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Case Report

Diagnostic approach of liver abscess

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ABSTRACT

Liver abscess is an infection of parasitic or bacteria into the liver parenchyma which causes encapsulation of suppurative material surrounded by inflammatory tissue. Liver abscess is an important health problem especially in low-middle income countries. It is not easy to diagnose liver abscess due to non-specific clinical signs. This case report, we presented a 46-year-old man who was hospitalized with suspected pulmonary infection. However, in the course of the patient's disease, we found a liver abscess.

Keywords: Liver abscess, Amoebic liver abscess, Pyogenic liver abscess

INTRODUCTION

Liver abscess is the invasion of parasitic or bacteria into liver, causing encapsulation of suppurative material surrounded by inflammatory tissue in the liver parenchyma.[1-3] This microorganism can invade the liver parenchyma through the bile ducts, the bloodstream (hematogenic), or spreading through organs adjacent to the liver such as through the gallbladder.[4]

Epidemiologically, liver abscess is a rare case, the incidence varies in various parts of the world. Research in the United States showed the incidence of liver abscess was 13 to 20 cases per 1,00,000 hospitalizations, while the incidence of liver abscess caused by amoebic infection in Asia was around 21 per 1,00,000 population per year.[2,5] In general, there is an increase in cases of liver abscess due to bacterial infection. The incidence of liver abscess due to bacterial infection in the United States increased from 2.7 per 100,000 population in 1994 to 4.1 per 100,000 population in 2005. Same as in the United States, the incidence of liver abscess due to bacterial infection in Taiwan increased from 10.83 per 100,000 population in 2000 to 15.45 per 100,000 people in 2011.[6] Liver abscess is an important health problem especially in low-middle income countries.[2] Liver abscess can be divided into amoebic and pyogenic. Amoebic liver abscess is caused by *Entamoeba histolytica* while pyogenic liver abscess is caused by various microorganisms such as *Klebsiella pneumoniae*, *Streptococcus milleri*, *Escheria coli*, *Burkholderia pseudomallei*, *Staphylococcus aureus* and Polymicrobial including anaerobic bacteria.[2]

The etiology of liver abscess varies in different parts of the world. In Southeast Asia and the African Continent, the most common cause of liver abscess is amoebic infection, while in Western countries liver abscess is predominantly caused by bacterial infection.[4] This difference in etiology may be due to the fact that Entamoeba histolytica infection is more common in low-middle-income countries than in high-income countries.[2] Clinically, amoebic and pyogenic liver abscess cannot be distinguished.[2] Signs and symptoms of liver abscess include malaise, right upper quadrant abdominal pain, anorexia, fever, weight loss, jaundice, vomiting, hepatomegaly, splenomegaly and diarrhea.[7] Laboratory examination may reveal leukocytosis especially an increase in neutrophils, an increase in C-reactive protein, an increase in alkaline phosphatase and abnormalities in liver function tests. In general, the signs and symptoms of a liver abscess are

nonspecific so that imaging studies such as ultrasound or computed tomography are needed to confirm the presence of liver abscess.[2,4]

CASE REPORT

A 46-year-old man came to the hospital with complaints of pain like being stabbed in the upper right abdominal region, radiating to the epigastrium and the right waist. Pain was felt worse with a change in position. The pain had been recurring since 3 months ago. Pain lasted for 3 days to 7 days then the pain subsided by itself. The onset of pain was usually followed by fever, malaise, nausea and vomiting. Patient also complained of coughing up since the last 2 weeks and weight loss of ±5 kg in the last 3 months. Previous history of diarrhoea was denied. Complaints of shortness of breath, night sweats and painful urination were denied. History of tuberculosis, diabetes mellitus, hypertension, abdominal trauma, history of surgery and a history of malignancy was denied.

On physical examination, blood pressure was 120/80 mmHg, heart rate was 108 per minute, respiratory rate was 20 times per minute, temperature was 38.8°C and oxygen saturation was 98% on room air. The patient was fully conscious with no signs of respiratory distress. On conjunctival examination, there were no signs of anemia or jaundice. Cardiac examination within normal limits. On pulmonary examination we found vesicular breath sounds, no crackles or wheezing was found. On abdominal examination, there was right upper quadrant abdominal tenderness, no liver or spleen enlargement was found. On extremities examination within normal limits.

Laboratory examination revealed leukocytosis (18.72×103 /µl) with an increase in neutrophils (0.57%), lymphocytes (76.2%) and eosinophils (9.2%) while monocytes tended to decrease (13.7%). There were slightly decreased hemoglobin levels (10.3 g/dl) with normal MCV (85.3 fl), MCH (27.5 pg) and MCHC (32.3 g/dl). There was an increase in the platelet count (636×103 /µl). Examination of serum glutamic-oxaloacetic transaminase (31 U/l) and serum glutamic pyruvic transaminase (33 U/l) were within normal limits. Examination of blood glucose (128 mg/dl), serum creatinine (1.0 mg/dl) and blood urea nitrogen (16 mg/dl) were also within normal limits. Urinalysis, stool examination, Widal test and electrolyte examination was within normal limits.

A chest X-ray showed that the heart was within normal limits, but there was an infiltrate on both lung fields (Figure 1). Based on clinical signs and a chest X-ray, we suspected that the patient has pulmonary tuberculosis infection, so we did a molecular rapid test. The result did not find *M. tuberculosis*. We investigated the causes of recurrent abdominal pain with ultrasonography. Abdominal ultrasonography examination revealed a cystic lesion in the right lobe of the liver which was suspected as a liver abscess (Figure 2). We performed abdominal computed tomography with contrast and found a mass with dense, well-defined septate fluid with a size of 15×9 cm in the right lobe of the liver, without primary nodules, liver size within normal limits (Figure 3). Based on clinical signs and imaging tests, we suspect the patient has an amoebic liver abscess. We treated patients with a combination of cefoperazone and metronidazole. After that, we do exploratory laparotomy for drainage and find ±500 cc of pus in the right lobe of the liver. The sample of the abscess fluid tested for culture but didn't find bacterial growth. Lack of this case report, we had given antibiotics for 1 weeks prior to the culture of the liver abscess.

Figure 1: PA chest X-ray shows infiltrates in both lung fields accompanied by hilar thickening.

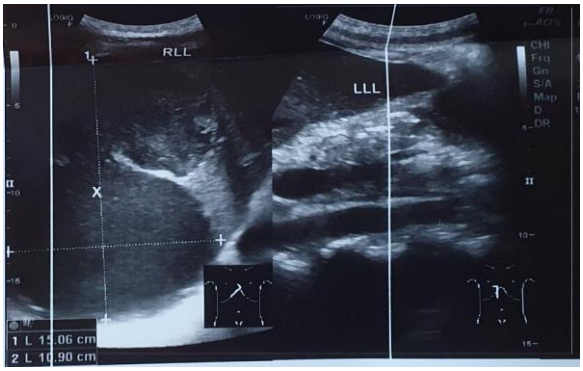

Figure 2: Abdominal ultrasound found cystic lesion in right lobe of liver suspected as liver abscess.

Figure 3: Abdominal computed tomography with contrast, find a mass with a septate fluid density, well demarcated with a size of 15×9 cm in the right lobe of the liver.

DISCUSSION

Liver abscess occurs due to infection of the liver parenchyma through the bile duct (acute cholangitis), infection through the portal vein or through the hepatic artery and gastrointestinal tract trauma (e.g. due to fish or chicken bones). The predisposing factors of liver abscess include old age, male gender, history of malignancy, alcohol consumption, diabetes mellitus, inflammatory bowel disease, liver cirrhosis, history of endoscopic sphincterotomy, immune-compromised state and proton pump inhibitor drugs usage.[3,8,11]

In general, the signs, symptoms and laboratory findings of a liver abscess are non-specific, making the diagnosis sometimes difficult.[3] Approximately 70% of cases of liver abscess are diagnosed within 2 weeks, and 43% of cases are diagnosed more than 2 weeks after symptom onset.[7] The clinical features of pyogenic and amoebic liver abscess cannot be distinguished.[2] The important signs and symptoms of liver abscess are abdominal pain and hepatomegaly.[7] Other signs and symptoms that may appear include fever, abdominal pain, especially in the right hypochondriac region, nausea and vomiting, night sweats, weight loss, diarrhea, cough, jaundice, changes in pulmonary features such as right pleural effusion, hepatomegaly, ascites and confusion.[7,9]

Laboratory findings on liver abscess include increased white blood cell count, increased C-reactive protein, hypoalbuminemia, increased aspartate aminotransferase (AST), increased alanine aminotransferase (ALT), increased alkaline phosphatase (ALP), increased gamma glutamyl transpeptidase (GGT), increased bilirubin, anemia, prolonged prothrombin time, increased globulin levels and increased international normalized ratio (INR).[3,10] Blood cultures are positive in 50% of cases, especially when the cause of the liver abscess is hematogenous spread. Culture of aspiration of liver abscess is very important in diagnosis and treatment. Approximately 30% of liver abscess cultures have negative results, this may be due to the administration of antimicrobial therapy before abscess culture examination.[1] Positive results in patients who have received antimicrobial therapy prior to culture examination may indicate the presence of an antibiotic-resistant pathogen. Aspiration of pus in pyogenic liver abscess macroscopically looks purulent and foul-smelling whereas amoebic liver abscess is generally brownish, thick and odorless.[2,11]

Due to the non-specific signs, symptoms and laboratory findings of a liver abscess, imaging tests such as ultrasonography or CT are necessary. Both of this test can diagnose more than 90% of cases of liver abscess.[4] Imaging test of liver abscess is important to determine the location, size, number of abscesses, consistency, and the presence or absence of gas in the abscess.[3]

Ultrasonographic findings in pyogenic liver abscesses may be hyperechoic or hypoechoic lesions with internal debris or septations. Amoebic liver abscesses may be seen as round, homogeneous, hypoechoic lesions usually located near the liver capsule.[1] CT findings of pyogenic liver abscess can be divided into two phases, pre-suppurative and suppurative. In the pre-suppurative phase, the appearance is heterogeneous, hypodense, with irregular contours, well demarcated, resembling a tumor, especially when the liver abscesses are multiple and small. In the suppurative phase, the appearance is hypoechogenic or anechogenic, sometimes multiloculated, with rounded contours with a more or less thick capsule. CT findings of an amoebic liver abscess showed a round, well-defined hypodense lesion.[1,4] Amoebic liver abscess is usually solitary and located in the right lobe of the liver, while pyogenic liver abscess is usually multiple and can be found in the right or left lobe of the liver.[12]

Treatment of pyogenic liver abscess generally uses third-generation cephalosporins such as ceftriaxone and metronidazole. Antibiotics can be given for up to 6 weeks. If the diameter of the abscess is more than 5 cm or does not respond to antibiotic therapy for 3 to 5 days, drainage may be needed. Treatment of amoebic liver abscess use metronidazole 750 mg orally three times a day or 500 mg IV every 6 hours for 10 days with luminal agent such as Diloxanide furoate 500 mg orally three times a day for 10 days. Aspiration of amoebic liver abscess is indicated in abscesses larger than 5-10 cm.[8,12] Other conditions requiring drainage of the liver abscess include left lobe abscess, multiple abscess, abscess with a high risk of rupture which is recognized on imaging examination.[12]

Complications of liver abscess include septic shock, right pleural effusion, vena cava thrombosis, thoracoabdominal fistula, gastric perforation, pancreatitis, peritonitis, empyema and peripancreatic abscess. The mortality rate of amoebic liver abscess is about 1-3% while that of pyogenic liver abscess is 10%.[13]

CONCLUSION

Liver abscess is not easily diagnosed because the clinical sign is nonspecific. Additional investigations such as ultrasound or abdominal CT scan are needed to help confirm the diagnosis. We reported a 46 year old male patient who was initially suspected of having a pulmonary infection but on the way we found a 15×9 cm liver abscess in the right lobe. We performed a drainage with exploratory laparotomy, obtained pus fluid in the right lobe of the liver as much as ±500 cc. The sample of the liver abscess fluid tested for culture but didn't find bacterial growth. The possibility of negative culture results was due to the fact that 1 week before the abscess drainage procedure, the patient had been given a combination of cefoperazone and metronidazole.

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