A review of Antimalarial agent

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ABSTRACT

Malaria is infectious diseases caused by parasites. Antimalarial drugs are the mainly cause p.vivax, p.falciparum, p.ovule it is important disease in world. In this review can discuss life cycle of malaria then pharmacokinetics, sign and symptom, mechanism of action

Keywords— Malaria, Life cycle malaria, Death rate 2002-2007

1. INTRODUCTION

blood sucking infections motionless one of the major causes of death in the third world countries. Blood sucking protozoan belonging to genus Plasmodium causes malaria, one of the most severe humid diseases. The four identified species of the parasite steady for inflicting human malaria are Plasmodium [1]

Table 1: Differences between various types of Parasites that cause malaria [2]

<table>
<thead>
<tr>
<th>Plasmodium type</th>
<th>Type that causes malaria</th>
<th>Endemic area</th>
<th>Febrile seizure period</th>
<th>Involvement and severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falciparum</td>
<td>tropical malaria</td>
<td>In all endemic areas</td>
<td>Irregular Crisis</td>
<td>Very serious, it can cause death if not treated quickly and effectively.</td>
</tr>
<tr>
<td>Vivax</td>
<td>tertan malaria</td>
<td>South America and Asia</td>
<td>Every 2 days</td>
<td>Grave, but with a delayed onset.</td>
</tr>
<tr>
<td>malariae</td>
<td>quartan malaria</td>
<td>South America and Asia</td>
<td>Every 3 days</td>
<td>Moderate, less frequently.</td>
</tr>
<tr>
<td>Ovale</td>
<td>tertan malaria</td>
<td>Africa</td>
<td>Every 2 days</td>
<td>Moderate, less frequently.</td>
</tr>
<tr>
<td>Knowlesi</td>
<td>It is mistaken with quartan malaria</td>
<td>Malaysia, Thailand and Cambodia</td>
<td>Every 24 hours</td>
<td>It can cause death if not treated quickly and effectively.</td>
</tr>
</tbody>
</table>

2. LIFE CYCLE

Four major types of plasmodia infect to men

(a) P.vivax
(b) P.falciparum
(c) P.ovule
(d) P.malaria

The individual is infected by malarial parasites through the bite of a female anopheles’ mosquito. The disease can also transmitted blood from mother to fetus across the placenta. After the sporozoites develop various stage:

- Pre-erythrocytic stage
- Erythrocytic stage
- Development of sexual forms
(a) pre-erythrocytic stage
- The duration of this phase 5-7 days for p.falciparum
- 8 days for p.vivax
- This phase releases thousand merozoites into the blood stream

(b) Erythrocytic stage
- In this phase multiplication of schizonts
- The release of merozoites is associated through paroxysm of fever with inflexibility

(c) Development of sexual forms
- Mosquito Bite sucked from blood mature into gametes in the mosquito gut
- Female gamate combine with male gamate to formation of zygote
- Zygote invades the gut wall to form oocyst [4]

Classification according to chemical nature

<table>
<thead>
<tr>
<th>CHEMICAL CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 – aminoquinolines</td>
</tr>
<tr>
<td>- Chloroquine, amodiaquine</td>
</tr>
<tr>
<td>8 – aminoquinolino</td>
</tr>
<tr>
<td>- Primaquine</td>
</tr>
<tr>
<td>4 – quinoline methanol</td>
</tr>
<tr>
<td>- Mefloquine</td>
</tr>
<tr>
<td>Quiniline containing cinchona alkaloids</td>
</tr>
<tr>
<td>- Quinine, quinidine</td>
</tr>
<tr>
<td>Diaminopyrimidine</td>
</tr>
<tr>
<td>- Pyrimethamine</td>
</tr>
</tbody>
</table>

3. SIGNS AND SYMPTOMS OF MALARIA
(a) Fever
(b) Chills
(c) Headaches and diaphoresis

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(d) Dizziness
(e) Malaise
(f) Myalgia
(g) Abdominal pain
(h) Nausea,
(i) Vomiting,
(j) Mild diarrhea,
(k) Dry cough [6]

4. MECHANISM OF ACTION OF DRUG

**Mechanism of action**

- **Hemoglobin** → **Globin utilized by malarial parasite**

  - **Heme** (highly toxic for malaria parasite)

  - **Chloroquine**
  - **Quinine, mefloquine**

  - **Heme Polymerase (+)**

  - **Hemozoin** (Not toxic to plasmodium) [7]

**Pharmacokinetics of drugs**

Antimalarial drugs, particularly those which are hydrophobic and lipophilic, are poorly absorbed after oral or intramuscular administration. Blood concentrations are inversely proportional to bioavailability.[8]

**Transmission**

Malaria is transmitted through the bites of female *Anopheles* mosquitoes. There are more than 400 different species. They also depend on climatic conditions that may affect the number and endurance of mosquitoes, such as rainfall patterns, temperature, and humidity [9]

**Prevention**

**Antimalarial therapy**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Explanation</th>
<th>Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causal prophylaxis</td>
<td>The preerythrocytic phase (in liver) which is the cause of malarial infection. The target is the purpose</td>
<td>Primaquine, Proguanil</td>
</tr>
<tr>
<td>Suppressive prophylaxis</td>
<td>Schizontocides which suppress the erythrocytic phase and thus attack of malarial fever</td>
<td>Chloroquine, Quinine, Mefloquine, Doxycycline</td>
</tr>
<tr>
<td>Radical cure</td>
<td>Total eradication of parasite from the blood</td>
<td>Primaquine, Tafenoquine</td>
</tr>
</tbody>
</table>

**Death rate in the world**

**Sustained Progress in the Worldwide Fight Against Malaria**

Estimated number of deaths caused by malaria worldwide between 2002 and 2012
5. CONCLUSION
To reduce date rate in the world, public awareness of the growing risk presented by the resurgence of malaria.

6. REFERENCES
[6] Trampuz. A; Jereb.M; Clinical review: Severe malaria; Us national library of Medicine National Institutes of health; Published online 2003 Apr 14
[7] https://www.slideshare.net/nasertadvi/antimalarial-drugs-15555784