Malaria at Johannesburg Hospital

A retrospective study

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Summary

A total of 43 patients diagnosed as having malaria were admitted to Johannesburg Hospital during 1988; 40 (94%) were infected with *Plasmodium falciparum*. Only 26 patients (60%) were recorded as having used prophylaxis of any kind; chloroquine alone and in combination was used as prophylaxis by 17. Patients were treated with quinine (alone or in combination) in 67% of cases. In 42% of patients chloroquine-resistant malaria was considered a possibility.

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Over the last 10 - 15 years the deterioration in the incidence of malaria in Africa has been partly due to the increasing spread of a *Plasmodium falciparum* population that is resistant to chloroquine and other drugs. There have been reports of chloroquine-resistant *P. falciparum* malaria from regions such as Ethiopia,[1] Kenya,[2] East Africa,[3] northern Malawi[4] and Mozambique[5] and chloroquine resistance has also been confirmed *in vitro* in southern Africa.[6,7]

The difficulty of malaria control in chloroquine-resistant parasites is further compounded by the toxicity of alternative drugs that make it difficult to propose effective and safe medication for chemoprophylaxis and therapy.

A selected group of malaria patients and the drugs used in their therapy is reviewed. It is important to note that Johannesburg Hospital is a tertiary referral centre and the patients reported may not be representative of the general population.

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Patients and methods

Johannesburg Hospital has 833 beds at present and during 1988 there were approximately 32 051 admissions. The hospital serves as a tertiary referral centre and is a teaching hospital of the University of the Witwatersrand. The records of the Haematology Laboratory of the South African Institute for Medical Research in Johannesburg, which serves the hospital, were studied to identify all patients with positive malaria smears admitted during 1988. The medical records of these patients were then obtained from the Medical Records Department.

Results

There were 43 positive blood smears from 32 male and 11 female patients (median age 30 years; range 3 - 66 years). The incidence of malaria in the different age groups is shown in Table I.

TABLE I. INCIDENCE OF MALARIA IN DIFFERENT AGE GROUPS

Age group (yrs)	No. of patients	%
0 - 10	2	5
11 - 20	5	12
21 - 30	20	46
31 - 40	7	16
41 - 50	3	7
51 - 60	4	9
61 - 70	2	5

Types of malaria

Infection with *P. falciparum* was the most common type of malaria seen and occurred in 40 patients (94%). Two patients were infected with *P. vivax* and *P. ovale*, respectively, and in 1 patient the type of malaria was not identified.

The regions where the patients were thought to have contracted malaria are listed in Table II. Six patients travelled through many malaria-endemic countries in Africa and so a definite area where they were infected could not be determined. The three regions where patients most often contracted malaria were Botswana, Malawi and Zimbabwe. None of the patients in this study were thought to have contracted the disease in South Africa.

TABLE II. SUSPECTED REGION WHERE MALARIA WAS CONTRACTED

Region	No of patients	%
Botswana	8	19
Malawi	7	16
Zimbabwe	7	16
Trans-Africa	6	14
Zambia	4	10
Swaziland	3	7
Unknown	3	7
Zaire	2	5
Ghana	1	2
Kenya	1	2
Namibia	1	2

Prophylaxis

Twenty-six patients (60%) had taken prophylaxis of some kind, while 10 patients had used no prophylactic agents (Table III). Data from 7 patients were not available. Only 13 of the 26 patients who had taken prophylactic measures had used the right dosage and, of these, only 11 continued taking medication after returning from an endemic malaria area. Chloroquine alone and in combination was used by 17 patients.

TABLE III. DRUGS USED AS PROPHYLAXIS

Drugs	No. of patients	%
Chloroquine	8	31
Chloroquine + pyrimethamine	4	15
Chloroquine + proguanil	4	15
Dapsone + pyrimethamine	2	8
Chloroquine + pyrimethamine + proguanil	1	4
Pyrimethamine + sulphadoxine	1	4
Prophylaxis taken but details not available	6	23
Total	26	100

Presenting clinical features

Most patients presented with a 'flu-like illness — fever, headache and splenomegaly being the major presenting signs (Table IV). The median period of duration of symptoms before diagnosis was confirmed was 4 days (range 1 - 30 days).

Laboratory abnormalities and clinical complications

Laboratory abnormalities included thrombocytopenia, anaemia, bilirubinaemia and leucopenia (Table V). Clinical complications included cerebral malaria, acute renal failure and adult respiratory distress syndrome (ARDS) (Table V).

TABLE IV. CLINICAL FEATURES ON ADMISSION

Presenting signs	No. of patients	%
Fever	38	88
Headache	31	72
Splenomegaly	31	72
Rigors	22	51
Gastro-intestinal symptoms	21	49
Jaundice	20	47
Hepatomegaly	19	44
Photophobia	10	23
Myalgia	8	19
Tachycardia	8	19
Conjunctivitis	3	7
Hypotension	1	2

More than one sign was present in some patients.

TABLE V. LABORATORY ABNORMALITIES AND CLINICAL COMPLICATIONS

Complications	No. of patients	%
Thrombocytopenia	24	56
Anaemia	20	47
Raised bilirubin levels	19	44
Leucopenia	16	37
Acute renal failure	4	9
Cerebral malaria	4	9
ARDS	1	2

More than one complication occurred in some patients.

Drugs used in therapy

In 42% of patients the possibility of chloroquine-resistant malaria was considered. This assessment was reached because the patient had become infected despite using adequate chloroquine prophylaxis, or because the patient did not respond to initial therapy using chloroquine and was then treated with another drug. Quinine combined with tetracycline was most commonly used for therapy (Table VI).

TABLE VI. DRUGS USED FOR THERAPY

Drugs	No. of patients	%
Quinine combined with tetracycline	23	53
Quinine alone	4	9
Chloroquine	4	9
Quinine combined with other drugs	2	5
Details of therapy not available	10	24

Twenty-nine patients (67%) were treated with quinine (alone or in combination) and side-effects occurred in 12 (41%) (nausea in 5 (17%), cinchonism in 4 (14%), hypoglycaemia in 1 (3%), and cinchonism together with hypoglycaemia in 2 (7%)).

While the data for the clinical course of 11 patients (26%) remain unknown, 31 patients (72%) recovered, with the median time spent in hospital being 7 days (range 2 - 17 days). One death was recorded in a woman diagnosed as having cerebral

malaria, who presented late. She was in renal failure and coma on admission and subsequently died, despite vigorous therapy.

Discussion

Three problem areas became apparent when reviewing the data: (*i*) timeous diagnosis and correct management of malaria; (*ii*) effective and safe prophylaxis; and (*iii*) degree of chloroquine resistance.

Major shortcomings in the management of malaria are a delay in diagnosis and inappropriate treatment.[8] Rapid diagnosis can be made using thick and thin blood smears, but the clinical features with which the patient presents and, in particular, a history of travel in an endemic area are also important clues.

Morbidity due to malaria is serious, particularly if diagnosis is delayed. The median duration of symptoms before diagnosis was 4 days, with a range of 1 - 30 days in our study. Available statistics suggest that many deaths in short-stay travellers due to malaria occur after return to their country of origin and lack of prompt and adequate medical care are often responsible.[9]

In this study, 29 patients, including 4 with cerebral malaria, were treated with quinine alone or in combination. In 11 of these patients chloroquine therapy was started but, because of a lack of response, quinine was subsequently administered. In 8 patients quinine therapy was instituted immediately, possibly because the patients had contracted malaria despite apparently using adequate chloroquine prophylaxis. There appeared to be no additional reason why quinine was administered immediately to the remaining 10 members of this group.

In 42% of patients chloroquine-resistant malaria was considered possible. Although this was not proven, the assessment is in keeping with current opinion about the frequency of chloroquine resistance. The implications regarding prophylaxis and therapy of malaria are significant.

The incidence of side-effects due to quinine was low and those reported resolved with dose reduction.

Our data indicate that only 26% of patients used adequate prophylaxis. Adequate prophylaxis is important, since surveys have indicated that patients with non-fatal infections have a much higher rate of use of chemoprophylaxis than those who die.[9] Details of recommended prophylaxis, although contentious, are available.[10-16]

A common laboratory finding was thrombocytopenia, which was short-lived and was not associated with any bleeding disorder. Cerebral malaria was seen in 4 patients. This diagnosis was based on the clinical features with which the patients presented, such as impairment of consciousness, acute convulsions, focal cerebral signs, coma and positive malaria smears.[17,18] ARDS was observed in 1 patient, who needed to be ventilated and was treated in the respiratory intensive care unit. There was 1 death in a woman diagnosed as having cerebral malaria, who presented late.

Future research in the field of malaria could include a study of the characteristics of parasitised and non-parasitised red blood cells. This may assist in understanding the mechanisms of resistance to drugs. The above observations suggest that the risk of contracting malaria may be minimised by programmes directed at encouraging the use of correct chemoprophylaxis by travellers. Travellers should also be educated about the risk of fatal malaria, and knowledge of diagnosis and treatment of malaria by health care practitioners could be improved to better achieve this objective.

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