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Leptospirosis: A tropical disease in the Midwest

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Introduction

Leptospirosis is a disease most prevalent in tropical countries surrounding the equator, with the incidence of new cases decreasing as you move north. It is a zoonotic disease, with rodents as the common host, contributing to about 1 million cases worldwide with up to 58,000 deaths per year.[1.,2.] Reported cases throughout the United States is about 3 per 100,000 population. The number of reported cases in the Midwest is low, but unfortunately, may more often be missed. Based off a Detroit study, there was a correlation between degree of rat infestation and seropositivity rates. Approximately 30% of children in urban Detroit demonstrated serologic evidence of previous leptospirosis infections.[3.] However, patients with severe symptoms requiring hospitalization in Detroit is still rare. Therefore, acquiring a thorough history, including investigation of pertinent exposures, is paramount in early diagnosis of Leptospirosis. With suspicion early on the disease course, treatment can be initiated early to prevent poor outcomes.

Case Presentation

This case is about a 50-year-old male, residing in Michigan, who presented to the emergency department with a 5-day history of progressively worsening subjective fevers, nausea and vomiting. The patient was otherwise healthy prior to the start of his symptoms. He denied any recent consumption of spoiled food and uncooked meats, exposure to sick contacts, or recent travel outside the country.

The patient's vitals on initial presentation were significant for absent fever, hypotension, and tachycardia. Physical exam findings were unremarkable at the time, aside from his tachycardia and orthostatic vital signs. His labs showed leukocytosis to 18,800 with neutrophil predominance, new onset thrombocytopenia at 39,000, acute kidney injury with a creatinine of 4.5 mg/dL and CPK at 1700. The liver profile showed a transaminitis with ALT in the 60s IU/L and AST 100-120 IU/L, up trending bilirubinemia, mostly direct, and normal alkaline phosphatase. Imaging including RUQ ultrasound and CXR, which showed now gross abnormalities. The patient was treated for sepsis with fluid resuscitation and antibiotics were ordered (but were not administered). He was subsequently admitted to the medical ward.

While on the medical ward, his vitals stabilized, and his acute kidney injury improved with volume resuscitation. The patient was subjectively feeling better after fluids, and his symptoms were attributed to a viral gastroenteritis. About 2 days into his hospitalization, the patient started to spike fevers and developed worsening right upper quadrant pain with notable jaundice and sclera icterus. Of note, the patient did not have conjunctival suffusions (present 55% of the time in leptospirosis infections[7.]). His liver enzymes continued to rise which prompted a hepatology consultation. The patient's ALT and AST peaked at 171 and 62 IU/L, respectively. Bilirubin peaked at 42 mg/dL, mostly direct. Work up for acute liver injury, short of liver biopsy, was unrevealing.

Case Presentation

Infectious disease was brought on board due to persistent symptoms of infection, about 2 days into his hospital course. On their evaluation, they caught a key component of his past exposure history, which pertained to his occupation, and home pets. The patient informed the infectious disease team he works as a home exterminator of rats. He also has multiple domesticated pet rats at home. This was missed on his initial admission history taking.

The patient's overall clinical presentation was consistent with Leptospirosis. He was promptly started on IV ceftriaxone. Serologies for Leptospirosis were sent out and came back positive for Leptospira IgM, and positive on Leptospira PCR. The patient completed a 7-day course of ceftriaxone and his liver function tests and blood counts improved. The patient made a full recovery.

Discussion

Although rare diseases generally are not on the top of diagnostic differentials, this case presentation shows how adhering to the fundamentals of obtaining a thorough history of present illness can prevent rare diseases from being missed or overlooked. In this case, the patient presented with clinical symptoms of an ongoing infection with an unusual exposure history that was noted later during his hospital course. If the patient's significant exposures were noted early on, then the treatment may have been initiated sooner, and reducing the risk of complications related to Leptospirosis, or even death.

Risk Factors

Occupational exposure
- Farmers, veterinarians, sewer workers, exterminators

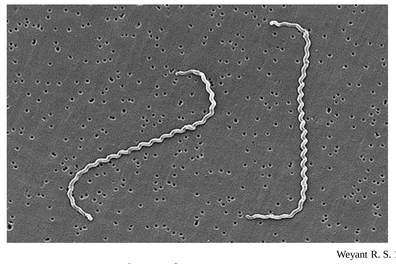
Recreational Activities
- Freshwater swimming, camping, canoeing

Household exposure
- Infestation by infected rodents, domesticated livestock, rainwater catchment system

Figures

Lin CY 2012

Figure 1. Conjunctival Suffusions



Weyant R. S. 1999

Figure 2. Spirochete of genus Leptospira. 21 species, 9 are considered pathogenic

Clinical Presentation

Portal of entry: Abrasion or cuts in the skin. Transmission through conjunctiva

Incubation period: ~ 10 days (range 2 to 26 days)

Patients generally present with:
- Fever
- Rigors
- Myalgias
- Headache
- Conjunctival Suffusions (55% of patients) – pathognomonic, rare in other systemic infections

*Most cases self limited or subclinical. Some cases can be severe to fatal.

Complications

Leptospirosis can be complicated by:
- Liver and renal failure
- Pulmonary hemorrhage
- ARDS
- Uveitis
- Optic neuritis
- Peripheral neuropathy
- Myocarditis
- Rhabdomyolysis
- Vasculitis with necrosis of extremities (seen in severe cases)

Treatment

For outpatient, with mild disease (controversial whether to use antibiotics):
- PO Doxycycline or Azithromycin

For hospitalized patients (7 day course), with severe disease:
- IV penicillin, doxycycline, ceftriaxone, or cefotaxime

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