Tikrit University

College of Nursing

Basic Nursing Sciences

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Microbiology

Parasitology

Malaria Diagnosis

By: assistant lecturer

Ghufran Ayad Ahmed

Malaria Diagnosis

Diagnosis of malaria can be difficult:

Where malaria is not endemic any more (such as in the United States), health-care providers may not be familiar with the disease. Clinicians seeing a malaria patient may forget to consider malaria among the potential diagnoses and not order the needed diagnostic tests. Laboratorians may lack experience with malaria and fail to detect parasites when examining blood smears under the microscope.

In some malaria-endemic areas, malaria transmission is so intense that a large proportion of the population is infected but not made ill by the parasites. Such carriers have developed just enough immunity to protect them from malarial illness but not from malarial infection. In that situation, finding malaria parasites in an ill person does not necessarily mean that the illness is caused by the parasites.

Clinical diagnosis

Clinical diagnosis is based on the patient's symptoms and on physical findings at examination.

The first symptoms of malaria (most often fever, chills, sweats, headaches, muscle pains, nausea and vomiting) are often not specific and are also found in other diseases (such as the "flu" and common viral infections). Likewise, the physical findings are often not specific (elevated temperature, perspiration, tiredness).

In severe malaria (primarily caused by Plasmodium falciparum), clinical findings (confusion, coma, neurologic focal signs, severe anemia, respiratory difficulties) are more striking and may increase the index of suspicion for malaria.

Clinical findings should always be confirmed by a laboratory test for malaria.

In addition to ordering the malaria specific diagnostic tests described below, the health-care provider should conduct an initial workup and request a complete blood count and a routine chemistry panel. In the event that the person does have a positive malaria test, these additional tests will be useful in determining whether the patient has uncomplicated or severe manifestations of the malaria infection. Specifically, these tests can detect severe anemia, hypoglycemia, renal failure, hyperbilirubinemia, and acid-base disturbances.

Microscopic Diagnosis

Malaria parasites can be identified by examining under the microscope a drop of the patient's blood, spread out as a "blood smear" on a microscope slide. Prior to examination, the specimen is stained (most often with the Giemsa stain) to give the parasites a distinctive appearance. This technique remains the gold standard for laboratory confirmation of malaria. However, it depends on the quality of the reagents, of the microscope, and on the experience of the laboratorian.

Antigen Detection

Various test kits are available to detect antigens derived from malaria parasites. Such immunologic ("immunochromatographic") tests most often use a dipstick or cassette format, and provide results in 2-15 minutes. These "Rapid Diagnostic Tests" (RDTs) offer a useful alternative to microscopy in situations where reliable microscopic diagnosis is not available. Malaria RDTs are currently used in some clinical settings and programs. The World Health Organization is conducting comparative performance evaluations of many of the RDTs which are

commercially available worldwide based on a panel of parasites derived from a global network of collection sites.

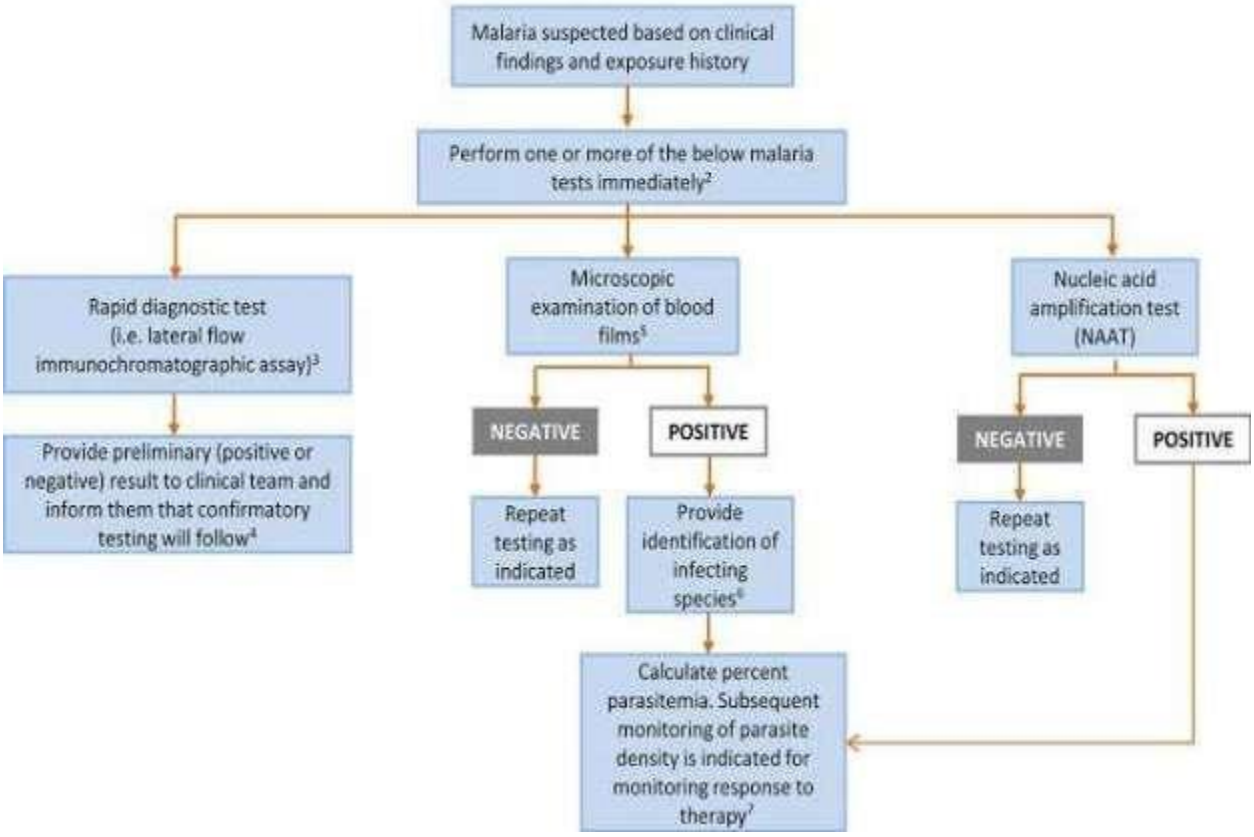
Molecular Diagnosis

Parasite nucleic acids are detected using polymerase chain reaction (PCR). Although this technique may be slightly more sensitive than smear microscopy, it is of limited utility for the diagnosis of acutely ill patients in the standard healthcare setting. PCR results are often not available quickly enough to be of value in establishing the diagnosis of malaria infection.

PCR is most useful for confirming the species of malarial parasite after the diagnosis has been established by either smear microscopy or RDT.

Serology

Serology detects antibodies against malaria parasites, using either indirect immunofluorescence (IFA) or enzyme-linked immunosorbent assay (ELISA). Serology does not detect current infection but rather measures past exposure.


Malaria suspected based on clinical findings and exposure history
Perform one or more of the below malaria tests immediately[2]
Rapid diagnostic test (i.e. lateral flow immunochromatographic assay)[3]
Provide preliminary (positive or negative) result to clinical team and inform them that confirmatory testing will follow[4]
Microscopic examination of blood films[5]
NEGATIVE
POSITIVE
Repeat testing as indicated
Provide identification of infecting species[6]
Nucleic acid amplification test (NAAT)
NEGATIVE
POSITIVE
Repeat testing as indicated
Calculate percent parasitemia. Subsequent monitoring of parasite density is indicated for monitoring response to therapy[7]


Malaria - Test
CBC
ESR
G-6-P-D
HEMATOCRIT (HC
MALARIA
RETICULOCYTE COUNT
PLATELET COUNT
CID FAST STAIN
PREPARETION