

## Infected Hepatic Cyst Treated with Percutaneous Transhepatic Drainage

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### Abstract

Simple hepatic cysts are common benign lesions that are usually asymptomatic and require no treatment. However, complications can occur. This report describes a patient with an infected hepatic cyst treated with percutaneous transhepatic drainage. A 64-year-old woman presented at a nearby hospital because of acute right-upper-quadrant pain, mild left-lower-quadrant pain, diarrhea, and fever. She was admitted and received intravenous antibiotics for 1 week, but symptoms persisted. She was, therefore, referred to our hospital. On admission, ultrasonography demonstrated multiple hepatic cysts. One 13-cm lesion was hypoechoic, unlike the other simple cysts, which were anechoic. Computed tomography showed that the density of the hypoechoic cyst was slightly higher than that of the other cysts. The wall of the cyst was thickened and showed contrast enhancement. On initial laboratory tests the serum C-reactive protein concentration was 18.49 mg/dL, and the white-cell count was 13,300/ $\mu$ L. An infected hepatic cyst was suspected, and percutaneous transhepatic drainage of the cyst was performed. A catheter was inserted into the cyst, and dark red fluid was obtained. The right-upper-quadrant pain gradually resolved after drainage. An infected hepatic cyst was diagnosed, and system antibiotics were administered. However, the mild left-lower-quadrant pain persisted. No pathogens were isolated from the drainage fluid. Minocycline hydrochloride (200 mg) was injected, and the catheter was clamped for 30 minutes, once daily for 3 days. The serum C-reactive protein concentration was 1.78 mg/dL, and the white-cell count was 5,700/ $\mu$ L. The left-lower-quadrant pain resolved, and colonoscopic examination revealed multiple diverticula of the sigmoid colon. Infection has not recurred, and the hepatic cyst has not become larger.

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**Key words:** infection, hepatic cyst, percutaneous transhepatic drainage

### Introduction

Simple hepatic cysts are common benign lesions that are usually asymptomatic and require no

treatment. However, complications, such as obstructive jaundice<sup>1</sup>, rupture<sup>2-5</sup>, intracystic hemorrhage<sup>5-10</sup>, and infection<sup>11-18</sup>, can occur. This report describes a patient with an infected hepatic cyst treated with percutaneous transhepatic

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drainage.

### Case Report

A 64-year-old woman presented to a nearby hospital because of acute right-upper-quadrant pain, mild left-lower-quadrant pain, diarrhea, and fever. The medical history was not relevant to the present condition. She was admitted to a nearby hospital and received intravenous antibiotics for a week, but symptoms persisted. The patient was referred to Nippon Medical School Hospital. On admission, ultrasonography revealed multiple hepatic cysts. A 13-cm lesion in the anterior-superior segment was hypoechoic, unlike the other simple cysts, which were anechoic (**Fig. 1**). Computed tomography (CT) confirmed the presence of multiple hepatic cysts. The density of the hypoechoic cyst in the anterior-superior segment was slightly higher than that of other cysts. The wall of this cyst was thickened and showed contrast enhancement (**Fig. 2**). Initial laboratory tests revealed the following results: serum aspartate aminotransferase concentration, 71 IU/L (normal, <28 IU/L); serum alanine aminotransferase concentration, 86 IU/L (normal, <33 IU/L); serum alkaline phosphatase concentration, 401 IU/L (normal 66 to 220 IU/L); serum lactic dehydrogenase concentration, 423 IU/L (normal, 180 to 460 IU/L); serum gamma glutamic transpeptidase concentration, 313 IU/L (normal, 8 to 39 IU/L); serum C-reactive protein concentration, 18.49 mg/dL (normal, <0.3 mg/dL); and white-cell count, 13,300/ $\mu$ L (normal, 4,000 to 8,000/ $\mu$ L). An infected hepatic cyst was suspected, and percutaneous transhepatic drainage was performed. An 8-French catheter was inserted into the cyst, and dark red fluid was obtained. Cystography did not demonstrate any communication between the intrahepatic bile ducts and the cyst. The right-upper-quadrant pain gradually resolved after drainage. An infected hepatic cyst was diagnosed, and flomoxef sodium was given intravenously (2 g per day). However, the mild left-lower-quadrant pain persisted. The cyst fluid was negative for cancer cells. No pathogens were isolated from the drainage fluid. Minocycline hydrochloride, 200 mg in 10 mL of

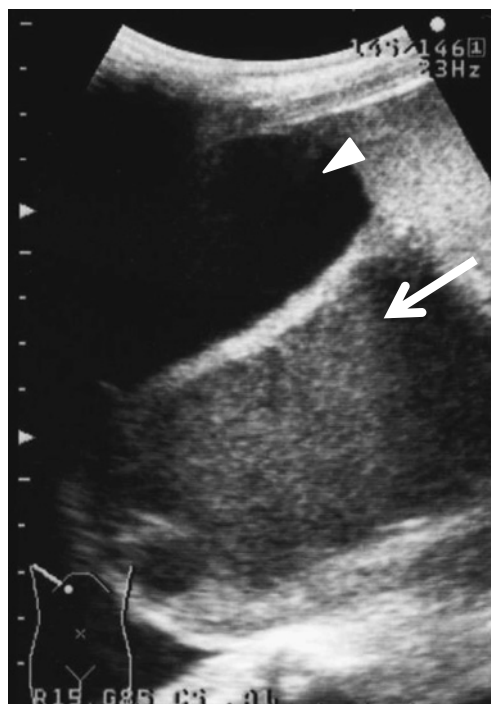


Fig. 1 An ultrasonogram of the liver, showing multiple hepatic cysts. A 13-cm hypoechoic lesion (**arrow**) differed from other simple cysts, which were anechoic (**arrowhead**).

saline, was injected into the drainage catheter, and the catheter was flushed with 10 mL of saline. The catheter was then clamped for 30 minutes. Minocycline hydrochloride was injected daily for 3 days. The serum C-reactive protein concentration was 1.78 mg/dL, and the white-cell count was 5,700/ $\mu$ L. The drainage catheter was removed 4 days after insertion. Eighteen days after drainage, the left lower abdominal pain resolved, and colonoscopic examination revealed multiple diverticula of the sigmoid colon.

The patient was discharged 29 days after drainage. Infection has not recurred, and the hepatic cyst has not become larger.

### Discussion

The prevalence of congenital hepatic cysts in the general population ranges from 2% to 4%<sup>19</sup>. Most nonparasitic cysts are congenital in origin and are solitary. Hepatic cysts can occur at any age, but the majority are found in patients aged 40 to 60 years. The female-to-male ratio has been cited as 5.25 : 1<sup>20</sup>. Solitary cysts involve the right lobe twice as often

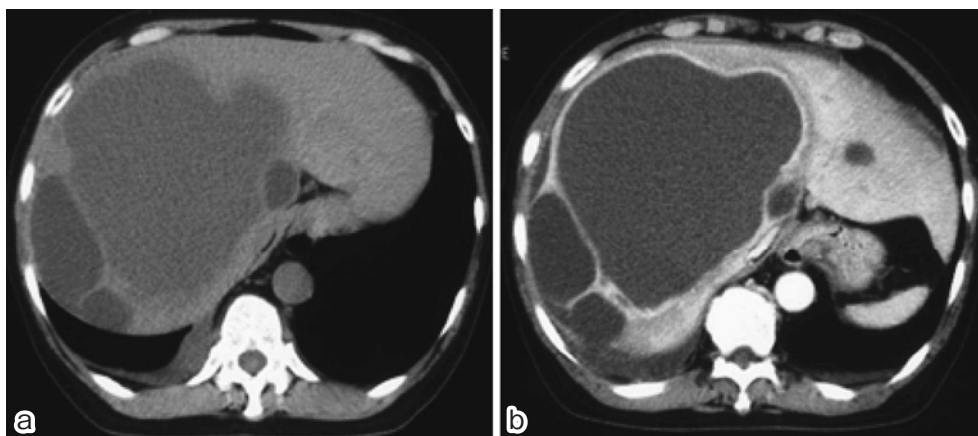


Fig. 2 Computed tomographic (CT) scans, showing multiple hepatic cysts. The density of the 13-cm cyst in the anterior-superior segment was slightly higher than that of the other cysts (a). The wall of the cyst in the anterior-superior segment was thickened and showed contrast enhancement (b).

as the left and very rarely arise in the falciform ligament<sup>21</sup>.

Most hepatic cysts are asymptomatic. Some cysts resolve spontaneously, but serious complications have been reported<sup>1-18,22</sup>. Infected hepatic cysts develop in up to 3% of patients with autosomal dominant polycystic kidney disease (ADPKD) who have end-stage renal failure, but in less than 1% of such patients with milder renal failure<sup>17,23-26</sup>. Rupture of an infected polycystic liver cyst into the pericardium has been reported in a renal-transplant recipient<sup>14</sup>. Monomicrobial infections with Enterobacteriaceae are the predominant type of infection in patients with ADPKD, in contrast to patients with noncystic hepatic abscesses, in whom polymicrobial infections are most common<sup>27</sup>. In our patient, no pathogens were isolated from the drainage fluid. Dark red fluid was discharged from the drainage catheter, and the right-upper-quadrant pain gradually resolved after drainage. The serum C-reactive protein concentration and white-cell count decreased after drainage. Pathogens are not present in all patients with infected hepatic cysts<sup>23</sup>.

The clinical manifestations of hepatic cysts include acute or subacute febrile illness, typically associated with tenderness in the right upper quadrant, leukocytosis, and an extremely high erythrocyte sedimentation rate but only mild liver-function abnormalities. Liver abscesses can be caused by the portal spread of intra-abdominal infections (e.g.,

appendicitis, diverticulitis, colitis). Implicated organisms include anaerobes, staphylococci species, neisseria species, *Escherichia coli*, *Streptococcus milleri*, and *Yersinia enterocolitica*<sup>13</sup>. Infected hepatic cysts might be caused by the same pathogens. With improved management of intra-abdominal infections, spread now occurs primarily through the biliary tree or arterial system. Other causes of infection are trauma, biliary obstruction, and infected liver tumors. Subacute bacterial endocarditis can cause hepatic cyst infections, but our patient had not undergone valve-replacement surgery and did not have bacterial endocarditis. Therefore, the most likely source of infection was the gastrointestinal tract. Yoshida et al.<sup>11,12</sup> reported 2 cases of infected hepatic cysts. The most likely source of infection in both cases was diverticulitis of the sigmoid colon. Our patient had left-lower-quadrant pain, diarrhea, and fever. Colonoscopic examination revealed multiple diverticula of the sigmoid colon. The patient may have had diverticulitis of the sigmoid colon, and the hepatic cyst may have become infected by hematogenous seeding, as described previously<sup>11,12</sup>.

Complex cysts can be observed on ultrasonography. Clinical and laboratory features and the use of modern scanning techniques facilitate the prompt diagnosis of infection in patients with hepatic cysts. In our patient, CT demonstrated a hepatic cyst with wall thickening that showed contrast enhancement. In infected hepatic cysts, CT

usually shows wall thickening, increased heterogeneous density, or gas bubbles within the cyst<sup>23</sup>. Ultrasonographic examination in our patient showed a hypoechoic lesion 13 cm in diameter with a thickened wall. Simple hepatic cysts are anechoic on ultrasonography. Hypoechoic cysts with a thickened wall in the liver suggest the presence of serious complications, such as hemorrhage or infection. Infected hepatic cysts are associated with fever or elevated C-reactive protein concentrations, permitting differentiation from hemorrhagic hepatic cysts.

The treatment of choice for infected cysts is a combination of percutaneous drainage and antimicrobial therapy<sup>11,12,23</sup>. Percutaneous transhepatic drainage can now be easily performed under ultrasonographic guidance, once the infected cyst has been identified. Recurrence of simple hepatic cysts has been reported after drainage alone, without injection of a sclerosing agent<sup>28-31</sup>. Sclerosing agents are thought to kill the secretory cells of the hepatic cyst, and a decrease in cyst size indicates resorption<sup>30,31</sup>. However, infected hepatic cysts usually do not recur after drainage alone, possibly because infection also kills the secretory cells. We recommend that symptomatic simple hepatic cysts are treated with percutaneous transhepatic drainage, followed by injection of 200 mg of minocycline hydrochloride in 10 mL saline. The catheter is then flushed with 10 mL saline and clamped for 30 minutes. Minocycline hydrochloride is injected daily for 7 to 8 days, and the catheter is removed<sup>30</sup>. We gave minocycline hydrochloride for only 3 days, because the infection might kill the secretory cells. Infection has not recurred, and the hepatic cyst has not become larger.

In conclusion, we have described a patient who had an infected hepatic cyst that shrank after drainage. Percutaneous transhepatic drainage with concomitant systemic antibiotic administration was an effective therapy.

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