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Alveolar Hemorrhage as a Manifestation of Leptospirosis - A Pediatric Case

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ABSTRACT

Background: A zoonosis is a disease or infection that is naturally transmitted from vertebrate animals to humans. When conducting a medical history and developing a differential diagnosis, clinicians should inquire about exposure to wild or domestic animals, occupational interests, and travel experiences.

Case Presentation Summary: A 14-year-old male with a history of COVID-19 presented with a four-day fever, accompanied by general malaise, cough, chest discomfort, and headaches. Later, he developed diarrhea, vomiting, a diminished appetite, and severe myalgias (especially in both calves). Analytical exams showed elevated CRP (217.3 mg/dL), LDH, uric acid, and minor increases in urea and creatinine. Imaging revealed hepatosplenomegaly and pulmonary abnormalities, including a tree-in-bud pattern and ground-glass densifications. Despite negative serologies, his symptoms worsened, including hemoptysis and desaturation, requiring oxygen supplementation. Further investigations, including new information on the history of handling objects contaminated with evidence of rats before symptom onset, suggested a possible zoonotic etiology. Treatment with doxycycline was initiated, later combined with ceftriaxone due to pleocytosis in the cerebrospinal fluid (CSF). He improved clinically and analytically (with decreasing inflammatory markers), CSF cultures were negative, and he was discharged with oral doxycycline. Leptospira was later detected in urine and antibiotic was discontinued after completion of an adequate therapeutic regimen. Follow-ups showed favorable evolution, as he became completely asymptomatic.

Discussion: Leptospirosis is the most widespread zoonosis in the world. Human infection arises through either direct contact with infected animals or indirect contact with urine-contaminated water or soil. The prevalence of this infection is underestimated because it is typically asymptomatic and self-limited3. Weil's disease a more severe form of leptospirosis, is distinguished by the presence of jaundice, renal impairment, and hemorrhages. Pulmonary involvement occurs in 20%-70% of adult patients, and alveolar hemorrhage can occur without other typical involvement, being uncommon in pediatric age. Adolescents with severe leptospirosis may exhibit adult-like symptoms compared to children. Recognizing leptospirosis in patients with pulmonary symptoms can be difficult, especially if the patient is from a non- endemic area and lacks other characteristic signs.

This is a classic case of pulmonary hemorrhagic involvement in a patient who has no other symptom of Weil's. In this case, the authors underline the necessity of gathering information concerning epidemiological risk exposure to aid in diagnosis, as clinical suspicion and prompt treatment can achieve complete clinical recovery.

Keywords: Leptospirosis, Pediatric age, Pulmonary hemorrhagic, Zoonosis

INTRODUCTION

Leptospirosis is a global zoonotic disease caused by pathogenic spirochetes from the genus Leptospira. It is distinguished by a diverse set of clinical and biochemical manifestations, ranging from self-limiting infection to potentially deadly disease. The classic type of Weil's disease is marked by jaundice, renal dysfunction, and bleeding. However, numerous clinical manifestations affecting the gastrointestinal and central nervous systems, lungs, muscle, heart, eye, and skin in children are frequently overlooked due to their generic nature, and most healthcare practitioners are unaware of leptospirosis. Consequently, the number of cases in research investigating juvenile patients with leptospirosis remains quite low [1].

CASE PRESENTATION

A 14-year-old male, presented to the emergency department with high fever, general malaise, cough, chest, abdominal discomfort, myalgias, and headaches for 4 days prior to admission. Later, he developed diarrhea, vomiting, diminished appetite, and difficulty walking due to severe myalgias (more severe in the calves). His prenatal, natal, postnatal, and familial histories were unremarkable, and he lived in a rural location. The initial laboratory studies showed several abnormalities, including relative neutrophilia, a mild increase in creatinine and blood urea nitrogen, leukocyturia and

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microscopic hematuria, elevated inflammatory markers, myoglobin of 184.8 ng/mL with remaining normal cardiac enzymes, and CRP of 217.3 mg/L. Due to abdominal and chest pain, an ultrasound scan and ECG were performed. Only homogenous hepatosplenomegaly was found. Culture studies of blood and urine did not reveal any pathogenic and all serologies were negative. The patient was admitted for monitoring, additional care, and to clarify the etiology of his condition. Throughout hospitalization, his symptoms worsened, including headaches, hemoptysis, and desaturation, prompting the introduction of supplementary oxygen. CT angiography was requested and revealed a tree-in-bud pattern, Centro acinar micronodularities, and minor ground-glass densifications throughout all lung lobes **(Figures 1 & 2)**, which excluded pulmonary thromboembolism but raised the hypotheses of a multisystem inflammatory condition with pulmonary involvement or atypical pneumonia with systemic manifestations (including zoonotic Etiologies-Leptospirosis, Acute Q fever, Brucellosis, and Lyme disease). A complete analytical study with cerebrospinal fluid analysis and a search for atypical zoonotic etiologies were performed. Treatment with doxycycline was initiated, later combined with ceftriaxone due to pleocytosis in the cerebrospinal fluid (CSF) to cover the most likely atypical etiologies. Due to the clinical severity, with respiratory and neurological dysfunction, a single dose of immunoglobulin was administered for possible multisystem inflammatory syndrome. After 7 days of endovenous therapy, clinical improvement was observed, and subsequent evaluations showed decreasing inflammatory markers and negative CSF cultures, thus he was discharged, totally asymptomatic, on oral doxycycline (for 14 days). Following hospitalization, a urine PCR was positive for Leptospira, and because he remained clinically stable and already completed 7 days of doxycycline, anti-biotherapy was discontinued.

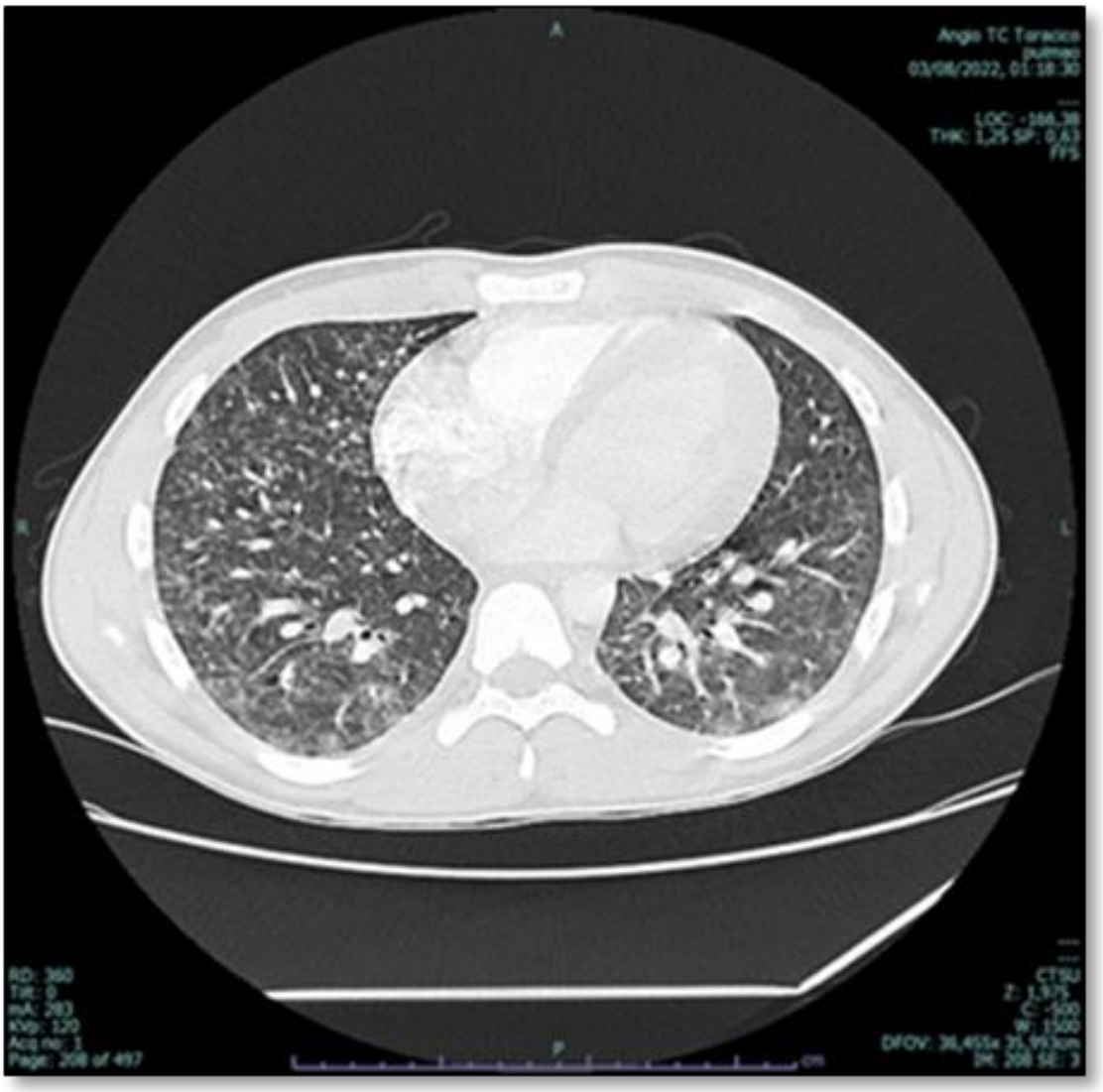

Figure 1. Thoracic CT-Scan showing pulmonary tree-in-bud pattern.

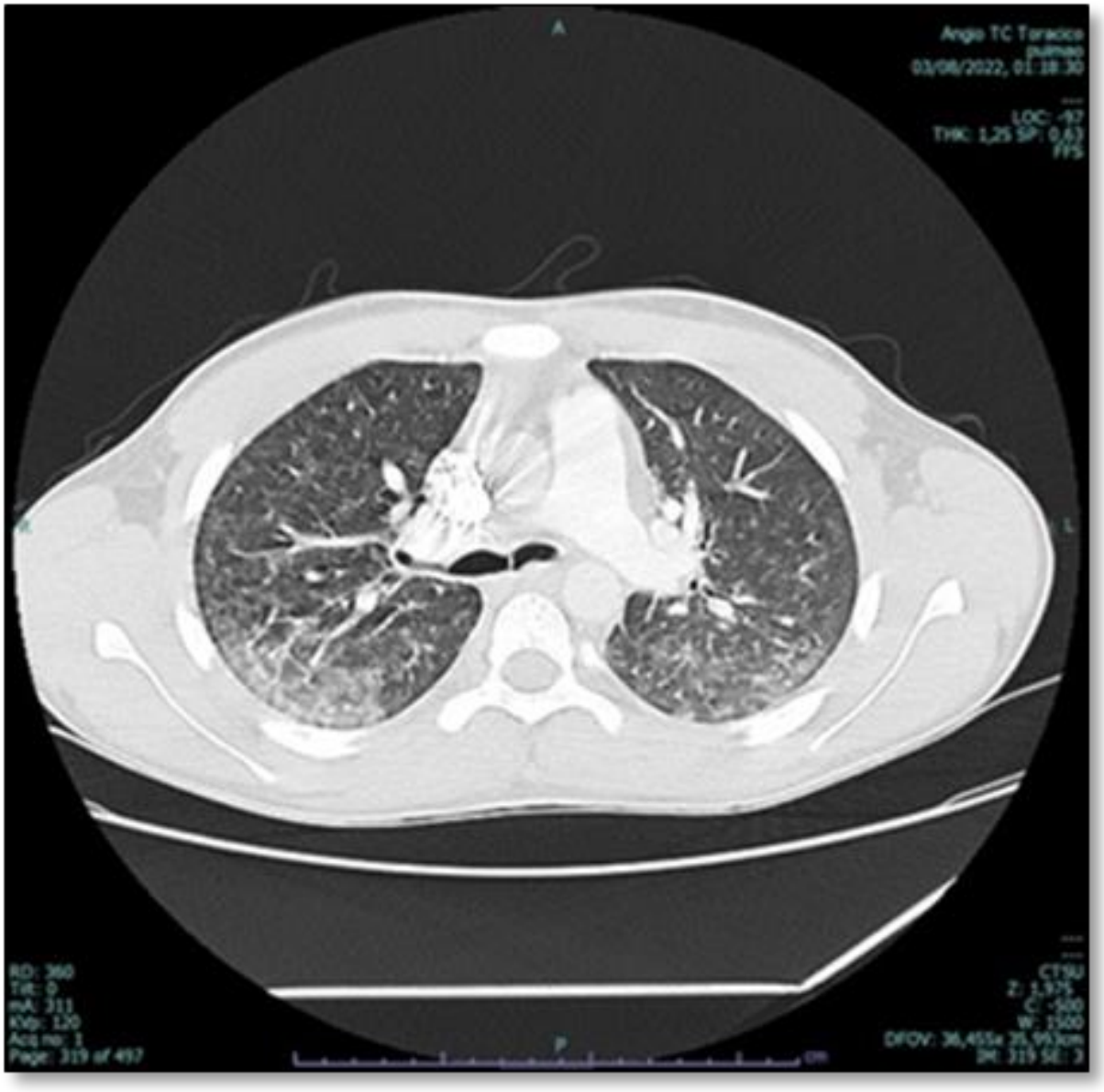

Figure 2. Thoracic CT-Scan showing ground-glass densifications.

DISCUSSION

This is a classic case of pulmonary hemorrhagic involvement in a patient who had no other symptoms of Weil's disease [2-4]. During acute illness, seronegativity has been associated with cross-reactive antibodies. To diagnose leptospirosis in such cases, molecular techniques such as real-time PCR can be used [5-8]. This is because Leptospira DNA can be detected in blood during the initial bacteremic phase of the illness, and in cerebrospinal fluid and urine a few days after the onset of symptoms [9]. Most cases of leptospirosis have a self-limited course without antimicrobial therapy [4,9]. However, some patients may experience severe complications that can lead to morbidity and mortality. For hospitalized children penicillin (250 000-400 000 units/kg/day, divided into 4-6 doses, maximum 6-12 million units/day, intravenously), doxycycline (4 mg/kg/day, divided into 2 doses, maximum 200 mg/day, intravenously), or ceftriaxone (80-100 mg/kg/day, once daily, maximum 2 g/day) can be given. The literature also mentions azithromycin, which is active against different zoonoses, however it should be considered in outpatient instances rather than moderate to severe disease. Severe illness may require supportive care such as fluid-electrolyte therapy, blood products, ventilatory support, and renal replacement therapy. In adult patients, corticosteroids may be administered when there is pulmonary

involvement and vasculitis [10-12]. Our patient received supportive care and was treated with doxycycline, resulting in resolution of both clinical and laboratory findings.

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