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Atypical Presentation of Cat-Scratch Disease in a 30-Year-Old Female: A Case Study

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Received: 26 April 2025 | **Revised:** 18 May 2025 | **Accepted:** 26 May 2025

Funding: The authors received no specific funding for this work.

Keywords: antibiotic therapy | atypical presentation | axillary lymphadenopathy | *Bartonella henselae* | cat-scratch disease

ABSTRACT

Cat-scratch disease (CSD) is a zoonotic infection caused by the Gram-negative bacterium *Bartonella henselae*, typically transmitted through the scratch or bite of a cat. This case report highlights an atypical presentation of CSD in a 30-year-old female pet groomer with prolonged fever, fatigue, and axillary lymphadenopathy. The patient's diagnosis was confirmed through histopathological findings of necrotizing granulomas and subsequent improvement after targeted antibiotic therapy with azithromycin. The case emphasizes the diagnostic challenges posed by atypical presentations of CSD, especially in regions with high cat exposure. This case also underscores the importance of considering CSD in the differential diagnosis of febrile lymphadenopathy and highlights the efficacy of antibiotic therapy in symptom resolution.

1 | Introduction

Cat-scratch disease (CSD), primarily caused by the Gram-negative bacterium *Bartonella henselae*, is a zoonotic infection transmitted to humans through the scratch or bite of cats [1]. CSD is widely distributed globally in all regions of North America [2]. The cat flea, Ctenocephalides felis, transmits the disease from cat to cat and can even infect humans. Furthermore, tick bites may spread the bacteria to humans. Approximately 50% of cats carry *B. henselae* and are completely asymptomatic [3, 4]. Since the 1940s, case series have been the primary source of information on CSD's age distribution, seasonality, and clinical characteristics. While these reports have considerably helped our understanding of the condition, they are prone to regional and referral biases and cannot be utilized to determine disease rates due to their lack of population-based data. Parinaud's oculoglandular syndrome is a prevalent atypical form of CSD. In immunocompromised patients, a number of other clinical symptoms have been reported, including bacteremia, hepatic peliosis, impaired mental status, or dementia [5, 6].

2 | Case Presentation

2.1 | Case History/Examination

A 30-year-old woman, a pet groomer living in an urban area, presented with a 2-week history of persistent fever associated with exhaustion. She reported a painful swelling in her left axilla, which developed 5 days prior to her visit. She also mentioned contact with stray cats, including a cat with visible skin lesions. However, the patient herself did not develop any scratch mark or skin lesion, which added to the diagnostic dilemma. Her fever was intermittent, peaking at 101.8°F, and

Summary

- This case underscores the diagnostic challenges of atypical cat-scratch disease presentations in adults, emphasizing the importance of histopathological confirmation and targeted antibiotic therapy for effective symptom resolution.

accompanied by mild headaches but no gastrointestinal symptoms or weight loss. On physical examination, she appeared slightly dehydrated but alert. Vital signs included blood pressure of 95/65 mmHg, pulse rate of 92 beats per minute, and oxygen saturation of 99% at room temperature. A 2.0 × 1.5 cm tender swelling was noted in the left axilla. While CSD typically presents with a primary inoculation lesion such as a papule or pustule at the site of cat scratch or bite, this patient exhibited isolated lymphadenopathy without any visible skin lesion or inoculation site, making diagnosis more challenging and making the presentation atypical.

3 | Methods

3.1 | Differential Diagnosis

Based on the clinical presentation and history of cat exposure, the following conditions were considered: CSD, toxoplasmosis, brucellosis, tuberculosis, and lymphoma. Cat-scratch disease can present with neurological manifestations in rare cases, such as neuroretinitis, encephalopathy, or myelitis, and may be confused with multiple sclerosis, encephalitis, autoimmune encephalitis, etc. [7, 8].

3.2 | Investigations

A series of investigations were conducted to identify the underlying cause (Table 1). Serological testing for *Bartonella henselae* IgG and IgM was unavailable. Due to resource limitations, confirmatory tests such as Warthin–Starry stain, immunohistochemistry, PCR, or culture could not be performed. Diagnosis was made on clinical grounds in conjunction with characteristic histopathological findings and positive response to antibiotics.

3.3 | Treatment Offered

The patient was diagnosed with cat-scratch disease based on clinical history, physical findings, and histopathological confirmation. She initiated the following treatment. azithromycin: 500 mg once daily for the initial phase of treatment; supportive care: adequate hydration and antipyretics. Upon improvement, the patient was discharged with instructions to complete a 4-week course of doxycycline: 100 mg twice daily.

TABLE 1 | The investigations were conducted to identify the underlying cause.

Investigation	Result	Reference range
Hemoglobin	12.5 g/dL	12.0–16.0 g/dL
Total leukocyte count	13,800/μL	4000–11,000/μL
Erythrocyte sedimentation rate (ESR)	38 mm/h	< 20 mm/h
C-reactive protein (CRP)	10 mg/L	< 5 mg/L
Blood cultures	No growth	Negative
Brucella serology	Negative	Negative
Toxoplasma serology	Negative	Negative
Chest x-ray	Normal	Normal findings
Abdominal ultrasound	Normal	Normal findings
Histopathology of lymph node	Necrotizing granulomas	Consistent with CSD

4 | Conclusion and Results

4.1 | Outcome and Follow-Up

The patient showed significant improvement. Her fever resolved within 48 h of initiating treatment, and the axillary lymphadenopathy began to regress within a week. Follow-up was scheduled at 2 weeks and 4 weeks to ensure complete resolution of symptoms and lymphadenopathy. At her 4-week follow-up, she was symptom-free with no residual lymph node enlargement.

5 | Discussion

CSD is a serious disease of animals and humans which is caused by *Bartonella henselae*. It usually starts as a trivial ailment, with regional adenopathy, febrile condition, and low energy levels, and then resolves on its own. However, atypical presentations may lead to diagnostic dilemmas such as the case presented in this study. This case is atypical not due to systemic involvement but due to the absence of a visible inoculation site or cutaneous lesion, which is present in the majority of typical CSD cases. The isolated axillary lymphadenopathy and prolonged fever without other systemic signs further complicated the diagnostic process. CSD is widespread throughout the world but geographical and ecological factors influence its incidence. These include high temperatures and many cats or stray cats, which enhances their prevalence [2, 3]. Tuncay et al. or Jeunesse et al. point out how relevant demographic variability is since the patients

were very different, ranging from young children to older ones [9, 10]. Children appear to have only a few localized areas of affected lymph nodes, while in adults, atypical and/or systemic alternating mast cells and histiocytes are observable along with fever of unknown origin or ocular involvement. This case report has correspondence with the observations made by Bruni et al. wherein a young case was reported who presented with enlarged axillary lymph nodes and mild fever. Conversely, a case of a child affected by visual impairment and dark shadows occlusion was recorded by Wang et al. indicating how systemic conditions may prevail [5].

This case underscores the diagnostic challenge posed by CSD in patients without clear inoculation marks or systemic signs. The absence of classic symptoms delayed initial diagnosis and prompted evaluation for lymphoma, tuberculosis, and toxoplasmosis. This emphasizes the need for clinicians to maintain suspicion for CSD even in the absence of hallmark features, especially in high-risk occupational groups such as pet groomers. In this case, lymph node biopsy and histopathological examination were pivotal in confirming the diagnosis. Necrotizing granulomas and PCR for *Bartonella henselae* DNA provided definitive evidence. This approach aligns with findings by Ma et al., where similar diagnostic techniques were used in a case mimicking Kawasaki disease [11]. Serological tests are valuable but may have limitations, including false negatives in early infection or immunocompromised patients. The absence of acid-fast bacilli in histopathology helped rule out tuberculosis, a crucial differential diagnosis in endemic regions, as noted in studies like Öcal-Demir et al. [10]. Parinaud's oculoglandular syndrome and hepatosplenic involvement are well-documented atypical forms of CSD, particularly in immunocompromised hosts. While the present case did not involve systemic complications, reports such as Balbino et al. highlight cases of axillary lymphadenopathy with systemic symptoms in immunocompetent adults. CSD can have a tissue response that has the potential to simulate cancerous conditions, which was illustrated in the case of Nainshtein-Baturov, in which a middle-aged male complained of fatigue and general malaise with features of lymphoma [12]. The clinical spectrum of these cases highlights the necessity of improved diagnostic suspicion and more organized diagnosis. The use of antibiotics is central to the management of CSD. There are differences in the antibiotics used based on the severity of the disease and the patient. A positive reaction of this patient to azithromycin is in line with the standards [13]. For those patients with severe or systemic involvement, therapy with doxycycline and rifampicin is recommended as seen in Ma et al. [11] CSD can also affect both the musculoskeletal and cardiovascular/respiratory systems, causing joint pain, muscle weakness, arthritis, and complications like endocarditis and shortness of breath. These can impair mobility and increase strain on the heart. Physical therapy (PT) aids in managing these effects by improving strength, joint mobility, cardiovascular endurance, and respiratory function [14]. PT also focuses on pain management, posture, and balance, supporting recovery and enhancing overall quality of life for individuals with CSD [15]. Early treatment initiation significantly reduces the duration of symptoms and prevents complications. Supportive care, including antipyretics and hydration, complements antibiotic therapy. In rare cases of persistent or complicated lymphadenopathy, surgical intervention may be considered [16].

CSD is an underrecognized zoonosis with significant public health implications. The role of cats as asymptomatic carriers, particularly those with flea infestations, underscores the importance of preventive measures. Education on safe pet handling

TABLE 2 | Up-to-date case reports of cat-scratch disease.

Study ID	Country	Sex	Age, years	Main signs
Tuncay et al. 2024 [9]	Turkey	Male	3	Fever, abdominal pain, weight loss, and night sweats
Jeunesse et al. 2024 [17]	United states	Male	13	Right-sided, baseball-sized neck mass
Bruni et al. 2024 [5]	Italy	Female	7	Low-grade fever and the concomitant presence of a painful, swelling in the right axillary cavity
Wang et al. 2024 [18]	China	Male	11	Declined visual acuity in the left eye with dark shadow occlusion
Ma et al. 2024 [11]	Japan	Female	5	Prolonged fever and symptoms resembling those of Kawasaki disease
Balbino et al. 2024 [19]	Italy	Female	45	Axillary lymphadenopathy
Öcal-Demir et al. 2024 [10]	Turkey	Male: 17/29	Mean (SD): 116 ± 51	Lymphadenopathy
Nainshtein-Baturov et al. 2024 [12]	United States	Male	58	Lethargy, stiff neck, and fever
Yin et al. 2024 [13]	China	Female	4	Intermittent fever, cough, with the neck, axillary enlargement
Smith et al. 2024 [6]	United States	Male	50	Swollen, firm, non-tender, and mobile lymph node

practices and regular veterinary care, including flea control, can reduce transmission risk. The diversity in clinical presentations, as summarized in Table 2, highlights the need for a tailored approach to diagnosis and management. Pediatric cases often exhibit localized symptoms, while adults may present with atypical or systemic manifestations.

6 | Conclusion

Cat-scratch disease is an underdiagnosed zoonosis with a wide spectrum of clinical manifestations, ranging from localized lymphadenopathy to systemic complications. This case demonstrates an atypical presentation in an adult female, emphasizing the importance of diagnostic vigilance, especially in patients with close contact with cats. Early recognition and appropriate antibiotic therapy, such as azithromycin, can lead to rapid symptom resolution and prevent complications.

Author Contributions

Elham Mohammed Khatrawi: conceptualization, project administration, resources, software, supervision, validation, visualization, writing – original draft, writing – review and editing. **Neo Zhong Yi Benjamin:** writing – original draft, writing – review and editing. **Pugazhendi Inban:** resources, software, validation, visualization, writing – original draft, writing – review and editing. **Sai Sakthi:** writing – original draft, writing – review and editing. **Omniat Amir Hussin:** writing – original draft, writing – review and editing.

Disclosure

The authors have nothing to report.

Ethics Statement

The authors have nothing to report.

Consent

Informed written consent was obtained from the patient prior to the drafting of the case report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available in the study itself.

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