CLINICAL ASPECTS MALARIA

DEFINITION
Malaria is an acute and chronic disease caused by obligate intracellular protozoa of the genus Plasmodium. P. falciparum, P. vivax, P. ovale, P. malariae, P. knowlesi

Epidemiology
- Endemic throughout most of the tropics.
- In 2015, 3.2 billion people were at risk of malaria. Most cases and deaths occur in sub-Saharan Africa.
- Asia, Latin America, and, to a lesser extent the Middle East and parts of Europe, are at risk.

Higher risk groups
- Infants, children under 5 years of age
- Pregnant women
- Patients with HIV/AIDS
- Non-immune migrants
- Travellers.

In Egypt, P. vivax is the commonest type and the female anopheles (pharoensis or sergenti) is the commonest vector.

Transmission
1-Bite of an infected female Anopheles mosquito
2-Rarely:
- blood transfusion
- shared needle use
- Congenital from mother to fetus

Life cycle
- Human cycle: Liver & Erythrocyte
- Anophyline cycle

PATHOPHYSIOLOGY

1. Destruction of erythrocytes.
2. Liberation of the parasites & erythrocytes material into circulation and host reaction to these events.
3. Erythrocytes sequestration in microcirculation
   - Erythrocyte containing P. falciparum adhere to microvascular endoth. (cytoadherance),
   - Occur in venules of vital organs (brain, heart liver, kidney, intestine )

4. Rosetting
   → Erythrocyte containing parasites adhere to uninfected erythrocyte leading to formation of rosettes.

5. Deformability
   → As the parasite matures inside the erythrocyte, the normally flexible biconcave disc becomes more spherical and rigid.

6. Permeability
   → There is mild generalized increase in systemic permeability in severe malaria

CLINICAL MANIFESTATION

1) Non specific symptoms (influenza-like):
   Headache, muscular pain, lethargy, lassitude.
2) Fever (paroxysm):
   - Ruptured schizont release pyrogens cytokines secretion by leucocytes fever
   - Classic paroxysm: Cold stage → Hot stage → Sweating stage
3) Anaemia:
   - Hemolytic in type.
   - Most marked in p. falciparum
4) Jaundice:
   - Hemolytic, hepatocellular, cholestatic.
   - Deep jaundice occur in P. falciparum
5) Splenomegaly:
   - The spleen enlarged in all forms of acute M.
   - 2ry hypersplenism (in repeated attacks)
6) Malarial dysentery:
   - Occur in P. falciparum.
   - Due to intestine. infarction 2ry to intest. Sequestration
7) Relapse:
   - P. vivax and p. ovale.
   - Due to maturation of persistent hypnozoites in liver.
8) Recrudescence:
   - P. falciparum and P. Malariae.
   - It is renewed manifestation of M. with appearance of parasitaemia.

DIAGNOSIS OF MALARIA

1. Clinical diagnosis
2. Direct method: Blood film
3. Indirect methods:
   - Therapeutic test
   - Serology
4. New methods:
   1) Quantitative buffy coat (QBC) technique:
   2) Dipstick methods:
   3) PCR:
**TREATMENT**

- Malaria is treated with antimalarial drugs and measures to control symptoms, including medications to control fever, antiseizure medications when needed, fluids and electrolytes.
- The treatment depends on the severity of the disease and the likelihood of chloroquine resistance.
- People with *falciparum* malaria have the most severe symptoms.

- People with *falciparum* malaria may need to be monitored in the intensive care unit of a hospital during the first days of treatment because the disease can cause breathing failure, coma and kidney failure.
- For pregnant women, chloroquine is the preferred treatment for malaria. Quinine, proguanil and clindamycin typically are used for pregnant people with malaria that is resistant to chloroquine.

<table>
<thead>
<tr>
<th>Chloroquine-sensitive areas</th>
<th>Chloroquine-resistant areas</th>
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<tbody>
<tr>
<td><strong>UNCOMPLICATED P. VIVAX &amp; P. OVALE</strong></td>
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<tr>
<td>1. Chloroquine</td>
<td>1. Quinine</td>
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<tr>
<td>1000 mg salt oral loading dose followed by 500 mg salt orally at 6 h, 24 h, and 48 h</td>
<td>625 mg salt orally 3 times a day for 7 d plus doxycycline, tetracycline, or clindamycin</td>
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<td>Followed by</td>
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<tr>
<td>2. Primaquine</td>
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<tr>
<td>52.6 mg salt orally every day for 14 d</td>
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| Chloroquine-resistant areas |  |
|-----------------------------|  |
| **UNCOMPLICATED P. FALCIPARUM** |  |
| Chloroquine | First line |
| 1000 mg salt oral loading dose followed by 500 mg salt orally at 6 h, 24 h, and 48 | |
| h | 1. Atovaquone-proguanil |
| | 4 tablets orally every day for 3 d or |
| | Artemether-lumefantrine |
| | 4 tablets oral starting dose, followed by 4 tablets orally 8 h later, followed by 4 tablets orally twice a day for 2 d |
| | Second line: Mefloquine |

**MCQ**

1. **Statement regarding malarial nephrosis are not true?**
   a) Is due to antigen antibody reaction bound firmly to the glomerular basement membrane
   b) Caused by *P. falciparum*
   c) Typically associated with nephrotic syndrome, anaemia, hepatosplenomegaly
   d) Antimalarial does not prevent progression

2. **Statement regarding Plasmodium falciparum is not true?**
   a) Causes more severe disease in pregnancy
   b) Is associated with recurrent relapses after initial treatment because of liver hypnozoites
   c) Is the only malarial parasite causing greater than 20% parasitaemia
   d) Is the only cause of cerebral malaria

3. **Statement regarding black water fever is not true?**
   a) Is due to acute tubular necrosis resulting from severe intra vascular hemolysis.
   b) Characterized by hemoglobinuria, bilirubinuria, oliguria.
   c) Caused by *p. malariae* infection
   d) Clinically characterized by fever, rigors, vomiting, jaundice.

4. **The first line of treatment of P. falciparum in chloroquine resistant area is :**
   a) Mefloquine
   b) Chloroquine
   c) Primaquine
   d) Artemether-lumefantrine

5. **statement regarding fever in malaria (paroxysm) is true:**
   a) Each paroxysm has 2 successive stages.
   b) Mediated by cytokines secreted in response to pyrogens released from ruptured schizont.
   c) Results from erythrocytes sequestration in microcirculation of vital organs
   d) Paroxysm occur every 72 hours in *p. falciparum* infection

6. **statement regarding relapse in malaria is not true:**
   a) It is reinvasion of blood cells after periods of totally absence of parasites from blood.
   b) Occur week, month or year after primary infection
   c) Occurs only in *P. vivax* and *p. ovale*.
   d) Results from multiplication of small number of erythrocytic parasites which survived the development of the host antibodies