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Cat-scratch disease in an adolescent: Diagnostic and therapeutic decision-making in outpatient management

Abstract

The most frequent clinical presentation of Cat-Scratch Disease (CSD) is subacute regional lymphadenopathy with or without fever. CSD is caused by the intracellular Gram-negative bacillus *Bartonella henselae*. Systemic disease may involve the liver and spleen. We describe the diagnostic and therapeutic approach to CSD in an immunocompetent 13-year-old male adolescent with lymphadenopathy and hepatosplenic involvement who was managed on an outpatient basis.

The case meets three of Margileth's criteria: a history of contact with a cat, hepatic and splenic microabscesses, and positive serology for *B. henselae* with a sterile lymph node aspirate. Antimicrobial treatment included trimethoprim-sulfamethoxazole and azithromycin. Needle drainage was performed because of increasing pain, tenderness, and fluctuance. Interdisciplinary management at a Pediatric Referral Hospital (PRH), including evaluation by a pediatric infectious disease specialist, allowed the patient to be managed on an outpatient basis.

This case highlights the importance of recognizing atypical presentations of cat-scratch disease, ensuring appropriate follow-up, and involving an interdisciplinary team in diagnosis and treatment.

Keywords: Atypical Presentation; Lymphadenopathy; Treatment; *Bartonella Henselae*; Cat-Scratch Disease.

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Introduction

Cat-Scratch Disease (CSD) is a common disease; the most frequent clinical presentation is subacute regional lymphadenopathy with or without fever [1,2]. Cats, especially those younger than 1 year, are vectors; they acquire *B. henselae* from bites of the cat flea (Ctenocephalides felis), leading to bacteremia, and are often asymptomatic carriers. Human transmission occurs through scratches, bites, or contact with infected cat saliva via broken skin. *B. henselae* can cause a self-limited infection, and lymphadenopathy usually resolves within 2 to 4 weeks in immunocompetent patients. A cutaneous manifestation is usually present, consisting of an erythematous papule or nodule, called the primary inoculation lesion, which lasts 1 to 3 weeks or sometimes several months. Regional lymphadenopathy is typically tender and may be solitary or involve multiple nodes, associated with edema and local erythema. Around 10% of affected lymph nodes may suppurate. Lymphadenopathy generally persists for 1 to 4 months [3]. Treatment with macrolides is recommended in these cases. Lymph node aspiration is not generally recommended except to relieve severe pain and swelling or when the diagnosis is unclear [3,4].

Atypical manifestations can involve viscera such as the liver and spleen. Systemic disease may present with fever, weight loss,

and abdominal pain, and abdominal ultrasound or computed tomography may demonstrate micro abscesses [1,3,6]. CSD may account for up to one-third of pediatric patients with fever of unknown origin. More severe or disseminated forms can occur in both immunocompetent and immunocompromised patients. Other described manifestations of CSD include osteoarticular involvement, encephalitis, conjunctivitis, neuroretinitis, optic neuritis, and endocarditis [1,2,6,8].

Antibiotic treatment in immunocompetent patients is recommended based on symptom severity. A short 5-day course of azithromycin has been shown in one study to decrease lymph node volume more rapidly than no treatment. In pediatric patients, the first evaluation frequently occurs in the emergency department. The decision to admit depends on the patient's clinical condition, access to pediatric and infectious disease specialists to complete the evaluation, the family's understanding of the possibility of CSD and its differential diagnoses, and access to medical consultation if warning signs or symptoms appear. Margileth's criteria are useful in the diagnostic approach [2,9,10].

We analyzed the case of an adolescent evaluated in the Pediatric Emergency Department (PED), in whom CSD was considered the most likely diagnosis at the initial evaluation. The pediatric emergency team at a Pediatric Referral Hospital (PRH) has experience in the diagnosis and treatment of the disease and provided care in collaboration with a pediatric infectious disease specialist, a clinical laboratory specialist, a radiologist, and a pediatric surgeon [2,8,14].

The aim of this report is to present the diagnostic and therapeutic approach to CSD in an immunocompetent adolescent with hepatosplenic involvement who was managed on an outpatient basis.

Case

A previously healthy 13-year-old male was evaluated in the Pediatric Emergency Department (PED) of a Pediatric Referral Hospital (PRH) within the public healthcare system. He presented with a mass in the left inguinal region that had appeared one week earlier; he had no fever, pain, or signs or symptoms of systemic involvement. No initiation of sexual activity. Environmental history revealed that he lived with a 4-month-old kitten with which he habitually slept and which reportedly scratched him. At this initial evaluation, his Pediatric Assessment Triangle was stable, vital signs were normal, and physical examination revealed inguinal lymphadenopathy with signs of inflammation but no other abnormalities. Complete blood count and liver function tests (including liver enzymes) were normal. Serology for *B. henselae* and an abdominal ultrasound were ordered. The discharge diagnosis was inguinal adenitis of infectious etiology. Antibiotic treatment with a 10-day course of sulfamethoxazole (400 mg)/trimethoprim (80 mg) (TMP-SMX), administered every 12 hours, was prescribed. He adhered properly to treatment.

Forty-eight hours after this initial consultation, an ultrasound of the left inguinal region was performed at the PRH. The scan revealed a 28 × 11 mm lymph node with preserved vascularity and fatty hilum, surrounded by smaller nodes with preserved hila. There was minimal subcutaneous tissue edema. No intra- or extranodal fluid collections were observed. Abdominal ultrasound showed a normal-sized liver with regular contours; a small calcification was observed in segment VII (likely a calcified granuloma), and a 13 mm lesion was seen in segment IV (possibly related to cat-scratch disease); the remaining parenchyma showed no abnormalities and had a homogeneous echo structure. The spleen was normal in size (107 mm) but showed heterogeneous echogenicity due to multiple cystic lesions with walls suggestive of splenic abscesses; the largest was a 10 × 6 mm subcapsular lesion in the mid-section, likely related to cat-scratch disease. The kidneys appeared normal.

Eleven days later, the patient visited the emergency service of a primary care center due to enlargement of the inguinal mass and was subsequently referred back to the PED. He remained afebrile and without abdominal pain. Serology for *B. henselae* (chemiluminescence assay) was reactive for both immunoglobulin G and M. Physical examination at that visit showed: The A (Airway), B (Breathing), C (Circulation), D (Disability): E (Exposure) was normal. In the exposure item he presented an oval-shaped mass (10 × 5 cm) was present at the root of the left thigh, with erythema, edema, warmth, and induration; no fluctuance was noted. There were no signs of lymphangitis. No skin portal of entry was evident. The oropharynx was normal. No other lymphadenopathy was found. The abdomen was soft and non-tender, with no visceromegaly or other masses. No genital lesions, Tanner stage 3; the remainder of the physical examination was unremarkable. Abdominal ultrasound showed a liver with regular contours and normal shape and size. A 15 × 9 mm image consistent with an abscess persisted in segment IV, along with splenic microabscesses. The diagnosis at this PED evaluation was CSD with hepatosplenic microabscesses. Azithromycin (500 mg every 24 hours for 5 days) and TMP-SMX (400/80 mg every 12 hours for 10 days) were prescribed, and follow-up at the pediatric infectious disease clinic was arranged. Signs and symptoms requiring an early return visit were explained, ensuring that the patient and his family understood them.

Forty-eight hours later, at the pediatric infectious disease outpatient clinic, the patient was in good general condition, with normal vital signs. The inguinal lymphadenopathy had increased in size, presenting as an oval, erythematous mass measuring approximately 5 × 11 cm (Figure 1). A Numerical Pain Rating Scale was applied: spontaneous pain was rated 3 out of 10 and 6 out of 10 on palpation, particularly along the outer edge of the enlarged node, which had an elastic consistency and central fluctuance. No lymphadenopathy in other regions or hepatosplenomegaly was found. Vision was normal. There were no neurological or cardiovascular signs or symptoms. The patient continued attending school but was partially restricted from sports activities. Treatment with azithromycin and TMP-SMX was continued. An evaluation by the surgical team was scheduled for the same day at the PRH to assess the need for drainage. During the evaluation, the presence of symptoms such as pain, enlargement of the abscess under antibiotic treatment, erythema and important fluctuation were considered. The surgical team decided to drain the suppurative lymphadenitis choosing needle aspiration as the technique, to decrease the possibility of complications such as persistent fistula. The procedure was performed in the outpatient clinic with local anesthesia, well tolerated, yielding 25 mL of turbid purulent fluid. A sample was taken to send to bacteriological study.

The patient returned to the pediatric infectious disease outpatient clinic four days after completing antibiotic treatment. He remained afebrile and in excellent general condition, with no pain in the left inguinal region and a marked reduction in

the size of the mass, which showed no erythema or edema (Figure 2). The central puncture site on the node was visible but showed no exudation. No lymphadenopathy in other regions or visceromegaly was found. Neurological and cardiovascular examinations were normal. Ultrasound of the left inguinal region showed inflammatory-appearing lymph nodes up to 11 mm in size. Alteration of the echo structure of the subcutaneous fat layer, consistent with residual changes, was observed; no fluid collections were seen.

At a follow-up visit with the infectious disease specialist, the lesion continued to improve (Figure 3). Abdominal ultrasound showed a liver with regular contours and normal shape and size. A 16 × 3 mm hypoechoic area persisted in segment IV, corresponding to the previous abscess; it showed no internal fluid collection. A small calcification with a granulomatous appearance was observed in segment VIII. The spleen was normal in size; findings consistent with microabscesses (up to approximately 12 mm) persisted. They appeared mature, with fluid-filled areas that were smaller than those seen on the previous ultrasound. No other abnormalities were observed.

Bacteriological culture of the fluid drained from the lymph node showed no bacterial growth.

Two follow-up calls were made; the grandmother reported that the patient remained asymptomatic in the inguinal region and had resumed all academic and sports activities. Abdominal ultrasound performed two and a half months after disease onset showed a small residual collection in segment IV of the liver and persistence of the small lesion with a granulomatous appearance. The spleen was normal in size, and all microabscesses were smaller than on the previous study. Ultrasound of the inguinal region showed resolution of the lymphadenopathy.



Figure 2: Cat-scratch disease in an adolescent: Diagnostic and therapeutic decision-making in outpatient management. Lymphadenopathy following drainage and antibiotic treatment, showing a marked reduction in size, with no pain, erythema, or edema. The central puncture site is visible, without exudate.



Figure 1: Cat-scratch disease in an adolescent: Diagnostic and therapeutic decision-making in outpatient management. Oval 11 × 5 cm inguinal lymphadenopathy with erythema, tenderness, and fluctuance.



Figure 3: Cat-scratch disease in an adolescent: Diagnostic and therapeutic decision-making in outpatient management. Favorable course with complete resolution of inflammatory signs.

Discussion

The diagnostic approach of CSD usually is based on the presence of prolonged fever, regional lymphadenopathy, a history of contact with cats, and the presence of hepatic and/or splenic microabscess [1-3]. Margileth's criteria are useful for suspect the disease and are still used for diagnosis: 1) history of contact with a cat; 2) negative serology for other causes of lymphadenopathy, sterile lymph node aspirate, and/or hepatic/splenic lesions; 3) positive serology for *B. henselae*, and 4) lymph node biopsy showing granulomatous inflammation or positive Warthin-Starry staining. A case is considered confirmed when 3 criteria are met. A case is considered probable when Margileth's criteria 1 and 2 were met [2].

In an adolescent with suspected CSD and inguinal lymphadenopathy, the differential diagnosis should include local skin and soft-tissue infections of the lower extremity or genital region, as well as sexually transmitted infections-such as primary syphilis, lymphogranuloma venereum, and chancroid. Lymph node tuberculosis, toxoplasmosis, Epstein-Barr virus or cytomegalovirus infection, and-depending on the epidemiological context-other infectious causes should also be considered. If the lymphadenopathy is persistent, painless, hard, or fixed, or is accompanied by prolonged fever, night sweats, weight loss, or hepatosplenomegaly, it is important to rule out neoplastic diseases such as lymphoma or leukemia, in addition to inflammatory causes. The absence of fever and systemic effects, the fact that sexual activity has not yet begun, and the physical examination findings make these diagnoses unlikely.

The case presented involves an immunocompetent adolescent with CSD and hepatosplenic involvement, the team of the PED suspected CSD at the first consult and proceed to complete the treatment and diagnosis ambulatory because the patient had no indication of hospital admission as severe liver or spleen pain, severe eye infection (Parinaud's oculoglandular syndrome), signs or symptoms of encephalopathy or endocarditis. The CSD with hepato-splenic involvement is the most frequent atypical presentation of the disease [1,6,9].

The diagnosis was confirmed by serology for *B. henselae*. The microbiology laboratory of the PRH used for serological diagnostic the indirect fluorescence assay, in 2026 the method was changed for chemiluminescent assays, now available [13].

The isolation of Bartonella spp. in culture is difficult, requiring 2 to 6 weeks of incubation for primary isolation. Histopathological studies demonstrating granulomatous inflammation or positive Warthin-Starry staining are useful and may help rule out other differential diagnoses [8,9]. Detection of *B. henselae* nucleic acid by polymerase chain reaction has good specificity, but its sensitivity ranges from 43% to 76% [3,14].

This case meets three of Margileth's criteria: a history of contact with a cat, hepatic/splenic microabscesses, and, as part of the diagnostic workup, positive serology for *B. henselae* and a sterile lymph node aspirate.

The antimicrobial treatment of CSD with abscess in liver and spleen is controversial, a variety of antibiotics are reported for the treatment of this entity [2,4,6,9,10]. For atypical disease, antibiotics such as rifampicin, TMP-SMX, ciprofloxacin, aminoglycosides, or clarithromycin/azithromycin in combination with rifampicin may be used, as reported in case series. Most immunocompetent children recover on their own within 2 to 4 months. There are doubts about if the cause of remission of the disease can be attributed to the antimicrobial efficacy treatment or the self-limited characteristic of the CSD in immunocompetent patients [10,6,16].

The adolescent in this report received adequate therapy for CSD since the first assistance in PED. The initial treatment with TMP-SMX has the advantage of being useful for treatment of infection due to S. aureus. The clinical course observed with the use of azithromycin and needle drainage, combined with an interdisciplinary management approach that included a pediatric infectious disease specialist, allowed for ambulatory treatment.

Regional lymphadenitis typically follows a self-limiting course and, in most cases, does not require surgical intervention. Historically, excision of the affected lymph nodes has been avoided due to the risk of fistula formation. However, some lymphadenopathy may undergo suppuration and form abscesses, particularly during the prolonged course of the disease. In such instances, drainage may be considered if there is a well-defined fluid collection, fluctuance, significant pain, or a lack of response to conservative management. In these cases, when CSD is confirmed or highly suspected, drainage by needle aspiration instead of incision and conventional drainage is preferred since it decreases the incidence of cutaneous fistula [5,9,16,17]. The case described by Jeunesse et al. serves as an example of cat-scratch disease requiring incision and drainage due to a lack of response to antibiotic therapy resulting in rapid, uncomplicated resolution [5]. In our patient, drainage was indicated due to increased tension and pain, and the procedure was successful.

The reduction of hepatosplenic lesions is progressive. The literature reports the persistence of residual intraparenchymal lesions for months or even years. Del Río et al. communicated the case of a 10-year-old girl with CSD and systemic manifestations who achieved clinical and ultrasonographic remission one year after the onset of symptoms [15]. In the case presented here, the clinical course has been favorable, with symptom remission and a reduction in the size of the hepatosplenic lesions over two and a half months.

Prevention of cat-scratch disease is primarily based on reducing exposure to *B. henselae* by avoiding cat scratches and bites, particularly during rough play, promptly washing any wounds with soap and water, and maintaining effective flea control in cats to reduce transmission among animals and the risk of human infection [9].

Conclusion

This case highlights the importance of recognizing atypical presentations of cat-scratch disease, establishing the possibility of outpatient management and follow-up based on clinical stability, the feasibility of outpatient monitoring and ensuring interdisciplinary management that includes a pediatric infectious disease specialist.

Although drainage is not standard practice due to the risk of fistula formation, it was necessary in this patient given the lesion's large size, fluctuance, significant pain and associated symptoms; the clinical outcome was favorable and free of complications. Effective referral and counter-referral coordination with the emergency department enabled outpatient management, avoiding the need for hospitalization.

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