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Letter to the editor

Babesiosis and Lyme disease co-infection in a female patient returning from the United States

Babésiose associée à une maladie de Lyme au retour des États-Unis

Keywords: Babesiosis; Lyme disease

Mots clés : Babésiose ; Maladie de Lyme

We would like to report the case of a babesiosis and Lyme disease co-infection in a 68-year-old American female patient with no previous medical history. The patient is living in the north of the New York state but has been spending a few months a year in Paris (France) for the past 20 years. She was bitten by a tick in the United States and presented with an erythematous lesion on the right leg, which spontaneously and progressively recovered. The patient travelled to France a month later and developed a fever (39 °C) associated with important asthenia, headache, dyspnea, and vomiting. On admission, the patient was febrile (38.8 °C) and presented with moderate dehydration. The clinical examination was otherwise normal. The hemoglobin level was 10.6 g/dL and platelets 49×10^9/L. White blood count cell was normal. The C-reactive protein was 70 mg/L. Aspartate aminotransferase and total bilirubinemia were 1.5 times the normal values. The analysis of the cerebrospinal fluid (CSF) did not reveal any abnormality. The results of the Giemsa-stained thick and thin blood smears revealed the presence of intra-erythrocytic parasites suggestive of *Plasmodium* trophozoites, but with smaller size and oblong shape. Parasitemia was 0.26%. The result of the rapid immunochromatographic test performed to detect malaria antigens (ICT Malaria, BinaxNOW®) was negative. The patient was treated with intravenous clindamycin (600 mg QD) and intravenous quinine (500 mg TID) as she was experiencing vomiting. Clinical improvement was observed within 48 hours. The patient was afebrile and stopped vomiting. The treatment was then switched to oral atovaquone (750 mg BID) and oral azithromycin (500 mg/day) for seven days. Parasitemia was checked four days after treatment initiation and the results were negative. The patient was discharged from hospital. The results of the serological tests revealed a positive Lyme antibody test (BORRELIA (Lyme) LISA Serum, BMD) (1.162 Ua/mL; negative value < 160 Ua/mL) confirmed by specific IgG and IgM western blot (recomLine Borrelia IgG/IgM, Mikrogen Diagnostik) based on specific criteria. Both tests performed in the CSF were negative. A new course of amoxicillin (3 g/day) was initiated for three weeks. We performed a physical examination as well as biological tests a month later and the results were normal.

To confirm the identification of the etiologic agent, we designed a pair of primers (Bab18S_F 5′-TCAAGTTTCTGACCCATCAG; Bab18S_R CGTCTTCGATCCCCTAAC) that specifically amplified a fragment of the 18S region of the rDNA from the various *Babesia* species previously involved in human infections. Amplification from a blood sample, followed by double strand direct sequencing using the same primers and Blastn comparison against the GenBank database, returned as first hit a sequence from *B. microti* with 100% identity (Accession number JX417370.1).

1. Discussion

Babesiosis is caused by protozoan parasites from the *Babesia* genus. Human babesiosis may be asymptomatic but can also be responsible for a wide spectrum of clinical presentations ranging from influenza-like syndrome to severe illness with organ failure and even death [1,2]. Ixodes ticks are responsible for the transmission of the parasites. Those ticks are themselves infected when feeding on infected cattle, roe deer, and rodents that represent the main reservoirs of parasites. The causative species of babesiosis differ across Europe and the United States. *B. microti* is most commonly found in the United States while *B. divergens* and EU1 genotype are the main causative agents in Europe [3]. Human autochthonous babesiosis is rare outside the United States. The country has, however, been faced with a significant increase in the disease incidence in some of the Northeast areas over the past decade (southern New England, New York, and North Central Midwest regions) [4,5]. Some of these areas, such as the Adirondack Mountains in the Northern part of the New York state are quite touristic. One can thus expect the number of tourists visiting these areas and the number of infected tourists to increase. The longest

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incubation period is eight weeks; some patients will therefore show the first symptoms once returned to their home country. As the clinical presentation of babesiosis is not specific, fever of unknown origin in patients returning from the United States should prompt physicians to detect the parasites on blood smears. Diagnosis may be difficult as intra-erythrocytic trophozoites may look like those of *Plasmodium*. Tetrad forms and high parasitemia levels are frequently observed. They can, however, be absent just like in our case patient. Finally, the identification of *Plasmodium*-like parasites on blood smears combined with a negative immunochromatographic test for plasmodial antigens is highly suggestive of babesiosis. Specific PCR performed on a blood sample may be used as an alternative diagnostic test. A combination of azithromycin (500–1000 mg on day 1 and 250 mg/day thereafter) and atovaquone (750 mg BID) for 7 to 10 days is now considered the standard treatment for mild to moderate presentations of babesiosis [6].

Physicians must also be aware that co-infection with Lyme disease may be quite common as *Ixodes scapularis*, the primary arthropod vector of *B. divergens*, may also be responsible for *B. burgdorferi*, the causative agent of Lyme disease [7]. Serological screening for Lyme disease should always be performed in patients presenting with babesiosis considering the possibility of late neurological complications. Finally, people travelling to the United States and particularly to the Northeastern areas should be advised to practice personal protection against arthropod bites.

2. Conclusion

We reported the case of a Lyme disease and babesiosis co-infection in a female patient returning from the United States. This case patient should draw the attention of physicians from non-endemic regions on the emergence of imported babesiosis and prompt them to diagnose associated Lyme disease.

Authors' contribution

LS managed the patient and wrote the article.
GB, AF, and CH made the parasitological diagnosis.
VL made the bacteriological diagnosis.
PMG reviewed the article.
CH made the parasitological diagnosis and wrote the article.

Disclosure of interest

The authors declare that they have no competing interest.

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