Successful Non-surgical Treatment of Ruptured Pyogenic Liver Abscess

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Abstract

A 72-year-old man with a fever and abdominal pain was referred to our hospital. On admission, the patient exhibited the clinical signs of septic shock. Computed tomography revealed a rim-and septal-enhanced lesion in the left lobe of the liver with hemorrhage along the hepatic capsule. Because Klebsiella pneumoniae was detected in both the blood and aspirated abdominal fluid, the patient was diagnosed with a ruptured pyogenic liver abscess. He was successfully treated with percutaneous abscess drainage and the systemic administration of antibiotics. Non-surgical treatment for a ruptured pyogenic liver abscess is therefore effective in at least some cases.

Key words: liver abscess, rupture, septic shock, percutaneous drainage, Klebsiella pneumoniae

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Introduction

A liver abscess is an uncommon, but potentially fatal clinical condition. Recent progress in the development of diagnostic tools and treatment modalities has contributed to the safe and effective treatment of liver abscesses. An amoebic liver abscess is caused by infection with Entamoeba histolytica and is commonly accompanied by acute amoebic colitis (1). The incidence of invasive amoebic infection has recently increased in male homosexuals and immunocompromised patients. Large amoebic liver abscesses were shown to frequently result in rupture into the abdominal cavity. On the other hand, a pyogenic liver abscess is mainly caused by infection with bacterial flora normally present in the intestine, including Escherichia coli and Klebsiella pneumoniae (2). Of importance, Klebsiella pneumonia is observed in the fecal samples of 75% of healthy Asian adults (3), and the incidence of liver abscesses caused by Klebsiella pneumoniae has recently been increasing (4). The development of a pyogenic liver abscess has been associated with biliary tract diseases such as choledocholithiasis, bile duct cancer, trans-catheter treatment against hepatocellular carcinoma (HCC) and severe bacteremia (5). However, the frequency of spontaneous rupture of pyogenic liver abscesses is less common than that of amoebic liver abscesses.

We herein describe a case of a ruptured pyogenic liver abscess that was successfully treated with ultrasound-guided percutaneous drainage and the administration of antibiotics.

Case Report

A 72-year-old man was referred to our hospital because of a fever and abdominal pain. The patient had been aware of general fatigue one week before admission, and he developed severe abdominal pain on the day of admission. He had no surgical history. On admission, a physical examination revealed a fever (39.0°C), tachycardia (110 beats/min), tachypnea (24 breaths/min), and hypotension (80/60 mmHg). The abdominal pain was reduced on admission, although he had a dull ache in the upper abdominal region. Neither hepatosplenomegaly nor peritoneal irritation signs were ob-
The CT findings. (a) Non-enhanced CT showed a hypodense mass (arrow) with slightly hyperdense fluid collection along the hepatic capsule (arrowheads). (b) Arterial-dominant phase images in contrast-enhanced CT demonstrated a multiloculated round mass with rim and septal enhancements.

Table. Laboratory Data on Admission

<table>
<thead>
<tr>
<th>Blood cell count</th>
<th>Blood chemistry</th>
<th>Serology</th>
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<tbody>
<tr>
<td>WBC 10,700 µL</td>
<td>TP 8.4 g/dL</td>
<td>CRP 30.0 mg/dL</td>
</tr>
<tr>
<td>RBC 3.74×10⁶/µL</td>
<td>Alb 3.8 g/dL</td>
<td>HBsAg (+)</td>
</tr>
<tr>
<td>Ht 11.3 g/dL</td>
<td>T-Bil 0.6 mg/dL</td>
<td>HCV-Ab (-)</td>
</tr>
<tr>
<td>Ht 31.4%</td>
<td>AST 126 IU/L</td>
<td>HIV-Ab (-)</td>
</tr>
<tr>
<td>Plt 4.1×10⁴/µL</td>
<td>ALT 83 IU/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LDH 332 IU/L</td>
<td></td>
</tr>
<tr>
<td>Coagulation</td>
<td>ALP 239 IU/L</td>
<td>CEA 2.8 ng/ml</td>
</tr>
<tr>
<td>PT-INR 1.06</td>
<td>γ-GTP 26 IU/L</td>
<td></td>
</tr>
<tr>
<td>FDP 8.2 µg/mL</td>
<td>T-Chol 146 mg/dL</td>
<td>PIVKA-II 161 mAU/mL</td>
</tr>
<tr>
<td>FG 961 mg/dL</td>
<td>BUN 28 mg/dL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cre 0.80 mg/dL</td>
<td></td>
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</tbody>
</table>

Non-enhanced computed tomography (CT) showed a hypodense mass located in the left lateral segment of the liver (Fig. 1a). Slightly hyperdense fluid collection indicated that there was hemorrhage extending into the abdominal cavity along the hepatic capsule (Fig. 1a). Arterial-dominant phase images obtained by contrast-enhanced CT revealed a multiloculated and liquefied mass with rim and septal enhancements (Fig. 1b). These findings indicated rupture of a liver abscess accompanied by hemorrhage, rather than a protuberant abscess from the liver surface. Since the patient exhibited the clinical signs of septic shock, we tentatively diagnosed a ruptured liver abscess.

The patient was treated with vasopressor therapy for the hypotension. Subsequently, the administration of antibiotics (doripenem, 1.0 g/day) and intravenous immunoglobulin therapy was performed. In addition, an ultrasound-guided percutaneous drainage tube was placed in the liver. Purulent and bloody fluid was intermittently discharged through the tube. *Klebsiella pneumoniae* was identified not only in the drained fluid, but also in the peripheral blood. A biopsy sample revealed abundant necrotic tissues, although no malignant tissues were observed (Fig. 2a). Periodic acid-Schiff (PAS) staining revealed no trophozoites of *Entamoeba histolytica* (Fig. 2b). Based on these findings, the patient was diagnosed with a ruptured liver abscess caused by *Klebsiella pneumoniae*. Although pyogenic liver abscesses have frequently been shown to be associated with bile duct diseases (3), magnetic resonance cholangiopancreatography (MRCP) in the patient revealed no abnormal findings (Fig. 3a).

Because the patient’s condition and laboratory data gradually improved, the drainage tube was removed 37 days after admission. He was discharged 40 days after his admission with oral antibiotics (levofloxacin, 500 mg/day). A follow-up CT conducted one month after the discharge revealed regression in both the abscess size and pericapsular fluid collection in the abdominal cavity (Fig. 3b).

Discussion

A ruptured pyogenic liver abscess occurs with an inci-
The pathological findings of the liver biopsy specimen. (a) Necrotic liver tissue, but not tumor tissue, was found (Hematoxylin and Eosin staining, ×200). (b) No trophozoites of *Entamoeba histolytica* were observed (PAS staining, ×200).

MRCP and follow-up CT images. (a) The MRCP image showed no abnormal findings. (b) Contrast-enhanced CT showed apparent regression in both the abscess and pericapsular fluid collection.

It has been reported that the K1 and K2 serotypes are the major serotypes of *Klebsiella pneumoniae* strains causing liver abscesses in Asia (10). In addition, the K1 strains were shown to be associated with extrahepatic complications, such as meningitis in cases with liver abscesses (11). Although serotyping was not performed in our case, it may be of importance for the management of liver abscesses caused by *Klebsiella pneumoniae*.

Spontaneous rupture and hemoperitoneum is a well-known characteristic of HCC (12). Because the serum level of PIVKA-II was slightly increased on admission in our patient, it was necessary to distinguish between a ruptured liver abscess and ruptured HCC. Arterial-dominant phase images during contrast-enhanced CT revealed a rim- and septal-enhanced mass, which indicated a multiloculated and liquefied lesion. These findings fundamentally differ from the findings of HCC, because HCC typically shows a solid mass with heterogeneous hypervascular enhancement in the arterial-dominant phase. In addition, the patient’s symptoms were considered to indicate septic shock rather than hemorrhagic shock. Taking into consideration that *Klebsiella pneu-*
moniae was detected in the abdominal fluid, we made a final diagnosis of a ruptured pyogenic liver abscess. Lee et al. showed that several factors, such as a medical history of diabetes, a larger abscess size, gas formation in the abscess and left hepatic lobe involvement are risk factors for spontaneous ruptured liver abscess caused by Klebsiella pneumoniae (13). In this case, the abscess was located in the left lobe and had a diameter of more than 60 mm.

A large pyogenic liver abscess with a diameter larger than 50 mm requires drainage in addition to the administration of antibiotics (14). Because percutaneous image-guided drainage is minimally invasive, it is considered appropriate as a first-line approach. Surgical drainage is frequently performed in cases of large and multi-loculated abscesses, ruptured abscesses and percutaneous drainage failure (15). However, whether non-surgical drainage and surgical treatment should be the treatment of choice for a ruptured liver abscess remains controversial. Since our patient exhibited a shock condition but no symptoms of severe peritonitis, we performed ultrasound-guided abscess drainage with the administration of antibiotics. His condition gradually improved without surgical treatment and he was discharged 40 days after his admission. Since liver abscesses caused by Klebsiella pneumoniae are often complicated by metastatic infection of the brain, eyes, lungs and other organs (16), continuous monitoring of not only the liver, but also other organs is necessary.

In conclusion, we herein reported a case of a ruptured liver abscess that was successfully treated by percutaneous abscess drainage and the systemic administration of antibiotics. Ensuring a proper diagnosis and immediately developing a therapeutic approach are required for the treatment of patients with ruptured pyogenic liver abscesses. For some cases of ruptured pyogenic liver abscesses, non-surgical treatment should be considered.

The authors state that they have no Conflict of Interest (COI).

Tenyu Motoyama and Sadahisa Ogasawara equally contributed to this work.

References