

Increased Risk for Severe Malaria in HIV-1–infected Adults, Zambia

Victor Chalwe, Jean-Pierre Van geertruyden, Doreen Mukwamataba, Joris Menten, John Kamalamba, Modest Mulenga, and Umberto D'Alessandro

CME ACTIVITY

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Learning Objectives

Upon completion of this activity, participants will be able to:

- Describe the impact of HIV infection on malaria infection
- Identify different levels of severity of malaria infection
- Describe the presentation of severe malaria in patients infected with HIV-1 in one region in Zambia
- Compare the risk for severe malaria in relation to CD4 count in patients infected with HIV-1

Editor

Karen L. Foster, Writer-Editor, US Centers for Disease Control and Prevention, Atlanta, Georgia, USA; copyeditor, *Emerging Infectious Diseases*. *Disclosure: Karen L. Foster has disclosed no relevant financial relationships.*

CME Author

Désirée Lie, MD, MEd, Clinical Professor, Family Medicine, University of California, Orange, California, USA; Director, Division of Faculty Development, UCI Medical Center, Orange. *Disclosure: Désirée Lie, MD, MEd, has disclosed no relevant financial relationships.*

Authors

Disclosures: Victor Chalwe, MD, MSc; Jean-Pierre Van geertruyden, MD, PhD; Doreen Mukwamataba, RN; Joris Menten, MSc; John Kamalamba, MD; Modest Mulenga, MD, PhD; and Umberto D'Alessandro, MD, PhD, have disclosed no relevant financial relationships.

To determine whether HIV-1 infection and HIV-1–related immunosuppression were risk factors for severe malaria in adults with some immunity to malaria, we conducted a case–control study in Luanshya, Zambia, during December 2005–March 2007. For each case-patient with severe malaria, we selected 2 matched controls (an adult with uncomplicated malaria and an adult without signs of disease). HIV-1 infection was present in 93% of case-patients, in 52% of controls with uncomplicated malaria, and in 45% of asymptomatic controls. HIV-1 infection was a highly significant risk factor for adults with severe malaria compared with controls with uncomplicated malaria (odds ratio [OR] 12.6, 95% confidence interval [CI] 2.0–78.8, $p = 0.0005$) and asymptomatic controls (OR 16.6, 95% CI 2.5–111.5, $p = 0.0005$). Persons with severe malaria were more likely to

have a CD4 count $<350/\mu\text{L}$ than were asymptomatic controls (OR 23.0, 95% CI 3.35–158.00, $p < 0.0001$).

The geographic overlap between HIV-1 infection and malaria, particularly in eastern and southern Africa, has caused concern since the 1980s. The degree of interaction between HIV-1 infection and malaria emerged during 1999–2009 and has been extensively reviewed for both nonpregnant and pregnant adult women (1,2). The effect of HIV-1 on malaria seems to be driven mainly by the incapacity of the immune system to control parasite load, leading to a higher prevalence of infection (3), a higher incidence of clinical malaria (4,5), and a risk for treatment failure (6) in immunosuppressed HIV-1 patients.

Reports of HIV-1 infection as a risk factor for hyperparasitemia or severe malaria are few and limited. In urban Burkina Faso, $>30\%$ of adults with severe malaria were also infected with HIV-1, whereas HIV-1 prevalence in the general adult population was $\approx 5\%$ – 14% (7). In South Africa, in an area of low malaria transmission (<1 case/1000/

Author affiliations: Tropical Diseases Research Centre, Ndola, Zambia (V. Chalwe, D. Mukwamataba, M. Mulenga); Institute of Tropical Medicine, Antwerp, Belgium (J.-P. Van geertruyden, J. Menten, U. D'Alessandro); and Thomson Hospital, Luanshya, Zambia (J. Kamalamba)

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Article Title:

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CME Questions

1. Which of the following best explains the large scale of the HIV-1–malaria interaction that has emerged in the last decade?
 - A. Longer survival of patients infected with HIV
 - B. Effects of increased antiretroviral drug use
 - C. Poor immune function and higher susceptibility
 - D. Poor control of malaria worldwide
2. A 28-year-old Zambian patient presents with a fever of 38.5°C, *Plasmodium falciparum* on thick smear with 120 parasites per 200 white blood cells, and jaundice. Which of the following best describes the likely diagnosis?
 - A. Uncomplicated malaria
 - B. Moderately severe malaria
 - C. Severe malaria
 - D. HIV and malaria
3. The study noted the importance of fever as an indicator of severe malaria in patients infected with HIV-1. Which of the following features were most commonly encountered in addition to fever?
 - A. Impaired consciousness and jaundice
 - B. Impaired consciousness and hypoglycemia
 - C. Multiple convulsions and jaundice
 - D. Hypoglycemia and jaundice
4. Which of the following best describes the association between HIV-1 infection and risk for severe malaria in the population studied?
 - A. HIV-1 infection is a risk factor for uncomplicated and severe malaria
 - B. Risk for severe malaria is only increased in patients with HIV-1 with a CD4 count <250 cells/ μL
 - C. HIV-1 infection increases the risk for severe malaria
 - D. Risk for severe malaria is increased only in patients with AIDS

Activity Evaluation

1. The activity supported the learning objectives.	Strongly Disagree					Strongly Agree
	1	2	3	4		5
2. The material was organized clearly for learning to occur.	Strongly Disagree					Strongly Agree
	1	2	3	4		5
3. The content learned from this activity will impact my practice.	Strongly Disagree					Strongly Agree
	1	2	3	4		5
4. The activity was presented objectively and free of commercial bias.	Strongly Disagree					Strongly Agree
	1	2	3	4		5