneumoniae*.

CONCLUSIONS

Symptoms, laboratory tests, and radiological findings of KLA may mimic a neoplasm. Furthermore, acute renal failure can complicate the diagnosis. Therefore, when we found a tumor-like liver lesion in an Asian man with chronic hepatitis B, diabetic mellitus, and acute renal failure, we had to consider

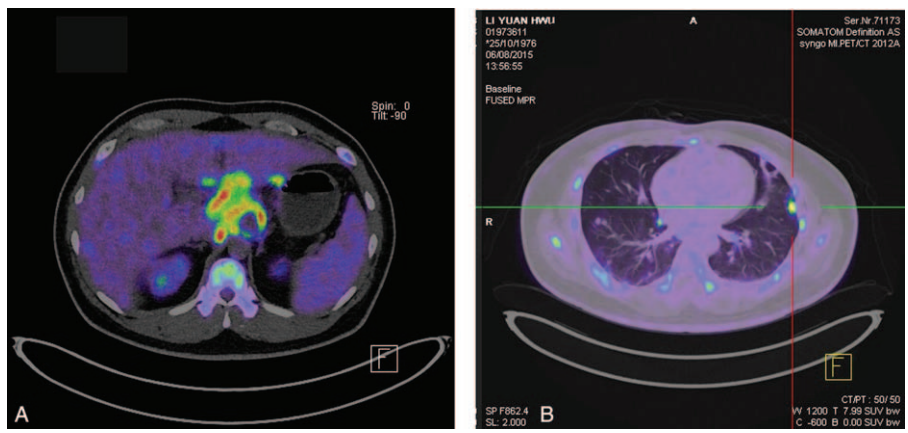

FIGURE 4. Positron emission tomography showing (A) suspected active infection with abscess formation involving the liver and abdominal cavity and (B) lung septic emboli.

liver abscess, even with ambiguous imaging findings and without significant signs of infection. Further invasive exams such as liver aspiration may be needed to confirm the real etiology in such complex cases.

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REFERENCES

1. Liu Y, Wang JY, Jiang W. An increasing prominent disease of *Klebsiella pneumoniae* liver abscess: etiology, diagnosis, and treatment. *Gastroenterol Res Pract.* 2013;2013:258514.
2. Fung CP, Lin YT, Lin JC, et al. Klebsiella pneumoniae in gastrointestinal tract and pyogenic liver abscess. *Emerg Infect Dis.* 2012;18:1322–1325.
3. Keller JJ, Tsai MC, Lin CC, et al. Risk of infections subsequent to pyogenic liver abscess: a nationwide population-based study. *Clin Microbiol Infect.* 2013;19:717–722.
4. Lee NK, Kim S, Lee JW, et al. CT differentiation of pyogenic liver abscesses caused by Klebsiella pneumoniae vs non-Klebsiella pneumoniae. *Br J Radiol.* 2011;84:518–525.
5. Decarie PO, Lepanto L, Billiard JS, et al. Fatty liver deposition and sparing: a pictorial review. *Insights Imaging.* 2011;2:533–538.
6. Hui JY, Yang MK, Cho DH, et al. Pyogenic liver abscesses caused by Klebsiella pneumoniae: US appearance and aspiration findings. *Radiology.* 2007;242:769–776.
7. Tan GJ, Berlangieri SU, Lee ST, et al. FDG PET/CT in the liver: lesions mimicking malignancies. *Abdom Imaging.* 2014;39:187–195.
8. Buppajarntham S, Shah M, Junpaparp P. Tumor-like pyogenic liver abscess caused by Klebsiella pneumoniae in diabetes. *Endocrine.* 2014;47:656–657.
9. Shin SU, Park CM, Lee Y, et al. Clinical and radiological features of invasive Klebsiella pneumoniae liver abscess syndrome. *Acta Radiol.* 2013;54:557–563.
10. Lin YT, Wang FD, Wu PF, et al. Klebsiella pneumoniae liver abscess in diabetic patients: association of glycemic control with the clinical characteristics. *BMC Infect Dis.* 2013;13:56.
11. Shah V, Arora A, Tyagi P, et al. Intrahepatic cholangiocarcinoma masquerading as liver abscess. *J Clin Exp Hepatol.* 2015;5:89–92.
12. Lim D, Lee SY, Lim KH, et al. Hepatic adenoma mimicking a metastatic lesion on computed tomography-positron emission tomography scan. *World J Gastroenterol.* 2013;19:4432–4436.
13. Mahmoodi K, Sohrabi B, Ilkhchooyi F, et al. The efficacy of hydration with normal saline versus hydration with sodium bicarbonate in the prevention of contrast-induced nephropathy. *Heart Views.* 2014;15:33–36.
14. Shyamala K, Girish HC, Murgod S. Risk of tumor cell seeding through biopsy and aspiration cytology. *J Int Soc Prev Community Dent.* 2014;4:5–11.