Cervical osteomyelitis and an epidural abscess: an unusual form of cat-scratch disease in one case

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Abstract
Background: The association of cervical osteomyelitis with epidural abscess is extremely rare; atypical symptomatology is what makes diagnosing and management challenging. This case is the sixth case reported in the literature. The objective of our study is to describe the clinical manifestation and treatment approach.

Case presentation: A 71-year-old male with no medical history, who was admitted to the emergency room for C7-T1 spinal cord compression caused by Bartonella henselae, marked improvement after decompression by evacuating the empyema and antibiotic course.

Conclusion: Cat-scratch disease or subacute regional lymphadenitis is a bacterial infection caused by Bartonella henselae; children and adolescents are mostly infected. Systemic complications are rare; the prevalence of bone damage is estimated at 0.1 to 0.3%. Our case allows a literature review of and put in focus on our diagnostic and therapeutic attitude.

Keywords: Case report, Bartonella henselae, Osteomyelitis, Cat-scratch disease, Epidural abscess, Cervical mini-discectomy

Background
Cat-scratch disease is a bacterial infection of Bartonella henselae. Bartonella henselae is a small Gram-negative bacillus. Cats are healthy carriers, but they can be infected too, cat-to-cat transmission mainly via flea bites or flea dirt; the bacteria reach the oral cavity then to the coat and the claws of the cat during cat’s bathing or when fighting with another cat. The germ spread to people if a person get scratched or bitten by infected cat [1].

Children and adolescents are most affected by this infection since adults represent only 10% of the population according to Carithers (p = 0.007) and the average age is 9 years [2, 3]. Systemic complications are rare; according to Graveleau, the prevalence of bone damage is estimated at 0.1 to 0.3% [4]. Fever and solitary or regional lymphadenopathy are the classic symptoms associated with a history of cat scratch or bite. In bone involvement, the clinical symptomatology is marked by bone pain (89%) and fever (84%) [4, 5]. We report an atypical case: the clinical manifestation and treatment approach.

Case presentation
We report a case of a 71-year-old male, immunocompetence, with no medical history who presented for several weeks neuropathic pain of the right shoulder associated with hypoesthesia and paresthesias of the ulnar edge of the forearm and last three fingers of the hand as well as night sweats without fever, no spinal pain, or lymphadenopathy. Interrogation reveals cat scratch in early December with purulent discharge for a few days. A strength force deficit was found in C7 and C8, counted 3/5. CBC shows leukocytosis at 12 G/L and an increased C-reactive protein at 120 mg/l. Urine culture performed on was sterile with leukocytes counting 1000/ml. B. henselae serology is IgM and IgG positive. Thoraco-abdomino-pelvic CT scan and a transthoracic
echography were normal. A cervical MRI showed signs of C7-T1 spondylitis associated with an epidural abscess, resulting in spinal cord compression (Fig. 1).

A microsurgical management was performed via the anterior sub axial approach; patient had benefited of cervicotomy, without sternoclavicular joint removal to reach this level anteriorly. A mini-discectomy, collection drainage, and decompression of the foramina C7-T1 were performed. Yellowish purulent semiliquid material was drained. No implant was placed. PCR on the biopsy finds a bone infection with *Bartonella henselae*.

Medical management by introduction of probabilistic antibiotic therapy with cefotaxime-oflocet. Changing the antibiotic regime to azithromycin-rifampicin for a total period of 6 weeks. The outcome was favorable with gradually deficit recovery. The post-operative MRI, performed 1 day after surgery, showed a complete evacuation of the empyema with persistent bone signal (Fig. 2).

**Discussion**

*Bartonella* osteomyelitis with spinal cord injury remains rare [5, 6]. In a cohort study of 1200 patients with cat-scratch disease, only six patients had systemic complications, 5% of the population, and among the complications there were only 2 cases of osteomyelitis (0.27%) [3, 5]. According to the literature, only 5 cases of cervical osteomyelitis have been reported and the present case is the 6th case (Table 1). It is common in children and adolescents. In *Bartonella* osteomyelitis, the infection spreads to the bone via tow pathways hematogeneous pathway or via lymphatic route [7, 8]. Thoracic and lumbar vertebrae are the mostly affected (42%) then cervical vertebrae, more rarely, the pelvic girdle (about 11%), rib cage, femur, humerus, and the head [9, 10].

Presence of an epidural abscess associated with osteomyelitis was noted in only 6 cases [7, 10–13].

The diagnosis was made by clinical context, confirmed by clinical examination and a combination of *B. henselae* serology with PCR. These combinations of PCR and serology have great interest in the event of diagnostic difficulties or atypical forms of cat-scratch disease [6, 14–17].

According to Bergmans [18], the diagnosis of CSD is established in the presence of the following criteria:

- Contact with a cat and clinically a scratch or other injury caused by canine aggression.
- A positive skin test
- Absence of other causes of lymphadenitis
- Characteristic histopathology on samples of local or systemic lesions

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**Fig. 1** Sagittal (left) and axial (right) MR images of the cervico-thoracic spine revealing abnormal contrast enhancement of the C6, C7, and T1 vertebral bodies, consistent with osteomyelitis. Additionally, an epidural abscess posterior to the C6-T1 vertebral bodies caused minimal thecal sac compression.
The non-specific clinical presentation, the difficulty in bacteriological diagnosis on the culture of samples, and often the unavailability of intradermal skin tests, are the disadvantages of these criteria. Currently, the diagnosis of certainty is based on the combination of serological and molecular techniques. This diagnostic combination is particularly useful in the context of adults because of the lack of symptoms and diversified differential diagnosis [5, 7, 15, 16, 19].

In addition of CSD criteria, we found that spinal pain associated with fever and elevated inflammatory markers, prompt us to search for CSD [5, 9, 12].

Spinal MRI is the choice examination for a relevant exploration of bone, disk, and spinal injuries. MRI allows physicians to diagnose infection early before bone destruction becomes visible on radiographs or even CT. It also allows a therapeutic evaluation [5, 7, 11].

Therapeutic options, in case of isolated spinal injury, without signs of spinal instability or neurological deficit, include a simple bone or lymph node biopsy. Drainage of the epidural abscess is performed by the posterior or anterior approach. A surgical treatment, allowing drainage of the abscess with the necessary bacteriological and histopathological samples, without putting up an arthrodesis system is better. In the pediatric population, the laminotomy is sufficient to drain the abscess [10–14, 20].

The medical treatment combines always an antibiotic therapy with a variable duration according to the surgeons, but it varies between 3 weeks and 6 months with an average of 9.9 weeks. The criteria for therapeutic success or failure vary according to the authors, and they include clinical criteria (disappearance of fever, regression of lymphadenopathy, improvement of bone pain, and other signs depending on the disease), biological (infectious and inflammatory assessment), and radiological (regression of radiological lesions) [3, 5, 7, 19].

CSD remains a largely underestimated disease and it can go unnoticed if the patient is mildly symptomatic or if the initial diagnosis is incorrect. Until now, no diagnostic and therapeutic consensus has been established [5, 7, 19].

Surgical treatment for osteomyelitis should be as less aggressive as possible, followed by efficient antibiotic treatment to achieve better results. In our case, surgical treatment has enabled decompression in emergencies by a 2 to 3 mm, median mini-discectomy with drainage of the abscess. To our knowledge, this is the first case of osteomyelitis treated like this.

Conclusions

Vertebral osteomyelitis of cervical spine is an atypical and rare complication of cat-scratch disease. The diagnosis is evoked in front of a suspect clinical context and confirmed by the Bartonella henselae serology with a PCR complement on biopsy samples.

Mini-discectomy may be an alternative treatment option especially on extensive osteomyelitis.

No consensus is currently established to unify the management of CSD. We report a rare case of cervical osteomyelitis to describe our particular diagnostic and therapeutic attitude.
Table 1: Reported cases of cervical spine osteomyelitis secondary to the cat-scratch disease

| Authors          | Year | Age (years), sex | Clinics | Fever | WBC/ESR/CRP level | Diagnosis | Epidural involvement | Surgery | Antibiotic duration | Recurrence treatment | Follow-up |
|------------------|------|------------------|---------|-------|-------------------|-----------|----------------------|---------|--------------------|----------------------|-----------|
| Woestyn et al.   | 2003 | 62, F            | Neck pain, paresthesia | Y*     | Y/NR/Y            | C5–6      | IgG+, PCR+            | NR      | C5–6 disease and arthrosis | Y, drainage          | 9 months |
| Vermeulen et al. | 2006 | 9, F             | Neck pain, torticolis, delayed right arm paresis | Y     | Y/Y/Y             | C4–6      | IgM+, IgG+, PCR+      | N*      | Anterior open biopsy and drain age | N          | 3 months |
| Tasher et al.    | 2009 | 5, M             | Neck pain, torticolis | Y     | Y/NY/N            | Skull base to C6 | IgM+ | Y                 | C3–5 laminectomy and abscess drainage | N          | 9 weeks |
| Mirouse et al.   | 2015 | 14, M            | Neck pain, torticolis | Y     | Y/NR/Y            | C2        | Serology+             | N       | Traction, surgical drainage | N          | 3 months |
| Akbari et al.    | 2018 | 7, M             | Neck mass          | N     | N/Y/NT*           | C2–4      | IgG+                 | Y       | None, collar        | N          | 12 months |
| Present case     | 2020 | 71, M            | Neck pain, paresthesia, motor deficit C7-8 | N     | Y/NR/Y            | C7–T1     | IgM+ IgG+ PCR+       | Y       | C7–8 disectomy, arthrosis, and abscess drainage | N          | 12 months |

* N, no (not present); *NR, not reported; *NT, not tested; *Y, yes (present); *+, positive

**Abbreviations**
B. henselae: Bartonella henselae; CBC: Complete blood count; IgM: Immunoglobulin M; IgG: Immunoglobulin G; CT scan: Computerized tomography scan; MRI: Magnetic resonance imaging; PCR: Polymerase chain reaction; CSD: Cat-scratch disease

**Acknowledgements**
None.

**Authors' contributions**
Conception and design: HK, SC. Acquisition of data: HK, SC. Analysis and interpretation of data: HK, SC. Drafting the article: HK, YD. Critically revising the article: all authors. Reviewed submitted version of manuscript: HK, SC, HC, and FP. Approved the final version of the manuscript on behalf of all authors: all authors. Study supervision: FP. “All authors have read and approved the manuscript.”

**Funding**
None.

**Availability of data and materials**
Not applicable.

**Declarations**

**Ethics approval and consent to participate**
Not applicable.

**Consent for publication**
A written consent to publish this information was obtained from study participants. A proof of consent to publish from study participants can be requested.

**Competing interests**
The authors declare that they have no competing interests.

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**Received:** 16 May 2020  **Accepted:** 3 July 2021

**Published online:** 18 October 2021

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