Case report

*Bartonella henselae* osteoarthritis of the upper cervical spine in a 14-year-old boy

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**A B S T R A C T**

We report a case of *Bartonella henselae*, an agent of cat scratch disease, C1-C2 osteoarthritis with osteolysis of the lateral mass of C2 in a 14-year-old boy. Oral antibiotics did not successfully treat the infection and surgery was necessary to treat the septic arthritis. The case opens discussion about bacterial osteoarthritis of the cervical spine and bone involvement in disseminated bartonellosis.

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1. Introduction

Cat scratch disease is a common infection that mainly affects children: 80% of patients are under 18. Surgical treatment is rare [1]; we report a case of C1-C2 osteoarthritis with osteolysis of the lateral mass of C2. We discuss the diagnostic and therapeutic management of *Bartonella henselae* (*B. henselae*) infection with cervical spine involvement and provide a review of the literature.

2. Case study

A 14-year-old boy with no prior medical history consulted his family physician for a cat scratch of the pinkie associated with neck pain and was treated locally with oral antibiotic (azithromycin). He was referred to our unit due to persistent cervicalgia, torticollis and an inflammatory syndrome.

At admission, the patient was feverish with a deteriorated general condition on clinical examination. There was a cut that had healed on the dorsal side of the right pinkie, a right supracondylar adenopathy, torticollis and cervicalgia. Range of motion of the cervical spine was reduced. The neurological examination was normal. The rest of the clinical examination was normal. Biological tests showed C-Reactive protein level 111 mg/L and WBC 7900/mm³. Serological tests for *B. henselae* were negative.

CT scan of the cervical spine performed at admission (Fig. 1) showed joint effusion and osteolysis of the lateral mass of C2 (Fig. 2).

MRI confirmed the effusion and osteolysis. There was no sign of epiduritis.

Surgery was decided to drain the fluid collection. It was performed 48 hours after antibiotics were discontinued and immobilization with cervical traction had been performed. A posterior approach was taken to the cervical spine. A purulent effusion was found around the right C1-C2 articulation. The lateral mass of C2 presented with 50% osteolysis. Bacteriological and pathological specimens were obtained. Because of the significant bone loss of C2, treatment was completed by a halo-cast for 3 months. Triple intravenous antibiotic treatment was begun following surgery including: amoxicillin-clavulanic acid, ciprofloxacin, and gentamicin.

Bacteriological tests were positive for *B. henselae*. The outcome was favorable with regression of general symptoms and pain. The patient left the hospital after 15 days of intravenous antibiotic treatment, which was switched to oral bi-therapy associating amoxicillin-clavulanic acid and ciprofloxacin for 2.5 months. Three months after surgery, cervicalgia had disappeared, biological tests were negative and CT scan showed partial reconstruction of the lateral mass of C2 (Fig. 3). The halo-cast was removed at the follow-up consultation and replaced by a soft neck brace for three more months. At postoperative month 6, the clinical examination was normal and reconstruction of the lateral mass of C2 was considered to be sufficient to remove the soft neck brace.

3. Discussion

Most cases of bacterial osteomyelitis occur before the age of 5 and involve the lower limbs. Osteomyelitis of the cervical spine usually presents as a torticollis [2], and may be complicated by...
Table 1
Location of *B. henselae* spinal infections in relation to age.

<table>
<thead>
<tr>
<th></th>
<th>Children</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>8.2 ± 2.9</td>
<td>32.3 ± 12.5</td>
</tr>
<tr>
<td>Cervical</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Thoracic</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Lumbar</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 2
Surgically managed cases of *B. henselae* osteomyelitis.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Age</th>
<th>Clinical Description</th>
<th>Imaging</th>
<th>Surgery</th>
<th>Antibiotics</th>
<th>Immobilisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modi [14]</td>
<td>4 years</td>
<td>Fever; dorsalgia</td>
<td>CT scan: T10: lysis of T10 muscle abscess</td>
<td>Drainage of abscess</td>
<td>Per os: rifampicin, 10 days and azithromic, 5 days</td>
<td>None</td>
</tr>
<tr>
<td>Abdel-Hacq [15]</td>
<td>5 years</td>
<td>Fever; abdominal pain</td>
<td>IRM: epidural abscess and T4-T7 osteomyelitis</td>
<td>Drainage of abscess and bone excision</td>
<td>IV: ceftriaxon/vancomycin Per os: clarythromycin, 15 days Per os: trimethoprim/ sulfamethoxazole, 10 weeks</td>
<td>None</td>
</tr>
<tr>
<td>Vermeulen [16]</td>
<td>9 years</td>
<td>Cervicalgia, fever; right paresia and loss of reflexes</td>
<td>MRI: osteomyelitis C4-C6 with para vertebral C5-C6 abscess compressing the vertebral foramen C7; T9: osteolysis of the lamina and epidural abscess</td>
<td>Drainage of abscess</td>
<td>IV: amoxicillin-clavulanic acid, 3 weeks</td>
<td>Soft neck brace 3 weeks</td>
</tr>
<tr>
<td>Bernini [17]</td>
<td>5 years</td>
<td>Dorsalgia, fever</td>
<td>MRI: paravertebral T3-T9 abscess with compression of the body of the vertebra at T7</td>
<td>Drainage of abscess and laminectomy T9-T10</td>
<td>IV: ceftriaxon, 3 weeks</td>
<td>None</td>
</tr>
<tr>
<td>Tasher [18]</td>
<td>5 years</td>
<td>Cervicalgia, fever</td>
<td>MRI: epidural abscess C1-C2 to C5-C6</td>
<td>Drainage of abscess and laminectomy C3-C5</td>
<td>IV: gentamicin and rifampicin 4 weeks Per os: rifampicin and azithromycin, 6 weeks Per os: azithromycin, 14 days</td>
<td>None</td>
</tr>
<tr>
<td>Al-Rahawan [19]</td>
<td>7 years</td>
<td>Dorsalgia, fever</td>
<td>MRI: paravertebral T3-T9 abscess with compression of the body of the vertebra at T7</td>
<td>Drainage of abscess</td>
<td>IV: amoxicillin-clavulanic acid, ciflox</td>
<td>None</td>
</tr>
<tr>
<td>Reported observation</td>
<td>14 years old</td>
<td>Cervicalgia, torticollis, deterioration of general condition</td>
<td>MRI: C1-C2 osteoarthritis osteolysis of the lateral mass of C2 and paravertebral abscess</td>
<td>Drainage of abscess and Excision of bone</td>
<td>IV: amoxicillin-clavulanic acid, ciflox, 2 months</td>
<td>Halo-cast, 3 months</td>
</tr>
</tbody>
</table>

Medullary involvement, which is nevertheless rare [1]. The case reported here involves the right C1-C2 cervical spine without neurological injury.

Indeed, osteomyelitis involving the atlas and/or the axis is very rare, and only a few cases have been reported in the literature, usually secondary to an ENT abscess [3–5].

The best diagnostic test is magnetic resonance imaging (MRI) [6], which provides imaging of soft tissue damage, bone loss and the risk of medullary compression by an epidural abscess. It is the most sensitive examination for the detection of vertebral osteomyelitis [7].

Cervical spine osteomyelitis is often secondary to dissemination of a retropharyngeal abscess following an ENT infection [8,9].
In our case, involvement of the cervical spine was secondary to a peripheral wound.

Bartonellosis is a benign infection that is common in children and resolves spontaneously. The diagnosis of cat scratch disease is based on serology and/or polymerase chain reaction (PCR) [10]. However, the diagnosis of cat scratch disease cannot be excluded if the PCR is negative, and a biopsy of an adenopathy can be performed to search for B. henselae [11]. Skeletal involvement is rare in cat scratch disease: 0.22% [12].

Sixty cases of B. henselae osteomyelitis were published between 1954 and 2013. Skeletal involvement was usually unifocal and the spine was involved in half the cases (52%). Involvement was more frequent in children and in the thoracic spine; this can be explained by the immature immune system in children (Table 1).

Management of cat scratch disease is mainly based on antibiotic treatment [1–13].

Surgical management is only found in cases with complications such as an epidural abscess, severe skeletal or articular involvement, neurological symptoms, or unsuccessful medical treatment [1].

Only 7 cases (11.6%) in the literature have been managed surgically (Table 2). In the case of cervical spine involvement, the risk is the development of medullary complications. Our case is similar to those in the literature with skeletal and articular involvement and unsuccessful antibiotic treatment resulting in hospitalization. Although all the cases in the literature that underwent surgery also received associated antibiotic treatment, the duration and mode of administration (oral vs. intravenous) are still a subject of debate. We prescribe at least 3 months of treatment because of the risk of potentially severe neurological or mechanical complications.

4. Conclusion

B. henselae C1-C2 osteoarthritis is a rare entity. It is important to make the diagnosis because of the mechanical and neurological risks of this disease. MRI is essential for the early diagnosis of this infection. Antibiotic treatment alone is unsuccessful in the presence of articular involvement and the articular effusion must be drained.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.
References