CLINICAL VIGNETTE

Murine Typhus in Santa Monica

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Case Report

A thirty-one-year-old woman, with a past medical history significant for psoriasis and herpes simplex I, presented to her primary care physician complaining of four days of worsening fatigue, myalgias, and a mild dry cough. In addition she reported a transient non-pruritic non-painful erythematous rash on her torso, upper arms, and hands. She reported decreased appetite, nausea, no vomiting but a few episodes of watery diarrhea. She denied headache, sore throat, chest pain or shortness of breath. She had recently returned from a trip to Washington D.C., where she walked in the suburbs but did not hike, nor did she have any exposures to animals or receive any insect bites. She denied any sick contacts. She is a lawyer who practices in Santa Monica and doesn't live with any pets. Physical exam was unremarkable. Influenza was suspected and the patient received a prescription for oseltamivir, which she took for five days without any improvement in her symptoms.

When she returned for further evaluation, she was treated empirically for community-acquired pneumonia; she received intramuscular ceftriaxone in the office and a prescription for azithromycin. Office labs showed a new anemia, mild thrombocytopenia, hyponatremia, and elevated hepatic transaminases. Chest-x-ray demonstrated increased interstitial markings in the lower lung fields with small bilateral pleural effusions. She was admitted for further work-up for hypovolemic hyponatremia in the setting of ongoing fevers.

On admission, she was ill appearing, febrile, with oxygen saturation of 98% on RA. Her physical exam was notable only for a few crackles at the bases. Her abdomen was soft, with mild right upper-quadrant tenderness but no rebound or guarding. Her joints were not swollen and her skin had a few psoriatic plaques on the lower extremities but no petechiae. An ultrasound showed trace perihepatic ascites, a small right pleural effusion and marked diffuse gallbladder wall thickening secondary to underlying liver inflammation/acute hepatitis. There was no cholelithiasis but there was a small amount of layering intraluminal sludge and non-dilated biliary ducts. Acute hepatic serologies, EBV and CMV PCRS were negative ruling out viral etiologies.

Infectious Disease obtained blood cultures, rickettsial antibody panels, toxoplasma IgG and IgM, Legionella urinary Ag, Ehrlichia, mycoplasma, and cocciodioides EIA. Empiric antimicrobial therapy was begun with levofloxacin and doxycycline directed at atypical pneumonia pathogens and rickettsial infections. All serologies and titers were negative except for the strongly positive Rickettsial antibody panel IgM to R. Typhi. Serology was consistent with murine typhus. The levofloxacin was discontinued and the patient rapidly improved on doxycycline.

Murine typhus is an infectious disease caused by the bacterium *Rickettsia typhi*—an intracellular obligate gram-negative bacteria. The most common vector is the rat flea, *Xenopsylla cheopis*, but cat and mouse fleas can also serve as less common vectors. Human infection occurs by the inoculation of infected flea feces into a bite site or other skin nidus, or is transferred to the conjunctiva or airway by aerolization.

In the United States, most cases of murine typhus have been reported in California, Texas, and Hawaii, but most states do not collect surveillance data about the disease[1]. It is speculated that the disease is under diagnosed since it can be easily mistaken for a viral infection. Outbreaks are uncommon and fatality rates low[2].

Murine typhus is found in both urban and suburban areas of Los Angeles County and can manifest itself in two distinct transmission cycles. The urban cycle is found usually in downtown LA where the vector is most commonly Norway rats and their fleas[3]. In residential communities, the suburban cycle prevails with the disease circulating among domestic cats and possums with the vector being the cat flea.

The illness is typically mild after an eight-to-sixteen day incubation period. Symptoms are non-specific

with abrupt onset of fever, myalgias, and headache predominating in the early period with or without nausea, vomiting, abdominal pain and diarrhea as well. Additionally, a maculopapular rash appears on days four to seven, first on the trunk and axilla and then moving peripherally. What makes the diagnosis challenging is the long differential diagnoses that accompany the symptoms. Numerous viral infections, especially those with exanthems, other rickettsial diseases, and drug reactions all have clinical features that overlap with murine typhus. Moreover, taking a history and inquiring about exposures may not aid in suspecting typhus since most patients deny contact with rodents or fleabites as did our patient.

The diagnosis is suspected after certain laboratory findings. Hyponatremia is common as are elevations in hepatic transaminases. Acute primary disease can be confirmed by IFA (indirect immunofluorescence assay) or EIA (enzyme immunoassay), which demonstrate a rise in the immunoglobulin (IgM) antibody titer.

Murine Typhus can be treated effectively with antibiotics - tetracycline or chloramphenicol are first line choices. Although there is no established recommended duration of treatment, it is advised to continue treatment forty-eight hours after becoming afebrile, or for a minimum of five days with doxycycline, or four to five days after becoming afebrile for chloramphenicol. [4]

Although the diagnosis of murine typhus at a Santa Monica hospital seems exotic, it is important to recognize that murine typhus is endemic in certain areas of Los Angeles and should be readily included on the differential diagnosis when confronted with a patient with persistent non-specific viral symptoms.

Prevention measures can be taken to reduce exposure to fleas, such as flea-control of domestic pets and flea-avoidance of rodents, opossums, and feral cats. Trimming foliage, utilizing screens for doors and crawl spaces, and keeping trashcans closed are all mechanisms that are effective in limiting inhabitation of wild animals and their vectors.

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