

Case Report

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Legionella pneumonia with rhabdomyolysis in a healthy young patient

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Abstract:

Legionella pneumonia is a lung infection caused by Legionella Pneumophila. Immune suppression, smoking, advanced age and chronic lung disease are the risk factors for Legionella Pneumonia. Pneumonia which developed outside hospital in a patient without an immune deficiency is defined as community-acquired pneumonia. Pneumonia with subacute onset, prodromal symptoms and extra pulmonary manifestations, often seen at a young age, is called atypical pneumonia. Although it is more common as a causative agent of pneumonia in patients with immune deficiency, Legionella Pneumophila is also an important cause of community-acquired atypical pneumonia. As a rare complication of legionella pneumonia, rhabdomyolysis causes a significant increase in mortality. We present a case of Legionella Pneumonia accompanied by rhabdomyolysis and acute renal injury.

Keywords:

Legionella pneumonia, rhabdomyolysis, acute kidney injury

Introduction

Legionella pneumophila is one of the major causes of community-acquired atypical pneumonia. Atypical pneumonia may present with clinical manifestations of extrapulmonary findings. Rhabdomyolysis, which is a rare complication of Legionella pneumonia can lead to a significant increase in mortality. Early detection of possible extrapulmonary findings in addition to the treatment for atypical pneumonia will result in increased survival. In this case report, the association of Legionella pneumonia and rhabdomyolysis was discussed.

Case Report

A 36-year-old male patient with the complaints of headache, sweating, muscle

pain, fever, drowsiness, weight loss, and fatigue lasted for 1 week was referred to our center because of renal dysfunction and increased levels of transaminase and creatine kinase.

The patient's medical history was unremarkable. He was not on any medication and had no addiction except smoking. The patient had been well until 1 week ago when he was in a holiday center. He lived in an air-conditioned room while the above-mentioned complaints began. The patient reported that urine color darkening, nausea, and anorexia developed with high fever and myalgia. He also stated that he had no complaints of shortness of breath and cough, but his fever frequently increased >39°C.

On examination, the blood pressure was 100/60 mmHg, the pulse rate was 112 beats/

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min, and the temperature was 36.5°C (while the patient used paracetamol). The respiratory rate was 28 breaths/min. The heart sounds were normal with a regular rhythm. Her lungs were clear on auscultation bilaterally. The abdomen was unremarkable on inspection. There was tenderness on deep palpation in upper quadrants without rebound tenderness or guarding. No lymphadenopathy or pretibial edema was detected. The patient was hospitalized to investigate the etiology of fever, acute kidney injury, and rhabdomyolysis. The laboratory test results on admission are shown in Table 1. The chest roentgenogram disclosed bilateral infiltrates with a mass image on the left side [Figure 1].

Because of the images on the chest X-ray, computed tomography of the chest was obtained and revealed bilateral infiltration foci [Figure 2].

In addition to the urine and blood culture, Legionella urinary antigen test was requested and was found positive. Treatment with intravenous levofloxacin was initiated. In addition, intravenous saline infusion was started for supportive care and for the treatment of rhabdomyolysis. He had a persistent high fever, loss of appetite, and headache during the first 2 days of hospitalization. The patient's fever completely disappeared on the 4th day. Urine and blood cultures were reported as negative. Leukocytosis was not detected during the follow-up, but neutrophil dominance was observed. Hemoglobin value decreased to 11.9 g/dl during the follow-up. Ferritin level was >2000 ng/ml, iron level was normal, and occult blood was negative in the stool.

Table 1: Laboratory results of the patient at the time of admission

Variable	On admission
Hb	14.9 (g/dl)
Htc	43.2
WBC	8.68×10 ³
Platelets	135.000×10 ³ /μL
BUN	33.0 mg/dl (↑)
Creatinine	1.65 mg/dl (↑)
ALT	87 Ü/L (↑)
AST	94 Ü/L (↑)
LDH	306 Ü/L (↑)
CRP	> 30.50 mg/dl (↑)
CK	3214 Ü/L (↑)
Sodium	134 meq/L (↓)
Potassium	3.40 meq/L (↓)
Phosphorus	3.70 mg/dl
Urine analysis	3+ hemoglobin, 3+ protein, 2+ ketone and 2-3 leukocytes, 1-2 erythrocytes, rare granular silene and amorphous urate crystals in each field in microscopy

CK: Creatine kinase, HB: Hemoglobin, WBC: White blood cell, Htc: Hematocrit, BUN: Blood urea nitrogen, ALT: Alanine amino transferase, AST: Aspartate aminotransferase, CRP: C-reactive protein, LDH: Lactate dehydrogenase, ↑: above the reference range, ↓: under the reference range

On the 2nd day of hospitalization, rales were heard on auscultation in the middle and lower zones of the lungs. The clinical symptoms decreased after the 3rd day of levofloxacin therapy and intravenous fluid replacement. Renal functions and transaminase levels returned to normal. Creatine kinase (CK) and C-reactive protein (CRP) values were significantly decreased, and the patient was discharged on the 8th day of hospitalization.

Control chest radiography revealed significant improvement. Hemoglobin level increased to normal limits, and urinalysis was found to be normal. The patient was informed about his process, and his written approval received for a case report presentation.

Discussion

We reported a case of Legionella pneumonia complicated with rhabdomyolysis and acute kidney injury that had no complaints of the respiratory system at the beginnings. Legionella pneumonia is a lung infection caused by *L. pneumophila*, one of the 21 species of Legionellaceae bacteria that can cause disease in humans.^[1] Immune suppression, smoking, chronic alcoholism, advanced age, chronic lung disease, and chronic kidney diseases are risk factors for the development of Legionella pneumonia. Contaminated water and air conditioning systems and medical devices used in respiratory treatment may be the causes of the disease.^[2,3] In addition to *L. pneumophila*, *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* are also among the major causes of community-acquired atypical pneumonia.^[4] While the mortality rate is 10%–20% in *L. pneumophila*, it may increase to 40% in hospital-based cases.^[5]

Pontiac fever, one of the clinical conditions caused by *L. pneumophila*, presents with fever, headache, myalgia, weakness, and flu-like symptoms and limited within 2–5 days after the incubation period, which lasted from a few hours to 48 h.^[2] However, the presentation of atypical pneumonia, which also called legionnaires' disease, may be fatal. The incubation time is 2–10 days, but periods exceeding 10 days have also been reported.^[2,6]

Fever, loss of appetite, headache, fatigue, and lethargy are common initial symptoms. Cough is often seen as an initial symptom, with sputum in half of the patients, bloody sputum or hemoptysis in one third.^[2] Muscle pain, diarrhea, nausea, vomiting, confusion, lethargy, hyponatremia, renal failure, hypophosphatemia, microscopic hematuria, and the elevated transaminase, CRP, ferritin, CK, and LDH levels are clinical and laboratory findings that can be observed in Legionella pneumonia.^[7] Hyponatremia is a relatively common electrolyte disorder in Legionella pneumonia. The

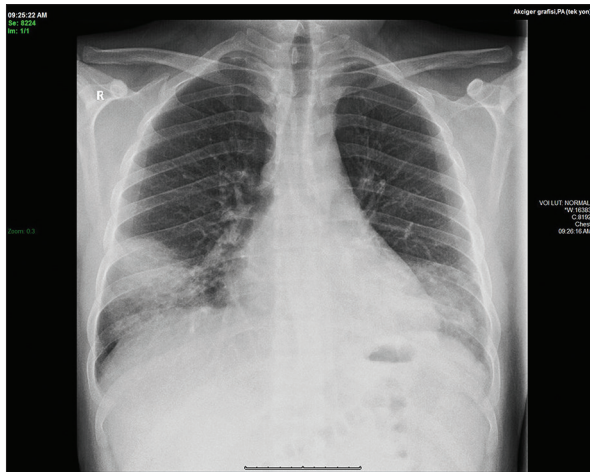


Figure 1: Infiltration areas on the chest radiograph that give a mass image on the right basolateral region and the left side of the heart

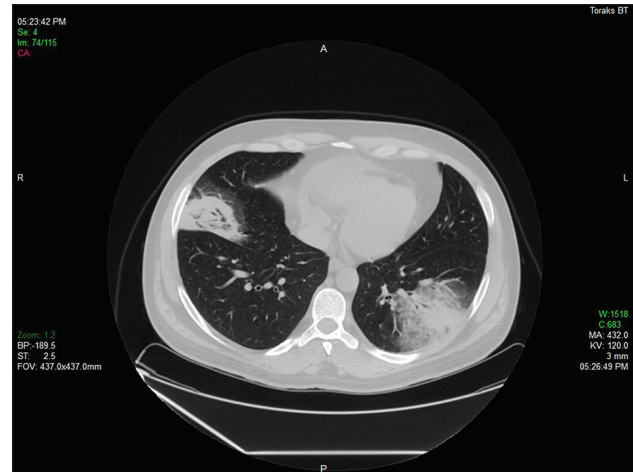


Figure 2: Computed tomography of the chest showing areas of bilateral pneumonic infiltration

possible mechanism of hyponatremia is thought to be inappropriate antidiuretic hormone syndrome.^[8]

Legionella pneumonia is rarely complicated by rhabdomyolysis.^[9] In the literature review published in 2015, there were only 23 cases of rhabdomyolysis accompanied by *L. pneumonia*.^[10] Mortality is observed in 5%–15% of *L. pneumonia*, but if rhabdomyolysis is added, it can increase to 40% and is considered as a poor prognostic indicator.^[11]

Although the cause of rhabdomyolysis in Legionella pneumonia is not fully explained, the presence of an exotoxin or endotoxin which causes bacterial tissue damage and direct invasion of the muscle has been suggested. The development of electrolyte disorders facilitating rhabdomyolysis such as hyponatremia, hypokalemia, and hypophosphatemia may also be helpful in explaining the development of rhabdomyolysis in Legionella pneumonia.^[7,12-15] In our patient, mild hyponatremia and hypokalemia were detected.

Rhabdomyolysis occurs due to the passage of muscle cell contents into the circulation after striated muscle damage caused by trauma, heavy exercise, drugs and toxins, alcoholism, hereditary muscle enzyme defects, and infections. Rhabdomyolysis can be asymptomatic and only be detected by elevated enzyme levels. However, severe electrolyte disturbances and renal failure may also develop and can cause high mortality. Myoglobinuria and CK elevation as well as the release of other intramuscular enzymes and electrolytes into the circulation reveal the clinical and laboratory results of rhabdomyolysis.^[15-17] Although hemoglobin 3+ was detected in urine dipstick, high blood transaminase, and CK levels as well as normal erythrocyte count on urine microscopic examination indicated the development of rhabdomyolysis.

The absence of symptoms such as cough, sputum, respiratory distress in the 1st day of our patient indicates a specific onset for atypical pneumonia. Although the absence of an underlying chronic disease or immunodeficiency in a young patient reduces the likelihood of *L. pneumonia* in the differential diagnosis, symptoms of fever and headache together with the findings in the chest X-ray have led us to request urine Legionella antigen test. Laboratory findings indicate that the leukocyte count is continuously normal during follow-up. Leukocytosis is unusual at atypical pneumonias and symptoms and signs of extrapulmonary-systemic organ involvement can be prominent.^[18]

The history of the patient's exposure to air conditioning in the hotel where he was staying for vacation and the atypical onset of the disease suggested Legionella pneumonia, and the diagnosis was confirmed by the positive detection of Legionella antigen in the urine. Sensitivity and specificity of Legionella urinary antigen have been reported to be 0.74 and 0.91, respectively.^[19] Considering the effect of early initiation of treatment on prognosis, it is also important that the test result can be obtained in a short time.

After 2015, four case reports of Legionella pneumonia complicated by rhabdomyolysis were published in the literature.^[20-23] According to our research, in the literature, there is only one case from Turkey, published in 2006.^[24]

Legionella disease is a notifiable infectious disease to the health government. We reported this case to the Turkey Ministry of Health.

Legionella pneumonia is an atypical pneumonia with high mortality. Since life-threatening extrapulmonary complications such as rhabdomyolysis, kidney damage,

and electrolyte disturbances may increase mortality, a detailed history should be obtained, and laboratory findings of atypical pneumonia should be evaluated.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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