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# Percutaneous Drainage as The Management of Amebic Liver Abscess (ALA): A Case Report

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## ABSTRACT

***Background:*** Amebic liver abscess (ALA) is the most common extraintestinal manifestation of amebiasis caused by Entamoeba histolytica infection. Clinical diagnosis of ALA is often uncertain due to no specific signs and symptoms. Abscess aspiration or drainage had a vital role in the management of ALA, mainly in cases with inadequate treatment response and large abscesses at risk of rupture. ***Case Presentation:*** A 66-year-old male patient presented with right upper quadrant abdominal pain for two weeks. He was diagnosed with a liver abscess in another hospital and then referred to our hospital due to inadequate clinical response after the treatment. Ultrasonography showed a solitary hypoechoic lesion in the right lobe of the liver and the CT scan revealed a well-defined hypodense lesion with regular margins in segment VII of the liver. Metronidazole and ceftriaxone were given intravenously during hospitalization. Percutaneous drainage of the liver abscess was performed on the seventh day of hospitalization with the indication of inadequate treatment response, size, and location of the abscess. The culture of the discharge showed growth of E. histolytica. No complications were found and the patient was discharged on the twelfth day of hospitalization with optimal clinical improvement. ***Conclusion:*** We report a case of ALA with inadequate response to the conservative treatment. The percutaneous drainage was performed for abscess decompression based on the preoperative ultrasound and CT scan. There is no complication was found and the patient was discharged on the twelfth day of hospitalization with optimal clinical improvement.

***Keywords:*** amoebic liver abscess; percutaneous drainage; E. histolytica

## INTRODUCTION

Amebiasis is caused by infection of *Entamoeba histolytica* (*E. histolytica*) and occurs in 50 million people worldwide. An amebic liver abscess (ALA) is the most common extraintestinal manifestation of amebiasis [1]. The reported incidence of ALA varies between 3-9% in amebiasis with mortality reaching almost 100% if left untreated [2]. Poor hygiene, alcohol consumption, lack of clean water, difficult access to healthcare facilities, low socioeconomic status is the predisposition factors for ALA [3]. The sign and symptoms of ALA are not specific, thereby the diagnosis of ALA is challenging. The role of ultrasound and computed tomography (CT) scan is very crucial in the diagnosis of ALA and both of them can be used as a guide for abscess aspiration or drainage in ALA [2]. The majority of ALA had a good response to metronidazole treatment. However, some ALA cases may have an inadequate clinical response to pharmacological treatment. Thus, abscess aspiration or drainage should be considered in a large ALA with a high risk of rupture [4].

Here we report a case of ALA with a large subcapsular abscess in the right lobes of the liver which had persistent abdominal pain even after being treated with metronidazole but was successfully treated using percutaneous drainage.

## CASE PRESENTATION

A 66-year-old male patient with a liver abscess was referred to the Surgical Polyclinic of Sanjiwani General Regional Hospital Gianyar. The patient had persistent dull abdominal pain in the right upper quadrant for two weeks. The abdominal pain was radiating to the right back and worsening when the patient took deep breaths or coughed. He decided to seek medical treatment because the abdominal pain also got worse over time. A fever for the last four days along with abdominal pain, bloated, nauseated but without vomiting, and appetite-decreased was complained by patient. Other symptoms, such as yellowish skin over the body (jaundice), abdominal distention, severe headache, and decrease in consciousness were denied.

The patient was diagnosed with a liver abscess and got five days treatment from the Internist in another hospital but was referred to our hospital because there was no improvement with conservative therapy and the patient might need surgical therapy. The previous history of liver disease, gallbladder and bile duct disorder, diabetes mellitus, and human immunodeficiency virus (HIV) infection was denied. The patient was a farmer with a side job as a palm tapper for making palm wine (traditional alcohol made from palm tree sap [*Arenga pinnata*]). He also had a habit of consuming fermented palm wine about 1-2 times a week.

The initial physical examination at the polyclinic showed a good general condition and a glasgow coma scale (GCS) of E4V5M6 with a regular pulse rate of 88 beats/minute, regular respiratory rate of 20 breath/minutes, axilla temperature of 36.2°C, blood pressure of 170/100 mmHg, and mild pain severity with a visual analogue scale of 4. The sclera was not icteric and the palpebral conjunctival was not anemic. The cardiovascular and respiratory systems were within normal limits.

Abdominal examinations found no distention, normal bowel sound, no apparent liver and spleen enlargement, and no peritoneal irritation sign, but there was tenderness on the right upper quadrant.

Laboratory examinations from the previous hospital showed a leucocytosis (12.8 x $10^3$/µL) with a neutrophilic predominance (90.6%). The complete blood count during the first visit to our hospital showed a normal count of leukocytes (8.20 x $10^3$/µL), neutrophil 74.2%, eosinophil 6.4%, hemoglobin 13.4 g/dL, erythrocyte count of 4.42 x $10^6$/µL, and thrombocyte count of 376 x $10^3$/µL. Other laboratory examinations include aspartate aminotransferase (AST) 36 U/L, alanine aminotransferase (ALT) 31 U/L, blood urea nitrogen 12.3 mg/dL, creatinine 0.49 mg/dL and random blood glucose 86 mg/dL

Abdominal ultrasound revealed a normal size liver with a sharp edge, a solitary hypoechoic lesion in the right lobe liver with a size of 8.72 x 6.29 cm with a homogenous parenchymal echogenicity around the lesion (Figure 1). The gallbladder, spleen, pancreas, kidney, bladder, and prostate were within normal limits. No free fluid was found in the intraperitoneal cavity.

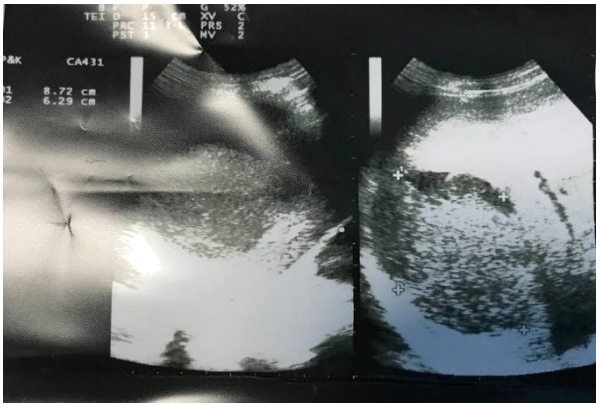


**FIGURE 1:** Liver ultrasound

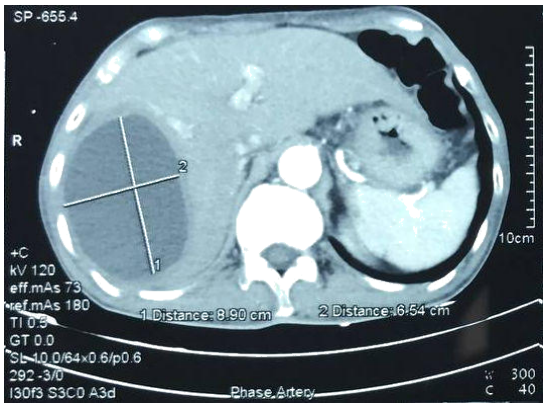


**FIGURE 2:** Axial View of Abdominal CT scan


**FIGURE 3:** Coronal View of Abdominal CT scan

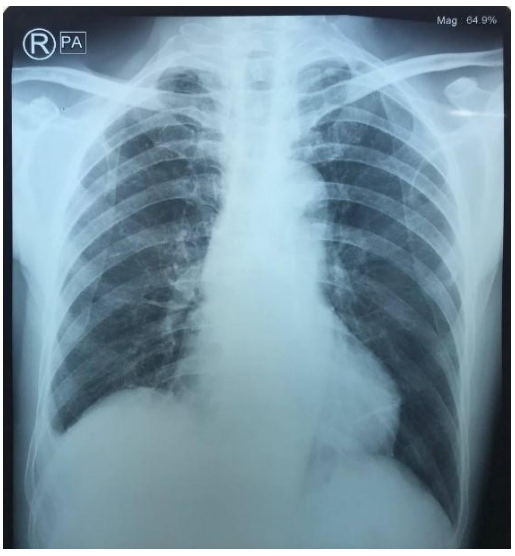


**FIGURE 4:** Chest X-Ray

The abdominal CT scan showed a hypodense lesion sized 8.01 x 8.90 x 6.54 cm with a well-defined margin in segment VII of the liver (Figure 2-3). Other findings on the abdominal CT scan were a calcified granuloma in segment VII of the liver and a small cyst in the left kidney.

The gallbladder, spleen, pancreas, right kidney, bladder, and prostate were within normal limits. No free fluid was found in the intraperitoneal cavity. The chest X-ray was also within the normal limit (Figure 4).

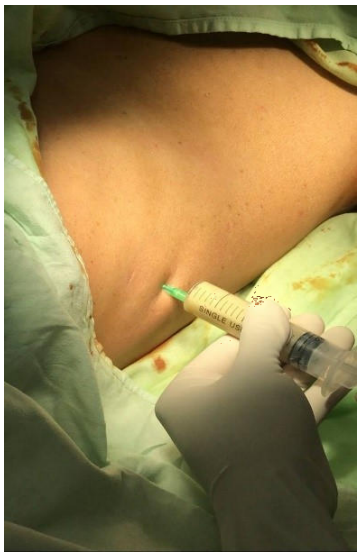

**FIGURE 5:** Trial of Liver Abscess Puncture.

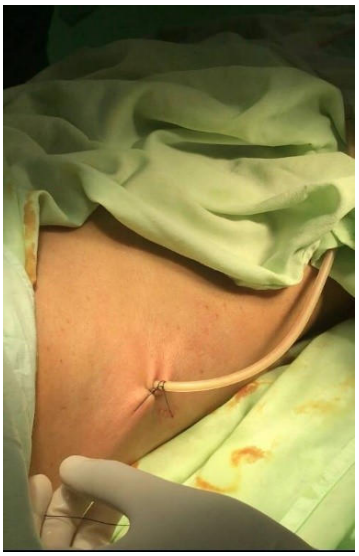

**FIGURE 6:** Percutaneous Drainage with NGT

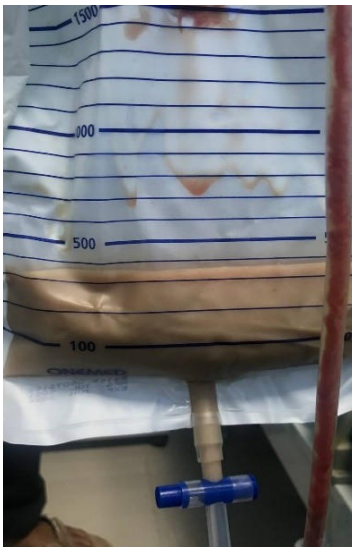


**FIGURE 7**: Anchovy Paste Discharge

The patient was diagnosed with a right lobes liver abscess and was treated with ceftriaxone 2 x 1 gram (IV), metronidazole 3 x 500 mg (IV), paracetamol 3 x 1 gram (IV), amlodipine 1 x 5 mg, and captopril 2 x 25 mg. During the first six days of treatment, there were no complaints other than persistent pain in the right upper quadrant of the abdomen. Thus, percutaneous drainage with general anaesthesia (GA) was performed on the seventh day of treatment. The percutaneous drainage was performed with the indication that the abscess was large and easily accessible. The percutaneous drainage was performed by doing a trial puncture parallel to the right seventh intercostal space (ICS) on the anterior axillary line. Subsequently, an approximately 2-cm incision parallel to the seventh ICS was done and an 18-Fr nasogastric tube was installed for the drainage process. The next day, a 300-ml brownish pus (anchovy paste) was found. The discharge was cultured and the result showed growth of *E. histolytica*. The abdominal pain subsided and the pus was reduced to 55 ml on the ninth day of treatment. The production of pus reduced over time and became less than 10 ml on the tenth and eleventh day of treatment. The drainage tube was removed on the twelfth day of treatment and the patient was discharged from the hospital with optimal clinical improvement. After the patient was discharged, the patient also got cefixime 2 x 100 mg orally as the alternative to intravenous ceftriaxone treatment and metronidazole 3 x 500 mg orally for 3 days. No local or systemic complications were found during the procedure or the hospitalization.

**DISCUSSION**

A liver abscess is a pus-filled cavity formed due to the invasion and multiplication of microorganisms in the liver parenchyma. The microorganism causing liver abscess might be bacteria, amoeba, or even fungi [5]. ALA is the most common extraintestinal manifestations of *E.histolytica* infection [6,7].

*E. histolytica* was commonly found worldwide. A high incidence of *E. histolytica* infection was found in the low-middle income countries [8]. *E. histolytica* infection is reported as the third-highest cause of parasitic infection death-related after malaria and schistosomiasis [9]. It is estimated that there were 50 million cases of amebiasis with a mortality rate of 100,000 deaths per year worldwide [7]. The highest incidence of ALA is found in Asia with an estimated incidence of 21 cases per 100,000 people per year. The incidence of ALA is found to be ten times higher in men than in women [10].

The majority of ALA cases are found in the population of 30-60 years old men. Poor environment sanitation, contaminated drinking water, malnutrition, and regular alcohol consumption are the predisposition factors for the *E. histolytica* infection [8]. A high incidence of ALA is also found in patients with decreased cellular immunity, such as HIV patients [6].

Infection is acquired when a person ingests food or water contaminated with quadrinucleated cysts of *E. histolytica.* This quadrinucleated cyst has thick walls and is resistant to gastric acid so that it can reach the ileum or caecum and experience excystation due to the influence of alkaline conditions and trypsin stimulation which damages the cyst wall. Motile trophozoites are released from the cyst during the excystation. These motile trophozoites will migrate to the colon and cause damage to the columnar epithelium of the Lieberkühn crypts causing inflammation and ulceration. The trophozoites will then penetrate the peritoneal cavity or spread to the liver, lungs, and other extraintestinal organs through the portal venous circulation [9]. The inflammation caused by these trophozoites in the liver will lead to necrosis of hepatocytes and the formation of brownish exudates with characteristics similar to “anchovy paste” [3].

Routine alcohol consumption is a well-known risk factor for ALA as stated in many previous studies [3,7]. Kannathasan et al., (2018) showed that type of alcohol (toddy and arrack) consumption and frequency of alcohol consumption (daily consumers and those who consumed 4–6 times a week) was a risk factor for ALA. This study showed that 100% (n = 346) of subjects with ALA had a habit of alcohol consumption and 70.8% (n = 245) of them drank alcohol on daily basis. The majority of subjects (79,2%) had consumed toddy (an alcoholic drink made from the fermented palm tree sap) and arrack [7]. The contaminated water and unhygienic process are suspected as the source of *E. histolytica* infection in those alcoholic beverages. Alcohol may also cause damage to the hepatocytes and Kupffer cells which leads to decreased immunity and increased susceptibility to infection. *In vitro* studies found that a high level of iron will also increase the proliferation, virulence, and cytotoxic ability of the amoeba [3].

Clinical manifestations of liver abscess are unspecific and it is difficult to differentiate ALA from pyogenic liver abscess (PLA) solely based on the clinical findings [4].

The clinical manifestations of ALA include atypical symptoms, such as fever (85-90%), abdominal pain (84-90%), weight loss (33-50%) jaundice (6-10%), and cough (10-30%). Hepatomegaly may be found in 30-50% of ALA cases.[9] Diarrhea is found in less than one-third of patients and dysentery can be found several months before the onset of ALA [6]. About 80% of ALA patients had a fever and right upper quadrant abdominal pain within 2-4 weeks after the abscess formation [10].

Pulmonary amebiasis is also one of the most common extraintestinal manifestations of amebiasis. The pulmonary infection may be caused directly by the extension of liver abscess or indirectly from the hematogenous or lymphatic spread. The clinical manifestations of pulmonary amebiasis were includes fever, hemoptysis, and referred pain on the right shoulder or right scapula region [9]. Other complaints, such as cough and dull percussion sound or crackles sound in the lower lobe of the right lung, could be found in the pleuropulmonary amebiasis [10].

The patient in this case had persistent abdominal pain for the last two weeks. He also had a fever for the last four days that occurred along with abdominal pain. He had a habit of consuming palm wine 1-2 times a week which was predicted as one of the predisposition factors for ALA. The physical examinations in our patient showed tenderness on the right upper quadrant of the abdomen and no peritoneal irritation was found. No other abnormalities were found on physical examinations.

Common laboratory findings in ALA include leucocytosis with neutrophil predominance, increased C-reactive protein (CRP), increased alkaline phosphatase, and abnormal liver function test result [8]. Other laboratory findings that might be found in ALA are anemia, hyperbilirubinemia, and hypoalbuminemia. These laboratory findings are not specific to a liver abscess, but they help determine the focus of radiological examination needed [4].

Culture and microscopic examination of ALA are considered less sensitive. Microscopic examinations only successfully identify trophozoites in less than 25% of cases of ALA. Based on the macroscopic characteristics of the aspirated fluid, ALA is suspected when an odorless, brownish, viscous fluid is found (often known as anchovy paste). This characteristic distinguishes ALA from PLA, which is characterized by foul-smelling purulent discharge [8]. Most cases of ALA do not coexist with colitis, which results in a negative result on stool microscopy. Stool microscopy also failed to distinguish between *Entamoeba* species [3].

Serological tests, such as indirect hemagglutination assay (IHA), latex agglutination, indirect immunofluorescence assay (IFA), or enzyme-linked immunosorbent assay (ELISA), play important role in the diagnosis of ALA [9] Serological examination (IgG) has a high sensitivity. However, in endemic areas with repeated exposure to *E. histolytica,* a definitive diagnosis of ALA based on the high IgG titer is challenging because it cannot distinguish acute amebiasis from long-standing amoeba infections [1,8,9]. Detection of Gal/GalNac *E. histolytica* antigen in the serum had a sensitivity of >95% and a specificity of 100% for diagnosing ALA. However, the sensitivity of this test may be reduced in cases that already had metronidazole therapy [8]. The presence of positive antigen serum and purulent discharge indicate an acute infection ALA diagnosis could be established with molecular examination using polymerase chain reaction (PCR) examination that had higher sensitivity than the parasitological examination [9].

The use of ultrasound and CT scan is very helpful in the diagnosis of liver abscess. Liver abscess on ultrasound or CT scan appears as a space-occupying lesion [8]. CT scan has a higher sensitivity than ultrasound in diagnosing a liver abscess (97% vs 85%) [11]. CT scan also had several advantages over ultrasound in diagnosing liver abscess, such as able to detect smaller liver abscess, assess the potential for rupture, and distinguish it from the neoplasm [5].

The feature of liver abscesses in ultrasound and CT scan may vary over time. In the pre-suppurative phase, a heterogenous hypodense lesion with an uneven surface and poorly defined margin might be found. Meanwhile, in the suppurative phase, the common feature of liver abscess is hypoechoic-anechoic lesions with rounded and encapsulated contours. Contrast-enhanced margin or known as a ring-sign appearance on a CT scan might also be found during the suppurative phase [3,5].

The typical imaging of ALA lesions are round or oval, unilocular, often solitary, and mostly located peripherally in the right lobe of the liver [11]. Morphological feature of ALA in CT scans may vary depending on the onset of symptoms and the treatment received. The feature of ALA lesion in CT scan during the acute phase is a cavity with absent or incomplete walls, ragged edges, and septates. This morphological feature is associated with more severe clinical manifestations, more severe laboratory abnormalities, and a higher complication rate. The ALA lesion may also appear as a hypodense lesion with well-defined walls and smooth edges on a CT scan which indicates an advanced process and initial recovery phase [12].

Our patient had leukocytosis with a neutrophil predominance on the initial complete blood count test in the previous hospital. However, the second complete blood count performed in the Sanjiwani General Regional Hospital showed normal results. These findings may be due to the response to therapy previously obtained in other hospitals. Based on the results of the ultrasound and CT scan, an abscess was found in the right lobe of the liver. A hypodense lesion with well-defined margins was found on a CT scan that was consistent with the imaging of an abscess in the suppurative phase and an ongoing recovery phase. Serology, antigen, and PCR assays were not carried out due to limited resources in our hospital.

Empirical antibiotics may be administered before specimen collection and then later adjusted based on the results of culture and sensitivity tests. The empiric antibiotics regimen should be broad-spectrum which covers gram-positive cocci and gram-negative bacilli, such as piperacillin/tazobactam, amoxicillin-clavulanic acid, or a third-generation cephalosporin plus an aminoglycoside. Metronidazole is added to cover anaerobic bacteria and amoebae [5]. The duration of antibiotic treatment should be adjusted based on the response to the therapy, such as clinical improvement, improved serial laboratory marker, and improvement in serial imaging [4].

Pharmacological therapies of ALA include administration of tissue dan luminal agent.[6] Administration of metronidazole as a tissue agent has shown a good response, even in large-sized abscesses. Clinical improvement, such as subside in fever and reduced abdominal pain, should occur within 72-96 hours after administration of metronidazole [4]. The usual dose of metronidazole used is 500-750 mg IV/PO every 8 hours for 7-10 days. Other antibiotic regimens including tinidazole, ornidazole, or nitazoxanide may be used as alternative of metronidazole.

A luminal agent, such as paromycin, diiodohydroxyquin, or diloxanide furoate, may be added to eliminate intraluminal trophozoite cysts [6].

The main treatment of ALA is pharmacological therapy. However, about 15% of ALA cases are refractory to the pharmacological therapy.[14] Surgical intervention, such as abscess aspiration or drainage, should be considered when the clinical response to the pharmacological therapy is inadequate (persistent fever and abdominal pain for more than 4 days) [6].Drainage of the abscess is also indicated in subcapsular ALA, ALA with size greater than 10 cm, ALA with bacterial superinfection, or an ALA larger than 5 cm in the left lobe of the liver (risk of rupture into the pericardium) [10]. A ruptured liver abscess may lead to empyema, peritonitis, pericarditis, or even heart tamponade due to accumulation of abscess fluid in the pleural or pericardium cavity depending on the location of the abscess [6].

Percutaneous needle aspiration (PNA) or percutaneous catheter drainage (PCD) is preferred over surgical drainage for the management of liver abscesses [8,13]. Due to the high morbidity and mortality rate of surgical drainage (10-47%), recently PCD is more commonly used with a high success rate, approximately 70-100% [14].

Trivedi et al., (2019) found a higher success rate for PCD than PNA (100% vs 77%) [13]. The meta-analysis conducted by Cai et al., (2015) also showed similar results. The success rate of PCD is significantly higher than PNA (96.1% vs 77.8%, $p = 0.041$). Two out of five randomized controlled trials (RCT) studies in the study by Cai et al., also revealed that the PCD group had a shorter time interval for significant clinical improvement than the PNA group [15]. A study by Kulhari and Mandia (2019) that investigated 190 cases of liver abscess found that clinical improvement in PCD group was significantly faster the PNA group (4.22 ± 1.25 days vs. 6.96 ± 1.33 days; $p < 0.001$). The mean time to 50% reduction in abscess volume was found to be faster in the PCD group than in the PNA group (4.43 ± 1.27 vs. 7.05 ± 1.25 days, respectively, $p < 0.001$). The PNA group was also reported to have a longer mean length of stay than the PCD group, but this was not significant (12.9 ± 4.02 vs. 11.44 ± 4.15 days, respectively, $p > 0.05$) [14].

Several advantages of PNA over PCD are it is more affordable, minimally invasive, can be performed on multiple abscesses, and had a lower risk of complications due to catheter placement [13,14]. Thick and heavy purulent discharge, as well as the rate of re-accumulation of purulent discharge, are determining factors for the success rate of PNA [13,15]. PCD could provide better drainage for thick and heavy purulent discharge because it has larger calibers [13].

Our patient had ceftriaxone and metronidazole as the empirical antibiotic treatment during hospitalization. Percutaneous drainage was chosen because of inadequate response to the pharmacological treatment (indicated by persistent abdominal pain) in this patient. Moreover, In addition, the large size of the abscess and the location of the abscess that is easily accessible, as well as the ability of PCD to provide continuous drainage are also determining factors for percutaneous drainage in this case. The percutaneous drainage was performed on the seventh day of hospitalization and approximately 300 mL of brownish pus was evacuated within the first 24 hours. The abdominal pain was reduced within 48 hours after the drainage. Minimal pus discharge (<10 mL) was found on the tenth and eleventh days of hospitalization. Thus, the patient was discharged from the hospital without complication and optimal clinical improvement on the twelfth day of hospitalization.

## LIMITATIONS

A limitation of this case report is the patient did not return for following-up after being hospitalized, thus serial ultrasound or CT scan images were not obtained after percutaneous drainage procedure.

## CONCLUSION

ALA is the most frequent extraintestinal manifestation of amebiasis caused by *E. histolytica*. The non-specific clinical manifestations of ALA may result in delays in diagnosis and treatment. Imaging using abdominal ultrasound or CT scan is helpful in establishing the diagnosis of ALA. Surgical intervention, such as an abscess drainage, is a crucial therapy for ALA cases that are refractory to the pharmacological treatment as well as abscess with a high risk of rupture to prevent morbidity and mortality due to complications of ALA.

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## DECLARATIONS

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