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Comparison of Peripheral Smear With Immuno Chromatography for The Diagnosis of Malaria.

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ABSTRACT

Malaria is common cause of fever in hot, humid conditions. It is caused by four species of Plasmodium vivax, faliciparum, malariae and ovale. Vivax and falciparum are widely distributed species.Conventional method of diagnosis is Microcopy of the thin and thick smear for detecting Malarial parasites with stains are still the gold standards. Though the microscopy is relatively Inexpensive, there are certain limitations. A total of hundred suspected cases of malaria were screened by peripheral smear and by Immuno chromatography test Smear was stained by Leishman stain and screened for Parasites. Rapid tests are available based on histidine rich protein-II and parasite lactate Dehydrogenase Vivax was the pre dominant species. (53%), followed by falciparum (37%), and mixed infection (10%) by peripheral smear.Immunochromatography test shows 52% vivax, 37% falciparum and 11% mixed infection.Specificity of Immunochromatography was 94.1%, and sensitivity was found to be 96%. The sensitivity of peripheral smear was found to be 97.7% and specificity was found to be 100% when compared to clinical diagnosis as standard. The specificity and sensitivity with peripheral smear was comparable to rapid test. Microcopy is best, economical and good in hospital. For routine screening if no expert is available rapid tests are good .It is quick easy to perform. It can be used in field condition.

KEYWORDS malaria; Rapid diagnosis kit

Introduction

Malaria is common cause of fever during the monsoon Malaria is common cause of fever in hot, humid conditions. Approximately 3oo million new Cases occur every year. It is caused by four species of plasmodium ***vivax, faliciparum, malariae*** and ***ovale***.[1] Vivax and falciparum are more widely distributed species. Climatic changes, human migration and drug resistance are the key factors that affect the spread of malaria [2]

The most common species in Africa, Papua New Guinea and Haiti is P***. falciparum,*** In South-East Asia, India, and Middle East it is ***P.*** vivax***,*** In China it is ***P .vivax*** with a long incubation period. In West Africa and Philippines it is ***P .ovale***, and ***P. malaria***e [3] the risk of infection is more common amongst men, than in women and 15- 40 years age group is the most commonly affected age group.[4]

New malaria ecotypes have been identified. [5] and major vectors transmitting malaria are seen in India There are 10 billion cases under treatment, and 800-1000 death reported by NAMP in the last few years. [5, 6]

Diagnosis by peripheral smear is the conventional method for the diagnosis of malaria.

Though the smear is relatively inexpensive, there are certain limitations such as; it requires experience and dependent absolutely on individual microscopist skills, techniques, microscopes and reagents which may vary. It also takes time and each slide may take 60 minutes.

It cannot detect in apyrexic phase of the disease, early phases and for monitoring of treatment Hence the study was done to evaluate the immuno chromatography test.

Material and methods

Conventional method of diagnosis is by microscopic examination of the thin and thick blood smear and remains the gold standard. It is the established method for the Laboratory diagnosis and for the confirmation of clinical Diagnosis. It can detect as low as 10 Parasites per µl of blood. It also helps in species identification and for assessing the parasite load.

It is cheap and can be performed in almost all laboratories.. It can be done by smearing one drop of blood on a glass slide and followed by staining.[6]

A total of hundred suspected cases of malaria were screened by peripheral smear and by Immuno chromatography test during the period 2010. Smear was stained by Leishman stain and screened for Parasites.

Blood was collected and the thick and thin blood smear was made on a glass slide. It is good method for detection of malaria.[7] The following stains Giemsa, Leishman, and Field's was used for staining. The stained slides are examined under the microscope for the presence of parasites particularly the tail end of the smear .for the diagnosis, World health organization recommends examination of minimum of 100 fields that is ,approximately 20 White blood cells, to be screened before reporting a thick smear negative, assuming an average WBC count of 8,000 per micro liter of blood, this gives a threshold sensitivity of 4 Parasites per micro liter of blood. In non immune patients, symptomatic malaria can occur at lower parasite densities, and screening more fields (e.g., 200, 300, or even the whole smear) might be warranted [7,8,9,10] .

The rapid test was done per manufactures instruction these tests are based on histidine rich protein-II and parasite lactate Dehydrogenase[11] The test requires whole blood or serum and results are obtained within 15 minutes. It utilizes the principle of immune chromo photography. As test sample flows through the membrane assembly of the dipstick, a colored anti body colloidal gold conjugate complexes with the antigen is formed.. The complex is immobilized by the antibody thus forming a colored band which is taken as confirmation of a Positive test .[12,13]

The histidine is a protein produced by trophozoites of the malaria parasite. The detection of this enzyme is also based on immuno --chromatography. It is a good antigenic marker for active malarial infection.[14,15]

Results.

Table1: shows the number of positive results of both the test.

Result	Peripheral smear	Immunochromatography test
positive	86	85

Table2: shows the various species of plasmodium positive by smear, and their percentage.

Test.	Plasmodium vivax	Plasmodium falciparum	Mixed infection
Peripheral smear	46(53%)	32(37%)	8(10%)

Table3: shows the various species of plasmodium positive by rapid test and their Percentage.

Test.	Plasmodium vivax	Plasmodium falciparum	Mixed infections
Immunochromatography test	44(52%)	32(37%)	9(11%)

Discussion.

The total number of suspected cases was hundred febrile patients. Out of that nine patients were positive for Widal and Dengue. Three patients did not follow up with the investigations. Eighty eight patients were clinically diagnosed with malaria based on clinical signs .There was male Preponderance 62% males and 38% were females. The age group varied from five years to sixty five years. Rapid test showed one false positive, which was negative by smear.

Vivax is the pre dominant species. (53%), followed by falciparum (37%), and mixed infection (10%) by examination of peripheral smear.

Immunochromatography test shows 52% vivax, 37% falciparum and 11% mixed infection.

Specificity of Immunochromatography was 94.1%, and sensitivity was found to be 96%. .

Positive predictive value compared with smear as standard was 97.7%and negative predictive value was94%%. The sensitivity of peripheral smear was found to be 97.7% and specificity was found to be 100% when compared to clinical diagnosis as standard..

Our study shows higher positive predictive value 97.7%as compared to K.Ravi Kumar etal,[16] but the sensitivity and specificity was comparable.

The sensitivity of rapid test varied from 95-97% and positive and negative predictive value varied from 97% to 98.2%. in similar studies. Identification of falciparum species was 100%when compared to peripheral smear, which is similar to our study.

Farcos etal found comparable results with smear 95%for falciparum, 87% for vivax and 83% for others[17] Our study showed 100% for falciparum, 95% for vivax and 88% for others (mixed infections)..Our study was comparable to William M. Stauffer etal..[18]

Microscopy is an age old practice and still considered the best tool for the diagnosis of malaria Rapid tests are good, and cost effective. These can be performed by any technical staff. QBC is very good and has sensitivity and specificity equivalent to microcopy. Molecular methods are good for identification of species and in the early phases of disease. The test preference depends on the laboratory set up. For routine screening if no expert is available rapid tests are good, even in field conditions rapid test can be used [14] Microcopy is best, and most economical and preferred in hospital settings. [19,20.]

Rapid kits can be used for large screening, and in detecting plasmodium falciparum infections.

The specificity is good and can be used in field and in any set up where the reports need to be fast and treatment needs to be started. Primary health care settings rapid test is good, as it does not require lab set up and trained expert. In microscopy. Confirmation of the results can be done by smear and other methods..

conclusion.

The specificity and sensitivity with peripheral smear was comparable to rapid test.

Microcopy is best, economical and good in hospital. For routine screening if no expert is available rapid tests are good .It is quick easy to perform. It can be used in field condition.

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