Letters to the Editor

The Panmalarial Antigen Detected by the ICT Malaria P.f./P.v. Immunochromatographic Test Is Expressed by Plasmodium malariae

The ICT Malaria P.f./P.v. test is a rapid immunochromatographic assay, manufactured in test card form (2). The assay detects Plasmodium falciparum-specific histidine-rich protein 2 antigen (HRP2) (4) and a panmalarial antigen. Recent field studies (5) have reported the ability of the test to detect Plasmodium vivax, but no data on antigen expression by P. malariae is available. Dyer et al. (1) reported a failure of the test to detect P. malariae. In contrast, we here present evidence that the panmalarial antigen is expressed by P. malariae.

Details of the ICT test are described elsewhere (2, 5). Briefly, 10 μl of whole blood is added to a sample pad containing colloidal gold-labeled antibodies followed by a buffer reagent to induce cell lysis. The released HRP2 and panmalarial antigens bind the antibodies on the pad. Antigen-labeled antibody complexes migrate up the test strip, where they cross two test lines and a control line. Interpretation is P. falciparum-positive if the HRP2-specific line is visible, whether or not the panmalarial antigen line is seen. When all three lines are observed, the test is interpreted as indicating a P. falciparum monoinfection or a mixed infection of P. falciparum and non-P. falciparum. If only the control and panmalarial antigen lines are noted, the sample is positive for a malaria parasite other than P. falciparum.

During field and hospital studies in 2000, we detected three cases of single P. malariae infections with the ICT test (#ML02 Lot 011190, expiration April 2001), at two sites in Southeast Asia. A blood smear from a hospital patient in Sangkhlaburi, Thailand, showed P. malariae infection by Giemsa microscopy (6,000 parasites/μl), and this observation was confirmed with nested PCR using species-specific primers (3). Two other cases of P. malariae infection were found in patients from Mandalay Division, Myanmar, and diagnosis was made by acridine-orange microscopy and confirmed by the same species-specific primers. The ICT test for both patients showed only panmalarial antigen and the control lines. Parasitemias were estimated to be 1,260 and 2,025 parasites/μl.

Another patient with P. malariae infection from Sangkhlaburi, Thailand, was nested PCR positive but ICT negative. The parasitemia (330 parasites/μl) of this patient was much lower than those of the ICT-positive patients, suggesting that the threshold for detecting the panmalarial antigen in P. malariae is on the same order of magnitude as that of P. vivax (J. R. Forney, C. Wonsrichanalai, A. J. Magill, J. Sirrichaisinthop, and R. A. Gasser, Abstr. 49th Annu. Meet. Am. Soc. Trop. Med. Hyg., abstr. 239, 2000).

The ICT test line configuration is known for its limitations. When P. malariae appears with P. falciparum in a coinfection, it is not possible to assess whether the panmalarial antigen is expressed by the first organism. The inability of ICT to differentiate non-P. falciparum species also limits its use as an epidemiological tool. In areas of endemicity such as Myanmar, where P. vivax is not the only common non-P. falciparum species (3), we can no longer assume that samples with Plasmodium-positive, P. falciparum-negative ICT tests are due to P. vivax. It has yet to be shown that Plasmodium ovale can be detected with the kit.

REFERENCES

Daniel Philippe Mason
School of Medicine
University of California at San Francisco
San Francisco, California

Chansuda Wongsrichanalai
AFRIMS-Kwai River Christian Hospital Clinical Center
Sangkhlaburi, Kanchanaburi, Thailand

Khin Lin
Vector Borne Diseases Control Project
Department of Health
Yangon, Myanmar

R. Scott Miller
Armed Forces Research Institute of Medical Sciences (AFRIMS)
Bangkok, Thailand

Fumihiko Kawamoto*
Department of International Health
Nagoya University School of Medicine
23-1, Showa-ku, Nagoya
Nagoya 466-8550, Japan

*Phone: 81-52-744-2113
Fax: 81-52-744-2114
E-mail: hiko@med.nagoya-u.ac.jp