

Aneela Arif MBBS, Nazaakat Ahmed MBBS, Alma Martini MD, Wen L Wang DO
Flushing Hospital Medical Center, Flushing, NY, Queens Hospital Medical Center, Queens, NY

Introduction

'Rat bite fever' is a rare and under diagnosed zoonotic disease that is contracted through exposure to infected rodents or through consumption of food or water contaminated with urine or droppings from infected rodents.

It is a bacterial infection, most commonly caused in North America by *S. moniliformis*.

S. moniliformis is difficult to grow in culture; therefore diagnosis is typically based on clinical suspicion (e.g. high likelihood of rodent exposure) and rule-out of other causes.

Here we present a case of rat bite fever that was quickly diagnosed upon collection of a detailed history. The case highlights the importance of a detailed history and knowledge of local endemic infections.

Case Description

A 53-year-old male presented with chills, generalized body pain, nausea, vomiting and epigastric discomfort for 1 day.

He reported recent exposure to a mouse with a bite on his left upper extremity 3 days before presenting.

At the time of admission, he had a high grade fever of 102.8°F with tachycardia and tachypnea.

On examination, he had a small round ulcer (1 cm) with black necrotic tissue with no exudate or erythema on his left upper extremity.

No rash was seen on his body.

Blood work was significant for elevated C-reactive protein (6 mg/dl) and procalcitonin (16.86 ng/dl) highly suggesting sepsis. COVID and influenza A/B were negative.

Since the patient did not have any rash, meningeal symptoms or joint pain, differential diagnoses including Lyme disease, rheumatoid arthritis, rickettsial infection and meningococemia were ruled out.

He was admitted to the hospital with a diagnosis of sepsis due to cellulitis of the left upper extremity secondary to rat bite.

Blood cultures were drawn and he was started on empiric antibiotic ampicillin/sulbactam.

Blood cultures did not show any growth.

Patient improved clinically after empiric treatment.

He was discharged on doxycycline for a total of 14 days.



Figure 1 (above): Rash with multiple tender 2-3mm palpable purpura in a patient with rat bite fever (Kwon et al. 2016). Rash was not present in our patient.



Figure 2 (above): Hemorrhagic vesicles on the first toe in a patient with advanced rat bite fever (Elliott 2007). Rash was not present in our patient.



Figure 3 (left): Acute synovitis of the metacarpophalangeal joint of the thumb in a patient with rat bite fever. Aspiration grew *Streptobacillus moniliformis*. Vasculitis lesion also present on the index finger (Tattersall and Bourne, 2003). Rash was not present in our patient.

KEY LEARNING POINTS

- Focus on obtaining detailed history and physical examination to help in defining differential diagnosis.
- Be mindful of endemic diseases present in your area.
- There is a need to decrease measures of mice/rat infestation.
- Just because a disease is underreported doesn't mean it doesn't exist.

Discussion

Diagnosing rat bite fever can be challenging as it can have a similar presentation to other diseases like rheumatoid arthritis, Lyme disease, disseminated gonorrhea, and meningococemia.

It typically presents with systemic symptoms like fever, vomiting, myalgia, migratory arthritis, and headache, along with local wound infection with no regional adenopathy.

It is usually treated empirically.

If left untreated, a rash on the extensor surface of hands and soles may develop. Rash can be maculopapular, petechial or hemorrhagic (see figures 1-3).

The most common complication is endocarditis, but bacteremia, meningitis, myocarditis, pneumonia and focal abscess, septic arthritis, osteomyelitis and multi-organ failure leading to fulminant sepsis may also occur.

Treatment for rat bite fever starts with local wound irrigation. Empiric treatment includes IV penicillin G and IV ceftriaxone. Upon clinical improvement, antibiotics can be transitioned to oral amoxicillin, cephalexin or doxycycline to complete 14 days course.

This case report illustrates the importance of a detailed history and physical exam, especially in areas like New York City, where rat infestation is not uncommon. Early diagnosis can help in treatment and prevention of life threatening complications.

References

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