

Management of Pyogenic Liver Abscess and Empyema as Its Complication

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ABSTRACT

Pyogenic liver abscess may have serious complications that need specific management. We reported a case of a young male patient aged 24 years old and complained of abdominal enlargement since 2 (two) weeks before. Abdominal ultrasound revealed multiple liver abscesses. Liver aspiration was performed and about 500 cc of yellowish purulent fluid was drained. During hospitalization the symptoms of fever and shortness of breath were getting worse although adequate antibiotic treatment had been given. Chest X-ray examination showed elevated right hemidiaphragm and right pleural effusion. Thoracocentesis and proof puncture showed purulent fluid. He was diagnosed with empyema as a complication of pyogenic liver abscess. Water Sealed Drainage (WSD) was performed to evacuate the fluid and he was given antibiotics. The patient's condition improved in several days.

Keywords: *Pyogenic liver abscess, complication, empyema*

INTRODUCTION

The incidence and types of liver abscess are varied among different countries. Liver abscess may be caused by bacterial infection, protozoa or fungus. It is classified into 2 categories: amebic and pyogenic liver abscess. In developed countries, 75% of liver abscess are pyogenic. However, the most common cause of liver abscess all over the world is amebic liver abscess.^{1,2,3}

Source of infection may arise from biliary system, portal pyemia, hematogenic spread, and direct extension from adjacent organs or penetrating trauma.^{1,3,4,5} About 15% of cases are of unknown etiologies.³ Pyogenic abscess is usually due to mixed infection of aerob and anaerob microorganisms. Among the most frequently found

organism are negative gram-negative enteric bacilli, *Streptococcus milleri* and *Bacteroides sp.*^{2,3,5,6}

Pyogenic liver abscess is diagnosed based on clinical signs and symptoms, laboratory results and radiologic examinations. Symptoms commonly found in pyogenic abscess are fever, upper right quadrant abdominal pain, decreased appetite, and weight loss. From physical examination we may find liver enlargement, jaundice and sometimes decreased breathing sound in lower lobe of the right lung.^{1,3,4,5,6} Laboratory result reveals leukocytosis, elevated liver enzymes, alkaline phosphatase, bilirubin level, hypoalbuminemia, and normocytic normochrom anemia.^{3,4} In amebic liver abscess, more than 95% of serologic amebic test will give positive result but

acute amebic liver abscess may have false negative result. Thus, Negative result on serologic test does not exclude amebiasis and the test should be repeated after one week.^{4,7} Abscess fluid culture is usually positive for bacterial infection compare to blood culture. Radiologic examination usually show elevated right hemidiaphragm, atelectasis and pleural effusion.^{1,4,5} Abdominal ultrasound might accurately detect liver abscess. However, CT can be more accurate with sensitivity nearly 100% but will cost much higher.^{5,8,9,10,11}

In the old days, the surgical intervention was the best therapeutic option in management of liver abscess. Recent development in the field of radiology and microbiology technology may allow early diagnosis and proper management with broad spectrum antibiotics and adequate abscess drainage.^{8,9,11}

Broad spectrum antibiotic is recommended in early treatment such as penicillin, cephalosporin, aminoglycoside, metronidazole or clindamycin. Metronidazole is given to overcome anaerob infection and amebiasis.^{1,5,7,8} If diagnosis of amebic abscess has been confirmed, metronidazole treatment can be continued. If it revealed likely due to pyogenic abscess, antibiotic treatment should be given according to clinical response and the result of blood or abscess fluid culture. There is no specific recommendation on how long antibiotic should be given. It is more tailored and individual treatment. Parenteral antibiotics should be given at least for 48 hours after no fever and leukocytosis and continued with oral antibiotics.⁸

Not all liver abscesses should be drainage, only the big ones which have more than 5 cm in diameter. Generally, small size abscess will resolve only with antibiotic administration. Liver abscess which is not drained will resolve longer by antibiotic. Surgical intervention is needed if there is treatment failure or underlying disease that needs surgical treatment.^{8,10}

The complications of liver abscess are sepsis, empyema as direct extension or abscess rupture into the pleural cavity, peritonitis due to abscess rupture and pleuropericardial effusion.^{1,5,7} Pyogenic liver abscess has poor prognosis if it was known to be multiple, the patient had severely ill condition or complications and diagnosis is delayed. Laboratory result hemoglobin level < 1 g%, bilirubin level > 1.5 mg/dL, leukocyte count > 15,000 / μ L and prolonged prothrombin also indicate poor prognosis.⁵

CASE ILLUSTRATION

Male patient, 24 years old was admitted in hospital with chief complaint enlargement of abdomen since 2 weeks before admission. Abdominal enlargement was

predominantly in the upper quadrant. He felt discomfort while breathing. Sometimes he felt nausea, lose his appetite and vomit. He lost body weight and suffered from fever since one month before. There was no history of coughing and urination was normal. Four weeks before he was hospitalized in private hospital for 9 days and had been told was having typhoid fever. After discharge, he was not feeling very well and was performed abdominal ultrasound was found liver enlargement and then he was referred to our hospital. History of jaundice, use of intravenous drugs, blood transfusion and alcohol consumption were denied.

From physical examination the patient looked severely ill, fully alert, blood pressure of 130/70 mmHg, pulse rate of 108 beat/minute, respiratory rate of 28 times/minute and body temperature of 39.8°C. The conjugative was pale and sclera was subicteric. Jugular venous pressure was normal. Heart examination was normal. The abdomen enlarged and there were hepatomegaly 4 fingers below arcus costae and 5 fingers below processus xiphoideus, consistency was firm and smooth. No splenomegaly. Shifting dullness was positive and bowel sound was normal.

Laboratory results were as follow: hemoglobin level 6.3 g/dL, hematocryte 17%, leukocyte 18,900/ μ L, platelet count 292,000/ μ L, blood glucose 101 mg/dL, BUN 39 mg/dL, creatinin 2.0 mg/dL, AST 356 U/L, ALT 77 U/L, albumin 3.4 g/dL, sodium 130 meq/L, potassium 3.1 meq/L, chloride 96 meq/L. Urinalysis showed slight proteinuria and hematuria.

The patient were given blood transfusion and repeated laboratory results were as follows: hemoglobin level 8.2 g/dL, MCV 77.3, MCH 25.9, MCHC 33.5, hematocryte 24.5%, leukocyte 17,700/ μ L, platelet counts 238,000/ μ L, AST 551 U/L, ALT 118 U/L, albumin level 1.6 g/dL, globulin level 4.1 g/dL, direct bilirubin 1.3 mg/dL, indirect bilirubin 1.1 mg/dL, Alpha-fetoprotein (AFP) < 0.5 μ g/L. The chest X-ray examination showed cardiothoracic index < 50% and elevated right hemidiaphragm. Abdominal ultrasound found multiple lesions in the liver suggested hepatoma with differential diagnosis liver abscess.

Based on anamnesis, physical examination and supporting examination, the problems in this patient were pyogenic liver abscess with differential diagnosis amebic liver abscess and hepatoma; anemia; hyponatremia; hypokalemia; hypoalbuminemia; acute renal failure; urinary tract infection

Liver abscess was diagnosed based on symptom of liver enlargement since 2 weeks before admitted to hospital, abdominal pain in the right upper quadrant, lose

appetite, loose weight. Physical examination revealed fever, hepatomegaly with firm consistency, regular surface and tenderness. Laboratory results were leukocytosis, elevated liver enzyme and phosphatase alkaline. Liver abscess in this patient was considered pyogenic with differential diagnosis hepatoma.

From blood level anemia microcytic hypochrom was found with hemoglobin level 6.3 mg/dL. It was thought due to chronic disease or iron deficiency. Iron status in this patient should be examined. Hyponatremia and hypokalemia based on sodium level 130 meq/L and potassium level 3.1 meq/L were thought due to decreased intake. Hypoalbuminemia was based on albumin level 1.6 g/dL. Diagnosis of acute renal failure was based on BUN 37 mg/dL and creatinin level 2.0 mg/dL. Urinary tract infection was suspected due to the presence of leukocyturia and hematuria.

Patient was given antibiotic treatment of cefotaxim 1 g three times daily, metronidazol 500 mg three times daily, sistenol three times daily, ranitidine injection twice daily and supplementation of sodium and potassium.

On the 8th days hospitalization, the patient was still had fever, worsening breathlessness, persistent abdominal pain and leukocytosis. The liver aspiration was performed on 9th day hospitalization. Abscess fluid was reddish brown about 250 cc in the right lobe of liver. It was planned to check for fluid abscess analysis and culture but unfortunately it was not sent to laboratory by his family.

After liver aspiration, chest X-ray was repeated and we found right plural effusion and decreased breath sound in the right lung. Pleural effusion was considered caused by direct extension or liver abscess rupture. We planned to perform proof puncture to analyze plural fluid was pus or not.

Three days after abscess aspiration, patient still had fever and breathlessness. Leukocytosis was improved. Pleural puncture revealed reddish purulent pleural fluid. He was consulted to thoracic surgery department and water sealed drainage (WSD) was inserted. About 400 cc serohemorrhagic fluid was drained.

On 3rd subsequent day after WSD insertion, breathlessness was improved, fever diminished, purulent fluid production from WSD \pm 150 cc/20 hours. Thorax surgery department and planned to perform thoracotomy after improvement of general condition. Case discussion between surgery, pulmonology and hepatology departments decided to perform liver aspiration optimally and if the was no good response, then thoracotomy would be performed.

On 24th day hospitalization fluid production of WSD

was decreased to 20 cc/24 hours, undulation positive and bubble positive. Repeated chest X-ray showed improvement (minimal right pleural effusion). The WSD was taken off on the next day. Amebic serologic test was negative and culture of abscess fluid no organism was found.

On 31st day patient looked moderately ill, compos mentis, blood pressure of 110/70 mmHg, pulse rate 82 beats/minute, respiratory rate 19 times/minute, body temperature 36.6°C. conjunctiva was pale, sclera was not jaundice. Heart and lung examination were normal. Liver was palpable 2 fingers below arcus costae. Laboratory results were as follow: hemoglobin level 10.2 g/dL, hematocyte 29.8%, leukocyte 3,100/ μ L, platelet count 171,000/ μ L, AST 37 U/L, ALT 25 U/L, albumin level 3.3 mg/dL, sodium 139 meq/L, potassium 3.4 meq/L, chloride 106 meq/L. Repeated abdominal ultrasound showed liver abscess in consolidation process. The patient was discharge from hospital and was given oral antibiotic cefadroxil 500 mg three times daily.

DISCUSSION

Diagnosis of liver abscess was considered in this patient based on the presence of fever, right upper quadrant abdominal pain, complaint of nausea and vomit, decreased appetite, loss of weight, hepatomegaly, leukocytosis, elevated liver enzymes and bilirubin, elevated right hemidiaphragm on chest X-ray, multiple lesions found at abdominal ultrasound examination and confirmed by fluid abscess obtained from liver aspiration.

Liver abscess in this patient was likely a pyogenic than amebic liver abscess because patient's condition was severely ill, multiple abscess, yellowish abscess fluid and had negative amebic serologic test. The result of abscess fluid culture was negative. It was might be due to antibiotic treatment given for this patient prior the culture examination. Considering it was not possible to perform the liver aspiration immediately, blood sample should have been taken prior to antibiotic treatment for culture examination.

Recommendation for management of pyogenic liver abscess was giving broad spectrum antibiotics before the result culture examination available. If the abscess has > 5 cm in diameter, guided ultrasound aspiration of liver abscess is recommended. Antibiotics given for this patient were cefotaxime (third generation of cephalosporin) and metronidazole to anticipate the possibility of concurrent amebiasis and considering the fact that 80% of pyogenic liver abscess was mixed infection of aerob and anaerob microorganisms. In this

patient, antibiotics had been given for 2 (two) weeks and liver aspiration had been done, but the response was not good because of complications such as empyema. In addition, hypoalbuminaemia and decreased immunologic status of the patient and inappropriate antibiotic treatment may contribute the poor treatment response. Empyema might arise from direct spread of the abscess or rupture of abscess into pleural cavity spontaneously or by trauma. There was not many reference could be found regarding the most frequent cause of empyema as complication of liver abscess.

Management of empyema by giving appropriate antibiotic treatment and pus drainage by water sealed drainage (WSD) had made good clinical response in this patient. The fever had already disappeared and

decreased breathlessness. Thus, empyema as complication of liver abscess was the cause of inadequate treatment response for the first 2 weeks of hospitalization.

Patient was discharged from hospital on 31st day of hospitalization in good clinical condition. The laboratory findings had improved and repeated abdominal ultrasound had shown smaller lesion size in the liver. The initial liver abscess was > 5 cm in diameter and it was already an indication to perform liver aspiration. It was very important to motivate the patient to have regular check up to evaluate the size of liver abscess beside antibiotic treatment. If it was necessary, liver aspiration might be repeated. Although the overall condition of patient had been improved, it is crucial to search the source of infection to prevent relapse in the future.

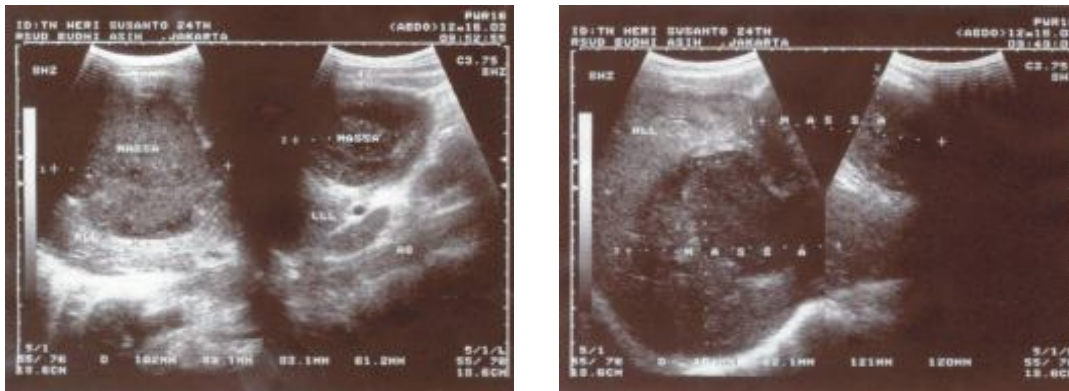


Figure 1. Abdominal ultrasound showed hepatomegaly with multiple lesions, blood vessels and biliary tract are deviated

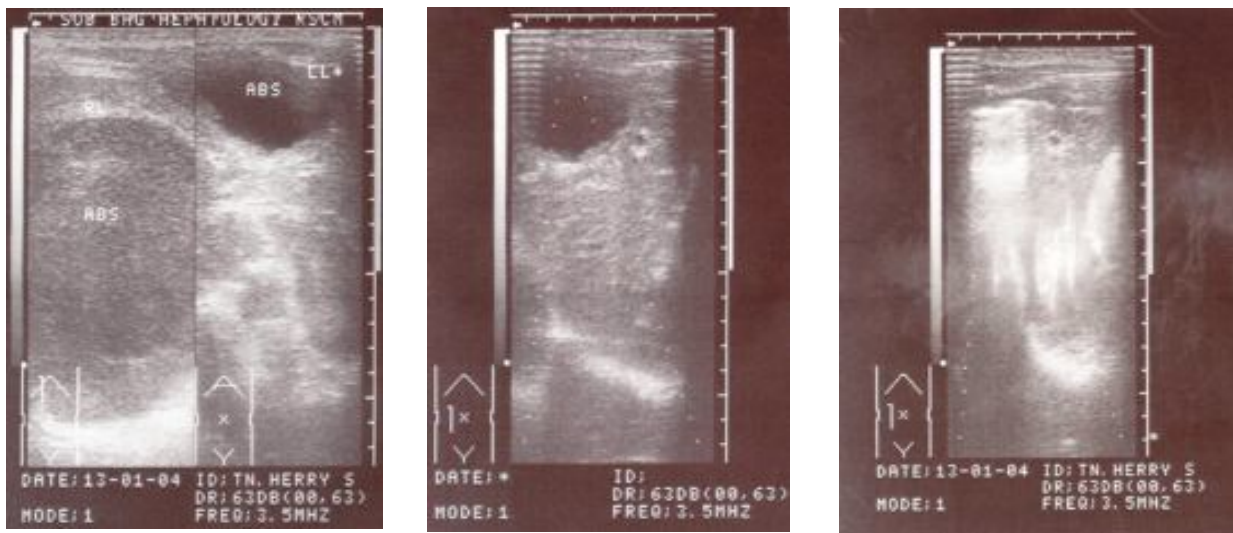


Figure 2. Abdominal ultrasound showed liver abscess after the second liver aspiration



Figure 3. Chest X-ray showed elevated right hemidiaphragm



Figure 4. Chest X-ray examination after thoracocentesis showed right pleural effusion

REFERENCES

1. Abdurachman SA. Abses Hati. Dalam: Sulaiman A, Daldiyono, Akbar N, Rani A, editor. Gastroenterologi Hepatologi. Jakarta: Penerbit Buku Kedokteran. CV Infomedika;1990.h.401-3
2. Okano H, Shiraki K, Inoue H, Kawakita T, Yamamoto N, Deguchi M, et al. Clinicopathological analysis of liver abscess in Japan. *International J Molecular Med* 2002;10:627-30
3. Krige JEJ, Beckingham IJ. Liver abscess and hydatid disease. *BMJ* 2001;322:537-40
4. Zalesnik F, Kasper DL. Intraabdominal infections and abscess. In: Braunwald E, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL, editors. *Harrison's Principles of Internal Medicine*. 15thed. USA: McGraw Hill Co 2001.p.829-34
5. Lisgaris MV. Liver Abscess. Available at www.emedicine.com/med/topic1316.htm
6. Red SL. Amebiasis and infection with free living amebiasis. In: Braunwald E, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL, editors. *Harrison's Principles of Internal Medicine*. 15thed. USA: McGraw Hill Co 2001.p.1200-2
7. Sherlock S, Dooley J. *Diseases of the liver and biliary system*. 11th ed. London: Blackwell Publ Co 2002.p.495-7
8. Stain SC, Yellin AE, Donovan AJ, Brien HW. Pyogenic liver abscess: Modern Treatment. *Arch Surg* 1991;126:991-6
9. Liew KVS, Lau TC, Ho CH, Cheng TK, Ong YS, Chia SC, et al. Pyogenic liver abscess: A tropical centre's experience in management with review of current literature. *Singapore Med J* 2000;41(10):489-92
10. Wong WM, Wong BC, Hui CK, Matthew, Lai KC, Tso WK, et al. Pyogenic liver abscess: Retrospective analysis of 80 cases over a 10-year period. *J Gastroenterol Hepatol* 2002;17:1001-7
11. Mohsen AH, Green ST, Read RC, McKendrick MW. Liver abscess in adult: ten years experience in a UK centre. *Q J Med* 2002;95:797-802