

## CASE REPORT

# Cat Scratch Disease from a Domestic Dog

Tun-Chieh Chen, Wei-Ru Lin, Po-Liang Lu, Chun-Yu Lin, Yen-Hsu Chen\*

Cat scratch disease (CSD), caused by *Bartonella henselae*, is a zoonosis and characterized by self-limited lymphadenopathy. It is transmitted commonly by scratch or bite from cats or kitten. We report an unusual case of CSD caused by a domestic dog scratch that we believe is the first report in Taiwan. A 23-year-old healthy woman developed cervical lymphadenopathy, mild fever, headache, and malaise 3 days after dog scratch. Her symptoms improved after azithromycin treatment. Serology proved *B. henselae* infection. The owners of a domestic dog might be at risk of "cat" scratch disease. [J Formos Med Assoc 2007;106 (2 Suppl):S65-S68]

**Key Words:** *Bartonella henselae*, cat scratch disease, dog, zoonoses

Cat scratch disease (CSD), first described by Debre et al<sup>1</sup> in 1950, is usually characterized by self-limited regional lymphadenopathy, cutaneous papule, or pustule at the site of inoculation, low-grade fever, malaise, headache, and sore throat.<sup>2,3</sup> This disease is caused by *Bartonella henselae* or possibly by other *Bartonella* species, which is transmitted to humans through a scratch or bite by a kitten that was infested from cat flea.<sup>2-4</sup> Domestic cats serve as a major persistent reservoir for *B. henselae*. Dogs or puppies are rarely the reservoir of *B. henselae*. Here, we present the first reported CSD case caused by a pet dog's scratch in Taiwan and review the literature on CSD from dogs.

## Case Report

A 23-year-old previously healthy woman had a painful lump on her left neck 3 days after a pet dog's scratch. This patient also had low-grade fever, malaise, and headache and later she visited

a private clinic. Oral clindamycin was prescribed after detailed head and neck field examination. However, the symptoms did not improve after oral antibiotics. The patient had no specific travel history and animal contact record. After that, she was referred to our hospital for further investigation. Physical examination found a tender and elastic lymphadenopathy over the left retroauricular area 3 cm in diameter. A small papule over the scratch site was also noted over her hand but no other skin lesion was found on her face, trunk, and extremities. Her vital signs were stable and meningeal signs were negative.

She had a white blood cell count of 3590/ $\mu$ L (neutrophils, 52.7%; lymphocytes, 36.2%; monocytes, 9.7%), hemoglobin of 13.2 g/dL, and a platelet count of 245,000/ $\mu$ L. Two sets of blood culture for aerobic and anaerobic bacteria were negative. VDRL test and toxoplasma antibody were negative. Antinuclear antibody was of low titer (1:40). Paired sera for serology of Lyme disease, scrub typhus, murine typhus, Q fever, and leptospirosis were all negative, which were tested by

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Division of Infectious Diseases, Department of Internal Medicine, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan.

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\*Correspondence to: Dr Yen-Hsu Chen, Division of Infectious Diseases, Department of Internal Medicine, Kaohsiung Medical University Hospital, 100 Tzyou 1<sup>st</sup> Road, Kaohsiung 807, Taiwan.  
E-mail: d810070@cc.kmu.edu.tw

the Center for Disease Control (CDC), Taiwan. The tender neck mass subsided gradually within 1 week after oral azithromycin 500 mg loading dose with a subsequent 6 days of 250 mg azithromycin QD treatment.<sup>5</sup> The serum for *B. henselae* antibody using immunofluorescent assay (IFA) was sent to CDC Taiwan and the result of the first serum sample (2 weeks after initial presentation) was negative. The convalescent serum was seropositive with IFA IgG titer over 1:256. One month later at the follow-up visit, the patient's condition was normal.

## Discussion

CSD is a worldwide zoonosis associated with a variety of manifestations, ranging from lymphadenopathy alone to systemic disease. It is caused by *B. henselae*, which also causes bacillary angiomatosis and bacillary peliosis hepatis. Immunocompetent patients tend to present with typical CSD, and immunocompromised hosts (including AIDS, chronic alcoholism, immunosuppressant user) tend to develop systemic disease. "Typical CSD" represents 88–89% of cases overall and manifests with nontender papules at the scratch site 3–10 days after exposure, and then regional lymphadenopathy follows ipsilaterally to the inoculation site within 1–7 weeks. Nodal enlargement usually persists for 2–4 months and then resolves spontaneously.<sup>2–4</sup> The diagnosis of CSD is based on the clinical syndrome of history of animal exposure, skin lesions, fever, and lymphadenopathy as well as laboratory results of culture methods, immunoserologic or immunocytochemical means, or DNA amplification.<sup>2,6,7</sup> The reported case fulfilled the diagnostic criteria for CSD. Treatment of CSD is still debated on the value of antibiotic therapy and there are several reports of the utility of various agents (rifampin, gentamicin, trimethoprim-sulfamethoxazole, fluoroquinolones, azithromycin) in the treatment of CSD. Only azithromycin has been demonstrated to accelerate the resolution of typical CSD lymphadenopathy in placebo-controlled, double-blinded

study.<sup>2,6</sup> The first pediatric and adult case reports of CSD from cats in Taiwan were published in 1997 and 1998, respectively.<sup>8,9</sup> There were 121 cases reported as CSD and 33 cases confirmed in 2004 in Taiwan.<sup>6</sup> Lien et al<sup>7</sup> have reviewed the clinical courses of eight pediatric cases in Taiwan. All cases developed lymphadenopathy with the interval from the scratch to onset of symptoms ranging from 7 days to 1 month. Seven of eight cases had fever. The most common location for inoculation was on the hands or fingers. The most commonly used antibiotic was gentamicin, with an average duration of 9 days of antibiotic treatment.<sup>7</sup> However, this female patient had an apparent dog exposure history followed by onset of the disease. In Taiwan, this is the first report of human *B. henselae* infection from a domestic dog. Five cases from Japan, one from Korea, one from Israel, and one from Denmark have presented *B. henselae* infections from dogs (Table).<sup>10–16</sup> Among them, cervical lymphadenopathy was the main complaint in four patients, one had right inguinal lymphadenopathy, and one had multiple lymphadenopathies. The Israeli patient developed metacarpal osteomyelitis after a dog scratch and the Danish patient suffered from flu-like symptoms and enlarged lymphadenopathy in aperture thoracis for 8 months.<sup>10–16</sup>

In Austria, 28% of cat owners, 23% of dog owners, and 13% of owners of both cats and dogs had positive antibodies against *B. henselae*. No difference in persons with and without domestic pets was seen in the study (26% vs. 20%).<sup>17</sup> Seropositivity using IFA test or enzyme-linked immunosorbent assay of *B. henselae* was detected in 6.5%, 3%, and 14% of the tested dogs in Hawaii, United Kingdom, and Zimbabwe, respectively.<sup>18–20</sup> Serum *B. henselae* IgG antibodies were detected in 10.1% of healthy dogs and in 27.2% of sick dogs in the southeastern United States.<sup>21</sup> So the seroprevalence of *B. henselae* among dogs was variable in different areas and in different health status of dogs. In addition, *Bartonella* species can cause dogs to have hepatic disease and endocarditis.<sup>22,23</sup> A Japanese study of infection of domestic dog fleas also found that five of 24 (20.8%) *Ctenocephalid felis*

**Table.** Published reports of patients with *Bartonella henselae* infection caused by dogs

Sex/Age (yr)	Country	Underlying diseases	Presentation	WBC (/mm <sup>3</sup> )	ESR (mm/hr)	CRP (mg/L)	Serology	Treatment	Outcome	Reference
F/23	Taiwan	Nil	Fever, left cervical LAP, and left hand papule	3590	N/A	N/A	Day 14: IgM(-), IgG(-) Day 21: IgG 1:256	Azithromycin	Cured	Present case
M/9	Israel	Nil	Left hand painful swelling for 5 wk	WNL	WNL	WNL	IgG(+)	TMP/SMZ Rifampin	Cured	Keret et al <sup>16</sup>
M/10	Japan	Nil	Fever and bilateral cervical LAPs for 11 d	6900	48	21	Day 8: IgM(-), IgG 1:256; Day 18: IgM(-), IgG 1:1024	Minocycline	Improved	Tsukahara et al <sup>15</sup> & Murano et al <sup>13</sup>
M/55	Japan	Nil	Fever, left submaxillary, right axillary, left inguinal LAPs	5400	54	18	IgM(-), IgG: (EIA unit) Month 3: 17 Month 6: 28 Month 8: 110	Doxycycline + Cefotaxime → Levofloxacin + Minocycline	Improved	Kusaba et al <sup>14</sup>
M/56	Japan	DM	Tender submandibular LAP	6300	76	22	IgM(-), IgG: (EIA unit) Month 1: >1024	Cefditoren pivoxil + Tosufloxacin	Improved	Kusaba et al <sup>14</sup>
M/64	Japan	Nil	Fever and right inguinal LAP for 27 d	13,600	51	47	IgM(-), IgG 1:1024	Erythromycin	Improved	Murano et al <sup>13</sup>
M/35	Denmark	Nil	Fever, chest pain, flu-like symptoms for 8 mo	WNL	WNL	Elevated	Month 8: IgM 1:256, IgG 1:1024 Month 9: IgM <1:16, IgG 1:256 Month 15: IgM(-), IgG(-)	Doxycycline	Relapsed after DC antibiotics	Schiellerup et al <sup>12</sup>
M/50	Japan	Nil	Left cervical LAP	8300	N/A	90	IgG 1:128	Minocycline	Improved	Yamanouchi et al <sup>11</sup>
F/25	Korea	Nil	Fever, left cervical LAP for 7 d	3490	3	Elevated	IgG 1:64	No treatment	Improved	Chung et al <sup>10</sup>

DM = diabetes mellitus; LAP = lymphadenopathy; WBC = white blood cell; WNL = within normal limits; N/A = not available; DC = disease control.

and two of two (100%) *C. canis* had positive *B. henselae* infection, as tested by polymerase chain reaction.<sup>24</sup> Therefore, *B. henselae* can infect dogs, dog fleas, and domestic dog owners and cause diseases in dog owners and in the domestic dogs themselves. However, there were no animal surveillance data in Taiwan. *Bartonella* infections occurred at a high prevalence of 39.2% among some rodent species in southern China.<sup>25,26</sup> Further investigation of the prevalence of *Bartonella* infections among humans and animals in Taiwan is necessary.

In conclusion, the name "CSD" leads to the misunderstanding that only cats carry *B. henselae*. Domestic dogs as well as cats can serve as a reservoir of *B. henselae*, and the owners of domestic dogs might be at risk of *B. henselae* infection. Therefore, clinicians should be alert to either scratch or bite by dogs, which could possibly result in *B. henselae* infection.

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