Isolated Splenic Cat Scratch Disease in an Immunocompetent Adult Woman

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We report a case of isolated splenic cat scratch disease in an immunocompetent woman. The clinical presentation of prolonged fever, night sweats, weakness, and intrasplenic lesions was highly suggestive of lymphoma. This is the second reported case of isolated splenic cat scratch disease in an adult and the first in a healthy adult.

Cat scratch disease (CSD) caused by Bartonella henselae frequently causes fever and lymphadenopathy in immunocompetent patients, especially children [1]. CSD seldom affects other organ systems, such as the liver or spleen. Isolated splenic CSD is extremely rare, and only a few cases have been reported to date.

We report a case of isolated splenitis due to active B. henselae infection in an immunocompetent woman who presented with fever of unknown origin. To our knowledge, isolated splenic CSD in an immunocompetent adult has not previously been reported.

Materials and methods. EIA was done using N-lauroyl sarcosine–insoluble outer membrane antigens from B. henselae to detect anti-B. henselae IgM and IgG in samples of the patient’s blood, as described elsewhere [2]. Octane was used to extract DNA from paraffin-embedded specimens. DNA was amplified from a 281-bp fragment of the 16S rRNA gene of B. henselae, using Bartonella-specific primers (p12B and p24E) [3]. The PCR products were transferred to a nylon membrane and hybridized, under stringent conditions, with a B. henselae–specific probe [4] by means of the digoxigenin labeling system, as described elsewhere [5].

Positive controls included pus aspirated from a lymph node in another patient with CSD and B. henselae isolate BhTA-2 (from a patient with CSD described elsewhere [5]). Negative controls included DNA extracted from a paraffin-embedded specimen of a lymph node with metastatic carcinoma, pus from non-CSD bacterial lymphadenitis, PCR reagents without DNA, and water.

Case report. A 43-year-old otherwise healthy white woman was admitted to the hospital because of fever of unknown origin. One month earlier, during an outpatient visit to a physician, she had begun complaining of fever (temperature, 39.0°C) accompanied by generalized weakness and night sweats. Temporary defervescence was noted after empirical treatment with amoxicillin and later with cefuroxime-axetil, but the symptoms recurred shortly thereafter. She had no underlying diseases and was not taking medications or using alcohol or illicit drugs. There was no history of recent travel. She reported raising “a healthy dog and a few parrots” but denied having been bitten.

On examination, the patient appeared to be well. Her oral temperature was 36.8°C, and her heart rate was 117 beats/min. Other findings of the physical examination were unremarkable. Of note, lymph nodes, liver, and spleen were not enlarged.

The following values were measured in samples of the patient’s blood: WBC count, 9500 cells/mm³ (normal differential); hematocrit, 32%; hemoglobin level, 10.3 g/dL (normal indices); platelet count, 236,000 platelets/mm³; and erythrocyte sedimentation rate, 65 mm/h. The results of a chemistry panel, including liver function tests, were within normal limits; the results of electrocardiographic and chest radiographic examination and of urinalysis all were normal. The results of serologic testing were negative for Epstein-Barr virus; cytomegalovirus; hepatitis viruses A, B, and C; adenovirus; Chlamydia, Toxoplasma, Rickettsia, and Brucella species; HIV; rheumatoid factor; and anti-nuclear antibodies.

Complement, immunoglobulin subclass, and fibrinogen levels were normal. The C-reactive protein level was 5.9 mg/dL (normal range, 0–0.8 mg/dL). Cultures of 5 sets of blood samples and of urine yielded negative results (sterile). A tuberculin skin test was nonreactive, and no acid-fast bacilli were found in sputum. The results of thyroid function tests and protein electrophoresis were normal. The fever persisted. Repeated questioning revealed that the patient was raising numerous cats and kittens for business purposes.

A CT scan of the abdomen demonstrated multiple hypodense...
areas within the splenic parenchyma, with minimal splenomegaly (figure 1). The liver appeared normal. Echocardiography yielded normal results. Testing of a bone marrow biopsy specimen revealed a slightly to moderately hypercellular marrow, with normal maturation and no evidence of malignancy.

A diagnostic splenectomy was done. Macroscopic examination revealed a slightly enlarged multinodular spleen. Microscopic examination revealed necrotizing granulomata with peripheral palisaded epithelioid cells, plasma cells, and rare multinucleated Langhans-type giant cells involving the red pulp. Foci of necrosis with numerous granulocytes, stellate abscesses, and occasional nonnecrotizing granulomata were evident (figure 2). The white pulp showed follicular hyperplasia. Stains for acid-fast bacilli and fungi yielded negative results. The pathologist considered these findings to be suggestive of CSD. A Warthin-Starry silver stain was not made.

Results of EIA were positive for anti–B. henselae IgM and negative for IgG in the acute-phase serum sample obtained on the first week of illness. Convalescent-phase serum samples obtained on weeks 8 and 11 were negative for anti–B. henselae IgM but positive for IgG. Paraffin-embedded spleen tissue was subjected to PCR and hybridization, which identified B. henselae DNA. Marked clinical improvement and near-immediate defervescence was noted shortly after surgery. The patient was subsequently discharged without additional therapy and was doing well 1 year after the splenectomy.

Discussion. B. henselae is a small gram-negative bacillus that can produce 2 entirely different pathologic reactions, depending on the immune status of the host: CSD, which is characterized by granulomatous nonangiogenic inflammation, and angiogenesis, in which a neutrophilic inflammatory response to bacilli located within the skin, bone, and other organs (bacillary angiomatosis) or the liver and spleen (peliosis) is seen. CSD mainly occurs in immunocompetent hosts, whereas bacillary angiomatosis mainly affects immunocompromised persons, especially those with HIV infection [6].

CSD, which was first described in 1950 [7], typically begins with a localized papule that appears 3–5 days after a cat scratch and progresses into a pustule. Tender regional lymphadenopathy typically develops within 1–2 weeks after inoculation [1, 8–10]. Systemic symptoms are frequent; they include fever, malaise, anorexia, and weight loss and may persist if the individual does not receive therapy [9, 10]. The majority of cases have occurred in patients <20 years of age [9], although recent data suggest that CSD may be more common among adults than previously has been recognized [10]. CSD may cause a myriad of clinical presentations and thus may masquerade as other syndromes and may be difficult to diagnose. Atypical CSD may occur in up to 11% of cases, and almost any organ may be involved [8].

We present here a case of isolated splenic CSD caused by B. henselae. The history of close contact with cats and kittens, the radiologic and histopathologic findings, the IgG and IgM seroconversion (as determined by EIA), and the identification of

Figure 1. Axial CT scan at level of kidneys without contrast media. Multiple hypodense lesions are evident within the splenic parenchyma. The spleen is only slightly enlarged.
Figure 2. Pathologic examination of the spleen. Macroscopic examination (top) reveals a slightly enlarged, multinodular spleen. Microscopic examination (bottom) shows a pathologic process involving the red pulp, with necrotizing granulomata and foci of necrosis with numerous granulocytes, stellate abscesses, and occasional nonnecrotizing granulomata. Follicular hyperplasia is present in the white pulp. (Hematoxylin-eosin stain; original magnification, ×240.)

*B. henselae* DNA using PCR and hybridization all favor this diagnosis. The EIA used in this report was recently evaluated in a large study of 84 patients with PCR-confirmed CSD. The specificity of this assay was found to be as high as 98%–100% and 99%–100% for IgG and IgM, respectively, as determined by testing of 3 control groups that included healthy subjects, patients suspected clinically of having CSD but eventually found to have other definite diagnoses, and patients with non-CSD acute infections with IgM response [2].

This case also demonstrates the importance of the IgM assay. The availability of an EIA for anti-*B. henselae* IgM is one advantage to use of the EIA, compared with the immunofluorescent antibody test; the latter was developed primarily for the detection of anti-*B. henselae* IgG and has not been routinely applied for the detection of IgM antibodies. The EIA, like the immunofluorescent antibody test, may not distinguish between the various species of *Bartonella* because of serologic cross-reactivity and, therefore, cannot by itself confirm the diagnosis.
of *B. henselae* infection. The primers used for the PCR assay are specific for the *Bartonella* genus and may, therefore, amplify pathogenic *Bartonella* species other than *B. henselae*. However, the oligonucleotide probe used for hybridization is species specific (based on screening of GenBank using BLAST software) and is expected to recognize *B. henselae* DNA sequence and not other pathogenic *Bartonella* species, such as *Bartonella quintana*, *Bartonella claridgeiae*, and *Bartonella elizabethae*.

In 2 series that included 28 children with hepatosplenic CSD, 5 had splenic involvement without hepatic involvement, but lymphadenopathy was uniformly present [11, 12]. In yet another series, which included 11 children with hepatosplenic CSD, 5 had no lymphadenopathy and 3 had splenic involvement without hepatic involvement [13]. Among 42 cases of hepatosplenic *B. henselae* infection (22 in children and 20 in adults), both the liver and the spleen were affected in 22 cases; the liver only, in 16 cases; and the spleen only, in 4 [6]. Two cases involving only the spleen occurred in healthy children and 2 occurred in adults. One of these adults had cancer and splenic bacillary peliosis, and the other had hereditary spherocytosis and diabetes mellitus accompanied by splenomegaly and a solitary splenic lesion caused by CSD [14]. A search of the literature did not reveal additional cases of isolated splenic CSD in adults. The case described here, therefore, is the second case to be reported of isolated splenic CSD in an adult and the first in a healthy patient.

In conclusion, this case represents an unusual manifestation of atypical CSD in an immunocompetent adult. When B symptoms (weight loss, low-grade prolonged fever or fever of unknown origin, and night sweats) and splenic involvement are present, as in the case under discussion, systemic CSD may easily be confused with lymphoproliferative malignancy [9, 15], and this confusion may result in performance of invasive diagnostic procedures, such as laparotomy. A complete medical history should be taken and a high index of suspicion maintained for diagnosis of atypical CSD in adults. Serologic testing and molecular methods such as PCR may be necessary aids in establishing the diagnosis.

**References**