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Cat-scratch fever in a 14-year-old girl – a case report

Choroba kociego pazura u 14-letniej dziewczynki – opis przypadku

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Abstract

Cat-scratch fever is a bacterial zoonotic disease most commonly caused by the bacteria *Bartonella henselae*. In the majority of cases, the pathogens enter the body as a consequence of a scratch by young cats. The disease usually presents as local lymphadenopathy and resolves spontaneously over a period of 8–12 weeks. The epidemiological status of bartonellosis in Poland varies. According to the latest epidemiological data, a total of 36 cases of the disease were reported in 2008, with 75% of cases requiring hospitalisation. The clinical presentation of cat-scratch fever is often non-specific, so a wide panel of tests is required to rule out other diseases that may be accompanied by local lymphadenopathy. The disease is usually mild and self-limiting, but some patients may require antibiotic therapy. The case reported here shows that a thorough evaluation of medical history plays a key role in the diagnostic process, providing a rapid and accurate preliminary diagnosis.

Keywords: cat-scratch fever, *Bartonella*, zoonosis, lymphadenopathy, zoonotic disease

Streszczenie

Choroba kociego pazura jest bakteryjną chorobą odzwierzęcą, wywoływaną najczęściej przez *Bartonella henselae*. W większości przypadków człowiek ulega zakażeniu po zadrapaniu przez młode koty. Choroba zwykle przebiega w postaci lokalnej limfadenopatii, samoistnie ustępującej w ciągu 8–12 tygodni. Sytuacja epidemiologiczna bartonelozy w Polsce jest zróżnicowana. Według ostatnich meldunków epidemiologicznych w 2008 roku zgłoszono 36 przypadków zachorowań, z których 75% wymagało hospitalizacji. Obraz choroby kociego pazura jest często niespecyficzny, co wymaga wykonania szerokiego panelu badań niezbędnych do wykluczenia innych chorób, którym może towarzyszyć miejscowa limfadenopatia. Choroba ma przeważnie przebieg łagodny i samoograniczający, jednak w niektórych przypadkach istnieje konieczność włączenia antybiotykoterapii. Opisany przypadek pokazuje istotną rolę prawidłowo przeprowadzonego wywiadu medycznego, pozwalającego na trafne i szybkie ustalenie rozpoznania wstępnego.

Słowa kluczowe: choroba kociego pazura, *Bartonella*, zoonoza, limfadenopatia, choroba odzwierzęca

INTRODUCTION

Cat-scratch fever (cat-scratch disease) is a bacterial zoonotic disease most commonly caused by the Gram-negative bacteria *Bartonella henselae* (95%) or, less commonly, *Afipia felis* (5%)⁽¹⁾. Bartonellosis is sub-acute or chronic local inflammation of lymph nodes developing after skin, eye, or mucous membrane infection. Humans become infected by being scratched by an animal vector – typically a young cat or dog.

In temperate-zone countries such as Poland, most cases are diagnosed during the autumn/winter period, from September until January. The disease is more common in children, usually between 8 and 16 years of age⁽²⁾.

Since 2009, no official records have been kept of cases of cat-scratch fever Poland. Based on the latest reports published by the Department of Epidemiology at the National Institute of Public Health – National Institute of Hygiene (NIPH-NIH), a total of 36 cases of cat-scratch fever were reported in 2008, with 75% patients requiring hospitalisation. The greatest number of cases was recorded in the first and fourth quarters of that year. The highest incidence was found in Podlaskie voivodeship, followed by Opolskie and Kujawsko-Pomorskie voivodeships, while the lowest incidence was observed in Lubuskie, Pomorskie, Warmińsko-Mazurskie and Zachodniopomorskie voivodeships. Also, the incidence in 2008 was shown to be over twice as high as in 2007 (36 cases vs. 14 cases)⁽³⁾.

The first sign of cat-scratch fever, usually appearing within 3–12 days after contact with the animal, is a papule or pustule at the site of the scratch⁽⁴⁾. Over the next few weeks (typically 1 to 3), a single local lymph node becomes progressively enlarged. The lymph nodes are usually tender and freely movable in the subcutaneous space⁽⁵⁾. Cat-scratch fever is most commonly associated with an enlargement of cervical, axillary, inguinal, cubital or intra-abdominal lymph nodes. Patients with the condition are typically afebrile; only one in 10 has a body temperature over 39°C⁽⁵⁾. In most cases, the disease runs a mild course. In the majority of patients, the symptoms resolve spontaneously within 8–12 weeks⁽⁴⁾.

Only approximately 10–30% of patients develop complications, most often manifesting as lymph nodes suppuration requiring surgical intervention⁽⁵⁾. In immunocompromised individuals, the disease may be accompanied by more severe complications including arthritis, encephalopathy, retinitis, optic neuritis, and erythema nodosum. In the United States alone, approximately 12,000 cases of cat-scratch fever are reported annually, of which approximately 500 require hospitalisation⁽⁶⁾.

CASE REPORT

A 14-year-old girl was admitted to the Department of Paediatrics, Paediatric Nephrology and Allergology at the Military Institute of Medicine in Warsaw with unilateral

enlargement of the lymph nodes in the area of the lower attachment of the right sternocleidomastoid muscle, fever (up to 38.8°C), and pain in her right ear. Lymphadenopathy developed approximately 2 weeks previously. A week later, pain and hearing impairment in the right ear developed. On the day of admission, the patient had a fever of 38.8°C. Upon admission, the girl was in fairly good general condition, with a noticeable forced tilt of the head to the right. The cervical lymph nodes on the right were enlarged and non-tender to palpation. In the right supraclavicular region, there was a palpable lymph node, approximately 3–4 cm in diameter, hard to the touch, poorly movable in the subcutaneous space. The skin overlying the lymph node was excessively warm. Severe acne was noted on the skin, and a linear scar was identified on the right arm, most probably resulting from a scratch by an animal. The mucous membranes in the oral cavity were moist, and the tongue was not coated. The throat and the palatine tonsils were slightly reddened. Prominent tooth decay was found. On auscultation, physiologically normal vesicular breaths sounds were audible above the lung fields. The abdomen was soft and non-tender. The liver and spleen were non-palpable. Bowel peristalsis was present. An otoscopic examination revealed the presence of white, structured secretion obscuring the lumen of the right external auditory meatus.

In additional examinations, the patient's inflammatory markers were not elevated (C-reactive protein 0.2 mg/dL, erythrocyte sedimentation rate 6 mm/h, lymphocytes $9.32 \times 10^3/\mu\text{L}$). All values for kidney and liver function were within the normal clinical range. The level of lactate dehydrogenase was low (220 U/L). Serum protein electrophoresis revealed the gamma globulin fraction within the normal range (19.9%). The assay for heterophile antibodies for infectious mononucleosis was negative. A serological assay to detect infection with *Toxoplasma gondii* and cytomegalovirus was negative. The patient's QuantiFERON-TB test was negative.

A chest X-ray revealed no parenchymal densities, and no widening of the mediastinal shadow. Ultrasound (US) examination revealed multiple enlarged cervical lymph nodes: submandibular and located along the sternocleidomastoid muscle on the right side, probably of inflammatory origin; the largest was the right supraclavicular lymph node (13 × 10 mm) (Fig. 1). In addition, the abdominal ultrasound showed liver enlargement (approx. 150 × 122 mm) and spleen enlargement (120 × 39 mm).

During hospitalisation, the girl was consulted by an ENT (ear, nose, and throat) specialist who diagnosed otitis externa of the right ear. A regimen of topical cefazolin + hydrocortisone was prescribed. Following a consultation with a maxillofacial surgeon, an odontogenic infection was ruled out.

Initially, based on the overall clinical picture, a diagnosis of lymphadenopathy of infectious origin was made. Amoxicillin with clavulanic acid was added to the treatment (375 mg every 8 hours, 3 times a day). Since the patient

Fig. 1. Ultrasound image of the supraclavicular lymph node

showed no obvious improvement in response to therapy, the diagnostic work-up was extended by serological testing for *Bartonella henselae* infection, and the suspicion of cat-scratch fever was raised. Consequently, the treatment was modified (ceftriaxone + amikacin), and the girl's clinical condition improved. On day 10 of ceftriaxone treatment, the symptoms resolved and the patient was discharged home.

As the antibiotic therapy administered in the Department was proven to be effective, and the symptoms resolved, the girl continued the treatment at home.

DISCUSSION

The diagnostic work-up and diagnosis of cat-scratch fever are based primarily on clinical symptoms (history of cat scratch followed by local lymph node enlargement), serological tests, and histopathological analysis of the enlarged lymph node.

Since the clinical presentation of the disease is often non-specific, a wide panel of tests is required to rule out other diseases that may be associated with local lymphadenopathy. Lymph node enlargement requires differential diagnosis with other causes of regional lymphadenopathies: neoplastic disease, infection with tuberculosis or other atypical mycobacteria, purulent lymphadenitis, infectious mononucleosis, tularaemia, toxoplasmosis, and cytomegaly. In the reported clinical case, in addition to excluding the infectious aetiology of local lymphadenopathy, odontogenic infection was also considered in the diagnostic work-up. Consequently, a consultation with a maxillofacial surgeon was ordered, which ruled out this diagnostic possibility. A proliferative process secondary to a neoplastic disease was excluded, as the lymph nodes were inflammatory on ultrasound examination. Considering the presence of a linear cat scratch in the proximal part of the upper limb drained by the enlarged lymph node, cat-scratch fever was included in the differential diagnosis. There is a 90% probability that cats belonging to individuals showing symptoms of infection are carriers of *Bartonella* spp.⁽⁷⁾. The initial diagnosis

of *Bartonella* spp. infection was confirmed by a serological test.

The reference method used in the diagnosis of bartonellosis is indirect immunofluorescence (IFA). In view of its high sensitivity (88%) and specificity (94%), IFA offers an opportunity to avoid surgical intervention in cases of pathologically altered lymph nodes⁽⁸⁾. According to the literature data, an increased level of IgG-class and IgM-class antibodies is observed in 97.5% and 21.4% of cases of suspected cat-scratch fever, respectively⁽⁸⁾.

Elevated IgM levels persist in the serum for only approximately 3 months after the infection, while early symptoms of the disease may appear no earlier than after 8 weeks. Therefore, at the time of diagnostic tests, elevated IgM levels might already be undetectable. In the reported case, high level of both IgG and IgM antibodies were found, which indicates an early stage of infection.

The literature contains case reports of *Bartonella henselae* co-infection with other infectious agents. Coinfections in humans include primarily infections caused by *Borrelia burgdorferi*, and less commonly by *Babesia microti* and *Anaplasma phagocytophilum*⁽⁹⁾. This observation can be attributed to the tick-borne transmission of these infections. In Poland, the main vectors are ticks of the family *Ixodidae*. Studies conducted by Sytykiewicz et al. in 2008–2009 on the population of ticks of the species *Ixodes ricinus* ticks in central and eastern Poland found *Bartonella henselae* genetic material in 4.8% of the studied arachnids. In addition, the coexistence of the genetic material of *Bartonella henselae* and *Borrelia burgdorferi* was demonstrated in 1.4% of the examined ticks⁽¹⁰⁾.

There are also known cases of other nosological entities developing in the course of cat-scratch fever. Ridder et al. report that cat-scratch fever may coexist with pharyngitis, otitis media, palatine tonsillitis, and paranasal sinusitis⁽¹¹⁾. In the reported case, inflammation of the external auditory meatus was diagnosed, which was not previously described in the literature.

Since cat-scratch fever usually has a mild and self-limiting course, there are no absolute indications for pharmacological treatment. As a result, there is no recommended regimen of antibiotic therapy in this disease. The most commonly used antibiotic is azithromycin at a dose of 10 mg/kg on day 1 of pharmacotherapy, followed by a dose of 5 mg/kg for the following 4 days⁽¹²⁾. Bass et al. report a reduction in baseline lymph node size in half of patients treated with azithromycin within the first 30 days of starting treatment⁽¹³⁾. Alternative therapeutic options include rifampicin, ciprofloxacin, or trimethoprim in combination with sulfamethoxazole⁽¹²⁾, but their efficacy has not, as yet, been verified by clinical studies. *In vitro* studies have demonstrated the susceptibility of *Bartonella henselae* to a broad range of antibiotics (penicillins, cephalosporins, aminoglycosides, chloramphenicol, tetracyclines, macrolides, rifampicin, fluoroquinolones and the combination of trimethoprim with sulfamethoxazole). These findings, however,

do not correlate with *in vivo* conditions⁽¹⁴⁾. In the reported case, therapy with amoxicillin and clavulanic acid was ineffective, but after switching to ceftriaxone with amikacin the patient's enlarged lymph nodes decreased in size, hepatosplenomegaly resolved, and the patient's general condition improved.

CONCLUSIONS

Expanding the diagnostic work-up to include cat-scratch fever might be beneficial in all cases of regional lymphadenopathy. The reported case demonstrates that a thorough evaluation of medical history plays a key role in the diagnostic process, providing a rapid and accurate preliminary diagnosis.

Conflict of interest

The authors do not declare any financial or personal links with other persons or organisations that might adversely affect the content of the publication or claim any right to the publication.

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