Vertebral Osteomyelitis Associated with Cat-Scratch Disease

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We describe a patient with vertebral osteomyelitis and paravertebral soft-tissue collections associated with cat-scratch disease (CSD). Diagnosis was established on the basis of histologic examination and serological and polymerase chain reaction (PCR) tests. Treatment consisted of administration of antibiotics, and although skeletal lesions were persistently evident on radiography the patient showed complete clinical recovery. In addition, 15 cases of documented osteomyelitis associated with CSD are reviewed.

Cat-scratch disease (CSD) is an infectious disease caused by Bartonella henselae, a gram-negative microorganism [1]. The classic clinical presentation (“typical” CSD) is characterized by a local infection at the site of the scratch, followed by regional lymphadenopathy 2 weeks later and variable systemic symptoms. Usually the disease is indolent and self-limiting. However, in recent years the number of published reports of patients presenting with atypical manifestations of CSD has increased [1–4].

We report a patient with vertebral osteomyelitis associated with CSD and review previous case reports on this rare manifestation.

Case Report

A 10-year-old girl presented with cervical lymphadenopathy, severe low-back pain, and fever (temperature, 40°C) of 3 weeks’ duration. A 2 × 5–cm firm-elastic, nontender lymph node without overlying erythema was palpated in the right cervical region. No other lymphadenopathy was found. Palpation of the lumbar vertebrae was painful.

CT revealed an osteolytic lesion of the processus spinosus of L2, surrounded by soft-tissue swelling. Multiple enlarged lymph nodes were present in the liver hilus and along the aorta. In addition, several hypodense nodules were visualized in the spleen and liver. MRI showed a soft-tissue mass at L2 and L3, with compression of the dura but not of the cauda equina (figure 1).

The cervical lymph node was surgically removed, and histologic examination showed granulomatous inflammation. Cultures of the lymph node and of aspirates of the vertebral lesion were negative for anaerobic or aerobic bacteria and fungi. A Ziehl-Neelsen stain was negative for acid-fast organisms. Warthin-Starry staining was not performed. Purified protein derivative skin tests for Mycobacterium tuberculosis and atypical mycobacteria were negative. Serological tests showed no evidence of recent cytomegalovirus, Epstein-Barr virus, or toxoplasma infection. PCR of the lymph node was positive for B. henselae, and serology for B. henselae was positive (ELISA reciprocal titers of antibody to B. henselae: IgM, >250; IgG, 600). On further inquiry the patient reported scratches, which were no longer visible, from two kittens (4 weeks of age).

Treatment with rifampin (900 mg once a day), later combined with ciprofloxacin (375 mg twice a day) for 6 weeks resulted in normalization of the temperature and a decrease in low-back pain. On CT 3 months later, destruction of the processus spinosus of L2 was still evident, but the soft-tissue mass had disappeared.

Discussion

CSD caused by B. henselae (formerly named Rochalimaea henselae) is a relatively common and ubiquitous infectious disease that occurs in persons of all ages. It was first described in 1950 [5]. Since then it has been recognized as one of the most common causes of regional lymphadenopathy, with an expanding spectrum of clinical manifestations [1, 2, 4, 6]. Osteomyelitis associated with CSD was initially described by Adams and Hindman in 1954 [7]. This manifestation seems to be rare, as only 15 cases involving immunocompetent patients (aged 2.5–18 years) have been reported (table 1). In the immunocompromised host, atypical manifestations of CSD such as osteomyelitis are well-known and potentially life-threatening [2].

Radiologic abnormalities consist of lytic lesions, sometimes with sclerosis or periosteal reaction surrounded by a soft-tissue mass [10, 11, 17, 19]. Osseous involvement in CSD can be multifocal, but in most patients a single osteolytic lesion has been found (on the skull, sternum, rib, vertebra, ilium, femur, tibia, or metatarsal), without a predilection for any particular site [7–21]. Diagnosis was established on the basis of skin tests (in 8 cases), histologic analysis of lymph nodes and/or bone biopsy (in 2 and 7 cases, respectively), serology (in 3 cases), and PCR tests (in 1 case), sometimes in combination. Ten patients received antibiotics.
Figure 1.  A. MRI scan of the lumbar spine that shows an osteolytic lesion of the processus spinosus of L2, surrounded by soft-tissue swelling (arrow). B, MRI scan that shows a soft-tissue mass at L2 and L3, with compression of the dura but not of the cauda equina (arrowheads).

Table 1. Review of 15 documented cases of cat-scratch disease (CSD) and associated osteomyelitis lesions.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Patient's age (y)</th>
<th>Localization</th>
<th>Diagnostic test</th>
<th>Treatment</th>
<th>Outcome¹ (follow-up period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[7]</td>
<td>5</td>
<td>Ilium</td>
<td>Histology (of BB, LN), skin test</td>
<td>None</td>
<td>Complete (9 mo)</td>
</tr>
<tr>
<td>[8]</td>
<td>4</td>
<td>Femur</td>
<td>Histology (of BB), skin test</td>
<td>Penicillin,* erythromycin,* tetracycline*</td>
<td>Incomplete (5 mo)</td>
</tr>
<tr>
<td>[9]</td>
<td>6</td>
<td>Metatarsal</td>
<td>Skin test</td>
<td>Erythromycin,* chloramphenicol¹</td>
<td>Complete (6 w)</td>
</tr>
<tr>
<td>[10]</td>
<td>2.5</td>
<td>Sternum</td>
<td>Skin test</td>
<td>None</td>
<td>Unknown</td>
</tr>
<tr>
<td>[12]</td>
<td>2</td>
<td>Skull</td>
<td>Histology (of BB, LN), skin test</td>
<td>Amoxicillin,* dicloxacillin,* nafcillin¹</td>
<td>Complete (3 mo)</td>
</tr>
<tr>
<td>[13, 14]</td>
<td>7</td>
<td>Humerus</td>
<td>Histology (of LN), skin test</td>
<td>Cefazolin,* dicloxacillin*</td>
<td>Unknown</td>
</tr>
<tr>
<td>[15]</td>
<td>11</td>
<td>Vertebra L4</td>
<td>Skin test</td>
<td>Cloxacillin*</td>
<td>Unknown</td>
</tr>
<tr>
<td>[16]</td>
<td>8</td>
<td>Vertebra T5</td>
<td>Histology (of LN), skin test</td>
<td>None</td>
<td>Incomplete (20 mo)</td>
</tr>
<tr>
<td>[17]</td>
<td>10</td>
<td>Vertebra L4</td>
<td>Unknown</td>
<td>Cefazolin,* oxacillin*</td>
<td>Unknown</td>
</tr>
<tr>
<td>[18]</td>
<td>12</td>
<td>Rib, vertebra T5</td>
<td>Histology (of LN)</td>
<td>Amoxicillin,* cefazolin*</td>
<td>Unknown</td>
</tr>
<tr>
<td>[19]</td>
<td>5</td>
<td>Vertebra T9</td>
<td>Histology (of BB), PCR</td>
<td>Nafcillin,* cefazolin*²</td>
<td>Incomplete (2 mo)</td>
</tr>
<tr>
<td>[20]</td>
<td>13</td>
<td>Acetabulum</td>
<td>Histology (of BB), serology</td>
<td>Cefazolin,* erythromycin*</td>
<td>Incomplete (9 mo)</td>
</tr>
<tr>
<td>[21]</td>
<td>6</td>
<td>Vertebra L2</td>
<td>Serology</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>[21]</td>
<td>7</td>
<td>Skull, tibia</td>
<td>Serology</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

NOTE. BB = biopsied bone; LN = lymph node.
* Treatment started before consideration of CSD.
¹ Treatment started after consideration of CSD.
² Complete or incomplete radiologic healing of the bone lesion.
Differential diagnosis of CSD osteomyelitis included chronic granulomatous diseases, histiocytosis, eosinophilic granuloma, bacterial osteomyelitis, and malignancy. The finding that the CSD osteomyelitis frequently occurred at a distance from the inoculation site or inflamed lymph node supports the hypothesis that the osteomyelitis mostly results from hematogenous or lymphatic spread.

In diagnosis of CSD the skin test nowadays is considered obsolete; it lacks standardization and has variable sensitivity [22]. In biopsied material, characteristic histopathologic changes can be found in which sometimes B. henselae is demonstrated. Culture and isolation of B. henselae is very difficult. Different seroreactivity of multiple B. henselae strains and cross-reactivity limit the solitary use of serology. Serology with PCR is probably the best method to date for diagnosing CSD [1, 2, 22–24]. When the serology is positive, a positive PCR test confirms the diagnosis. A negative PCR test does not exclude CSD; it can result from sampling error, infection with other Bartonella species, or elimination of the B. henselae [24].

It is not clear whether antibiotics contribute to recovery from CSD osteomyelitis. In patients with typical CSD (lymphadenopathy or lymphadenitis), a recent prospective evaluation of azithromycin showed a significant decrease in lymph node volume on ultrasonography [25]. In patients with atypical or systemic CSD, antibiotic therapy seems to result in clinical improvement [26]. Ciprofloxacin, rifampin, trimethoprim-sulfamethoxazole, and gentamicin are considered most effective [27]. In immunocompromised patients, more commonly used antibiotics such as erythromycin have also been effective.

Most patients with CSD osteomyelitis have an excellent prognosis [1, 2, 27, 28]. At follow-up (data available from 10 weeks to 24 months), progressive healing of the bony lesions was noted in most patients.

In all patients presenting with regional lymphadenopathy and localized skeletal abnormalities, CSD must be considered, especially when standard cultures remain negative and when histologic examination of tissue shows necrotizing granulomas. Diagnosis is established by serological assays in combination with B. henselae PCR. Although CSD, including CSD osteomyelitis, is usually self-limiting, treatment may be successful in preventing progressive disease and accelerating clinical recovery.

References