Official Journal of Erciyes University Faculty of Medicine

DOI: 10.14744/cpr.2024.48293
J Clin Pract Res 2024;46(3):298–301

Video-Assisted Thoracoscopic Surgery (VATS) Decortication for the Management of *Brucella* Empyema

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ABSTRACT

Background: Brucellosis is a significant public health concern in endemic regions. Although pulmonary involvement is rare, there are a few reported cases of empyema. This case report discusses a rare instance of brucellosis leading to empyema and pleural thickening.

Case Report: A 55-year-old patient presented with dyspnea and was subsequently diagnosed with pleural effusion. Based on the medical history, tests were conducted on blood and pleural fluid, both of which tested strongly positive for *Brucella* agglutination. Further imaging showed pleural thickening and an expansion defect, necessitating video-assisted thoracoscopic surgery (VATS) for decortication.

Conclusion: Untreated brucellosis can lead to severe complications, including rare conditions such as empyema and pleural thickening. Therefore, early diagnosis and the prompt initiation of medical treatment are crucial to prevent these serious complications.

Keywords: Decortication, *Brucella*, empyema, VATS, brucellosis.

Cite this article as:
Turan O, Ekici MA. Video-Assisted Thoracoscopic Surgery (VATS) Decortication for the Management of *Brucella* Empyema. J Clin Pract Res 2024; 46(3): 298–301.

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Submitted: 12.03.2024
Revised: 05.04.2024
Accepted: 28.04.2024
Available Online: 16.05.2024

Erciyes University Faculty of Medicine Publications - Available online at www.jcpres.com

INTRODUCTION

Brucellosis, caused by *Brucella* bacteria, is among the most prevalent zoonotic diseases worldwide. It is a major public health issue, especially in regions like the Mediterranean, Western Asia, Africa, and Latin America, where it remains endemic.[1] Despite its widespread impact, the exact incidence of brucellosis varies considerably across affected countries, ranging from 0.01 to 200 cases per 100,000 individuals.[1] The disease is primarily transmitted through direct contact with infected animals, consumption of contaminated animal products, or inhalation of infected aerosols.[2] Given its diverse clinical manifestations, *Brucella* is frequently considered in the differential diagnosis of various illnesses.[2]

Typically, individuals suffering from brucellosis experience symptoms like fever and fatigue, which are often accompanied by sweating and widespread body aches throughout the illness.[3] While detecting the bacteria directly is considered the gold standard for diagnosis, culturing the bacteria can be difficult, particularly in patients who are already taking antibiotics. Consequently, serological methods such as agglutination test and enzyme-linked immunosorbent assay (ELISA) for immunoglobulins are crucial for diagnosis.[4] Although pulmonary complications are uncommon in brucellosis, appearing in only 1–5% of large case series, rare instances of pleural

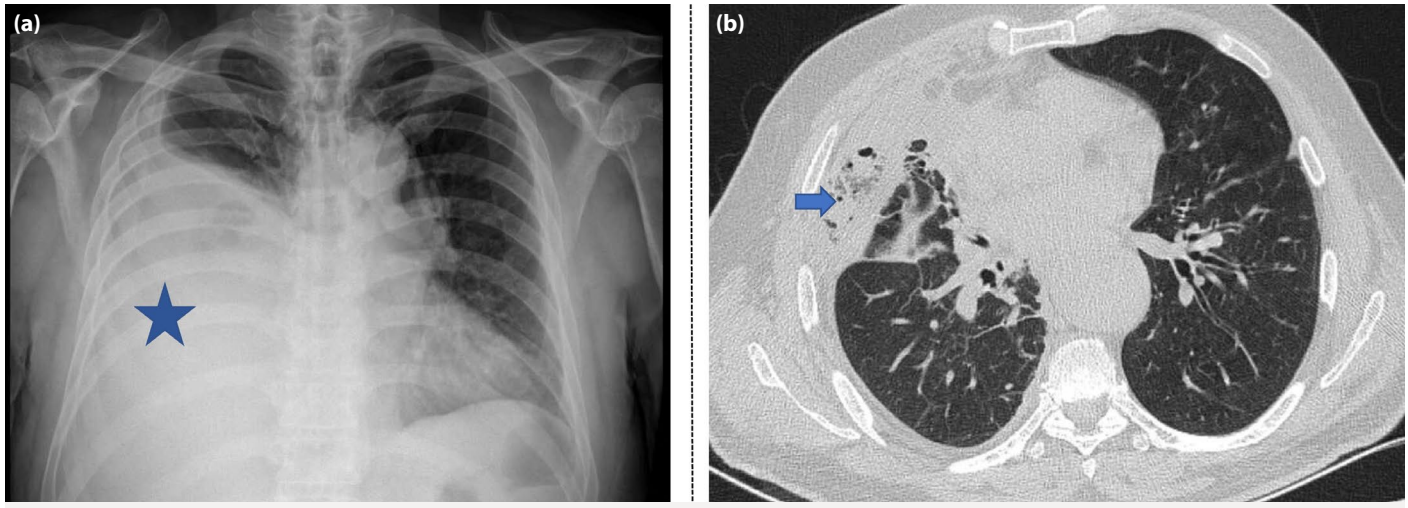

Figure 1. (a) Initial chest X-ray. **(b)** Post-drainage X-ray displaying an air-fluid level and an expansion defect in the anterior upper lobe of the right lung.

effusions caused by *Brucella* have been reported.[5] Cases of lung decortication have been observed in patients with brucellosis and hemorrhagic pleural effusion, though the frequency of such cases remains uncertain.[6] We report a case of empyema, a serious and potentially deadly complication of brucellosis if not treated.

CASE REPORT

A 55-year-old male patient, who was generally healthy except for hypertension, visited our clinic with complaints of shortness of breath and night sweats. He reported working in cattle breeding and frequently consuming fresh cheese. He denied having fever, chills, or rigors. Two weeks earlier, he had visited an emergency clinic with similar symptoms and was tentatively diagnosed with pneumonia, for which he was prescribed clarithromycin®. Physical examination revealed reduced breath sounds in the right hemithorax. A chest X-ray indicated a significant pleural effusion in the right hemithorax (Fig. 1a). Laboratory tests showed an increased white blood cell (WBC) count (11.55x10^3/μL), with a majority of neutrophils (79.5%), a sedimentation rate of 6, and elevated C-reactive protein (CRP) levels (151 mg/L). Serological testing revealed high *Brucella* antibody titers (*Brucella* agglutination: 1/5120, *Brucella* immunoglobulin G (IgG) as measured by ELISA: 11.19, *Brucella* immunoglobulin M (IgM): 2.53). Blood cultures were negative. The patient was hospitalized, and the pleural effusion was drained via a thoracic catheter, revealing exudative empyema with pleural fluid characteristics (glucose: 1 mg/dL, lactate dehydrogenase (LDH): 2524 U/L). Subsequent computed tomography after drainage showed an air-liquid level in the anterior upper lobe of the right lung (Fig. 1b). The patient underwent video-assisted thoracic surgery (VATS) for decortication, which revealed widespread pleural thickening, empyema, and a parenchymal abscess in the upper lobe of the right lung (Fig. 2). Complete decortication and drainage were performed, and no growth was found in the intraoperative pleural fluid cultures. *Brucella* agglutination in the pleural fluid measured 1/640. Treatment included monodox®, rifampicin®, and ceftriaxone®. The chest tube was removed on the fourth postoperative day as drainage ceased. He was discharged showing improvement on chest X-ray (Fig. 3). Postoperative pleural pathology revealed a chronic-active necrotizing inflammatory process without granuloma formation. The patient began taking tetradox® and continued follow-up showed decreasing CRP levels (23.5 mg/L) and a *Brucella* agglutination titer of 2560 at three months.

DISCUSSION

Despite fever and fatigue being common symptoms leading brucellosis patients to seek care, this patient presented with shortness of breath and night sweats. This led us to suspect an earlier onset of the disease. Notably, a positive *Brucella* IgG test suggests an infection duration of at least three weeks.[4] Additionally, *Brucellae* have been detected in blood cultures in 44% of cases.[7] The two-week course of antibiotic therapy our patient underwent might have inhibited bacterial growth. The high titers of the *Brucella* agglutination test, along with positive IgG and IgM tests, led to a diagnosis of acute-chronic brucellosis.

Lung involvement in brucellosis is uncommon, with only 30.8% of affected patients exhibiting pleural effusion.[7] Our patient's clinical presentation notably featured massive pleural effusion. Although comprehensive studies on the fluid characterization of pleural effusions in brucellosis are lacking,

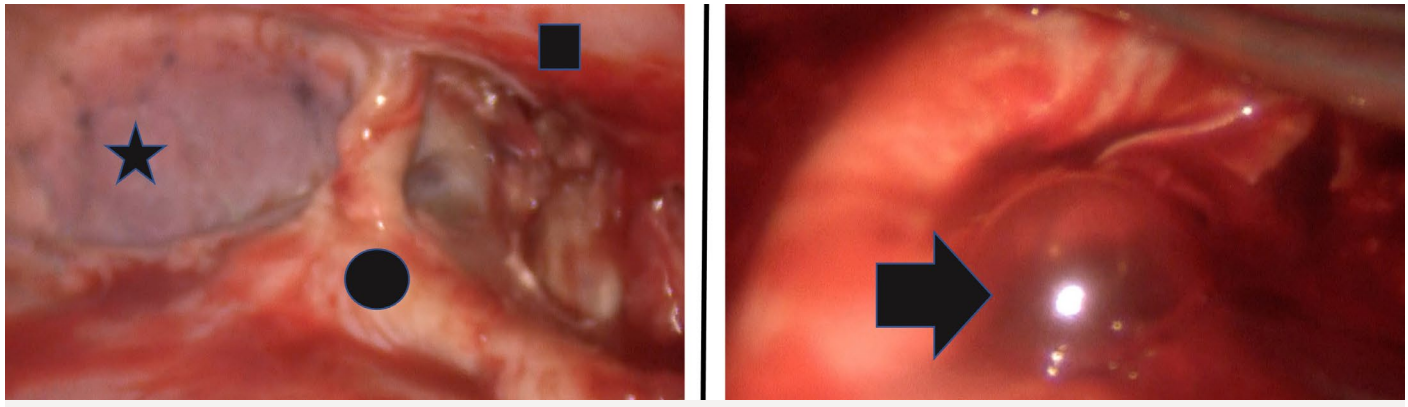

Figure 2. Pleural thickening (indicated by a circle), thoracic wall (marked with a square), lung parenchyma (denoted by a star), and purulent fluid on the thickened pleura (pointed out with an arrow).

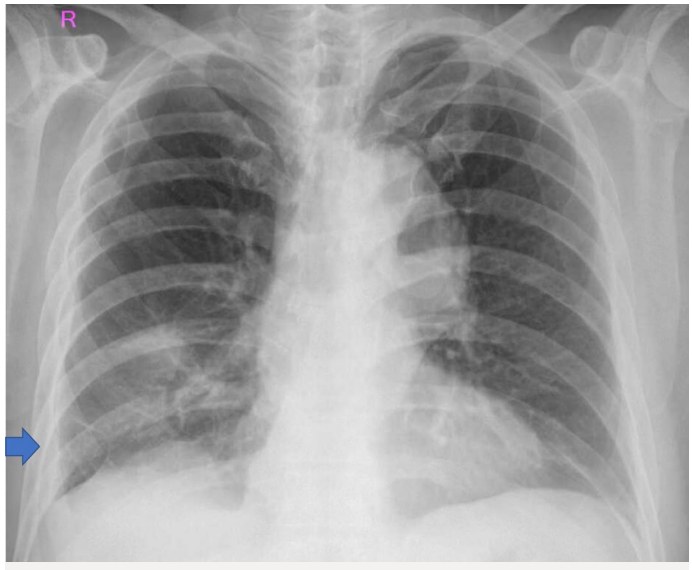

Figure 3. Chest X-ray taken on the fourth day post-operation.

available results suggest exudative effusions with low glucose and high LDH levels.[8,9]

Treatment typically includes drainage, targeted antibiotic therapy, and decortication when lung expansion is inadequate, similar to classic empyema management. The recommended medical treatment for brucellosis involves administering doxycycline and rifampicin for at least six weeks.[5] The performance of VATS decortication during the fibrinopurulent phase of empyema has demonstrated superior outcomes when compared to fibrinolytic therapy, closed-tube thoracostomy, and open surgery.[10] In the case of our patient, decortication was necessitated by inadequate lung expansion despite the drainage of pleural effusion.

As cases of decortication for brucellosis are infrequent, it is challenging to make comparisons based on surgical findings alone. However, the patient showed marked improvement in inflammatory markers and blood *Brucella* agglutination levels after both surgical and medical interventions, indicating a positive response to treatment.

CONCLUSION

Brucellosis remains a significant public health challenge in endemic regions. Healthcare providers must consider brucellosis as a possible underlying cause when patients present with empyema in these areas. A detailed patient history is essential, with an emphasis on potential risk factors such as occupation and dietary habits. If brucellosis is suspected, further diagnostic evaluation is warranted to confirm or rule out the infection. Recognizing the importance of surgical lung decortication in the management of brucellosis empyema is crucial. Early diagnosis and timely initiation of medical treatment are key to preventing severe complications.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Author Contributions: Concept – OT, MAE; Design – OT, MAE; Supervision – OT; Resource – OT; Materials – OT; Data Collection and/or Processing – OT, MAE; Analysis and/or Interpretation – OT; Literature Search – OT; Writing – OT; Critical Reviews – OT, MAE.

Conflict of Interest: The authors have no conflict of interest to declare.

Use of AI for Writing Assistance: Not declared.

Financial Disclosure: The authors declared that this study has received no financial support.

Peer-review: Externally peer-reviewed.

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