Radiology Case Reports 20 (2025) 2248–2252

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Case Report

Cat-scratch disease mimicking soft tissue sarcoma in a pediatric patient☆,☆☆,★

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ARTICLE INFO

Article history:
Received 23 November 2024
Revised 21 January 2025
Accepted 23 January 2025

Keywords:
Cat-scratch disease
Sarcoma mimicker
Pediatric

ABSTRACT

Cat scratch disease, first described in France in the 1930s, is a benign infectious disease with often atypical presentation. Its clinical symptoms and radiologic features can overlap with those of a sarcoma. Here we present the case of a 12-year-old female with cat-scratch disease that was initially misdiagnosed as a soft tissue sarcoma of the elbow. The patient was then successfully treated with an antibiotic course. Our case emphasizes the importance of early consultation by a specialized multidisciplinary team given the lack of specificity and overlap of presentation among benign and malignant masses.

Introduction

Benign musculoskeletal lesions often overlap clinical and imaging characteristics with bone and soft tissue sarcomas [1,2]. Both entities usually have a similar presentation, with palpable tumors or localized pain as the predominant symptoms [3]. This nonspecific presentation can lead to initial diagnostic efforts directed at assessing a potential malignant tumor or mass, generating an emotional impact on the patient as well as the additional burden of unnecessary invasive studies until an accurate diagnosis is reached [1].

A thorough understanding of these pathologies, as well as early consultation with a musculoskeletal specialist and multidisciplinary team discussion, are essential to minimize delays in diagnosis and avoid unnecessary ancillary tests for these patients. Here we present the case of a 12-year-old female with cat-scratch disease that was initially misdiagnosed as a soft tissue sarcoma of the elbow.

Case report

A 12-year-old female presented to our service with a chief complaint of an elbow mass that had been present for 2

☆ Institution(s) at which the work was performed: Institute of Orthopedics and Traumatology, Montevideo, Uruguay.
☆☆ Acknowledgments: No funding was received for this manuscript.
★ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.
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https://doi.org/10.1016/j.radcr.2025.01.071

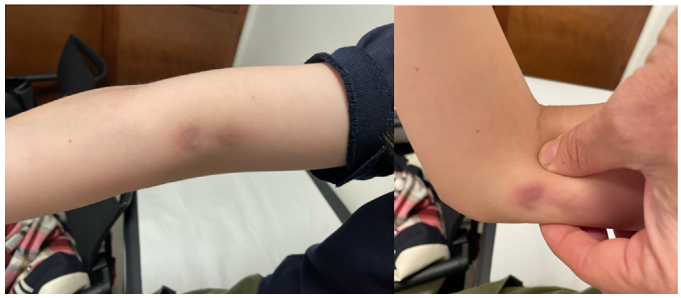

Fig. 1 – Clinical picture of the patient's elbow indicating the location of the mass as well as its associated skin discoloration.

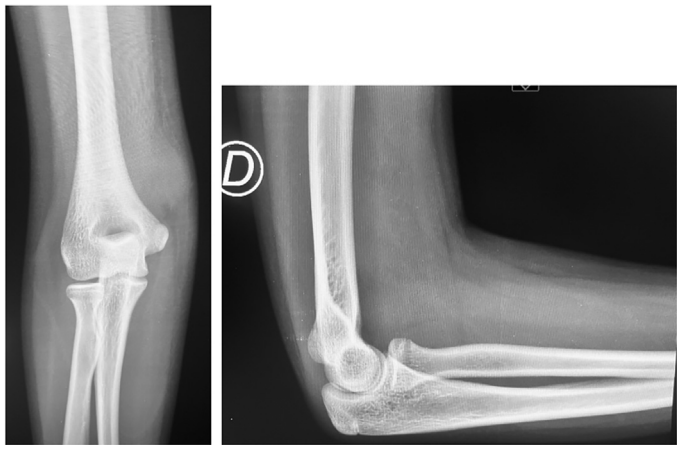

Fig. 2 – Radiographs of the right elbow, anteroposterior and lateral views, demonstrating increased density of the soft tissues on the medial aspect.

months. The mass had recently increased in size per patient and parents. The patient had no prior history of trauma to that area, nor did she have any constitutional symptoms such as fever or weight loss. She did not have any other previous relevant medical history. On physical examination the mass was present over the ulnar aspect of the elbow, with an oval shape, and had 3 cm in its biggest diameter (Fig. 1). The mass was tender to palpation, of hard consistency with poorly defined limits and was adhering to deep planes. Skin discoloration was present over the mass. The patient did not have any sensory-motor deficits.

Radiographs of the elbow were obtained demonstrating not obvious bony alterations, with an increase in soft tissue density over the area where the mass was present (Fig. 2). Following laboratory exams were requested showing white blood cell counts within normal range, and normal values of C-reactive protein and erythrocyte sedimentation rate. A CT scan of the elbow was also obtained demonstrating an indeterminate mass over the medial aspect of the elbow without alterations of the humerus cortex (Fig. 3). No other lesions were identified and no adenomegaly was present in the surrounding soft tissues.

Following, an MRI with and without contrast of the elbow was performed where the tumor was observed in further detail (Fig. 4). A superficial mass roughly oval measuring 21 × 32 × 39 mm was described. The tumor was heterogeneous, hypo and isointense on T1, and heterogeneous and hyperintense on PD sequences with fat saturation. With contrast sequences the tumor demonstrated thick heterogeneous peripheral enhancement with a 19 mm solid enhancing nodule within. The tumor had intimate contact with the ulnar neurovascular bundle, displacing it. Given the tumor's worrisome appearance the MRI was reported as concerning for sarcoma.

Two weeks after the initial consultation a CT-guided biopsy of the lesion was performed, obtaining 2 fragments of whitish material and 20cc of yellowish material, which were sent for anatomopathological study and bacteriological culture. No bacterial growth was obtained. As a complication, the biopsy area developed an infection, requiring oral antibiotic treatment with resolution of the symptoms. The anatomopathological report indicated extensive necrosis and purulent process, with small, poorly organized histiocytic granulomas, without giant cells (Fig. 5). Immunofluorescence and immunohistochemistry staining were performed, which were positive for lymphoblastic lymphoma and Ewing sarcoma, but could not be conclusive to rule out other malignancies. The case was discussed in the multidisciplinary tumor board where cat scratch disease emerged as a new diagnostic possibility, supported by the epidemiological notion obtained from a new questioning of the patient, who reported the recent adoption of a cat. Blood serology to confirm the diagnosis of Bartonella henselae infection was requested, which resulted positive with a dilution of 1/256. Antibiotic treatment with Azithromycin was implemented with improvement of the mass, disappearing completely within 4 weeks.

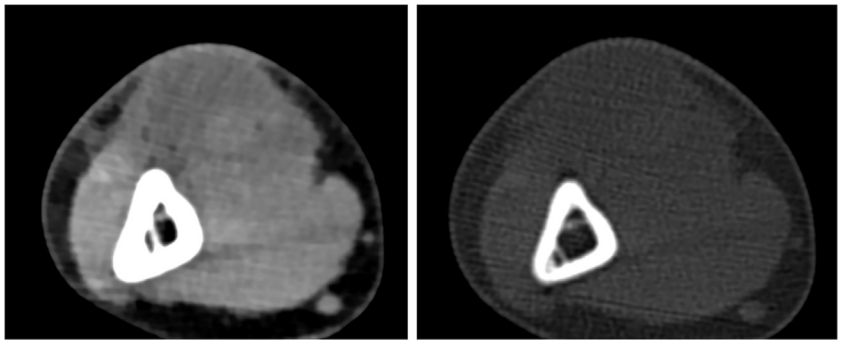

Fig. 3 – CT-scan of the elbow with axial views of soft tissue and bone windows showing the presence of a mass on the medial aspect with no abnormalities of the distal humerus.

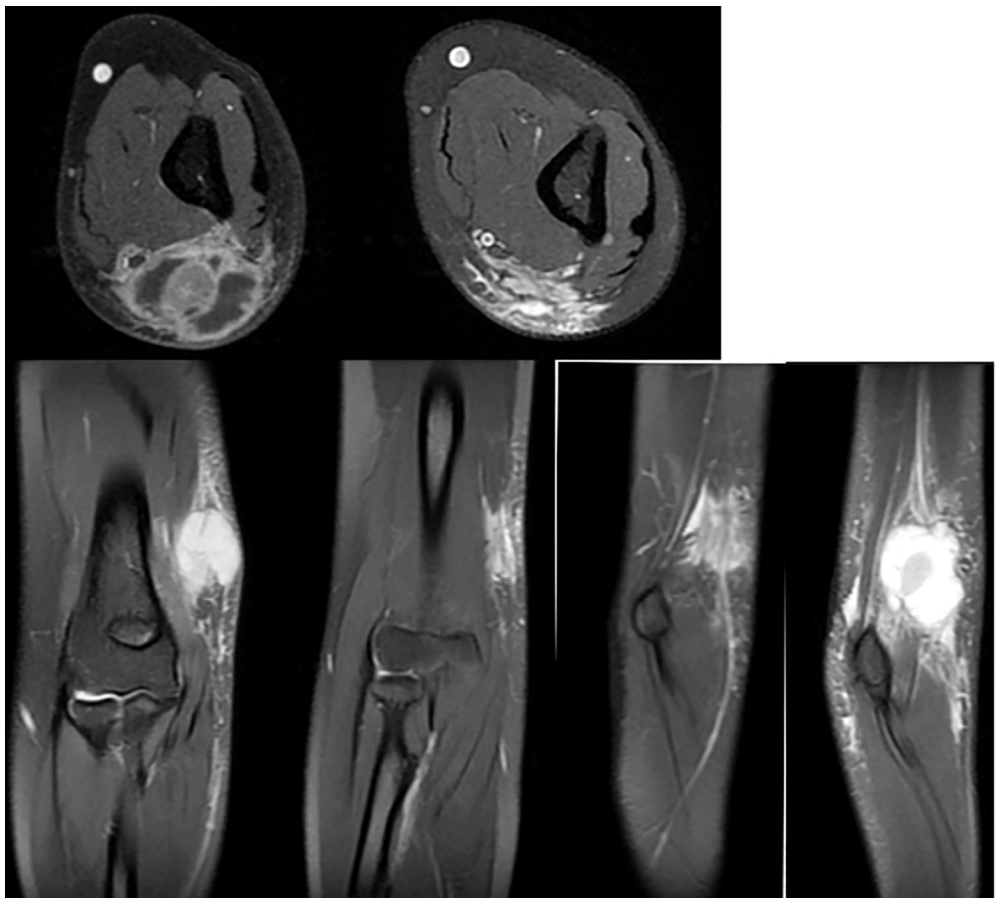

Fig. 4 – MRI with and without contrast of the elbow, axial, coronal and sagittal views of the T1-fat suppressed post contrast sequence, demonstrating the mass in further detail with areas of necrosis and enhancing central nodule. The mass is abutting the ulnar nerve.

Discussion

Cat scratch disease, first described in France in the 1930s, is a benign infectious disease caused by Bartonella henselae, a gram-negative bacillus that is difficult to culture [4,5]. The disease usually affects children and young adults and has worldwide distribution without regional predominance [6]. The disease is transmitted by cats under one year of age, with recent contact with cats being identified in more than 90% of cases and transmitted to humans almost always by scratches and only very rarely by bites or licks [7]. Antibiotic treatment is controversial in immunocompetent patients since in most cases this is a self-limiting disease with an evolution of 1 to 5 months [8].

Three to five days after contact a papule-pustule usually appears, which frequently evolves into a scab and 2 weeks later painful regional lymphadenopathy appears, in

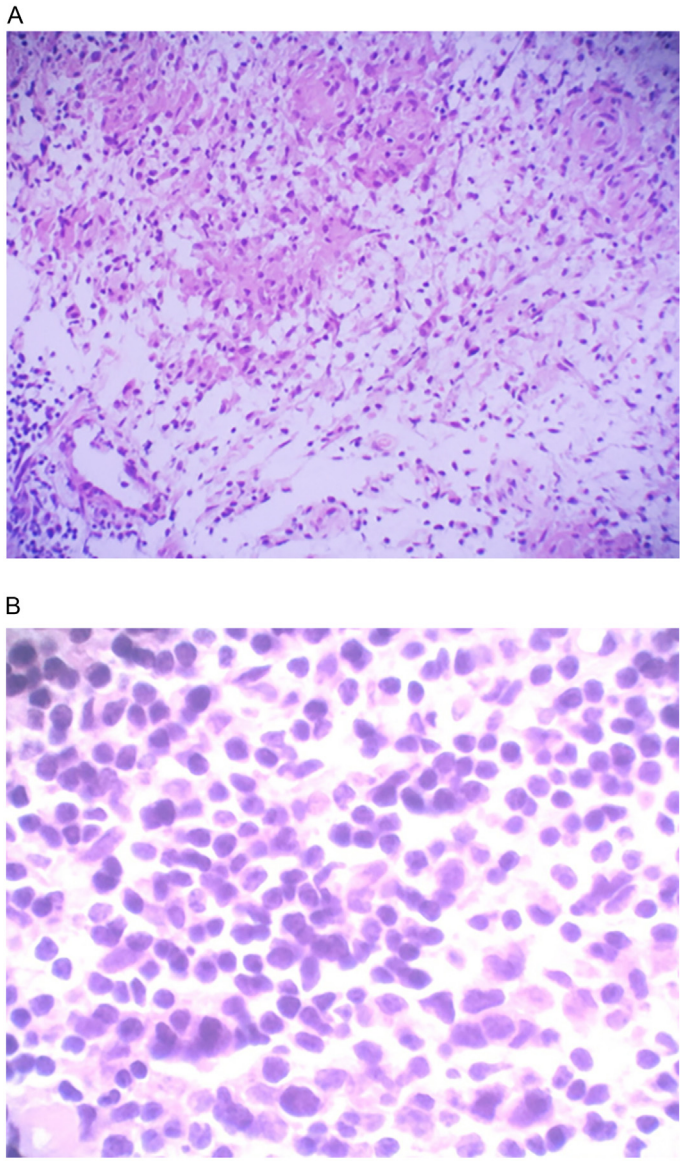

Fig. 5 – Microscopic image H&E x 10 (A) and x 40 (B) of the lesion demonstrating necrosis and inflammatory infiltrate as well as poorly organized histiocytic granulomas.

most cases single, large and persistent for several months [9]. In some cases, it may be associated with symptoms such as general malaise, fever and headache. Cutaneous manifestations, except for the primary inoculation macule, are rare, and include the presence of granulomatous lesions, as in the case of our patient [10]. Atypical forms of presentation include prolonged febrile syndrome and involvement of different parenchyma such as the central nervous system (encephalitis, meningitis), visceral (liver or splenic microabscesses), ocular or bone (axial and limb skeleton), the latter being the rarest [11,12].

The diagnosis can be confirmed by biopsy of an affected lymph node demonstrating granulomatous inflammation with central necrosis, or by specific serological tests for Bartonella henselae with high sensitivity and specificity [13]. In Uruguay there are no epidemiological records for cat-scratch disease and serological diagnostic methods have been recently introduced in the country, which probably contributes to the low diagnostic suspicion and underdiagnosis of this disease [14]. Besides the classic symptoms there have been many case reports of patients with atypical presentations. A teenager had a case of spinal involvement with disease present in the L2 body with extension into the medullary canal, however, with no neurological deficit [15]. Similarly, there is a report of another teenager with a polyostotic presentation, with affectation of the ribs, proximal humerus, femur as well as visceral involvement [15]. A 4-year-old presented with a suprasternal mass that underwent resection, with the diagnosis being made postoperatively [16]. These cases emphasize the diversity of presentations, as well as the importance of this disease as a simulator of different tumors, including soft tissue sarcomas.

The retrospective study by Amerstorfer et al. described a series of 10 patients referred to a specialized sarcoma center

Graz, Austria, whose final diagnosis was cat scratch disease (0.4% of the patients referred to the center for the studied period) [17]. The study highlights the low prevalence of this disease among patients referred to a sarcoma center and emphasizes the importance of suspecting it as a differential diagnosis, as well as the expertise of the radiologists to recognize these lesions. Dhal et al. published a meta-analysis in 2021 about cat scratch disease as a malignancy mimicker [18]. The report highlighted the young average age of patients, the female gender predominance and mainly the heterogeneity of initial diagnostic approaches that ultimately elicited the cat scratch disease. Although there is a vast histopathological diversity of soft tissue sarcomas (160 subtypes in the WHO classification), the vast majority present in a very similar way to non-neoplastic pathologies [19]. This unspecific clinic and radiologic features frequently lead to delays in diagnosis and treatment [1]. In the case of our patient there was an initial overreliance on the imaging concern for sarcoma which misguided further assessment. Given the apprehension due to the possibility of a malignant diagnosis that should be promptly diagnosed and treated, relevant information was overlooked, for example, the history of a recent new cat in the family.

Conclusion

The case presented illustrates that cat scratch disease can present with clinical and radiologic characteristics similar to soft tissue sarcomas. The complexity and low incidence of soft tissue sarcomas require evaluation by specialists, highlighting the importance of multidisciplinary assessment. Although cat scratch disease is a rare diagnosis among patients referred to a sarcoma center, it should be considered as a differential diagnosis, thus avoiding subjecting patients to excessive diagnostic studies and costs.

Patient consent

Per the local Institutional Review Board consent was exempt due to this being the case of research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimen with the information being recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. Nevertheless, the patient was informed and consented for this publication due to journal requirements.

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