

## **Pneumonia due to *Rhodococcus equi* in a non-Hodgkin's lymphoma patient: case report**

### **Pneumonia due to *Rhodococcus equi* in a non-Hodgkin's lymphoma patient: case report**

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#### **ABSTRACT**

The authors reported a lung infection by *Rhodococcus equi* in a 25 years-old male patient admitted to hospital with cough, dyspnea, fever, and previous diagnosis of pleural effusion. *R. equi* was isolated from pleural fluid and the patient acquired nosocomial infection by *Acinetobacter baumannii*, isolated from chest drain. The patient was treated with antibiotics. During hospitalization, he was diagnosed with non-Hodgkin lymphoma of precursor T-cell lymphoblastic lymphoma subtype in biopsy of pleura. After undergoing surgery for pulmonary decortication for drain empyema, the patient died due to septicemia.

**Keywords:** *Rhodococcus equi*, non-Hodgkin lymphoma, pleural effusion, pleural empyema, sepsis.

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#### **RESUMEN**

Los autores informan de una infección pulmonar por *Rhodococcus equi* en un paciente masculino de 25 años que fuera hospitalizado con tos seca, disnea, fiebre y diagnóstico previo de derrame pleural. *R. equi* se aisló del líquido pleural y el paciente adquiere una infección nosocomial con *Acinetobacter baumannii* aisladas

de un drenaje torácico. El paciente recibió tratamiento con antibióticos y, durante la hospitalización, fue diagnosticado *linfoma no Hodgkin* subtipo de linfoma linfoblástico de precursoras de células T en la biopsia pleural. Después de la cirugía para decorticación pulmonar para la fuga de empiema, el paciente falleció debido a una septicemia.

**Palabras clave:** *Rhodococcus equi*, *linfoma no Hodgkin*, derrame pleural, empiema pleural, septicemia.

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## INTRODUCTION

*Rhodococcus equi* (formerly *Corynebacterium equi*) is a pleomorphic coccobacillus, gram-positive, nocardioform actinomycete, aerobic, opportunistic, partially alcohol-acid resistant, optionally intracellular, non-spore former, non-motile, commonly found in nature. Infections were firstly reported in 1923 in foals which presented chronic granulomatous pneumonia.<sup>1,2</sup> The first human case of *R. equi* infection was described in 1967, in a patient with lung abscess.<sup>3</sup> The disease occurs mainly in HIV infected people, transplanted, patients with lymphoma, chronic renal insufficiency, alcoholism, lung cancer, leukemia, and other states of immunodeficiency.<sup>4</sup>

Strains of this bacterium can be found in cattle, pigs and horses manure. Therefore, the soil is a natural reserve to this microorganism, infecting by inhalation, inoculation into wounds, mucous membranes or contaminated food intake.<sup>5,6</sup> The main local of infection is the lung, presenting an evolving pneumonic clinical condition with cough, gradual fever, general malaise, dyspnea, and in some cases hemoptysis and chest pain.<sup>6,7</sup> Besides lung infections, *R. equi* can cause abscesses, diarrhea with blood, cachexy, pleurisy, hepatopathies, septic arthritis, lymphadenitis, peritonitis, meningitis, osteomyelitis, rhinitis, laryngitis, enteritis, local adenitis, mastoiditis, otitis, prostatitis, sepsis, among others.<sup>8,9</sup>

## CASE REPORT

A 25 year-old man, ironmaster, denying smoking and alcoholism, attended at Adult Emergency Care at hospital with left ventilator-dependent chest pain for 30 days, after excessive effort at work; dyspnea, fever and dry cough for 7 days. He had been using syrup of paracetamol + diphenhydramine + pseudoephedrine + dropropizine, ibuprofen and levofloxacin for three weeks. He denied contact with any tuberculosis patient. He went through a chest x-ray (XR) 8 days before hospitalization, which showed stickiness on the hilum of the lung with pleural effusion on the left. Chest computed tomography (CT) made four days before showed pleural effusion in the lower third of the left hemithorax. Ceftriaxone and clindamycin have been initially administered. In the following day the patient was hospitalized at the pulmonology sector at the hospital, diagnosed with pleural effusion. Initial treatment with oxacillin and azithromycin, ceftriaxone kept and quitting clindamycin. Thoracentesis has confirmed pleural effusion in the lower left lobe. A thoracic drain was inserted in the patient.

Pleural fluid analysis containing lymphocytic exudate (empyema), providing the following results (normal values): glucose: 2 mg/dL (> 60); protein: 4.6 g/dL (3); lactate dehydrogenase (LDH): 3905 IU/L (200); pH: 7.2 (7.64); leukocytes: 2645/ $\mu$ L (<1000); lymphocytes: 80% (< 65%); bacterioscopic: cells (+), leukocytes (++++), absence of microorganisms colorable by Gram's method; research of alcohol-acid resistant bacillus (BAAR), culture for mycobacteria, direct mycological, and culture for common germs also resulted negative. Normal hemogram with slight neutrophilia and monocytosis. Biochemical parameters: C-reactive protein: 16.1 mg/dL (< 0.5) and lactate dehydrogenase: 1088 IU/L (81 - 234).

The patient went through pleuroscopy, resuming the administration of clindamycin. A new thoracic XR showed an improvement in the image, with good expansibility. The patient started to present nausea, episodes of diarrheic feces, tachycardia, sweating, chills, hemoptysis and decreased appetite. Azithromycin was suspended and patient presented leukoplasic lesions in the tongue, and sanguinary thoracic drain with fibrin. Pulmonary auscultation with decreased movement in two lower thirds of the left lung and negative blood culture. Previous medication was suspended, and the administration of piperacillin + tazobactam and vancomycin was started.

There was a clinical worsening of the patient with ventral pain, breathing difficulty, continuous pain, pleural alterations at the CT, and edemas in the upper and lower limbs, tachypnea and tachycardia. *Rhodococcus equi* was isolated in the pleural fluid. Adenosine deaminase (ADA) of the pleural fluid of 313.8 IU/L ( $\leq$  40). Thoracotomy made with decortication for the drain of the pleural cavity. Previous medication was ceased and treatment for *R. equi* was initiated with linezolid and imipenem. Tramadol was administered for pain relief and furosemide to decrease the edemas. Oxygen therapy applied due to the worsening of the dyspnea. The operative injury caused by the thoracotomy presented a small quantity of secretion with a slight purulent aspect and serosanguineous thoracic drain. In drain tip culture *Acinetobacter baumannii* was isolated, treatment with tigecycline and polymyxin B started.

In the following days, the patient was isolated and a sample of parietal pleura was sent to pathological analysis, being detected massive pleural infiltration for non-Hodgkin's lymphoma (NHL) with diffuse pattern and mainly small cells. A biopsy of the pleura has evidenced sharp infiltration by small lymphocytes with round or oval nuclei and scarce cytoplasm, suggesting NHL. Linezolid and imipenem were interrupted and thoracic drains were taken off.

New laboratory tests showed: creatinine: 1.4 mg/dL (0.8–1.3); leukocytosis with a shift to the left; C-reactive protein: 24 mg/dL (< 0.5); hemoglobin (anemia): 7.7 g/dL (12.8–7.8) and uric acid: 11.1 mg/dL (3.6–7.7). The immunohistochemical exam of the pleura was consistent with lymphoblastic lymphoma of immunophenotype T (T precursor cells), a subtype of NHL. New thoracic CT has revealed broad interstitial infiltrate in the left with pleural thickening and a possible abscess. Bronchofibroscope showed a structural distortion of the left upper lobe bronchus and lower with extrinsic compression and paleness of mucosa. Bronchoalveolar lavage with a small quantity of mucopurulent secretion.

There was a clinical worsening of the patient, who started to become pale and to receive parenteral nutrition and plasma transfusion. Bone marrow biopsy showed a

slight hypocellularity concerning the patient's age, with representations of the three hematopoietic series and no evidences of infiltration by lymphoma. In the course of time, the patient presented a clinical picture of nosocomial pneumonia and pleural effusion complicated with empyema, thoracotomy being made with two drains in the left.

In the 37th day of hospitalization, the patient suffered a cardiorespiratory arrest, adrenalin and massage being applied. Patient became pale and unresponsive to stimuli, being sedated with midazolam. Dopamine and noradrenaline were administered. The patient died, due to a septicemia that occurred as a consequence of a surgery for pulmonary decortication to drain the pleural empyema caused by the NHL.

## DISCUSSION

*Rhodococcus equi* rarely causes infection in humans; however, its incidence has been increasing significantly. It is also found in patients submitted to corticosteroid therapy and with hematologic malignancies, as in this report (non-Hodgkin's lymphoma). It can be found in association with other opportunistic infections as *Mycobacterium kansasii* pneumonia, *Salmonella enteritidis* dysentery and visceral leishmaniasis.<sup>9</sup> In this case, there was an association with a nosocomial infection by *Acinetobacter baumannii*.

The infection diagnosis requires the microbiological identification. The most collected samples are sputum, bronchial brushings, transthoracic needle aspiration and blood culture.<sup>6</sup> In this report, the identification was done in a sample of pleural fluid.

The patient presented pneumonia with pleural effusion and lymphocytic exudate (empyema), confirmed with the pleural fluid exam. In biochemical exams done in the serum, increases in the values of LDH and C-reactive protein were observed. In malignancies, the levels of LDH are increased; being the assay of this enzyme relevant to monitor and predict the lifespan in Hodgkin's and non-Hodgkin's lymphomas.<sup>10</sup>

Infectious agents have been implicated in the NHL genesis.<sup>11</sup> However, literature has not provided reports that *R. equi* can cause the risk to develop NHL. Therefore, it is believed the patient had already presented the disease before the bacterium infection.

The biopsy of the patient's marrow has not showed infiltration by lymphoma, suggesting that he had the disease in its primary form, that is, it kept located in extra nodal sites in the lung (pleura), considered rare.<sup>12</sup>

In this report, the patient had not been diagnosed with NHL at the time of hospitalization, was first identified infection with *R. equi*. The bacterium was isolated only in pleural fluid with negative blood cultures. Pulmonary symptoms have occurred at the time of admission, which suggests that it may have occurred

to the spread of *R. equi* pleural cavity into the blood during pulmonary decortication surgery, leading to septicemia and subsequent death of the patient. However, as it was not possible to confirm the etiologic agent which caused septicemia, it is assumed that the *A. baumannii* was also associated with this infection.

The case report is, to our knowledge, the first case of pneumonia due to *R. equi* in patients with NHL. Infections with this species in humans are an underdiagnosed disease and subidentified. Our intention is to alert health professionals about the importance of suspecting the occurrence of pneumonia caused by *R. equi* in patients with NHL.

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