

A 3-year-old African American boy is brought to the emergency department for fever. Since returning from a family trip to Nigeria last week, he has been lethargic with constant nausea and headache. He has had several episodes of vomiting and watery diarrhea each day and high spiking fevers, chills, and drenching sweats every other day. The boy carries the sickle cell trait and has no other medical problems. He takes no medications and his vaccinations are up to date. His temperature is 40 C (104 F), blood pressure is 90/60 mm Hg, pulse is 132/min, and respirations are 24/min. Examination shows a tired-appearing boy with jaundice. Lungs are clear to auscultation. The abdomen is soft and nontender. Hepatosplenomegaly is present. Range of motion in his neck and extremities is normal. Laboratory studies show mild anemia and thrombocytopenia. Which of the following factors is associated with decreased morbidity from this illness?

- ☐ A. History of hepatitis A vaccination
- ☐ B. History of meningococcal vaccination
- ☐ C. Male sex
- ☐ D. Prophylaxis with ciprofloxacin
- ☐ E. Sickle cell trait
- ☐ F. Young age

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- ☐ A. History of hepatitis A vaccination [5%]
- ☐ B. History of meningococcal vaccination [3%]
- ☐ C. Male sex [0%]
- ☐ D. Prophylaxis with ciprofloxacin [2%]
- ☒ E. Sickle cell trait [89%]
- ☐ F. Young age [1%]

Proceed to Next Item

Explanation:

User Id: [REDACTED]

Malaria	
Pathogenesis	Transmission of <i>Plasmodium falciparum</i> , <i>P vivax</i> , <i>P ovale</i> , or <i>P malariae</i> parasites by the bite of an infected <i>Anopheles</i> mosquito
Clinical features	<ul style="list-style-type: none">• Periodic febrile paroxysms• Nonspecific malaise, headache, nausea, vomiting, abdominal pain, diarrhea, myalgia, pallor, jaundice, petechiae, hepatosplenomegaly
Complications	<ul style="list-style-type: none">• Children: Seizure, coma, hypoglycemia, metabolic acidosis

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Complications	<ul style="list-style-type: none">• Children: Seizure, coma, hypoglycemia, metabolic acidosis• Adults: Jaundice, acute renal failure, acute pulmonary edema
Diagnosis	Thin & thick peripheral blood smears
Protection	<ul style="list-style-type: none">• Hemoglobinopathies (Hgb S, Hgb C, thalassemia)• Partial immunity from previous malarial illness
Prevention	<ul style="list-style-type: none">• Antimalarial drugs<ul style="list-style-type: none">• Atovaquone-proguanil• Doxycycline• Mefloquine• Chloroquine• Hydroxychloroquine• Insecticide-treated nets• Household insecticide residual spraying

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This child's clinical presentation is concerning for malaria, a dangerous **parasitic** infection transmitted by **mosquitos** in **tropical regions** worldwide. Almost 2000 people die from malaria every day. *Plasmodium falciparum* is the primary cause of morbidity and mortality in sub-Saharan Africa. **Cyclic fevers** (eg, every 2 or 3 days) with other nonspecific systemic symptoms are the key features of malarial illness (Table). The febrile paroxysms parallel the waves of red blood cell invasion when parasites are released from the liver into the bloodstream. Diagnosis is confirmed by microscopic visualization of Giemsa-stained parasites on **thick and thin blood smears**.

Carriers of the **sickle cell trait** are inherently protected from severe disease, as the misshapen red blood cells create a suboptimal environment for parasitic proliferation.

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Carriers of the **sickle cell trait** are inherently protected from severe disease, as the misshapen red blood cells create a suboptimal environment for parasitic proliferation. Patients with a past history of malarial infection are also at relatively low risk for severe disease on reinfection due to partial immunity.

(Choice A) Acute hepatitis A infection can cause fever, abdominal pain, nausea, vomiting, diarrhea, hepatomegaly, and jaundice. However, this patient's cyclic fevers are suggestive of malaria rather than hepatitis.

(Choice B) *Neisseria meningitides* vaccination can prevent infection from serogroups A, C, Y, and W-135. Meningitis causes fever and severe headaches, but patients usually have neck stiffness and photophobia as well. In addition, bacterial meningitis causes precipitous neurologic decline within hours of onset.

(Choices C and F) Both sexes are equally susceptible to malaria. However, infants and young children are at increased risk for life-threatening complications, such as **cerebral malaria** (eg, seizures, delirium, coma).

(Choice D) Ciprofloxacin is not recommended for malaria prophylaxis. It can treat traveler's diarrhea caused by *Escherichia coli*, *Campylobacter jejuni*, *Shigella*, and *Salmonella*. However, bacterial enteritis typically resolves within 5 days and would not cause periodic fevers.

Educational objective:

Malaria should be suspected in any ill patients, especially those with a history of **febrile paroxysms**, who have traveled to an endemic-tropical region. **Thick and thin blood smears** should be ordered for parasite detection and quantification. Nonimmune children are at highest risk of death, but the sickle cell trait confers some protection from severe complications.

References:

1. [Hemoglobin variants and disease manifestations in severe falciparum](#)

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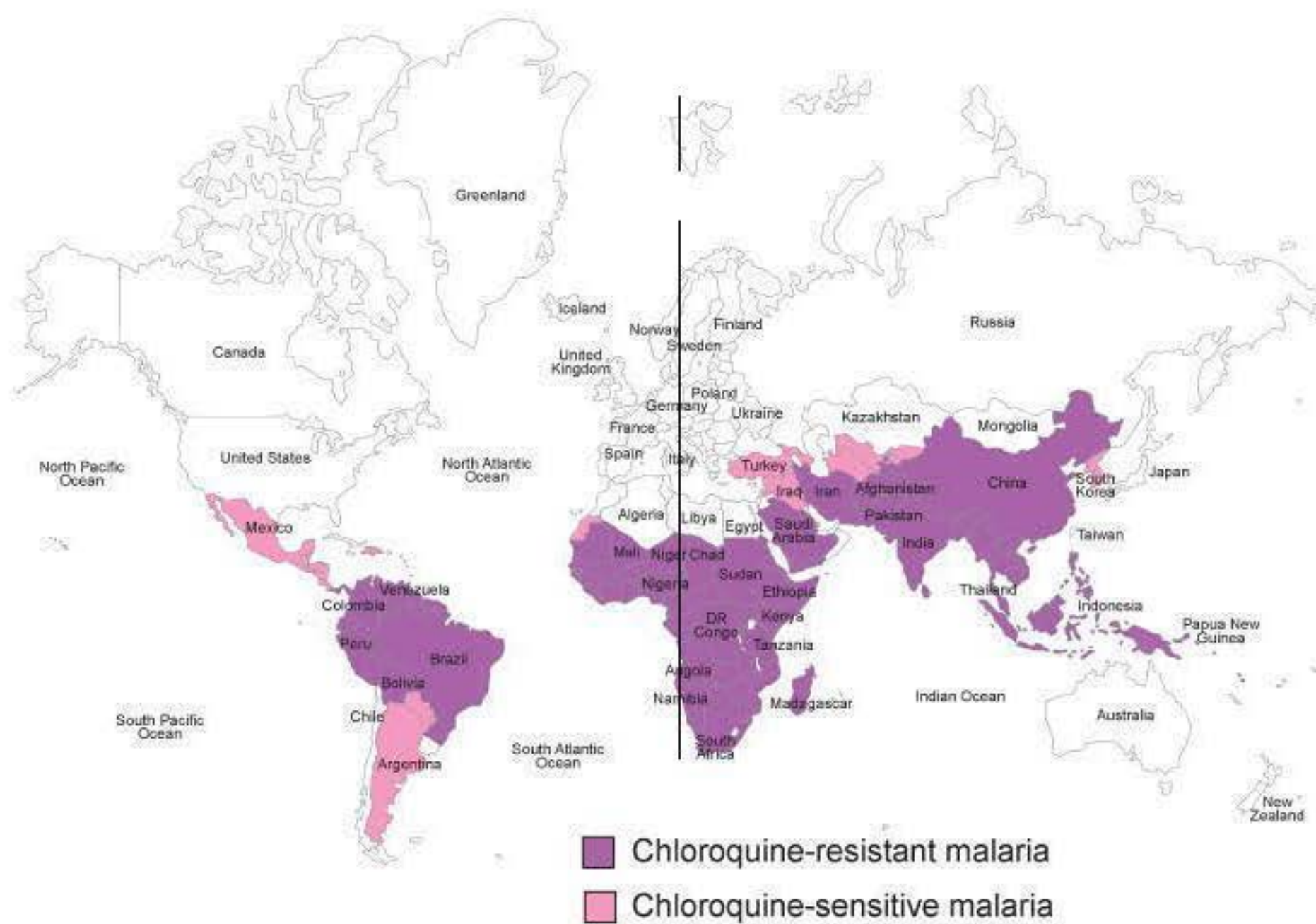
References:

1. [Hemoglobin variants and disease manifestations in severe falciparum malaria.](#)
2. [Imported pediatric malaria presenting to an urban pediatric emergency department: a case series.](#)
3. [Does this patient have malaria?](#)
4. [Hemoglobins S and C interfere with actin remodeling in Plasmodium falciparum-infected erythrocytes.](#)
5. [Malaria.](#)

Media Exhibit

malaria regions

Map of malaria regions



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