



Babesiosis Co-infection in a Patient with Lyme Disease from Endemic Area

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Abstract

A 65 year-old female with known history of controlled hypertension, presented to the Emergency Department with symptoms of fevers, headache, vomiting and low urine output for the past 5 days. Complete blood Count showed Anemia, Thrombocytopenia and acute kidney injury. Peripheral Blood smear revealed intracellular ovoid rings. Patient had history of Lyme disease and immigration from India about 8 months ago. Symptomatic treatment was started, but at fourth day of hospitalization he developed symptoms of Bell's palsy. Blood serology is then sent and it turned out to be positive for Borellia burgdorferi.

Introduction

Babesiosis is a tick-borne malaria-like illness caused by species of the intraerythrocytic protozoan *Babesia*. Humans are opportunistic hosts for *Babesia* when bitten by nymph or adult ticks. Currently, *Babesia* infection is transmitted by various tick vectors in Europe, Asia and northwestern and northeastern United States.

Case Report

A 65 year-old female with past medical history of controlled hypertension, presented to the Emergency Department with symptoms of fevers, headache, vomiting and low urine output for the past 5 days. The patient had recently emigrated from India about 8 months ago and has been staying in Eastern Long Island, NY. On admission the patient found to have Anemia, Thrombocytopenia and Acute kidney injury. Significant labs include hemoglobin of 9.8 g/dl, platelets of $37 \times 10^9/L$, BUN of 80 mg/dl,

creatinin of 5.2 mg/dl, prothrombin time of 14.6, AST 60 U/l and ALT 65 U/l, LDH of 345 U/l, fibrinogen of 665 mg/dl, CPR of 18.2 mg/l and ESR of 85 mm/h. Haptoglobin was within normal limits. Peripheral blood smear revealed intracellular ovoid rings resembling both *Plasmodium* species and *Babesia microti* rings (figure 1). The patient was started on a 7-day treatment with Doxycycline and Quinine to cover either infection. Later on PCR test for *Babesia microti* came back positive. On the day of planned discharge, the patient began to complain of right-sided numbness and difficulty closing the mouth and right eye. The diagnosis of Bell's palsy had been established. *Borellia burgdorferi* serology then sent and it turned out to be positive. Doxycycline had been started for another 2 weeks and the patient was symptom-free after the new course.

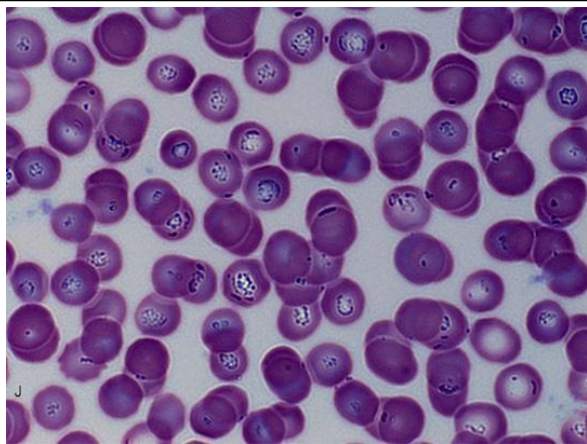


Figure 1: Gimsa-stained thin blood smear: shows intraerythrocytic ovoid rings resembling Babesia rings.

Discussion

Human babesiosis is a zoonotic infection in which ticks transmit babesia organisms from a vertebrate reservoir to humans. The infection is incidental in humans. The primary Babesia species that infect cattle include Babesia divergens, Babesia bigemina, Babesia bovis and babesia major. In horses the main species is Babesia equi. Babesia canis is the primary species in dogs, and babesia felis is the main species in cats. Babesia microti is the main species found in mice. Babesia species and organisms of the closely related genus Theileria have worldwide distribution, parasitizing the erythrocytes of wild and domestic animals. These parasites are commonly called prioplasms because of pear-shaped forms found within infected Red Blood Cells (RBCs). Most human babesial infections are caused by Babesia microti (found only in the United States) or by Babesia divergens or Babesia bovis (found only in Europe).

Human babesiosis is infrequent and occurs in limited geographic locations. In the United States, it is usually an asymptomatic infection in healthy individuals. Several group of patients become symptomatic, and, within the subpopulations, significant morbidity and mortality occur. The disease most severely affect patients who are elderly, immunocompromised, or asplenic. The history of babesiosis include fever and chills. Patients with babesiosis have symptoms similar to

those of malaria. Symptoms are related to the degree of red blood cells (RBCs) parasitemia. The spectrum of disease manifestation is broad, ranging from a silent infection to a fulminant malarialike disease that results in severe hemolysis and, occasionally, death.

In the United States, infection with B microti in otherwise healthy individuals generally remains subclinical; however, symptomatic infection is common in asplenic patients, older patients, and patients with underlying medical condition, including human immunodeficiency virus (HIV) infection. Because bovine babesiosis due to B divergens and B bovis in Europe mostly occurs in patients who are asplenic, such infections are generally clinically overt and frequently fatal. Patients typically report a history of travel to an endemic area between May and September. This is the period during which the Ixodes tick is in its infectious nymph stage. Because the nymph, the primary vector, is only 2 mm in diameter when engorged, most patients do not recall a tick bite. The incubation period after the tick bite is usually 1-3 weeks but may occasionally be as long as 9 weeks.

In the present case the patient is a 65 year-old female with past medical history of controlled hypertension, presented to the Emergency Department with symptoms of fevers, headache, vomiting and low urine output for the past 5 days. The patient had recently emigrated from India about 8 months ago and has been staying in Eastern Long Island, NY. On admission the patient found to have Anemia, Thrombocytopenia and Acute kidney injury. Significant labs include hemoglobin of 9.8 g/dl, platelets of $37 \times 10^9/L$, BUN of 80 mg/dl, creatinin of 5.2 mg/dl, prothrombin time of 14.6, AST 60 U/l and ALT 65 U/l, LDH of 345 U/l, fibrinogen of 665 mg/dl, CPR of 18.2 mg/l and ESR of 85 mm/h. Haptoglobin was within normal limits. Peripheral blood smear revealed intracellular ovoid rings resembling both Plasmodium species and Babesia microti rings. The patient was started on a 7-day treatment with Doxycycline and Quinine to cover either infection. Later on PCR test for Babesia

microti came back positive. On the day of planned discharge, the patient began to complain of right-sided numbness and difficulty closing the mouth and right eye. The diagnosis of Bell's palsy had been established. Borellia burgdorferi serology then sent and it turned out to be positive. Doxycycline had been started for another 2 weeks and the patient was symptom-free after the new course.

Symptoms

Initial symptoms begin gradually and are nonspecific. Common symptoms include malaise, fatigue, anorexia, shaking chills, sustained intermittent fever which may be as long as 40 C, headache, myalgias, arthralgias, nausea, vomiting, abdominal pain, depression and emotional lability, dark urine, photophobia, conjunctival injections, sore throat, cough, neck stiffness, altered sensorium and shortness of breath. Physical examination may vary, depending on the severity of the disease. Most patients with babesiosis have few, if any, physical findings. Fever is generally present. A minority of patients have jaundice and splenomegaly.

Complications:

The complications of babesiosis are related to the degree of intravascular hemolysis. The main complications include jaundice, hemoglobinuria, potential renal failure, shock, death, relapse and spontaneous splenic rupture. Cardiac complications may include myocardial infarction and congestive heart failure.

Prognosis

In the United States, the prognosis of babesiosis is excellent with most patients recover spontaneously. About 25% of adults and 50% of children infected with babesia are asymptomatic, improve spontaneously without treatment, or both. Fewer than 10% of US patients with babesiosis have died, and most of these have been elderly or asplenic. In Europe, however, babesiosis is a life-threatening disease. Most symptomatic European patients asplenic, which contributes to a poor prognosis. More than 50% of patients with

babesiosis in Europe become comatose and die. About 83% of infected patients are asplenic.

Diagnosis

Main approaches include, Serum Cellular Evaluation, Peripheral Blood Smears, Serum Chemistry, Serologic Testing, Hamster Inoculation and Polymerase Chain Reaction Assay.

The differential diagnosis include, Acute anemia, Colorado Tick Fever, Ehrlichiosis, Insects bites, Lyme disease, Malaria, Q fever, Relapsing fever in Emergency Medicine, Rock Mountain Spotted Fever, Tick-Borne diseases, Typhoid Fever.

Treatment

If the patient is otherwise healthy and asymptomatic, no treatment is required. Most of the otherwise healthy patients infected by B microti appear to have a mild illness and recover without a specific chemotherapy; however, treatment is recommended for all diagnosed cases to prevent sequelae and potential transmission through blood donations. Immediately start elderly, immunocompromised, or asplenic patients on a combination treatment regimen of intravenous (IV) Clindamycin and oral Quinine or IV Atovaquone and IV Azithromycin to avoid acute renal failure. Combination therapy with Clindamycin and quinine or Atovaquone and azithromycin is more effective than either Azithromycin or Atovaquone alone. Do not give Quinine to pregnant patients. Intubation or mechanical ventilation may be required for patients who develop respiratory distress or failure.

Conflict of interest/source of funding: None

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