

As a Failure to Follow Basic Medical Rules for a Sample, Has a Costly Diagnosis of a Zoonosis

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ABSTRACT: Cat-scratch disease can be transmitted from cats and dogs in winter. It is usually self-limited and caused by *Bartonella henselae*. It may cause serious symptoms, including neurological findings, especially in immune-deficient patients. A female patient was referred to our outpatient clinic at the age of 3 years and 10 months with a preliminary diagnosis of neurodegenerative metabolic disease. Her complaints began after a stray cat scratched her. We found out that the hospital to which she was admitted provided only local wound care due to her history of contact with a cat and that she was vaccinated against rabies. Her body temperature increased, her neck lymph nodes became swollen, and she developed otitis and mastoiditis after 1 month. Additionally, we discovered that she had deteriorated in her walking ability after 6 weeks and developed hand tremors after 10 weeks. It was discovered that previous centers to which the patient applied did not question cat contact. All metabolic tests performed for the differential diagnosis of last admission findings were considered nonspecific. Considering cat-scratch disease due to her clinical history, she was referred to the pediatric infection unit for a *Bartonella henselae* test, and the test result was 1/256 positive. Failure to follow basic medical rules might be costly in diagnosis and treatment. Cat scratch disease is a zoonosis and a major public health problem. In differential diagnosis, these medical procedures should always be considered before rare metabolic diseases.

KEYWORDS: Cat-scratch disease, *Bartonella henselae*, encephalitis, zoonosis, primary immunodeficiency diseases, medical overuse

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Introduction

As researchers gained more knowledge about metabolic diseases, they began to prioritize differential diagnosis. The patient was referred to our clinic with a pre-diagnosis of neurodegenerative metabolic disease due to tremor and ataxia in the hands, having undergone many expensive metabolic tests. Due to her history of immunodeficiency and cat scratching, a preliminary diagnosis of cat scratch disease was made, which was confirmed through targeted testing.

Case Report

A female patient aged 3 years and 10 months was referred to our outpatient clinic with a preliminary diagnosis of neurodegenerative metabolic disease due to complaints of hand tremor, impaired walking, and irritability. Clinical findings were evaluated by questioning the disease history and detailed personal and family history.

Her complaints began when a stray cat scratched her. We found out that the hospital to which she was admitted provided only local wound care due to her history of contact with a cat and that she was vaccinated against rabies. After 1 month, her body temperature rose, her neck lymph nodes were swollen, and otitis and mastoiditis developed. After being readmitted to the hospital, the patient received 1 week of oral amoxicillin-clavulanic acid treatment, reducing her fever and regressing the defined infection findings. However, the patient presented to the pediatric neurology unit 6 weeks later due to a deterioration in her walking and tremor in her hands. The patient was referred to our department with metabolic screening tests performed in this last referral center.

Her medical history revealed that she was born by normal spontaneous delivery at term with a weight of 3380 g and had postnatal 40-day jaundice. Her umbilical cord dropped in 15 days. Additionally, we learned that the patient began walking at the age of 11 months, spoke normally, and experienced no complications during vaccinations. When she was 12 months old, she developed an inner ear infection called mastoiditis. The patient's father had a family history of acute lymphoblastic leukemia treatment.

Since the basal metabolic tests (tandem screening and organic acid in the urine) performed before the patient's admission to our department were found to be normal, the patient's clinical finding was considered as a preliminary diagnosis of cat-scratch disease, with a history of onset. The patient was referred to the infectious diseases unit. However, it was learned that cat-scratch disease was thought to be a self-limiting disease, and tests were requested for the differential diagnosis of additional metabolic and infectious diseases before treatment. Even after positive immunological tests and initiation of cat-scratch disease treatment with rifampicin, additional testing was ordered (see Table 1). Changes in disease clinical manifestations are shown in Figure 1 on a timeline.

Consent was received from the patient's family for publication.

Discussion

The patient had no known medical history, and her neurological development was normal for her age. Her complaints began in November when she was scratched by a stray cat (*Felis silvestris catus*). Catscratch disease is a self-limiting zoonosis caused



Table 1. Price difference according to the rational test plan and examination of the patient.

RATIONAL TEST PLAN		NON-RATIONAL TEST PLAN			
TEST NAME	TEST COST (TL)	PRE-TREATMENT	TEST COST (TL)	POST-TREATMENT(RIFAMPICIN: 2 × 150 MG (20 MG/KG/D)	TEST COST (TL)
<i>Bartonella henselae</i> agglutination test result: IgG >1/256 positive	64	ESR: 6mm/L	21	Whole blood count: normal	91
		CRP: 3.14 mg/L	84	CRP: 2.07 mg/L (<3)	84
		IgA: 0.57 g/L (0.7-1.4)	105	APTT: 25.7sn (22-42)	21
		IgA: 0.57 g/L (0.7-1.4)	105	PT: 12 s (10-14) (91.7%)	21
		IgM: 0.935 g/L (0.4-2.3)	105	INR: 1.04 (0.85-1.15)	21
		BUN: 25.7 mg/dL (10-50)	35	Homocysteine: 5.15 μmol/L (5-14)	140
		Creatine: 0.21 mg/dL (0.26-0.77)	35	Rheumatic disorders evaluation (ANA, Lupus antibodies): nonspecific	280
		AST: 29.7 U/L (<50)	35	CSF evaluation	
		ALT: 13.8 U/L (<50)	35	Protein: 20 mg/dL, chlorine: 126.9 mmol/L (118-132); glucose: 54 mg/dL (45-80)	126
		LDH: 205 U/L (110-295)	35	Neurotransmitter evaluation	
		Calcium: 9.74 mg/dL (8.2-11)	28	Urinary VMA: 13.76 mg/g creatine (n < 7)	105
		Magnesium: 2.28 mg/dL (1.9-2.5)	28	Urinary 5-HIAA: 7.67 mg/g creatinine	105
		Sodium: 138 mEq/L (136-146)	28	Cranial MR: normal	114
		Potassium: 4.13 mEq/L (3.5-5.1)	28	Abdominal USG: liver: 98 mm, spleen: 52 mm; normal	26
		Uric acid 3.7 mg/dL (2.4-8)	35	Spinal MR: normal	96
		ASO: 50.6 IU/mL	63	EEG abnormalities designating suspicious paroxysmal disorder	57
		RF: 9.69 IU/mL	141		
		Anti-toxoplasma IgM: 0.04 IU/mL (0.5-0.6)	112		
		Anti-toxoplasma IgG: 0.1 IU/mL (1.6-3)	112		
		EBV VCA IgG: 0.02 and IgM: 0.02 negative	224		
		EBV EBNA: 0.02, negative	112		
		Viral panel (Mumps, measles, VZV, HBV, HIV, HAV) negative	672		
		<i>Borrelia burgdorferi</i> : IgM, IgG negative	140		
		Brucella negative	63		
		TSH: 2.27 IU/mL (0.7-5.97)	105		

(Continued)

Table I. (Continued)

RATIONAL TEST PLAN		NON-RATIONAL TEST PLAN			
TEST NAME	TEST COST (TL)	PRE-TREATMENT	TEST COST (TL)	POST-TREATMENT(RIFAMPICIN: 2 × 150 MG (20 MG/KG/D)	TEST COST (TL)
		sT4: 1.25 mg/dL (0.96-1.77)	91		
		Folate: 13.03 ng/mL (3.89-26.8)	105		
		Vitamin B12: 274 pg/mL (107-771)	105		
		Biotinidase activity: 8.5 U/L (3.5-13.8)	49		
		Quantitative amino acids in blood: nonspecific	60		
		Urine organic acid: nonspecific	90		
		Carnitine profile: C0: 25.67 nmol/L (24-53), carnitine esters nonspecific	210		
		AFP: 2.5 IU/mL (0.5)	140		
Total	64		3336		503
	64/(3336 + 503)			Rational test plan/nonrational test plan cost	~1/60

Turkish Lira (TL)=0.12\$.

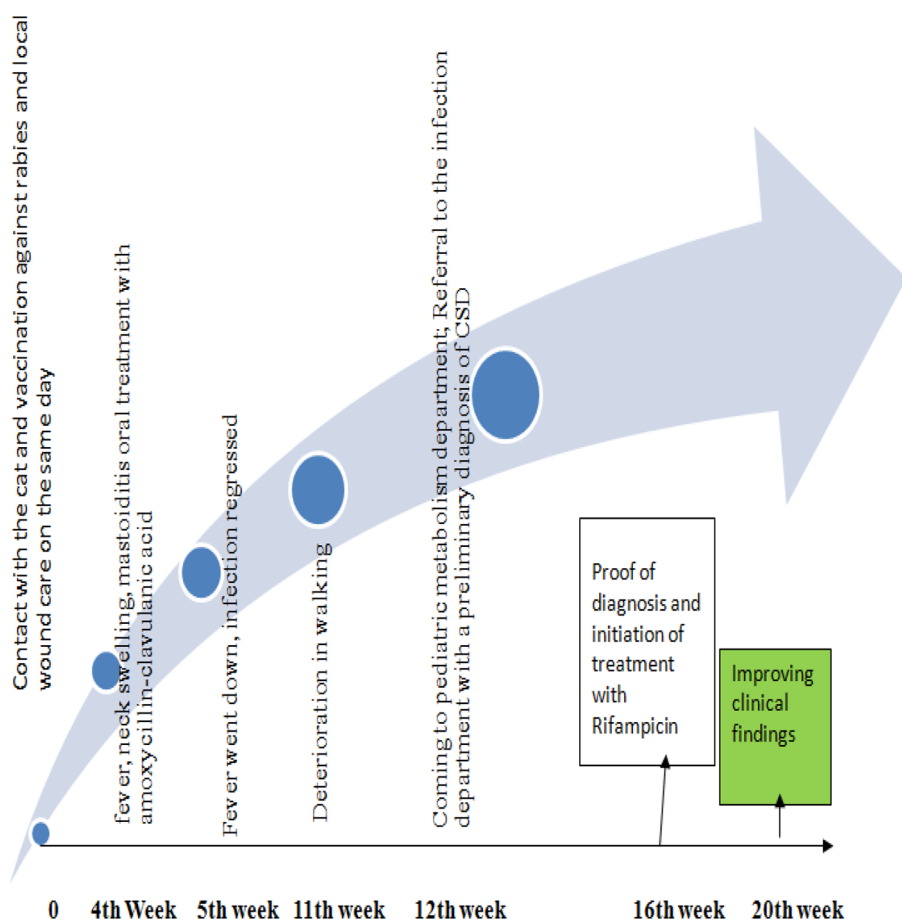


Figure 1. Changes in our patient's clinical symptoms are shown on the timeline.

by *Bartonella henselae*, a gram-negative bacillus¹⁻⁴ that can be transmitted from cats and dogs in autumn and winter. In addition, it may cause serious symptoms, including neurological findings in immune-deficient patients.^{4,5} Also, severe clinical findings related to *Bartonella henselae* are more common in children and adolescents than in adults.⁵ The patient was 2 years and 4 months old, and her immunoglobulin A level was at the lower limit.

Cat-scratch disease is not easily considered in the differential diagnosis as it is typically self-limited by a patient without immune problems. Diseases that are not expected to be serious such as the cat scratch disease, are often underestimated in patients with severe neurological findings. However, it is a treatable disease. It can spread to larger areas in immune-deficient patients even though it is more frequently recognized by isolated lymphadenopathy. In many organs and tissues, including the liver, eyes, joints, brain, paraspinal areas, and spleen, abscesses can cause life-threatening infections in patients presenting with these atypical findings. The patient came into contact with the cat during the autumn-winter season when *Bartonella henselae* illness is more prevalent.⁵⁻⁷ After 1 month of incubation, the patient developed submandibular lymphadenopathy, fever, and mastoiditis and was administered with amoxicillin-clavulanate. We learned that her neurological development was appropriate according to her age, and her neurological findings were noticed for the first time. Amoxicillin-clavulanate is not an option for *Bartonella henselae* treatment. Encephalitis developed in the immune-deficient patient. Cat-scratch disease was considered primarily in light of these findings. *Bartonella henselae* test result was 1/256, positive. It could be treated with macrolides, fluoroquinolones, tetracyclines, rifampicin, and sulfamethoxazole-trimethoprim. Rifampicin 14 mg/kg/24 hours for 14 days as oral administration was preferred among the options as it was appropriate according to her age.⁵⁻⁷ In the follow-up, it was observed that the patient's tremor improved, and ataxia decreased significantly 1 month after the Rifampicin treatment, which was administered orally for 14 days.

Conclusion

The lack of good chronological disease history is the most important problem that should be focused on in this case report in order to consider cat-scratch disease in the differential

diagnosis. Due to the limited time allocated to the patient in the outpatient clinic, many of our colleagues blindly request all the tests they can reach for symptomatic differential diagnosis to close this gap and avoid the risk of malpractice, and the patient who receives the correct diagnosis by chance is fortunate.

Another important point we try to emphasize is that cat-scratch disease is not thought to cause life-threatening clinical findings. Cat-scratch disease, which is regarded as a "self-limited benign disease" by many of our colleagues, is not considered in the differential diagnosis of patients with serious clinical findings. Our paper sought to illustrate what this disease can cause in terms of health and economy if it is ignored in the differential diagnosis, with a case report that experienced these 2 conditions. This approach, which results in serious financial loss, can be remedied by increasing the amount of time allocated to the patient and conducting a thorough medical history. Cat scratch disease is a zoonosis and a major public health problem. Infectious diseases are more common than metabolic diseases. In differential diagnosis, these medical procedures should always be considered before rare metabolic diseases. The first step of the art of medicine is to conduct a thorough history. Failure to follow basic medical rules will be costly in diagnosis and treatment.

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