

# Successful treatment of acute empyema caused by *Aeromonas sobria* in an advanced liver cirrhosis patient: A case report

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## Summary

Bacterial empyema is a rare complication of liver cirrhosis (LC) patients. The treatment of patients was challenge and associated with poor outcome. *Case report:* In this article, we reported for the first time a 55-year-old patient with decompensated LC due to alcohol abuse who was diagnosed with acute empyema. Bacterial culture of pleural fluid indicated *Aeromonas sobria* (*A. sobria*) as a causative pathogen. The patient also performed severe coagulation disorder with INR 2.56; platelet counts 24G/L. The patient was successfully managed by board-spectrum antibiotics and drainage of the pleural with pigtail catheter. He was followed for a year without relapsing. *Conclusion:* We reported the first case of severely acute empyema caused by *A. sobria* in a patient with decompensated LC and successful treatment with appropriate antibiotics in combination with pigtail drainage in our clinical setting.

**Keywords:** Liver cirrhosis, *Aeromonas sobria*, pleural empyema.

## 1. Background

Liver cirrhosis (LC) imposes a considerable health burden in many countries because of its complications [1]. Among several complications, opportunistic infections worsen the clinical outcomes of decompensated LC [2]. Currently, *Aeromonas species* are recognized as opportunistic pathogens in advanced LC patients and their infections can lead to seriously clinical outcomes with high fatality rate [3, 4].

Previous studies have shown that LC patients are at high risk of bacterial empyema because of immunosuppression [5, 6]. Management of patients with empyema is the use of appropriate antibiotic therapy and usually combines with removal of pus from the pleural cavity [7]. Nevertheless, the pleural interventions were challenge because of severe coagulation disorder. In this report, we described, a

successful treatment case of severe empyema due to *A. sobria* in a decompensated LC patient.

## 2. Case presentation

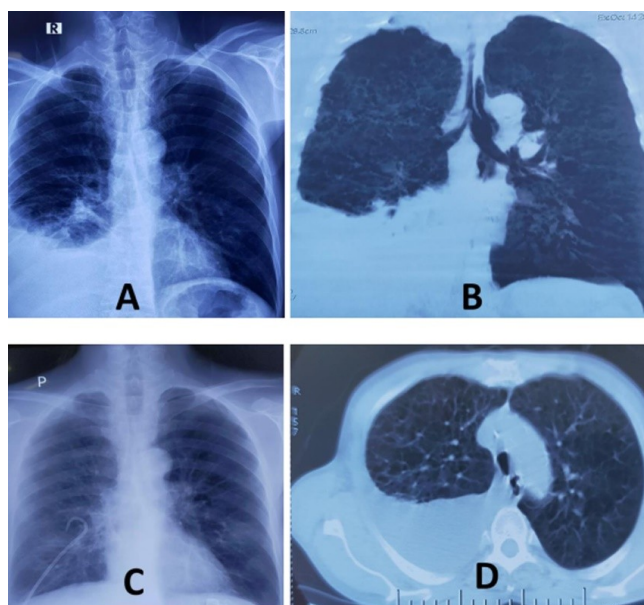
### 2.1. Clinical manifestations

A-55-year-old man presented with high fever, progressive dyspnea, and right-sided pleuritic pain for three days. His medical history had been alcoholic liver cirrhosis for four years and had received no continuous monitoring and management. He was admitted to the 108 Military Central Hospital, Hanoi. On admission, he had a high temperature of 39.4°C, pain in the right lower lung field, clouding of consciousness, rapid pulse rate (118 beats/min), and low blood pressure of 87/56mmHg. The patient suffered from progressive dyspnea with a high respiratory rate (32 breaths/min) and saturation of peripheral oxygen (SpO<sub>2</sub>) of 90%. So that, he was supplied oxygen via a mask reservoir bag of 7 - 8L/min to maintain up to 96% of SpO<sub>2</sub>.

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**Figure 1.** Chest X-ray (A) and CT scan (B and D) show large right-sided pleural effusion, but no sign of pneumonia. (C) It is the image of pigtail catheter at fifth day of pleural drainage

## 2.2. Laboratory assessments

The chest X-ray and CT scan showed a right pleural effusion without pneumonia (Figure 1). The ultrasound showed moderate abdominal ascites and large right pleural effusion. The analysis of total peripheral blood cells showed that white blood cells were 16.9G/L, of which neutrophile accounted for 86.5% (14.6G/L). The main results of the serum biochemical tests were pro-calcitonin: 2.37ng/mL; lactate: 13.3mmol/L and albumin 22g/L. Hepatic failure with severe coagulation was indicated by increased international normalized ratio: 2.56; total bilirubin: 253 $\mu$ mol/L; direct bilirubin: 120 $\mu$ mol/L; NH<sub>3</sub>: 293 $\mu$ g/dL and platelet counts: 24G/L. The pleural fluid featured turbid and yellowish (Figure 2) and characterized by dense leucocytes to 92% of neutrophile, high protein levels (25.7g/L), and extremely low levels of glucose. Pleural fluid culture was performed with the API-20E Vitek II System, bioMérieux, France, and the results showed positive for *A. sobria*. To confirm the culture result, another pleural fluid sample was subjected to nanopore sequencing and the result was consistent with bacterial culture.



**Figure 2.** The pleural effusion showed turbid and yellowish color at the first time of thoracentesis by needle

## 2.3. Treatment and follow-up

The diagnosis of acute bacterial pleural empyema was established and intravenous infusion of broad-spectrum antibiotics (meropenem plus moxifloxacin) was immediately administered. The patient was removed pleural effusion by needle aspiration but pleural fluid was relapsing rapidly. Because of the severe coagulation disorder that will put a patient at high risk of bleeding if intervention of thoracentesis, we considered and discussed the ability of insertion of a large drain into the pleural space with the thoracic surgeon. Subsequently, we made the final decision to use a small pigtail catheter (Size CH10, MarFlow, Zurich, Switzerland) for pleural drainage. A large volume of 1500ml of pleural fluid was aspirated out from the right pleural cavity for the first time and decreasing day by day. Antibiotic therapy was used for 10 days with meropenem plus moxifloxacin and following 14 days with third-generation cephalosporin plus moxifloxacin. The patient was also administered intravenously albumin 20% and fresh human plasma. Drainage was maintained for 25 days and the patient was discharged in a stable condition after 35 days of hospitalization. Patient was re-examined two weeks later and imaging

modalities (ultrasound and chest X-ray) indicated no pleural effusion and pneumonia. The patient had followed up for a year without relapsing empyema.

### 3. Discussion

In this report, we highlighted the bacterial agent and successful management with broad-spectrum antibiotics and drainage of the pleural with pigtail catheter (pigtail drainage) of the first case of acute empyema in a decompensated LC patient in Vietnamese clinical setting. The diagnosis of acute pleural empyema was established based on clinical manifestations and laboratory data with the dense neutrophile of pleural fluid. Additionally, the result of pleural fluid culture was positive with *A. sobria*.

*Aeromonas species* are recognized as the causative agents of fish disease and also the opportunistic pathogens in immunocompromised patients causing infections by oral ingestion of contaminated or undercooked seafoods in Asia-Pacific, including Vietnam [4, 8]. In clinical setting, reports of opportunistic infections, including septicemia, pneumonia, skin and soft tissue infections, necrotizing fasciitis in LC patients caused by *A. sobria* were presented in Japan and Taiwan [4, 9, 10]. However, there is scant information on *Aeromonas species* - acquired infection in the pleural effusion or peritoneal fluid in LC patients in Vietnam. In our report, although blood culture was negative but *A. sobria* was detected from pleural fluid by both bacterial culture and nanopore sequencing modalities.

The management of acute bacterial empyema in advanced LC patients is complicated because of immunosuppression and coagulation disorder. However, patients with spontaneous bacterial empyema are not necessary to insert chest tube [11]. Although, our patient had not evidence to diagnose spontaneous bacterial empyema because of deficiency in proof of pre-existing hepatic hydrothorax. But there was no sign of pneumonia on chest X-ray and CT scan. Additionally, the patient performed severe coagulation disorder with INR 2.56 and platelet 24G/L. Thus, we discussed with thoracic surgeons and decided on treatment of the patient with broad-spectrum antibiotic and pigtail drainage as an initial choice. As a result, the patient's

clinical condition gradually improved and patient was able to be discharged after a long duration of hospitalization and had no relapsing after a year of follow-up. The literature review shows good clinical outcome of *Aeromonas* empyema in LC patients. A report from Japan on *Aeromonas* infection in patients with LC showed a case with empyema and septicemia was alive [4]. Chao et al reported six *Aeromonas* empyema patients with LC in Taiwan, all patients were cured by antibiotics and drainage [10]. Additionally, Wang JT et al reported a LC patient with spontaneous empyema caused by *A. sobria* who was successfully treated with cefotaxime and pigtail drainage [9]. Thus, board-spectrum antibiotic plus pigtail drainage should be an initial choice for the management of acute empyema caused by *A. sobria* in decompensated LC patient with severe coagulation disorder.

### 4. Conclusion

Consequently, we reported the first case of severely acute empyema caused by *A. sobria* in a patient with decompensated LC and successful treatment with appropriate antibiotics in combination with pigtail drainage in our clinical setting.

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