

## CASE REPORT

# Brucella pleurisy: An extremely rare complication of brucellosis

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## Abstract

Brucella is a rare pathogen of the lung. This intracellular organism can involve pleura in the sub-acute and chronic course of the disease. Here, we introduce an infrequent case of brucella pleurisy that presented to our hospital with chest pain.

## KEYWORDS

brucella, lung, pleurisy

## 1 | INTRODUCTION

Brucellosis is an endemic disease in many developing countries, and the most common species are *Brucella abortus* and *Brucella melitensis*.<sup>1</sup> Contaminated dairy consumption or contact with an infected animal is responsible for infecting humans.<sup>2</sup> The variability in clinical presentations, including fluctuating fever, sweating, arthralgia, myalgia, back pain, and hepatomegaly, is commonly implicated in the differential diagnosis.<sup>3</sup> Cardiovascular, respiratory, and nervous system dysfunction, hepatitis, and osteoarthritis are the most known complications of brucellosis. Although Zheng et al.<sup>4</sup> reported that the incidence of respiratory involvement in brucellosis is about 13%, which can appear as a cough, pneumonia (or bronchial pneumonia), pleural effusion, pulmonary embolism, or

even respiratory failure, most previous studies announced respiratory involvement as a rare complication. Here, we present a rare case of brucella pleurisy in a 40-year-old man with low-grade fever, arthralgia, and chest pain.

## 2 | CASE PRESENTATION

A 40-year-old smoker man presented to our clinic with low-grade fever, arthralgia, and low back pain for several months. He was treated for brucellosis (with doxycycline and rifampin) 7 days before this presentation, and at that time, he suffered from chest pain and dry cough. Physical examination of the lungs showed decreased breathing sounds and dullness of the base of the right hemithorax. The cardiac examination was normal. There was no

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lymphadenopathy or organomegaly. He had a history of unpasteurized dairy product consumption. Also, there was a history of brucellosis in his father several years ago. The right costophrenic angle (CPA) was not sharp on the chest X-ray (CXR). Also, a right pleural effusion without significant parenchymal infiltration was noted in the lung computed tomography (CT) scan. (Figure 1).

Transthoracic echocardiography was normal. The levels of the inflammatory markers were high [C-reactive protein (CRP): 38 mg/L (0–1 mg/L), erythrocyte sedimentation rate [(ESR): 115 mm/h (<25 mm/h)], and the platelet (PLT) count: 502,000/mm<sup>3</sup>]. Evaluation of rheumatologic markers was negative (wright test and 2ME were 1/320 and 1/160, respectively). (Table 1) Analysis of pleural fluid adenosine deaminase (ADA) levels and post-treatment follow were done. (Table 2) The patient was treated for brucella pleurisy with gentamicin (240 mg/daily/IV) and ceftriaxone (1 g every 12 hr/IV) plus rifampin (600 mg per day, orally) for 2 weeks. He had no fever on the fifth day. After 7 days, his chest pain and cough gradually decreased to disappear. The laboratory changes trend showed in Table 1. Medications also changed to oral formulations after 2 weeks with ofloxacin (300 mg/daily) (intolerant to doxycycline) plus rifampin for 10 weeks. The patient was followed up 6 and 12 weeks after discharge,

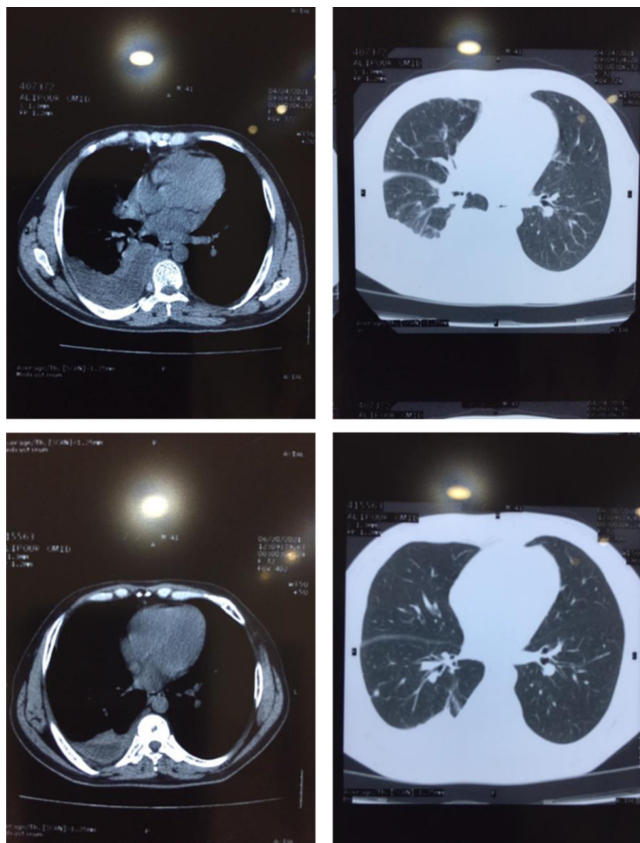


FIGURE 1 Radiological findings

and he did not have any complications and was improved completely. Lung examination became normal, and he was unsatisfied with repeating imaging. Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy on the title page of the manuscript.

### 3 | DISCUSSION

Brucellosis is an infection with multiple presentations, and whether in an endemic region or not, a thorough history of exposure and clinical suspicion is required. Delayed diagnosis deprives the patient of specific treatment, as occurred in this case. In addition to the common clinical findings in brucellosis, including fever, headache, malaise and weakness, myalgia, arthralgia, backache, and anorexia, some organs may be affected like gastrointestinal, respiratory, cardiovascular, hematopoietic, and nervous systems. The extended disease and inappropriate treatment may lead to even more severe consequences.<sup>5,6</sup>

Andriopoulos et al. in 2007 investigated the clinical presentation, diagnosis, and treatment of 144 cases of acute brucellosis. According to the data, no one exerted respiratory impairment features; however, splenomegaly (51%), cervical lymphadenitis (31%), hepatomegaly (25%), genitourinary (13% of men) and osteoarticular involvement (42%), cholecystitis (2%), breast abscess (0.7%), and acute abdomen (0.7%) were confirmed in many cases.<sup>7</sup>

The genitourinary involvement by tuberculosis may be as a part of generalized disseminated infection, or as localized genitourinary disease such as sterile pyuria. In such a situation, differentiation with brucellosis infection has to look for.<sup>8</sup>

The incidence of respiratory complications of brucellosis has been reported <1%–5%. The exact pathophysiology of this complication is not well defined. The most reported symptoms are fever, cough, dyspnea, sputum production, hemoptysis, and lymphadenopathy, and the most radiographic findings are interstitial pattern, lobar pneumonia, and pleural effusion.<sup>9</sup>

Literature shows the analysis of the pleural fluids revealed exudative effusions with increased ADA level, decreased glucose concentration, and lymphocyte predominance. Studies showed that timely diagnosis and appropriate treatment result in a good prognosis. Hakan Erdem et al. in the largest series of pulmonary brucellosis in 2014 showed that the most symptoms of the patients were fatigue (87.2%), cough (85.7%), sweating (79.6%), lack of appetite (74.4%), and arthralgia (68.4%), while our patient referred with chest pain, arthralgia, and low-grade fever. In that research, the most forms of pulmonary involvement were pneumonia, pleural effusion, bronchitis,

TABLE 1 Laboratory data

Parameters	Baseline values	2 weeks after treatment	8 weeks after treatment
WBC Count (/μl)	20,000	7200	-
PMN (%)	84.7	61.3	-
Lymph. (%)	6.5	31.2	-
Mono. (%)	5.4	4.8	-
Eos. (%)	3.4	2.7	-
Hb (g/dl)	4.3	13.5	-
PLT (/μl)	502,000	392,000	-
ESR	115	85	-
CRP	38	20	-
Wright test	1/320	-	1/160
2ME	1/160	-	1/80
Serum IDH	246		
Serum protein	3.2	-	-
COVID-19 PCR on Nasopharyngeal swab	Negative		

Abbreviations: 2ME, 2-Mercaptoethanol; CovidCOVID-19, corona virus disease 2019; CRP, C-reactive protein; Eos, eosinophil; ESR, Erythrocyte sedimentation rate; Hb, Hemoglobin; IDH, isocitrate dehydrogenase; Lymph, lymphocyte; Mono, monocyte; and PCR, polymerase chain reaction; PLT, platelet; PMN, polymorphonuclear; WBC, white blood cells.

TABLE 2 Pleural fluid analysis

Parameter	Results
WBC (/μl)	300
PMN (%)	30%
Lymph (%)	70%
RBC	4000
Glucose(mg/dl)	68
IDH(IU/L)	17.0
Protein(g/dl)	2.7
ADA(NL < 30 IU/L)	16
Wright test	1/160
Gram stain	Negative
Bacteriologic culture	No growth
Ziehl-Neelsen for AFB	Negative
Cytology for malignancy	Negative
Culture on Castaneda medium	No growth after 3 weeks
MTB-PCR	Negative

Abbreviations: ADA, adenosine deaminase; IDH, isocitrate dehydrogenase; Lymph, lymphocyte; MTB, Mycobacterium tuberculosis; and PCR, polymerase chain reaction; PMN, polymorphonuclear; WBC, white blood cells.

nodular lung lesions, pulmonary embolism, ARDS, and surprisingly no pleurisy.<sup>10</sup>

To the best of our knowledge, there are three case reports of brucella pleurisy, and all were completely recovered after 8–12 weeks of treatment with rifampin plus

doxycycline. There were also no radiological findings or relapses during their follow-up.<sup>11–14</sup> The same happened in our case, except for the selected regimen, which consisted of ofloxacin instead of doxycycline because of intolerance to doxycycline.

The similarity with tuberculosis (TB) pleurisy is remarkable. We suggest that brucellosis should be considered in the differential diagnosis of tuberculosis, especially in the endemic regions of both diseases, since they are completely different in treatment strategies.<sup>15</sup> However, the presence of arthralgia and a history of unpasteurized dairy product consumption can be considered to the detriment of TB diagnosis. Since Iran is an endemic region for TB, TB infection was ruled out for our patient with a negative MTB-PCR test. It should be noted that measuring ADA alone could not confirm brucellosis, because the pleural fluid ADA level elevates in TB, too.<sup>14</sup>

## 4 | CONCLUSION

Brucella pleurisy is a rare complication of brucellosis, even in an endemic region. The physician should always be aware of any symptom associated with respiratory involvement in a patient with brucellosis or with a history of the disease, because this complication may occur in the sub-acute phase of the disease. Fortunately, in the case of uncommon brucella pleurisy, effective management results in both clinical and radiological improvement.

## AUTHOR CONTRIBUTIONS

Alikhani A and Majidi H involved in conceptualization and clinical assessment of the patient. Abbaspour Kasgari H involved in data collection and drafting. Nekoukar Z involved in drafting, reviewing, and editing the final version of the manuscript. All authors critically revised and approved the final submitted version.

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None.

## CONFLICT OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

## ETHICAL APPROVAL

The manuscript was approved by institutional review boards or local ethics committee.

## CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy on the title page of the manuscript.

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