Malaria due to *Plasmodium ovale* in Rhodesia

BY

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The first record of the occurrence of *Plasmodium ovale* in Rhodesia was by Blair (1938). Blair reported eight positive films from Africans living in what is now Chief Njelele's area, Gokwe Tribal Trust Land. This focus probably no longer exists, because since the 1950s the area has been included in intensive hut-spraying campaigns and the most recent survey (1968) failed to show any malaria at all.

In the two years following Blair's paper three cases of *Plasmodium ovale* infection in Europeans, contracted in Rhodesia, were recorded: two by Alves (1939) and one by de Meillon and Gear (1940). Thereafter it was completely lost sight of in Rhodesia, and the only records from nearby territories relate to Lourenço Marques (Soeiro and Rebello, 1938), Swaziland (du Toit, 1942) and recently, Zambia (Wolfe, 1968). Of these territories, only Moçambique figures on the maps published by Lysenko and Beljaev (1969).

It is still not widely realised that *P. vivax* is a rare parasite in Africa, and that most African cases of *P. vivax* infection probably relate to *P. ovale* or possibly *P. malariae*, and this may account for the hiatus of 26 years between du Toit's and Wolfe's records. Following the discovery of one case (C.G.) in which both thick and thin films were examined, the staff of this laboratory came to recognise the appearance of *P. ovale* in routine thick films, and between June and September, 1969, 11 further cases were discovered in Africans living in the northern areas of Rhodesia.

CASE REPORT

C.G., a European working in the Zambesi Valley, contracted malaria in February, 1969. A routine thick film, stained with Field's stain, showed ring forms and he was treated with 105 mg. chloroquine intramuscularly, followed by 900 mg. orally.

The fever rapidly responded to treatment, but he had two further attacks in March and April, 1969, before being referred to this laboratory as a possible case of chloroquine-resistant *P. falciparum* infection. Not having seen him previously, the only recommendation I could make was that any further attack be treated with a full course of 1,500 mg. by mouth (apart from any initially given intramuscularly).

A fourth attack of malaria started on the evening of the 13th June, 1969. A thick film was taken during the attack and stained with Field's stain. I saw the patient on the morning of the 14th June, when the initial attack had subsided, and he was apyrexial. Further blood films, both thick and thin, were then taken.

Examination of the thick film taken during the attack was enough to show the parasite was not *P. falciparum*. In addition to numerous ring forms, a few gametocytes and schizonts were present, while the low number of merozoites per schizont (4-8) indicated either *P. malariae* or *P. ovale*.

All films taken on the 14th June were stained with Giemsa's stain, and a diagnosis of *P. ovale* infection made from the thin films on the following characters:

(1) Mature trophozoites not amoeboid.

(2) Infected red cells not enlarged, but frequently oval-shaped and with fimbriated ends.

(3) Fairly marked dehaemoglobinisation of the infected cells.

(4) Distinct Schuffner's stippling.

(5) The golden-brown colour of the pigment in the gametocytes. (No schizonts were seen in these films.)

The patient was treated with a full course of chloroquine, followed this time by 120 mg. primaquine, and to date has not had a further relapse.

Comments

Perhaps the most interesting feature of this case is the occurrence of three relapses within four months of the initial attack of malaria. Previous accounts of *P. ovale* malaria indicate that relapses are rare. In this case their number and frequency led to a mistaken diagnosis of chloroquine resistance.

A lesson to be learnt is that while the finding of rings in a thick film is sufficient to confirm a clinical diagnosis of malaria, diagnosis does not stop there, and a thorough search of both thick and thin films is necessary to establish the correct species diagnosis. Field's stain is a quick and easy method for staining thick films, but for accurate species identification in thin films an alcohol-based Romanowsky stain such as Giemsa's is superior. Further, in a febrile patient, parasites should be numerous enough to permit diagnosis from a thin film.

The treatment of an acute attack of malaria depends on the species of parasite found. A full course of 1.5 grams of chloroquine suffices in most cases of *P. falciparum* infection, but the three remaining parasites require to be followed up with an 8-aminoquinoline drug.

The possibility remains, of course, that this case was originally a mixed infection due to *P. ovale* and the common *P. falciparum*, the latter being eliminated by initial treatment with chloroquine. Therefore, even if an initial diagnosis of *P. falciparum* infection is made, in the event of a relapse the possibility of infection with one of the other three parasites should be considered before that of *P. falciparum* resistance to chloroquine.

Further Cases

The findings from this case and from the 11 cases of *P. ovale* infection, subsequently diagnosed, are listed in the table. Eight had previously had blood films examined and found to be negative, and four had previously been treated with cycloguanil pamoate and chloroquine in the course of a field trial of the former drug.

De Meillon's and Gear's case was believed to have been infected at either Zimbabwe or Victoria Falls. *P. ovale* has never been reported from Zimbabwe or anywhere in Victoria province, but Case 6 indicates that it still occurs at Victoria Falls.

This series indicates that *P. ovale* is widespread if uncommon in the Zambesi Valley, and probably occurs along the whole length of the river. Cases 8 to 12 occurred on the Ruenya River, a tributary of the Zambesi, close to the Moçambique border.

Acknowledgments

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Addendum

Since the initial submission of this paper for publication two cases of *Plasmodium ovale* infection, both diagnosed microscopically from thick and thin blood films, have occurred in African employees of this laboratory. Both had taken chloroquine as a suppressive during visits to the Zambesi Valley and for two weeks thereafter.

The first one became ill in November, 1969, four months after the last exposure to infection the previous July. The second is believed to have been infected in May, 1969. Between then and August, 1970, he had five attacks of fever, of gradually increasing severity, before the parasite responsible was finally confirmed as *P. ovale*.

Both patients have been free of relapses following treatment with primaquine.

Table I

PLASMODIUM OVALE INFECTIONS, JUNE-JULY, 1969

Case No.	Race	Age	Sex	Where Infected	Previous History	Diagnosed from	Parasite
1.	E.	Adult	M.	"Zambesi Valley"	Initial attack February, 1969; 3 relapses March-June, 1969, before infection was recognised as due to *P. ovale*.	Thick and thin films	Pure *P. ovale*
2.	A.	4	M.	Gutsa Tribal Trust Land	10. 3.68 Blood negative. 10. 9.68 Blood negative. Given 1.5 ml. cycloguanil pamoate and 300 mg. chloroquine. 29. 1.69 Blood negative. 10. 5.69 Malaria parasites present.	Thick film	Mixed *P. ovale* and *P. falciparum*
3.	A.	8	F.	Gutsa Tribal Trust Land	10. 3.68 Blood negative. 10. 9.68 Blood negative. Given 1.5 ml. cycloguanil pamoate and 300 mg. chloroquine. 29. 1.69 Blood negative. 10. 5.69 Malaria parasites present.	Thick film	Pure *P. ovale*
4.	A.	7	F.	Gutsa Tribal Trust Land	10. 3.68 Blood negative. 19. 5.69 Malaria parasites present. Not seen in interim.	Thick film	Mixed *P. ovale* and *P. falciparum*
5.	A.	6	M.	Gutsa Tribal Trust Land	10. 3.68 Blood negative. 10. 5.69 Malaria parasites present. Not seen in interim.	Thick film	Pure *P. ovale*
6.	A.	10	F.	? Victoria Falls	Nil. *P. ovale* found in film taken 15.5.69.	Thick film	Pure *P. ovale*
7.	A.	?	?	"Mount Darwin District"	Nil. *P. ovale* found in film taken 18.6.69.	Thick film	Pure *P. ovale*
8.	A.	13	M.	Chikwizo Tribal Trust Land	27.11.68 Blood negative. Given 2 ml. cycloguanil pamoate and 450 mg. chloroquine. 14. 3.69 Blood negative. 16. 7.69 Malaria parasites present.	Thick film	Pure *P. ovale*
9.	A.	8	M.	Chikwizo Tribal Trust Land	27.11.68 Blood negative. Given 1.5 ml. cycloquanil pamoate and 300 mg. chloroquine. 19. 3.69 Blood negative. 16. 7.69 Malaria parasites present.	Thick film	Mixed *P. ovale* and *P. falciparum*
10.	A.	9	F.	Chikwizo Tribal Trust Land	19. 3.69 Blood negative. 16. 7.69 Malaria parasites present.	Thick film	Pure *P. ovale*
11.	A.	10	M.	Chikwizo Tribal Trust Land	Nil. *P. ovale* found in film taken 16. 7.69.	Thick film	Pure *P. ovale*
12.	A.	8	M.	Inyanga North Tribal Trust Land	18. 3.69 Blood negative. 17. 7.69 Malaria parasites present.		

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