

Malaria Recurrence Caused by *Plasmodium falciparum*

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Worldwide, malaria infects 270 million persons each year¹ and has a mortality rate of 1%. In the United States, fewer than 1,000 cases of malaria are diagnosed in those who have a history of travel. The diagnosis is typically delayed, with an ensuing higher morbidity and mortality associated with hospitalization.² The delayed diagnosis might be a result of the low incidence of malaria in nonendemic areas and the nonspecificity of the signs and symptoms.³ The case reported in this article is unusual in that no recent travel occurred, diagnosis was made expeditiously in the emergency department, and *Plasmodium falciparum* malaria might have recurred after an unusually long delay of more than 1 year.

Case Report

A 29-year-old Hispanic man was examined in the emergency department and questioned with the aid of an interpreter. He had not traveled outside United States since his arrival more than 1 year ago. He reported treatment of malaria and dengue fever when he lived in Mexico but had been apparently well until his present illness.

He complained of nausea and vomiting, fever, chills, and anorexia for the previous 4 days. He also complained of headache, dizziness, dark urine, and back pain with muscle aches. The patient's temperature was 101.9°F, pulse 101 beats per minute, respirations 20/min, and blood pressure 110/64 mm Hg. He had orthostatic hypotension, with a supine blood pressure 116/62 mm Hg and a heart rate of 71 beats per minute, which changed to a standing blood pressure of 92/60 mm Hg and

tachycardia (101 beats per minute). Abnormal laboratory values were total bilirubin 1.4 mg/dL, a platelet count of 64,000/mL, and amber-colored urine. Microscopic examination of a thick blood film was positive for *P falciparum* malaria. The patient was given fluids—5% dextrose in normal saline—a prescription for quinine, 650 mg 3 times a day for 5 days, and one treatment course of 5 tablets of mefloquine (250 mg). The patient was released from the emergency department the same day with a confirmed diagnosis of falciparum malaria. Close follow-up examinations were recommended.

Discussion

Malaria is a parasitic infection transmitted by mosquitoes. Signs and symptoms are high fever with chills, sweating, headache, nausea and vomiting, muscle pain, and bloody stools.⁴ If untreated, the infection will recur throughout the person's lifetime. This disease is endemic in parts of Africa, South and Central America, Mexico, Middle East, Southern Asia, and India.⁵

Typically the incubation period of *P falciparum* can range from 10 to 14 days. The malarial paroxysm begins with less-prominent symptoms, ie, the cold stage. During this stage vasoconstriction lasts from 30 minutes to 1 hour during which the patient feels very uncomfortable. The next stage, the hot stage, lasts 2 to 6 hours during which the patient feels very hot. The cycle ends with the sweating stage.

Infection with *P falciparum*, which is the only parasite species that is able to invade all red blood cells, especially the young cells, can potentially result in the most severe form of malaria, causing extensive organ damage in kidneys, liver, brain, and gastrointestinal tract. Cerebral malaria in particular can lead to coma and convulsions. Almost all deaths associated with malaria are due to falciparum malaria.

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P vivax and *P ovale* are well recognized as causes of recurrent malaria. Waksman et al⁶ reported an 8-month time lag between the traveler's visit to an endemic country and the manifestation of malaria caused by *P vivax*. Another case report by Grobusch et al⁷ described a 22-month delay in the signs and symptoms of *P vivax* infection. The authors conclude that malaria should be considered even years after traveling. Malaria in the past has been a serious health problem in parts of Europe, United States, and other industrialized countries. Currently, it is recognized as an imported disease in immigrants, military personnel, and travelers.⁸

Several articles have been written on the recurrence of falciparum malaria.^{9,10} Malaria recurrence separated by more than 12 months is less likely to be due to *P falciparum* infection.¹¹ *P falciparum* malaria recurrence can occur by two different mechanisms: reinfection and recrudescence. Recrudescence with a long latency is the more likely explanation for this case, because reinfection usually occurs after day 14 of treatment¹² and in endemic areas. Recrudescence can be due to (1) incomplete or inadequate treatment as a result of drug resistance or improper choice of medication, (2) an antigenic variation,¹³ and (3) multiple infection by different strains.

Conclusion

Prompt diagnosis and treatment can decrease the associated morbidity, potential mortality, and associated costs of malaria. Regardless of how recently or remotely travel occurred, malaria should be included in the differential diagnosis for anyone with a febrile illness who has lived in or traveled to an endemic area.

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