

## INTRODUCTION

- Rat bite fever is a zoonotic illness caused by *Streptobacillus moniliformis* in North America and *Spirillum minus* in Asia.<sup>1</sup>
- *Streptobacillus moniliformis* is a fastidious gram-negative rod found in respiratory and urinary flora in rodents.
- The infection is spread through contact with rodents (called Rat Bite Fever) or through contaminated food or water (called Haverhill Fever).<sup>2</sup>
- The estimated incidence in the US is 2,000 infections annually as the infection rate per rat bite is 10%, with 20,000 rat bites occurring each year.<sup>3</sup>
- Susceptible populations include pet rat owners, those near rodent infestations, and veterinary workers. Children are more susceptible as their immune system is not fully developed.
- Typical presentation includes fever, rash, and polyarthralgias. Complications include abscesses, hepatitis, nephritis, pneumonia, meningitis, endocarditis, and pericarditis.
- The mortality rate ranges from 3% with early identification to 12% with delayed treatment.<sup>2</sup>

## CASE SUMMARY

- 7-year-old female originally diagnosed with cellulitis in clinic two days after being bitten by her pet rat
- She returned to the emergency room nine days later with a fever, headache, myalgias, pharyngitis, vomiting, poor oral intake, and rash.
- Laboratory investigations revealed a leukocytosis of 23.3, CRP 6.95, and ESR 18. Urinalysis, chest x-ray, Covid-19, and influenza tests were all negative. She had hyponatremia with a sodium of 130. Liver enzymes and echocardiogram were unremarkable.
- On hospital admission, she was given IV ceftriaxone at 20 mg/kg every 24 hours, IV normal saline at 20 cc/hr as multiple boluses, and antipyretics.
- Retrospectively diagnosed with rat bite fever.
- Discharged home two days later with oral cephalexin.
- She made a complete recovery at one-week follow-up. Blood cultures remained negative.

## TIMELINE

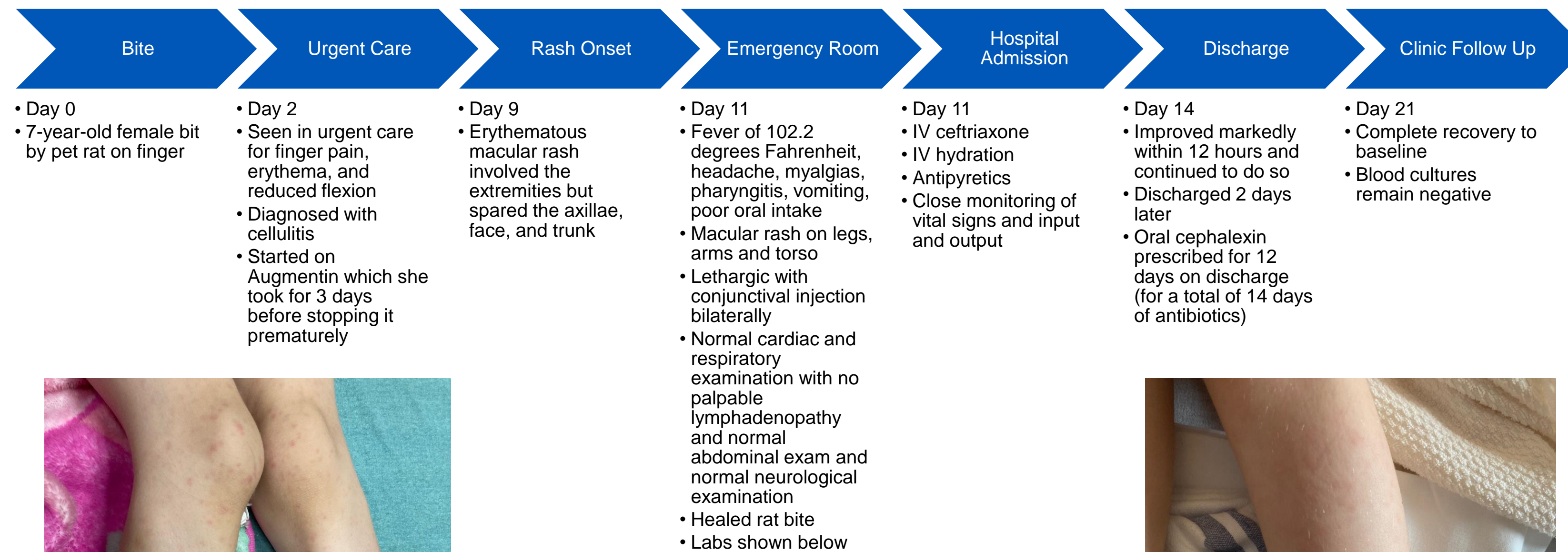


Figure 1: Erythematous macular rash present on extremities on day 1 of hospitalization

TABLE 1: Laboratory Findings

Laboratory Findings	Value	Normal Range
White Blood Cells	23.3	3.4 - 9.6
C-Reactive Protein	6.95	≤8
Erythrocyte Sedimentation Rate	18	12
COVID-19 PCR	Negative	Negative
Blood Culture	No Growth	No Growth



Figure 2: Improvement of rash after antibiotic therapy on day of discharge.

## MANAGEMENT

- As blood cultures are unreliable due to the fastidious nature of this organism, increased awareness is needed for diagnosis.
- **First line therapy is Penicillin G. However, in most case reports, cephalosporins are started empirically and are effective.**
- Alternative treatments include doxycycline and azithromycin.<sup>2</sup>

## DISCUSSION

- A similar case occurred in 2005 in Minnesota in a 23-year-old who was critically ill. The case was sent to the Minnesota Department of Health for definitive diagnosis.<sup>4</sup>
- This case demonstrates how Rat Bite Fever can be missed owing to multiple non-specific symptoms as well as blood cultures that are often negative.
- As incidence is underestimated and presentation can involve severe illness with accessible treatment, we illustrate the importance of obtaining a detailed history and awareness of this illness.

## REFERENCES

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