Residual house spraying against malaria must be done correctly to be effective

To the Editor: Residual indoor spraying with DDT or one of the (semi) pyrethroids is a well-established method of malaria control. It is still the main preventive means used in malaria control programmes worldwide.\(^1\) Considerable successes have been booked in the southern African region with programmes depending largely on residual indoor spraying.\(^2\) However, for this method to be effective a number of conditions have to be met.\(^3\) Among these are factors relating to the implementation method, timing, spraying technique, supervision, etc.

In Zimbabwe annual spraying has become a routine. However, its effectiveness has not been firmly established. Repeated prevalence surveys in otherwise comparable sprayed and unsprayed areas in Mt Darwin district, Zimbabwe, showed non-significant marginal effects in favour of spraying, namely 15% and 19% in April (peak season), and no difference in prevalence in September (10% in both areas) (unpublished report presented at the National Malaria Review Meeting, Victoria Falls, 1995).

In an attempt to appraise possible effects of spraying as it is routinely carried out (in our case with \(\alpha\)-cypermethrine\(^4\)), we conducted a longitudinal case-controlled study in the same area in Mt Darwin District in Mashonaland Central Province. We followed up 400 schoolchildren (mean age 12 years) through repeat blood slide examinations, a proven method to estimate malaria morbidity incidence rates.\(^5\)

In the group of children from sprayed villages there were 120 new episodes from a total of 23,129 days’ observation, leading to an incidence rate (IR) of 0.623 per person season. The figure for the unsprayed villages was 148 infections, 19,882 days and an IR of 0.893 respectively. This difference, although slight, is significant \((p = 0.04)\).

With regard to frequency of malaria, the number of episodes per child per season was calculated and compared according to spray status of the area. Differences were found to be pronounced. Of the 200 children in the schools in sprayed villages, 102 (51%) had malaria once or more as opposed to 109 (54%) in the group from the unsprayed villages. In other words, 49% and 45.5% of children in sprayed and unsprayed areas respectively remained malaria free \((p = 0.62)\).

However, children in unsprayed areas had more repeat incidents of malaria infection; 34% versus 10% had two or more episodes, and 9.5% versus 1% had three or more episodes (Table I).

These findings suggest that the spraying provided some protection against repeat infections, but did not protect against an initial malaria infection.

The abovementioned findings and observations made in the field during the spraying campaign lead us to make the following recommendations:

1. When considering such costly programmes, each of the possible arguments for residual house spraying should be weighed. Any national malaria vector control programme needs sustained and authoritative input from expert entomologists.

2. All monitoring tools available should be integrated in a spraying programme, without which the activity should not be embarked upon. This strict quality control routine should not be compromised. It implies certain organisational conditions that would lead to increased ‘verticalisation’, a situation that carries its own disadvantages.

3. When choosing a control strategy the cost of spraying (with ‘in-built’ quality monitoring) has to be set against the cost of other preventive measures.

4. Recent widely tested alternative methods of vector control\(^6\) are more cost effective than an insufficiently supervised spraying campaign.\(^8\)

<table>
<thead>
<tr>
<th>Severity (number of malaria episodes)</th>
<th>Spray status</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>None</td>
<td>98</td>
</tr>
<tr>
<td>One</td>
<td>82</td>
</tr>
<tr>
<td>Two</td>
<td>11</td>
</tr>
<tr>
<td>Three</td>
<td>8</td>
</tr>
<tr>
<td>More than three</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
</tr>
</tbody>
</table>

Chi-square = 20.6, \(p = 0.00035\)

A van Geldermalsen

E Govere
Ministry of Health and Child Welfare
Mashonaland Central
Zimbabwe

P van der Stuyft
Prince Leopold Institute for Tropical Medicine
Antwerp
Belgium


Chloroquine-induced retinal toxicity

To the Editor: Many patients in South Africa develop profound visual loss every year as a result of chloroquine toxicity. The patients are often oblivious of the toxic effects of the drug and have been given higher-than-recommended doses, very often due to the ignorance of prescribing doctors. These patients have not been sent for ocular testing. There is no means of reversing the drug’s blinding effect.

Hydroxychloroquine (Plaquenil) is much safer than chloroquine, with a lower risk of retinal damage (maximum dose 400 mg/day or 6.5 mg/kg/day). It is currently available on motivation on a named patient basis from Sanofi Synthelabo (tel. (011) 319-8656), and should always be used instead of chloroquine.

Chloroquine-related blindness has been almost completely eradicated in Western countries where hydroxychloroquine is freely available.

Maculopathy is a much less frequent occurrence and is much less severe if hydroxychloroquine is used rather than chloroquine.2

Chloroquine (Nivaquine, Daramal, Plasmoquine) is an antimalarial first used during World War II. It is prescribed for treatment of amoebiasis, rheumatoid arthritis, juvenile chronic arthritis, systemic lupus erythematosus and discoid lupus and as prophylaxis against malaria.

The drug is excreted very slowly from the body and becomes concentrated in the melanin-containing cells of the retinal pigment epithelium (RPE) and choroid.

Retinal toxicity with degeneration of the RPE and neurosensory retina occur and are a severe sight-threatening complication of chloroquine use.

Most cases of toxicity have developed when a higher-than-recommended dose is used: 200 mg/day or 3.5 mg/kg/day (using lean body weight). A total cumulative dose between 100 and 300 g is usually required to cause toxicity, i.e. 200 mg/day for 3 years.

The earliest visual manifestation of retinal toxicity is a paracentral scotoma. This occurs before visual acuity loss or ophthalmoscopic fundus changes. If the drug is discontinued the scotoma usually disappears.

By the time a characteristic bull’s eye maculopathy occurs there is moderate visual acuity loss (6/18 - 6/12), with an area of depigmentation around the fovea surrounded by a ring of hypopigmentation. This enlarges slowly. This stage of retinopathy may progress even if the drug is stopped, and indicates irreversible damage.2

Eventually there is end-stage maculopathy with severe visual acuity loss and marked atrophy of the RPE of the entire retina with unmasking of the choroidal vessels as well as secondary damage to the neurosensory retina. Retinal arteries become attenuated, the optic disc is pale and pigment clumps develop in the peripheral retina (pseudo-retinitis pigmentosa).

Screening is mandatory for all patients on chloroquine therapy:3 (i) baseline examination by an ophthalmologist within 6 months of starting treatment; (ii) annual screening for the first 5 years after starting treatment if patients are taking higher-than-recommended doses and are at higher risk due to age over 60 years, or associated renal/liver or retinal disease; and (iii) 2-yearly for other low-risk users of chloroquine.

Fluorescein angiography is also helpful in early demonstration of RPE abnormalities before vision loss occurs.

Prevention is the best form of treatment.

Strict adherence to drug dosages is imperative. The chloroquine daily dose is thought to be more important than the cumulative dose and should be tailored according to gender and height (Table I).

Pressure by rheumatologists, dermatologists and ophthalmologists to get hydroxychloroquine registered in South Africa is critical. We encourage all prescribing doctors in South Africa to switch their patients to hydroxychloroquine.4 This will bring us in line with other countries where chloroquine-induced blindness has been virtually eliminated.

Kelvin Rivett
President, Vitreoretinal Society of South Africa
18 St James Road
East London, E Cape

Table I. Recommended daily chloroquine dosage

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>Tablet/week</th>
<th>Height (cm)</th>
<th>Tablet/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
</tr>
<tr>
<td>&lt; 146</td>
<td>4</td>
<td>&lt; 150</td>
<td>5</td>
</tr>
<tr>
<td>146 - 156</td>
<td>5</td>
<td>150 - 160</td>
<td>6</td>
</tr>
<tr>
<td>158 - 172</td>
<td>6</td>
<td>&gt; 162</td>
<td>7</td>
</tr>
<tr>
<td>&gt; 172</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
