

## SUSPECT HEPATOPLEURAL FISTEL INITIATED BY LUNG ABCESS BECOMES HYDROPNEUMOTHORAX WITH THE COMPLICATION OF LIVER ABCESS

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### ABSTRACT

**Background:** A liver abscess is an inflamed liver lesion that can migrate into the pleural cavity and cause lung abscess and empyema. Hepatopleura fistulas are one of the reasons why cancer might spread to the pleural cavity.

**Case:** A 25-year-old man complains of sudden shortness of breath, exacerbated by strenuous activity. An x-ray was performed showing a lung abscess. after 6 days, a repeat x-ray showed a hydropneumothorax, and a Water Sealed Drainage was performed. An abdomen ultrasound was carried out and found a picture of a liver abscess. In the patient's condition, repeated abdominal ultrasounds were done to determine the size of the liver abscess and repeated chest X-rays were done to examine the WSD. No hepatopleural fistula was discovered in this patient, and the liver abscess was less than 5 cm, therefore drainage was not necessary. Antibiotics were administered to the patient. The patient was treated for 40 days and it was found that the lungs had not expanded an open pleural window was performed.

**Conclusion:** This patient was then consulted for thoracic and cardiovascular surgery for further management of the lungs that had not yet expanded and fluid production was still ongoing, a decision was made with further intervention.

**Keywords:** Hydropneumothorax, Lung Abscess, Liver Abscess

### ABSTRAK

**Latar Belakang:** Abses hati adalah lesi hati yang meradang yang dapat berpindah ke rongga pleura dan menyebabkan abses paru dan empiema. Fistula hepatopleura adalah salah satu alasan mengapa kanker dapat menyebar ke rongga pleura.

**Kasus :** Seorang pria berusia 25 tahun mengeluh sesak napas yang tiba-tiba, yang diperburuk oleh aktivitas berat. Rontgen yang dilakukan menunjukkan adanya abses paru. setelah 6 hari, rontgen ulang menunjukkan adanya hidropneumotoraks, dan dilakukan Drainase Tertutup Air. Ultrasonografi abdomen dilakukan dan menemukan gambaran abses hati. Pada kondisi pasien, USG abdomen berulang dilakukan untuk menentukan ukuran abses hati dan rontgen dada berulang dilakukan untuk memeriksa WSD. Tidak ditemukan adanya fistula hepatopleura pada pasien ini, dan abses hati berukuran kurang dari 5 cm, oleh karena itu drainase tidak diperlukan. Antibiotik diberikan kepada pasien. Pasien dirawat selama 40 hari dan ditemukan bahwa paru tidak mengembang sehingga dilakukan pembedahan jendela pleura.

**Kesimpulan:** Pasien ini kemudian dikonsultasikan untuk bedah toraks dan kardiovaskular untuk penatalaksanaan lebih lanjut pada paru-paru yang belum mengembang dan produksi cairan masih berlangsung, keputusan dibuat dengan intervensi lebih lanjut.

**Kata Kunci:** Hidropneumotoraks, Abses paru, Abses hati

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## INTRODUCTION

An amebic liver abscess (ALA) is an inflammatory lesion of the liver caused by *Entamoeba histolytica*. The incidence varies, around 3% to 9% of all cases of amebiasis. Hepatopulmonary fistula is an uncommon benign condition associated with a substantial mortality risk. Intriguingly, the prevalence of the various etiological factors has changed over time, particularly as liver ablating techniques and surgery have advanced. Recent and less invasive techniques have provided a new perspective on their management, even though surgery remains the gold standard and definitive option. A step-by-step approach to this entity, from diagnosis to treatment, has to be reestablished in order to identify the role of interventional modalities and devise a management algorithm.<sup>1</sup>

A lung abscess refers to the occurrence of liquefactive necrosis in the lung tissue, resulting in the development of cavities that are larger than 2 cm. These cavities contain necrotic debris or fluid and are primarily caused by microbial infections. Aspiration, a potential etiological factor, can manifest during states of altered consciousness and typically results in the formation of an abscess characterized by the presence of purulent material.<sup>2</sup> Additionally, it should be noted that alcoholism is a prevalent disorder that increases the susceptibility to developing lung abscesses. The classification of a lung abscess is based on its etiology. When it arises from an existing lung parenchymal disorder, it is referred to as a primary lung abscess, which accounts for around 60% of cases. On the other hand, when it occurs as a complication of another process, such as vascular emboli or the rupture of an extrapulmonary abscess into the lung, it is termed a secondary lung abscess.<sup>3</sup>

Multiple imaging modalities are available for the identification of thoracic contents, including computerized tomography (CT) scanning and thoracic ultrasonography. The primary approach to treatment is the administration of a broad-spectrum antibiotic that can effectively target and eliminate a diverse range of microorganisms comprising the mixed flora. In addition, pulmonary physiotherapy and postural drainage are significant components. In certain cases, surgical interventions are necessary for the purpose of drainage or pulmonary resection in eligible individuals.<sup>4</sup>

A liver abscess can be characterized as a collection of pus within the liver, which may arise as a result of hepatic injury or the spread of an intraabdominal infection through the portal circulation. In this study, we aim to investigate the effects of a specific intervention on a particular population. The bulk of these abscesses can be classified as either pyogenic or amoebic, with a smaller proportion attributed to parasitic and fungal origins. The majority of amoebic infections are attributed to the pathogenic species known as *Entamoeba histolytica*. Pyogenic abscesses typically have a polymicrobial nature, with certain microorganisms being more frequently observed within them, including *E. coli*, *Klebsiella*, *Streptococcus*, *Staphylococcus*, and anaerobic bacteria. Although the occurrence of abscesses is infrequent, it is vital to comprehend their gravity due to the elevated mortality hazard for those who do not receive treatment.<sup>5</sup>

According to the second source, the typical sequence of abscess development involves the passage of bowel contents from the abdominal cavity to the liver via the portal vein. Numerous instances involve a biliary tract infection leading to the formation of an abscess by direct contact. Liver abscesses can be categorized using many classification systems: The first factor to consider is the

spatial distribution inside the liver. Approximately half of solitary liver abscesses manifest in the right lobe of the liver, which is considered a more substantial region with a greater blood supply. Comparatively, the occurrence of such abscesses in the left liver lobe or caudate lobe is less frequent. Another approach involves taking into account the origin of the information. In cases where the etiology is infectious, the predominant categorization of liver abscesses involves bacterial origins, which encompass amebic sources, as well as parasitic origins, which encompass hydatiform cysts.<sup>5</sup>

Hepatopleura fistula is an uncommon condition in Pulmonology and Respiratory medicine. This case's diagnostic enforcement is also difficult to determine. To confirm the presence of a hepatopleural fistula, several supporting examinations are required. A concurrent condition between a pulmonary abscess and a hepatic abscess frequently overlaps in diagnosis enforcement, causing execution delays. As for the case reports submitted in this manuscript to form a paradigm of diagnosis against the suspicion of hepatopleura fistula resulting from the simultaneous occurrence of pulmonary abscess and hepar abscess. In order to improve prognosis, the administration and implementation of the diagnosis in these cases requires a multidisciplinary team approach.

### CASE

A 26-year-old male patient came with complaints of shortness of breath. shortness of breath began to be felt in the last 1 week and got worse in the 5 days before admission to the hospital. Shortness of breath is sudden and exacerbated during strenuous activity. Shortness of breath decreases when the

patient turns to the right. Shortness of breath is not affected by dust, weather, or food. Patients also complain of coughing up phlegm, white phlegm. History of coughing up the blood of approximately 50 ccs in 24 hours 2 weeks before entering the hospital. The patient also complained of right-sided chest pain, chest pain felt heavy when breathing, and pain did not radiate to the back. The fever was felt for 2 weeks before entering the hospital but disappeared with the administration of febrifuge. The patient is a truck driver with a history of exposure to the chemicals he carries. The patient had poor oral hygiene, with a habit of smoking 1 pack per day for 8 years. The patient underwent a chest X-ray examination with the impression of a right lung abscess, at this time no invasive procedures had been performed. Chest X-ray evaluation for 1 week was carried out with the belief that the lung abscess had ruptured and became hydropneumothorax and a Water Sealed Drainage was installed with a production of 300-500 cc per day. The patient was then treated and evaluated for Water Sealed Drainage every day, with the problem in this patient, namely the lungs had not expanded after 30 days of treatment.

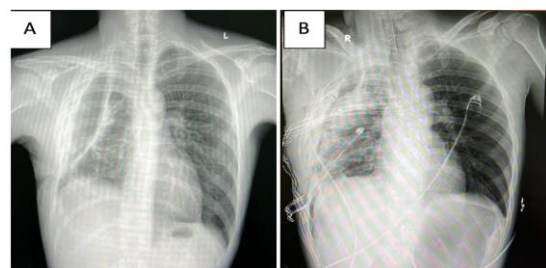


Figure 1. Chest x-rays : (A) before decortication ; (B) after decortication was performed (The presence of pleural thickening is observed prior to the surgical procedure of decortication, and subsequent improvement is observed following the completion of decortication)

The patient also had a CT scan and abdominal ultrasound for diagnostic confirmation with the impression of right hydropneumothorax and liver abscess. From the laboratory at the time of admission, it was found that the impression of leukocytosis was given broad-spectrum antibiotics, namely injection of cefadroxil and metronidazole tablets to prevent the spread of anaerobic germs, then also with the impression of hypoalbuminemia then given albumin tablets and high protein nutritional improvements.

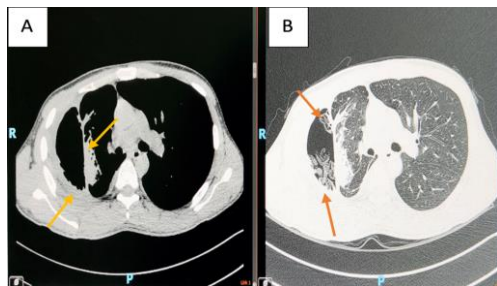


Figure 2. Chest CT-Scan : (A) with contrast (B) lung window  
(The pleural cavity has identifiable visuals of hipodens ,air lesions, and fibroinfiltrate)

Pleural fluid analysis has also been performed suggesting empyema. In the last 10 days of the Water Sealed Drainage evaluation, liquid production was still ongoing as much as 100-200 cc per day. This patient has also had a culture of pleural fluid with the result of pseudomonas aeruginosa and the antibiotics are replaced according to the culture with piperacilin tazobactam. An examination of acid-fast bacteria and a rapid molecular test of pleural fluid samples was found negative.



Figure 3. USG Abdomen: A hypoechoic lesion with vague margins is observed in the right hepatic lobe, accompanied with air reverberation between the lesion and its surroundings, leading to the impression of a hepatic abscess.

In the patient's case, repeated chest X-rays were performed to evaluate the WSD, and repeated abdominal ultrasounds to assess the size of the liver abscess. In this patient, no hepatopleural fistula was found and the liver abscess was less than 5 cm, indicating no indication for drainage. the patient was given ceftriaxone and metronidazole antibiotics for anaerobic bacteria. and for lung expansion, continuous suction is performed. however, after 40 days of evaluation, the lungs did not inflate. This patient was consulted for thoracic and cardiovascular surgery for further management of the lungs that had not yet expanded and fluid production was still ongoing, a decision was made with further intervention, namely an open pleural window.

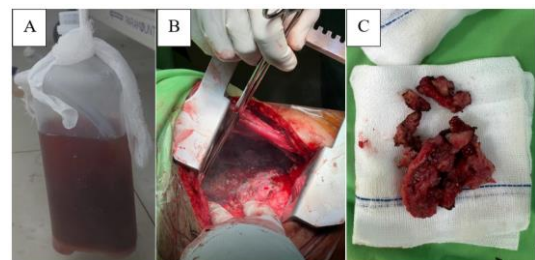


Figure 4. Progressivity of Patient Management: (A) Visible fluid with empyema characteristics during the fibropurulent phase (B) Intraoperative decortication after open pleural window (C) Resected lung tissue from decortication

In the management of drugs and evaluation of actions with the results of the lungs not expanding and fluid production is still ongoing, then the patient was decided to be referred to cardiovascular thoracic surgery for further management. After obtaining consent from the patient and family, further intervention measures were carried out, namely open pleural window with the aim of open drainage. Treatment after open pleural

window lasted for 1 month with improved results, then re-evaluated with thoracic X-ray and CT-Scan. Then the patient was decorticated with the aim of developing the lung, it was seen that the pleura had thickened (schwarte), after decortication the patient was given a chest X-ray examination with the results that the lung had begun to expand.

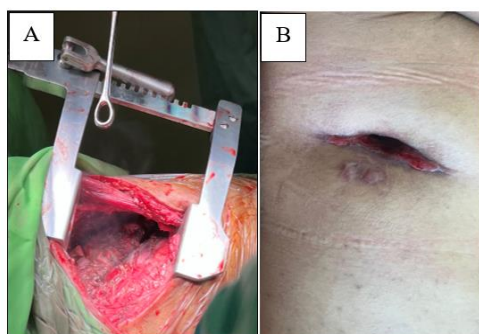


Figure 5. Clinical Evaluation of Patient: (A) Open pleural window Intra operative (B) Following an open pleural window and decortication, the surgical laceration improved progressively

## DISCUSSION

*Entamoeba histolytica* causes an inflammatory liver lesion known as an amebic liver abscess (ALA). The prevalence ranges from 3% to 9% of all amebiasis patients. It is difficult to diagnose a hepatobronchial fistula and lung abscess that follow a pyogenic liver abscess based just on symptoms and chest radiography. Particularly in cases of liver amebic illness, liver abscesses that develop near the diaphragm might enter the thoracic cavity and cause lung abscess and acquired hepatobronchial fistula.<sup>2,3</sup> Hepatobronchial fistula has previously been shown to appear with bile-stained sputum, cough, dyspnea, and/or fever.<sup>3</sup> Hepatobronchial fistula after a liver abscess is typically diagnosed with CT scans. Hepatobronchial fistula is indicated by the existence of an air- and fluid-filled liver abscess cavity directly below the diaphragm

that is continuous with a lung abscess in the right lower lung field. After injecting contrast agent, percutaneous tubography can identify a hepatobronchial fistula.<sup>4</sup>

*Entamoeba histolytica* causes an inflammatory liver lesion known as an amebic liver abscess (ALA). The prevalence ranges from 3% to 9% of all amebiasis patients. In the patient's condition, repeated abdominal ultrasounds were done to determine the size of the liver abscess and repeated chest X-rays were done to examine the WSD. No hepatopleural fistula was discovered in this patient, and the liver abscess was less than 5 cm, therefore drainage was not necessary. Antibiotics for anaerobic bacteria were administered to the patient in the form of ceftriaxone and metronidazole. and continuous suction is used to expand the lungs. The lungs did not expand after 40 days of observation, thus an open pleural window procedure was carried out.

On the basis of the symptoms and a chest radiograph, it was initially thought that our patient had pneumonia that had been made worse by a lung abscess. A hepatobronchial fistula allowed a liver abscess and a lung abscess to connect, according to a CT scan. It is difficult to diagnose this disorder before a CT scan without the defining signs of a productive cough with bile-stained sputum in addition to fever and leukocytosis. Therefore, patients with a lung abscess in the right lower lung field should be evaluated for the possibility of a liver abscess accompanied by a lung abscess.

As of yet, there are no firm recommendations for treating lung abscesses that arise after a penetrating liver abscess. Therapeutic approaches range from aggressive surgery to minimally invasive techniques.<sup>5</sup> Because there was a chance of developing a bronchopleural fistula,

hemothorax, pneumothorax, or pyothorax, open pleural window was postponed in our instance.<sup>6</sup> Open pleural window is the only treatment option for a pure lung abscess despite the possibility of consequences. However, our example demonstrates that, even in the existence of contact between the lung and liver abscesses, a lung abscess brought on by a penetrating hepatic abscess can be successfully treated by open pleural window. According to a prior investigation, open pleural window was utilized to successfully treat a lung abscess brought on by a penetrating liver abscess. However, this method has a higher risk of complications like secondary infection if not properly cared for after action.<sup>7</sup>

In conclusion, the rare consequences of liver abscess include hepatobronchial fistula and lung abscess. Clinicians should be aware that individuals with a lung abscess in the right lower lung field that also borders a liver abscess may develop a hepatobronchial fistula. Early computed tomography imaging should be taken into consideration to prevent a delay in diagnosis and to promptly provide the necessary treatments. When contact between the two abscesses is established, lung abscess brought on by a penetrating liver abscess can be treated with open pleural window and antibiotic treatment.

## CONCLUSION

Despite being benign, the hepatopulmonary fistula poses a significant mortality risk of up to 10.3% in some case series, which is primarily due to complications from surgical interventions. Since the initial account provided by Ferguson and Burford in 1967, several methodologies have been employed, leading to notable advancements in outcomes, particularly with the advent of less intrusive procedures. Based on the available evidence, it is recommended to use a hybrid approach for the management of this

uncommon clinical condition. This method combines surgical techniques with either endoscopic or interventional radiologic procedures. The specific treatment plan should be tailored to each patient, taking into consideration the underlying cause and the severity of the illness.

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