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RADICAL TREATMENT OF MALARIA AND OPERATIONAL DIFFICULTIES IN IMPLEMENTATION

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In the eradication programme the radical treatment of malaria should not only mean the elimination of symptoms, but should also include the thorough and complete cure of the disease in such a manner that all blood and tissue stages of the parasite are entirely eliminated. The points to be emphasized, the prevention of relapses of the disease, and the elimination of the gametocytes. This will ensure that the anophelines existing in the area will be prevented from causing new transmission. In the radical treatment the elimination of gametocytes is of considerable importance for the following reasons:-

The carrying out of the radical treatment is practicable in the advanced attack and consolidation phases owing to the absence of transmission and to the low percentage of positive cases. During the consolidation phase the density of anopheline vectors increases, and if no attention is paid to the gametocytes in the radical treatment the re-establishment of transmission is greatly probable. It is, therefore, essential to consider the plasmodium species and the definite effect of the various anti-malaria drugs on the different forms and stages of the radical treatment.

1. CLASSIFICATION OF WELL-KNOWN ANTI-MALARIA DRUGS IN THE PROGRAMME

The effect of these drugs on the various stages of the life-cycle of the parasite from the radical treatment viewpoint, is as follows: (Causal prophylactic and sporontocidal drugs are not included).

1.1 Blood Schizonticide: The following drugs are effective on all the asexual erythrocytic forms:

a) 4-Aminoquinoline (chloroquine, amodiaquine)
b) Quinine
c) Mepacrine

These drugs have a strong effect on the clinical sumptoms, but the proguanil group has a weaker effect.

1.2 Anti-relapse drugs (Secondary tissue schizonticides) are effective on the exoperythrocytic phase in P. vivax and P.malariae in the liver. The most useful compounds are:-

8-Aminoquinolines (Pamaquine, Primaquine, Quimocide); these drugs give radical treatment to all infections, or causal relapse. This treatment is possible either during the first attack, or the relapse stage. It should be pointed out that a complete treatment in vivax infections depends somewhat on the particular strain of parasites.

1.3 Gametocidal drugs are as follows:-

8-Aminoquinoline (Pamaquine, Primaquine, Quinocide). These are very effective on the sexual forms of all malaria parasites.

Quinine, mepaquine, chloroquine and amodioquine also have a satisfactory effect on the gametocytes of P.vivax and P.malariae but are ineffective on the falciparum gametocytes.

1.4 Drugs used in causal prophylactic - (primary tissue schizonticide and sporontocidal) are outside the scope of the present subject, and are not dealt with here.

2. METHODS USED IN RADICAL TREATMENT IN IRAN

Giving due consideration to the above and to the most effective drugs with the least side-effects and their availability in the Iran malaria eradication programme, the radical treatment method is dealt with hereunder.

2.1.Radical treatment of P. falciparum: One dosage of chloroquine of 1,500 mgs. for an adult for three days as follows:

1st day 900 mgs.
2nd day 300 mgs.
3rd day 300 mgs.

For eliminating the gametocytes and preventing the transmission of the disease, 45 mgs. of primaquine is also given in addition to the above.

2.2 The radical treatment of P.vivax and P.malariae: The treatment of these two species which have exoerythrocytic cycles varies with the facilities existing in the different localities of the country, the expansion and establishment of a health unit network,

2.3 In cases where the patient is under the treatment of a malaria eradication physician, hospital doctors or private practioner after the prescription of one dosage of 600 mgs. of chloroquine, for the schizonticides, a daily dose of 15 mgs. of primaquine for fourteen days is prescribed for adults. When the patient is under the observation of the physician, any side-effects can be easily recognized. The above method, will not be practicable in the regions where health or curative centres do not exist.

2.4 The field treatment. Malaria eradication agents under the supervision of Malaria Eradication Organization treat the positive P. vivax and P.malariae in the field as follows:-

One dose of chloroquine (again 600 mgs.) is administered for schizonticides, and the first dose of primaquine 45 mgs. is additionally given to an adult. During the following eight weeks one dose of 45 mgs. of primaquine together with 300 mgs. of chloroquine are prescribed per week.

2.5 Primaquine sensitivity, has been investigated by various experiments and studies carried out by specialists in a number of countries, and it has been stated that side-effects are due to glucose-6-phosphate Dehydrogenase deficiency.

In Iran investigations on sensitivity to primaquine were carried out by Dr. Jane E. Bowman in the Namazi Hospital in Shiraz

on the basis of the various religious denominations and tribal communities. The results obtained were as follows:

Population	Sensitive	Non sensitive	Total	% Sensitive
Moslem	78	906	984	7.9
Zoreastrian	0	146	146	0.0
Armenian	1	157	158	0.0
TRIBES				
Ghashghai	15	118	133	11.3
Basseri	11	72	83	13.3
Mamasani	18	73	91	20.0
Boyrahmadi	3	5	8	37.5
Doshmanziari	1	9	10	10.0

It was consequently found that the proportion of sensitivity is high among the tribes and relatively low among the rest of the population.

3. ADVANTAGES AND DISADVANTAGES OF THE ABOVE MENTIONED METHODS OF TREATMENT, AND THE DIFFICULTIES IN THEIR IMPLEMENTATION

3.1 14 day method

As previously mentioned this method can be applied to cases, under the observation of the physician. The radical treatment can be completed in two weeks, and if any side-effects occur, possible dangers can be prevented by the physician.

3.1.1 Even in the above condition this method still has certain disadvantages. When the patient is hospitalized or placed under the care of the doctor, after one dosage of schizonticides he will feel cured and refuse to take the remaining treatment and undergo further hospitalization.

In order to keep such a patient in the hospital and under observation, it will be necessary to provide for the living cost of his family. This applies to labourers and farmers with a low standard of living. There are other difficulties when the patient is the mother of the family.

Furthermore, in areas where hospitals are few in number and the beds available are strictly limited to urgent and acute cases, the hospitalization of malaria patients presents difficulties.

3.1.2 The difficulties of implementation of the 14-days' method in the field are even greater than those encountered in

that the patient leaves his own village to work in other villages, or in the farms or moves to summer or winter quarters, etc. Furthermore, there are meteorological factors (floods, rain, snow, etc.) causing the blocking of roads and other obstacles to communications which may prevent the agent from reaching a specific village; even if he arrives there he may find that the patient has left the vicinity.

Again, the peasants are particularly averse to taking tablets - the form in which the drugs are usually issued in the malaria eradication programmes - and obstinately believe that injections are more effective. This idea sometimes causes them to refuse to take the tablets. The next point is the impossibility of collecting correct and complete observations.

3.2.3 Relapses in the weekly treatment method. This method was put into practice in Iran in 1961. No relapses have been detected among individuals who have been regularly treated for six weeks or more. But before establishing a definite conclusion it is necessary to investigate the results obtained in the current year. It has been suggested that the patient who has been subjected to the radical treatment last year should be given one dose of 45 mgs. four times at weekly intervals during this year before the transmission season.

4. CONCLUSION

Taking into consideration the difficulties mentioned above, the following should be considered:

A. The radical treatment method of falciparum with one dosage of 1,500 mgs. of chloroquine and 45 mgs. of primaquine is to be advocated.

B. The 14 days radical treatment method of P.vivax and P.malariae, when the facilities of health units are available, would be more practicable and would yield better results.

In the field, which is distant from curative and health centres, the weekly radical treatment method could be achieved more easily, less expensively and with less danger to the patient.

curative centres (i.e. in cities and small towns). They may be summarized as follows:-

Assigning an agent for a continuous period of 14 days in a village for radical treatment will require an increase in personnel and will consequently incur extra expense. Again the issue of 14 tablets to the patient himself who lacks any knowledge of the subject, as well as the absence of medical observation may well cause complications to occur; these may be serious and may forfeit the cooperation of the public or even endanger the success of the malaria eradication programme as a whole. Also, since the administration of one dose of schizonticides temporarily eleminates the symptoms and the general discomfort of the patient, he may feel completely cured and he may avoid taking the remaining tablets which have been issued to him. This has happened in a large number of cases.

3.2 Weekly method

As a result of experience and studies in various countries, it has been observed that the administration of primaquine will have less side-effects for the patient, due to the presence of G-6-P-D, if more than one day elapses between each dose. in general one week is considered the suitable interval to reduce the side-effects. Therefore, in the field, where no observation and control by a physician is possible, the weekly method of radical treatment is adopted.

3.2.1 Advantages of the weekly method are:

An agent can cure a considerable number of positive cases in one week and this will decrease the number of agents and will consequently involve less expense. Thus the radical treatment could be applied to a wider area. The side-effects caused by the weekly dosage of primaquine would be insignificant and the drug could be administered with safety and confidence. In fact, the agent would himself give each dose to the patient and would ensure that he had actually taken it.

3.2.2 Difficulties involved in the weekly method:

The long period of cure (eight weeks) and the interval between doses (one week) present difficulties. The administration of the drug at the correct interval and on the assigned day is not 100% practicable. It often happens

C. In order to remove the executive and administrative obstacles the most efficacious solution would be the carrying out of health education programmes by which the public could be enlightened and the malaria patients warned and advised in every possible way. It should thus be possible to remove most of the practical difficulties encountered.

D. Since the majority of positive cases in the transmission season coincide with that of agricultural activity, and since such cases may have to work in the field on certain dates with no facilities for hospitalization, it is suggested that such patients should be treated during the night, or, that treatment should be postponed till the autumn of the same year. With regard to those individuals who migrate from one area to another full reports are forwarded to the responsible officers in charge of both areas to complete treatment of such cases.

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