

Kan Donörlerinde Sıtma Araştırılması ve Optimal Hızlı Sıtma Testinin Klasik Yöntemle Karşılaştırılması

Hakan TEMİZ¹, Kadri GÜL²

¹Diyarbakır Government Hospital, Laboratory of Microbiology, ²Dicle University Medical Faculty, Department of Microbiology, Diyarbakır, Türkiye

ÖZET: Sıtma; hastalıkla yapılan tüm mücadelelere rağmen ülkemizin Güneydoğu Anadolu Bölgesi için problem oluşturmaktadır. Hastalığın bulaşması sivrisineklerle, kan ve kan ürünleri transfüzyonuyla, infekte kişilerden yapılan organ transplantasyonu ve kontamine enjektör kullanımıyla olmaktadır. İnfekte donörlerdeki parazit yükü az olduğundan kişilerde klinik semptomlar gözlenmeyebilir ve hastalık etkeni parazit donörlerde yıllarca canlı kalabilir. Bundan dolayı donör kanları bu açıdan iyice incelenmelidir. Bu çalışmanın amacı; bölgemizde endemik olan sıtma etkenlerinin transfüzyon aracılığıyla taşınıp taşınmadığını araştırmaktır. Bu amaçla 2006 yılında Dicle Üniversitesi Tıp Fakültesi Kan Bankasına başvuran 1850 donörün kanları hızlı test olan Optimal Rapid malaria test ve Giemsa boyama yöntemi ile incelendi. Her iki yöntem ile etken patojen tespit edilemedi. Sonuç olarak; kan bankalarında sıtma için kullanılan tarama testleri yararlı olmakla birlikte yeterli derecede duyarlı değildir. Endemik bölgelerde; donörlere ayrıntılı sorgulama formu ve fizik muayene uygulanması sıtma riski taşıyan donörlerin ayırımında kullanılabilir.

Anahtar Sözcükler: Sıtma, Hızlı sıtma testi, Kan Bankası

Investigation of Malaria in Blood Donors and Comparison of the Optimal Rapid Malaria Test to the Classical Method

SUMMARY: Malaria is still a problem in the southeastern region of Turkey despite all the effort to eradicate the disease. The spread of malaria is by the transfer of agents by mosquitoes, transfusions of blood and blood products, organ transplantations from infected individuals and the use of contaminated injectors. The numerical load of parasites in infected donors may be very low, therefore no clinical symptoms may be observed and Plasmodium species may live in the body of donors for years. As the agents may live long in the body of donors, the blood from donors must be examined thoroughly for agents. The aim of this study was to determine whether malaria which is endemic in our region is transmitted by transfusion products. The blood from 1850 donors, who presented at the Dicle University Faculty of Medicine Blood Bank (Diyarbakir) in 2006, was examined by the optimal rapid malaria test and by Giemsa stained preparations. No pathogens were detected by any of these methods. In conclusion, the screening tests for malaria may be useful but not sufficiently sensitive for blood banks. In endemic regions; a more specific questionnaire and physical examination can be used to exclude blood donors who are at the risk of malaria.

Key Words: Malaria, rapid malaria test, blood bank

INTRODUCTION

Malaria is a parasitic infection. It presents as an acute paroxysmal febrile disease in humans. It proceeds to the progressive form unless treated (15). Laveran was the first to detect the agents of malaria in human blood in 1880. In 1897 it

was detected to develop in *Anopheles*. Currently more than two billions of people are under the threat of malaria in more than 90 countries. Malaria is spread by the *sporozoa* carried by infected *Anopheles* during blood meal or by the transfer of infected erythrocytes during blood donation. The agent is also reported to spread by transfusions of thrombocytes and leukocytes, organ transplantation, contaminated injectors or needles and congenital route (6).

More than 40% of the world's population lives in regions risky for malaria. Each year 160-200 million of new cases are seen with a total of 300-500 millions of clinical cases annually, 2 millions of which die of the disease (24). Malaria

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Yazışma /Corresponding Author: Hakan Temiz

Tel: (90) (412) 228 54 34 Fax: (90) (412) 224 52 67

E-mail: drhakantemiz@gmail.com

is still an endemic infection in the Southeast Region of Turkey despite all the effort to eradicate the disease (23).

The geographic conditions in Diyarbakir are suitable for the reproduction of *Anopheles spp.* and malaria is still endemic. Distribution of total malaria cases in Turkey and Diyarbakir; between the years 2001 and 2006 is shown in Figure 1 (23, 26).

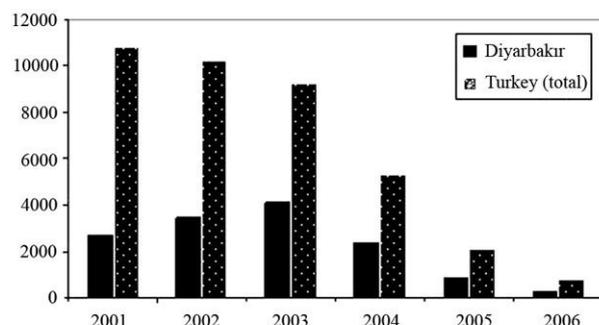


Figure 1. Distribution of total malaria cases in Turkey and Diyarbakir; between the years 2001 and 2006

The absence of a vaccine against malaria, the resistance development of *plasmodia* against drugs and the resistance of *anopheles* against insecticides end up with a more complicated problem. Malaria was also reported to transmit via transfusion in countries including the USA, Venezuela and Canada (21).

The aim of our study under the light of this information is to detect whether malaria is transmitted by blood transfusion from blood donors in Turkey and to compare the Optimal Rapid Malaria Test, which is a quick test to the classical Giemsa staining method.

MATERIAL AND METHODS

In the extent of this study, blood was drawn in year 2006, from 1850 volunteer donors who admitted to Dicle University Faculty of Medicine Blood Bank (Diyarbakir). The blood drawn from the donors were evaluated by DiaMED OptiMal Rapid Malaria Test (Quick Test) and by the classical method (the examination of Giemsa stained thick and thin blood smears).

By OptiMal Rapid Malaria Test; the presence of *plasmodium* lactate dehydrogenase (pLDH) specific to *plasmodium* species (*Plasmodium vivax*, *Plasmodium malaria*, *Plasmodium falciparum*, and *Plasmodium ovale*) was investigated in a short time period in donor bloods (less than 10 minutes) (2, 13).

In the classical method, the thick and thin blood smears prepared from the blood drawn from the donors were stained by Giemsa and examined for the agents.

RESULTS

In this study, the blood was drawn from volunteered donors between ages 18-65 who admitted to the Blood Bank of Dicle University Faculty of Medicine which is located in Diyarbakir,

which is an endemic region. The blood samples were examined by OptiMal Rapid Malaria Test and Giemsa staining which is accepted as the gold standard. None of the donors revealed parasite infected erythrocytes and pLDH.

DISCUSSION

The spread of malaria as a parasitic infection is via the transfer of agents by mosquitoes, transfusions of blood and blood products, organ transplantations from infected individuals and the use of contaminated needles and injectors (25, 28). The numerical load of parasites in infected donors could be very low, therefore no clinical symptoms may be observed and *Plasmodium* species may live in the body of donors for years. As the agents may live long in the body of donors, the blood from donors must be examined thoroughly for agents.

Costin *et al.* (4) have emphasized the importance of this situation by detecting the development of malaria in a 22-year-old female free of symptoms who was transfused during delivery. Kleinman *et al.* (12) reported three cases of transfusion malaria in Pennsylvania and Missouri between the years 1996-1998. Davidson *et al.* (5) emphasized that malaria might be spread via blood transfusions. Mungai *et al.* (14) detected 93 cases of transfusion malaria in 28 states between the years 1963-1999. These studies indicate that the best way to prevent transfusion malaria is to examine the donor blood for malaria.

In our country malaria is still an important disease. 74 cases of transfusion malaria were reported between the years 1977-2003. Cases were reported by Öksüz *et al.* (16) from Trabzon, Yaylı *et al.* (27) from Isparta and Işıkdöğün *et al.* (8) from Diyarbakir. It is known that malaria could be transmitted by organ transplantation. Yenen *et al.* (28) reported transmission of *Plasmodium vivax* by kidney transplantation. The transmission of malaria by transfusion is still an important issue. Quick tests are required to prevent the spread in blood banks. The diagnosis through the classical method takes a long time as well as it requires educated staff (14, 17).

Different results were obtained from studies that compare the classical method to OptiMal Rapid Malaria Test. Tarazona *et al.* (22) searched for the agents of malaria in the blood of 72 patients by thick preparations and OptiMal test and reported a 54% positivity with thick preparations and a 50% positivity with OptiMal test. Iqbal *et al.* (9) reported that they determined 25% positivity with thick preparations and 30% positivity with OptiMal test in the blood of 930 patients with suspected malaria. Again Iqbal *et al.* (10) investigated the agents of malaria in another study in 550 immigrants by microscopy, PCR and OptiMal test and they detected positivity ratios of 23%, 26% and 17% respectively. In a study conducted by CDC to determine the significance of OptiMal test, blood material from 273 suspected cases were examined by microscopy, PCR and OptiMal test. OptiMal test was found to be 90.5% specific and 97.5% sensitive for *P.falciparum* (3).

Hunt-Cooke *et al.* (7) compared the classical and quick tests on people with suspicion of malaria and they recommended the use of the quick test where the use of microscopy is inappropriate or where no sufficient number of staff is available. Pattanasin *et al.* (19) from Thailand reported 88% sensitivity and 92% specificity for OptiMal test for the diagnosis of *P.falciparum* parasites. Aslan *et al.* (1) compared the results with thick preparations (the classical method) to the results from OptiMal test and concluded that OptiMal test may be used as a new and quick test. Palmer *et al.* (18) detected that OptiMal test is less sensitive than the classical method whereas it is as specific as the other tests. These results suggest that OptiMal Rapid Malaria Test may be used for the quick diagnosis of malaria (2). Nonetheless, no matter what strategy is adopted, it is likely that cases of transfusion-transmitted malaria may still occur, so malaria must always be considered in any patient with a febrile illness post-transfusion (11).

In Turkey; there are two studies conducted to determine the incidence of malaria spread by transfusion from donors. One of these is a study by Seyrek *et al.* (20) from Şanlıurfa. In this study blood from 5000 donors ;aged between 18-65; were examined by the classical method and no infected erythrocytes were detected. In the other study, Öner *et al.* (17) examined the blood from 2229 donors by the classical method and by OptiMal Rapid Malaria Test where no infected erythrocytes were detected by the classical method or *plasmodium* specific lactate dehydrogenase enzyme was detected by the quick test.

All donor candidates asked for malaria and candidates presenting evidence of malaria disease did not accepted as donor. In last three years; the total number of malaria cases showed a significant decrease in our region and all over the Turkey (23, 26). The detection of no parasites in blood donors may be dependent on these conditions.

In conclusion, the screening tests for malaria may be useful but not sufficiently sensitive for blood banks. In endemic regions; more specific questionnaire and physical examination can be used to exclude blood donors who are at the risk of malaria.

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