

An Uncommon Cause of Chest Pain: Multiloculated Hepatic Abscess in a Patient with Strongyloides Stercoralis Infection

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Abstract Liver abscesses are purulent collections in the liver parenchyma that result from bacterial, fungal, or parasitic infections. Infection can spread to the liver through the biliary tree, hepatic vein, or portal vein when an adjacent infection or trauma expands. We report a case of a 53-year-old male who presented to an ambulatory clinic for evaluation of substernal chest pain. He reported associated palpitations, chills, shortness of breath, and diaphoresis. An abdominal CT revealed a mass with multiple loculations in the right and caudate hepatic lobe consistent with an abscess. Blood cultures grew *Klebsiella pneumoniae*, and ova and parasite exams showed *Strongyloides stercoralis* larvae. After four weeks of antibiotic treatment, a follow-up abdominal CT demonstrated complete resolution of the hepatic abscess. This case is an unusual presentation of a hepatic abscess as the patient did not report abdominal symptoms.

Keywords: multilobulated liver abscess, strongyloidiasis, bacteremia, chest pain

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with chest pain to our institution.

1. Introduction

Liver abscesses, the most common type of visceral abscess, are an uncommon but potentially life-threatening infection. In a report of 540 cases of intraabdominal abscesses, which also included intra- and retroperitoneal abscesses, pyogenic liver abscesses accounted for 48% of all visceral abscesses and 13% of all intraabdominal abscesses. The annual incidence of liver abscesses has been estimated at 2.3 cases per 100,000 people and is higher among men than women [1]. As a result of its dominant vasculature, the right hepatic lobe is most affected in 91% of cases. Most pyogenic liver abscesses are polymicrobial, reflecting patient and geographic variability. *Escherichia coli* has generally been reported as the most common isolated microbe; however, recent data show that *Klebsiella pneumoniae* is the most common pathogen in pyogenic liver abscesses [2]. The majority of aspirated fluid cultures are positive, whereas blood cultures are positive in only 50% of cases [3]. It is noteworthy that approximately 40% of liver abscesses develop local or systemic complications, the most common being generalized sepsis and pleural effusion. We report a case of liver abscess in a patient with a strongyloidiasis infection complicated by bacteremia with *Klebsiella pneumoniae* who presented

2. Case Presentation

A 53-year-old male with a past medical history of hypertension who recently emigrated from El Salvador presented to our ambulatory clinic for evaluation of substernal chest pain that started eight days earlier. He described the chest pain as intermittent, non-radiating, and associated with palpitations, chills, shortness of breath, and diaphoresis. He denied fever, abdominal pain, nausea, or vomiting. Physical examination revealed that the abdomen was soft, non-tender, and non-distended. The ECG showed junctional tachycardia and T wave inversion in lead III and aVF. The patient was sent to the emergency department to rule out acute coronary syndrome. At the emergency department, laboratory tests were performed and significant for WBC 12.63 K/uL, lactate 10 mmol/L, ALK 193 U/L, AST 88 U/L, ALT 94 U/L, T Bili 0.4 mg/dL, D-dimer 878 ng/mL, troponin elevated to 0.82 ng/mL, and A1c 8.6%. CTA of the chest was negative for pulmonary embolism but revealed an incidental heterogeneous mass within the liver. An abdominal CT confirmed a 5.5 cm x 8.9 cm x 9.8 cm mass with multiple loculations in the right and the caudate hepatic lobe that was suspected of being an abscess (Figure 1).



Figure 1. CT of abdomen and pelvis with IV contrast showing a 5.5 x 8.9 x 9.8 cm mass with multiple loculations in the right and caudate hepatic lobe compatible with an abscess

The patient was admitted for the management of septic shock secondary to a hepatic abscess. Blood cultures grew *Klebsiella pneumoniae*. Ova and parasite exams showed *Strongyloides stercoralis* larvae. Antibodies for *Entamoeba histolytica*, HIV, and HTLV-1 were negative. Interventional radiology specialists recommended against abscess drainage due to its complexity and location. The patient initially received treatment with ceftriaxone 2g intravenous daily and metronidazole 500 mg intravenous three times daily for five days with some improvement in presenting symptoms and subsequently was discharged home on cefuroxime 500 mg oral two times daily with a recommended total therapy of six weeks. Approximately two weeks after discharge, the patient started to experience new episodes of fever and returned to the emergency department for evaluation. An abdominal CT

demonstrated an increase in the size of the hepatic abscess. An MRI of the abdomen was subsequently performed and showed multiple right hepatic lobe abscesses with a dominant 4.4-cm abscess in segment eight that was not observed in the abdominal CT taken two weeks prior (Figure 2). Interventional radiology was consulted for the second time and deferred percutaneous drainage of the abscess due to difficult access. Infectious disease recommended discontinuing oral cefuroxime due to inadequate response and initiating treatment with ceftriaxone 2g intravenous daily and metronidazole 500 mg orally three times daily for four week, and oral ivermectin for two weeks to manage strongyloidiasis. After four weeks of treatment, a repeat abdominal CT demonstrated complete resolution of the hepatic abscess (Figure 3).

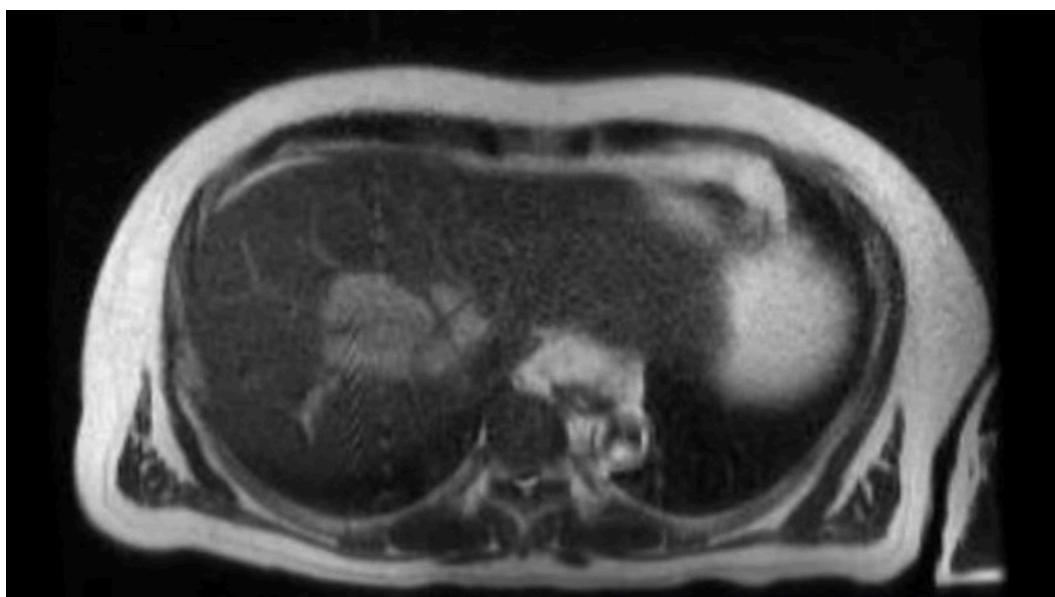


Figure 2. MRI of the abdomen w/wo IV contrast showing multiple peripheral enhancing diffusion restricting masses within segments 8, 1, and 6. The dominant mass measures 4.4 x 4.3cm in segment 8



Figure 3. CT of the abdomen and pelvis with IV contrast after four weeks of antibiotic treatment showing resolution of the hepatic abscess

3. Discussion

A liver abscess is an uncommon but potentially life-threatening infection. Common predisposing causes include biliary disease, gastrointestinal malignancies, congenital anomaly of the biliary tree, portal vein seeding, and penetrating trauma [2]. Approximately 18–66% are cryptogenic, with no underlying cause identified [2]. Liver abscesses are commonly caused by polymicrobial infections, with the most common organisms being *E. coli*, *Streptococcus*, *Enterococcus*, and anaerobes [4]. Recent data show that *Klebsiella pneumoniae* is the most common pathogen in pyogenic liver abscesses, with higher susceptibility in diabetic patients [4].

The clinical manifestations are variable and depend on the abscess's size, the patient's general health, associated comorbidities, and complication [5]. Clinical manifestations often include right upper quadrant pain, high fever, nausea, and vomiting [5]. Loss of appetite, jaundice, ascites, pleural effusion, and respiratory symptoms may also occur, though less frequently. Laboratory findings include leukocytosis, elevated CRP, and occasional liver function test abnormalities [6]. Given that neither symptoms nor laboratory testing is specific, diagnosis relies mainly on imaging. Ultrasound and abdomen CT demonstrate 85% and 97% sensitivity, respectively, for the diagnosis of liver abscesses. However, they are not able to definitively differentiate the microbiological etiology [6].

Management includes image-guided drainage and antibiotic therapy [3]. Most aspirated fluid cultures are positive, whereas blood cultures are positive in only 50% of cases. Some studies suggest that small abscesses (3–5 cm) can be treated by antibiotics alone. Indications for percutaneous drainage include if the abscess is large (>10 cm in diameter), subcapsular, at high risk of rupture, superinfected, or if there is poor response to medical treatment [6]. There is considerable variation in clinical practice regarding total antibiotic duration. It is recommended that antibiotic treatment be continued for at least four to six weeks, but the optimal time is still unclear [3].

Hepatic abscesses can result from bacterial, fungal, or parasitic infections. The parasite most associated with hepatic abscess is *E. histolytica*, but little has been documented of other parasites such as *Strongyloides stercoralis* in developing a hepatic abscess. *Strongyloides stercoralis* is an intestinal nematode that infects 3–100 million people worldwide [7]. While strongyloidiasis is mainly asymptomatic in 50% of patients, it may present as a disseminated disease with the spread of larvae to tissues outside of the autoinfection cycle, including the liver [8]. Chronic and disseminated strongyloidiasis increases the risk of severe enterobacteria infection, especially *Klebsiella pneumoniae* infection. It has been suggested that the *Strongyloides stercoralis* larvae can cause intense inflammation of the cecum, which allows *Klebsiella pneumoniae* to invade the intestine. This indicates that strongyloidiasis causes severe disease with enterobacteria via induction of mucosal rupture, leading to dissemination [3]. Penetration of the larvae through the intestinal wall can be associated with gram-negative sepsis, as larvae carry enteric microorganisms into the bloodstream. However, this relationship requires further study.

This case is an unusual presentation of a hepatic abscess, in which the patient did not report abdominal symptoms and presented with chest pain. Chest pain accounts for approximately 7.6 million annual visits to emergency departments (ED) in the United States, making chest pain the second most common complaint. Chest pain can be due to heart-related causes and other physical causes. Heart-related causes include angina, myocardial infarction, pericarditis, myocarditis, and aortic dissection. Other physical causes may include costochondritis, spasm of the esophagus, esophageal motility disorders, esophagitis, pulmonary embolism, pneumonia, pleuritis, and pneumothorax. Also, a person with septic shock can develop chest pain that may mimic symptoms of an acute heart attack. This is known as type 2 myocardial ischemia, which is defined as ischemia resulting from mismatched myocardial oxygen supply and demand, unrelated to unstable coronary artery disease (CAD) [9]. The patient's chest pain presented in this case was secondary to type II

myocardial ischemia as a result of septic shock that developed in the setting of a hepatic abscess.

4. Conclusions

Chest pain can be due to multiple diseases, and physicians should be able to recognize all causes of chest pain, including uncommon presentation of an infectious process. This case is interesting because cases of strongyloidiasis leading to superimposed bacterial infections are rare. There are not many documented cases of hepatic abscess due to strongyloidiasis, and this could represent an area of further study. A liver abscess can result in 100% mortality without treatment, which improves to between a 2.5%-14% mortality rate when treated. For this reason, early diagnosis and treatment are essential for decreasing mortality [5].

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