

low-density malaria and infant HIV-1 viral load, the consequences of high-density or clinical malaria need to be explored. If clinical malaria in infants increases HIV-1 viral load as it does in adults (1,2), our study underscores dual benefits of malaria treatment in the context of HIV: 1) keeping malaria in check, and 2) preventing an increase in HIV viral load. Ethical issues prevent prospective studies to assess the impact of coinfection early in life, but alternatives include using animal models or stored specimens.

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References

1. Hoffman IF, Jere CS, Taylor TE, Munthali P, Dyer JR, Wirima JJ, et al. The effect of *Plasmodium falciparum* malaria on HIV-1

RNA blood plasma concentration. *AIDS*. 1999;13:487-94.

2. Kublin JG, Patnaik P, Jere CS, Miller WC, Hoffman IF, Chimbiya N, et al. Effect of *Plasmodium falciparum* malaria on concentration of HIV-1-RNA in the blood of adults in rural Malawi: a prospective cohort study. *Lancet*. 2005;365:233-40.
3. Rogers MF, Thomas PA, Starcher ET, Noa MC, Bush TJ, Jaffe HW. Acquired immunodeficiency syndrome in children: report of the Centers for Disease Control National Surveillance, 1982 to 1985. *Pediatrics*. 1987;79:1008-14.
4. Pizzo PA, Wilfert CM. Markers and determinants of disease progression in children with HIV infection. The Pediatric AIDS Siena Workshop II. *J Acquir Immune Defic Syndr Hum Retrovirol*. 1995;8:30-44.
5. Ayisi JG, van Eijk AM, ter Kuile FO, Kolczak MS, Otieno JA, Misore AO, et al. Risk factors for HIV infection among asymptomatic pregnant women attending an antenatal clinic in western Kenya. *Int J STD AIDS*. 2000;11:393-401.
6. Ayisi JG, van Eijk AM, Newman RD, ter Kuile FO, Shi YP, Yang C, et al. Maternal malaria infection and perinatal HIV transmission, western Kenya. *Emerg Infect Dis*. 2004;10:643-52.
7. Yang C, Li M, Newman RD, Shi YP, Ayisi J, van Eijk AM, et al. Genetic diversity of HIV-1 in western Kenya: subtype-specific differences in mother-to-child transmission. *AIDS*. 2003;17:1667-74.
8. Bloland PB, Boriga DA, Ruebush TK, McCormick JB, Roberts JM, Oloo AJ, et al. Longitudinal cohort study of the epidemiology of malaria infections in an area of intense malaria transmission II. Descriptive epidemiology of malaria infection and disease among children. *Am J Trop Med Hyg*. 1999;60:641-8.
9. Greenberg AE, Nsa W, Ryder RW, Medi M, Nzeza M, Kitadi N, et al. *Plasmodium falciparum* malaria and perinatally acquired human immunodeficiency virus type 1 infection in Kinshasa, Zaire. A prospective, longitudinal cohort study of 587 children. *N Engl J Med*. 1991;325:105-9.
10. Kalyesubula I, Musoke-Mudido P, Marum L, Bagenda D, Aceng E, Nduwa C, et al. Effects of malaria infection in human immunodeficiency virus type 1-infected Ugandan children. *Pediatr Infect Dis J*. 1997;16:876-81.

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African Tickbite Fever in Travelers, Swaziland

To the Editor: African tickbite fever (ATBF), which is caused by *Rickettsia africae*, is well documented in travelers to southern Africa (1-3) and transmitted by unguulate ticks of the genus *Amblyomma*. Positive serologic results were reported in 9% of patients (1) and 11% of travelers (4) from southern Africa. We report an outbreak of ATBF with an attack rate of 100% among 12 Dutch travelers to Swaziland.

The 12 travelers (9 male and 3 female) visited Mkhaya Game Reserve in Swaziland in May 2003 for several days. Upon returning to the Netherlands, they consulted our clinic for assessment for fever, malaise, and skin eruptions. Epidemiologic and clinical data were obtained after the patients provided informed consent. All symptomatic patients were treated before serum samples were collected.

Acute-phase and convalescence-phase serum samples were obtained from 8 patients at 3 and 9 weeks, respectively, after symptoms were reported. Only convalescent-phase serum samples were obtained from the other 4 patients. Serologic assays were conducted for screening and confirmation in Rotterdam, the Netherlands (Department of Virology, Erasmus University Hospital) and Marseille, France (Unité des Rickettsies, Faculté de Médecine, Université de la Méditerranée), respectively.

In Rotterdam, immunofluorescence assays for immunoglobulin G (IgG) and IgM against *R. conorii*, *R. typhi*, and *R. rickettsii* were performed with multiwell slides on which antigens were fixed (Panbio Inc., Columbia, MD, USA). Serum samples with fluorescent rickettsiae at dilutions $\geq 1:32$ were considered positive.

In Marseille, a microimmunofluorescence assay for IgG and IgM against *R. africae*, other members of the spotted fever group, and *R. typhi* of the typhus biogroup was used. Western blotting for *R. africae* and *R. conorii* was performed with reactive serum samples and repeated after cross-adsorption that removed only antibodies to *R. conorii* (5). Serologic evidence for infection with *R. africae* was defined as 1) seroconversion; 2) IgG titers >64, IgM titers >32, or both, with IgG and IgM titers >2 dilutions higher than any of the other tested spotted fever group rickettsial antigens; 3) a Western blot profile that showed *R. africae*-specific antibodies; and 4) cross-adsorption assays that showed homologous antibodies against *R. africae* (1).

All 12 travelers had a diagnosis of ATBF. Epidemiologic, clinical, and serologic results are shown in the Table. Two patients had a history of a tickbite. Lymphadenopathy in the

groin was the only clinical sign observed in 2 other patients. For all 10 patients with symptoms, the symptoms abated within a few days after treatment with doxycycline, 100 mg orally twice a day (5 patients) for 7 days, or ciprofloxacin, 500 mg orally twice a day (5 patients) for 7 days. No relapses or complications were noted 1 year later.

Assays in both locations showed serologic reactivity against *R. conorii* and *R. rickettsiae*. Specific antibodies against *R. africae* were detected by Western blot in 8 patients (Table). All 12 travelers were infected with *R. africae*. In 3 other patients, immunofluorescence assays demonstrated seroconversion for specific antibodies. One patient with no clinical symptoms had low IgG (32) and IgM (16) titers against rickettsiae by immunofluorescence and IgG by Western blot.

Tick vectors of *R. africae* attack humans throughout the year. The pro-

portion of patients having multiple eschars, which indicate the aggressive behavior of the tick, varies from 21% (6) to 54% (2). The 100% attack rate observed in this study emphasizes the risk for ATBF in sub-Saharan travelers. In our study group, only 2 persons had multiple eschars, but serologic analysis showed that all patients were infected with *R. africae*. Most cases of ATBF have a benign and self-limiting course with fever, headache, myalgia, and a skin rash. However, patients who are not treated show prolonged fever, reactive arthritis, and subacute neuropathy (7).

The long-term sequelae of ATBF remain to be established. Early treatment would not likely have prevented these complications. Jensenius et al. reported that travel from November through April was a risk factor for ATBF (1). The travelers in our study visited Swaziland in May. We speculate that tick bites were likely caused by larvae or nymphs, which are often

Table. Clinical and serologic characteristics of 12 travelers with African tickbite fever, Swaziland, 2003*

T	Sex/ age, y	Fever/ headache/ myalgia/ rash	Tickbite/ eschar site/ lymph. site	Sera	Rotterdam, the Netherlands		Marseille, France			
					<i>Rickettsia conorii</i> IgG/IgM†	<i>R. rickettsii</i> IgG/IgM†	<i>R. conorii</i> IgG/IgM†	<i>R. africae</i> IgG/IgM†	WB	WB ads.
1	F/47	Y/N/Y/Y	N/N/groin	A	0/32	32/32	0/0	0/0	NT	NT
				C	>128/>128	>128/32	128/0	128/0	+	Ra
2	M/14	Y/Y/N/N	Y/foot/groin	A	>64/>64	>64/>64	32/0	64/0	+	Ra
				C	>128/32	>128/16	256/0	256/0	NT	NT
3	M/13	N/N/N/N	N/N/N	A	0/0	32/0	0/16	0/16	+	NC
				C	0/0	0/0	0/16	0/16	NT	NT
4	M/10	N/N/N/N	N/N/groin	A	>64/>64	>64/>64	0/16	0/32	+	Ra
				C	>128/32	>128/16	0/64	0/64	NT	NT
5	M/50	Y/Y/N/Y	N/N/groin	A	0/0	0/0	0/0	0/0	NT	NT
				C	>128/>128	>128/32	64/8	64/8	+	NC
6	M/13	N/N/N/N	N/N/groin	A	0/0	0/0	0/0	0/0	NT	NT
				C	>128/16	>128/16	32/16	32/16	+	Ra
7	M/11	Y/N/N/N	N/N/retro.	A	0/0	32/0	0/0	0/0	NT	NT
				C	0/>128	16/32	0/32	0/32	+	NC
8	F/47	Y/Y/Y/Y	N/mult./groin	A	0/0	32/0	0/16	0/16	+	NC
				C	>128/16	>128/0	32/8	32/8	NT	NT
9	M/5	Y/N/N/N	Y/thumb/ axillary	C	NT/NT	NT/NT	0/0	0/0	Ra	NT
				C	32/32	>128/>128	0/0	0/0	+	Ra
10	M/44	Y/Y/Y/N	N/shoulder/ axillary	C	0/0	0/0	0/0	0/0	+	Ra
11	F/10	N/N/N/N	N/N/trunk	C	0/0	0/0	0/0	0/0	+	Ra
12	M/50	N/N/N/N	N/N/N	C	0/0	0/0	0/8	0/16	+	Ra

*T, traveler; lymph., lymphadenopathy; IgG, immunoglobulin G; IgM, immunoglobulin M; WB = Western blot; WB ads., WB after cross-adsorption that removed antibodies to *R. conorii*; Y, yes; N, no; A, acute phase; NT, not tested; C, convalescent phase; +, positive for *R. africae* and *R. conorii*; Ra, positive for *R. africae*; NC, not conclusive; retro., retroauricular; mult., multiple.

†Ratio of titers.

unrecognized stages. Many affected travelers may not seek medical attention or may have received a wrong diagnosis. Therefore, surveillance based only on reported cases is likely to underestimate the true incidence of travel-associated *R. africae* infection.

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References

- Jensenius M, Fournier PE, Kelly P, Myrvang B, Raoult D. African tick bite fever. *Lancet Infect Dis.* 2003;3:557–64.
- Raoult D, Fournier PE, Fenollar F, Jensenius M, Prio T, de Pina JJ, et al. *Rickettsia africae*, a tick-borne pathogen in travelers to sub-Saharan Africa. *N Engl J Med.* 2001;344:1504–10.
- Consigny PH, Rolain JM, Mizzi D, Raoult D. African tick-bite fever in French travelers. *Emerg Infect Dis.* 2005;11:1804–6.
- Jelinek T, Loscher T. Clinical features and epidemiology of tick typhus in travelers. *J Travel Med.* 2001;8:57–9.
- Fournier PE, Roux V, Caumes E, Donzel M, Raoult D. Outbreak of *Rickettsia africae* infections in participants of an adventure race in South Africa. *Clin Infect Dis.* 1998;27:316–23.
- Jensenius M, Fournier PE, Vene S, Hoel T, Hasle G, Henriksen AZ, et al. African tick bite fever in travelers to rural sub-Equatorial Africa. *Clin Infect Dis.* 2003;36:1411–7.
- Jensenius M, Fournier PE, Fladby T, Hellum KB, Hagen T, Prio T, et al. Subacute neuropathy in patients with African tick bite fever. *Scand J Infect Dis.* 2006;38:114–8.

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Catheter-related Bacteremia and Multidrug-resistant *Acinetobacter lwoffii*

To the Editor: *Acinetobacter* species are ubiquitous in the environment. In recent years, some species, particularly *A. baumannii*, have emerged as important nosocomial pathogens because of their persistence in the hospital environment and broad antimicrobial drug resistance patterns (1,2). They are often associated with clinical illness including bacteremia, pneumonia, meningitis, peritonitis, endocarditis, and infections of the urinary tract and skin (3). These conditions are more frequently found in immunocompromised patients, in those admitted to intensive care units, or in those who have intravenous catheters, and those who are receiving mechanical ventilation (4,5).

The role of *A. baumannii* in nosocomial infections has been documented (2), but the clinical effect of other *Acinetobacter* species has not been investigated. *A. lwoffii* (formerly *A. calcoaceticus* var. *lwoffii*) is a commensal organism of human skin, oropharynx, and perineum that shows tropism for urinary tract mucosa (6). Few cases of *A. lwoffii* bacteremia have been reported (3,5–7). We report a 4-year (2002–2005) retrospective study of 10 patients with *A. lwoffii* bacteremia admitted to a 600-bed teaching hospital in central Italy.

All 10 patients were immunocompromised; 8 had used an intravascular catheter (peripheral or central) and 2 had used a urinary catheter. Blood cultures of the patients were analyzed with the BacT/ALERT 3D system (bioMérieux, Marcy l'Etoile, France). Isolates were identified as *A. lwoffii* by using the Vitek 2 system and the API 20NE system (both from bioMérieux).

Susceptibilities of 10 *A. lwoffii* isolates to 18 antimicrobial drugs were determined by the broth microdilution method, according to Clinical and Laboratory Standards Institute (CLSI, formerly NCCLS) guidelines (8). The drugs tested were amikacin, ampicillin-sulbactam, aztreonam, cefepime, cefotaxime, ceftazidime, ceftriaxone, ciprofloxacin, gentamicin, imipenem, levofloxacin, meropenem, ofloxacin, piperacillin, piperacillin-tazobactam, tetracycline, tobramycin, and trimethoprim-sulfamethoxazole. MIC was defined as the lowest drug concentration that prevented visible bacterial growth. Interpretative criteria for each drug tested were as in CLSI guidelines (8). *A. lwoffii* resistant to ≥ 4 classes of drugs were defined as multidrug-resistant (MDR) isolates.

A. lwoffii isolates were genotyped by pulsed-field gel electrophoresis (PFGE) to determine their epidemiologic relatedness. Chromosomal DNA was digested with *Sma*I (9) and analyzed with a CHEF DR II apparatus (Bio-Rad Laboratories, Hercules, CA, USA). PFGE patterns were classified as identical, similar (differed by 1–3 bands), or distinct (differed by ≥ 4 bands) (10).

Among the 10 *A. lwoffii* isolates, 6 were susceptible to all drugs except cephalosporins (cefepime, cefotaxime, ceftazidime, and ceftriaxone) and aztreonam. The other 4 isolates were MDR: 3 were susceptible only to imipenem (MICs 1–4 $\mu\text{g}/\text{mL}$), meropenem (MICs 1–2 $\mu\text{g}/\text{mL}$), and amikacin (MICs 2–4 $\mu\text{g}/\text{mL}$). The fourth MDR strain was susceptible to imipenem (MIC 2 $\mu\text{g}/\text{mL}$), meropenem (MIC 2 $\mu\text{g}/\text{mL}$), amikacin (MIC 4 $\mu\text{g}/\text{mL}$), and ciprofloxacin (MIC 1 $\mu\text{g}/\text{mL}$). Seven antimicrobial drug resistance profiles were detected (Table).

Macrorestriction analysis of the *A. lwoffii* isolates identified 8 distinct PFGE types. Two MDR strains (strains 2 and 3 in the Table), which