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Lieut-Col. J. W. W. Stephens, W. Yorke, B. Blacklock & J. W. S. Macfie

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STUDIES IN THE TREATMENT OF MALARIA

XXVII. INTRAVENOUS INJECTIONS OF NOVARSENOBILLON AND INTRAMUSCULAR INJECTIONS OF QUININE BIHYDRO- CHLORIDE IN SIMPLE TERTIAN MALARIA

BY

LIEUT.-COL. J. W. W. STEPHENS, R.A.M.C.

W. YORKE

B. BLACKLOCK

AND

J. W. S. MACFIE

From the Liverpool School of Tropical Medicine

Undertaken at the request of the War Office

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The observations made by us can be divided into three groups.

GROUP I. A single intravenous injection of novarsenobillon 0.9 gramme on the first day with an intramuscular injection of quinine bihydrochloride grains 15 on the first and second days of treatment.

GROUP II. An intravenous injection of novarsenobillon 0.9 gramme on the first, eighth, and fifteenth days, with intramuscular injections of quinine bihydrochloride grains 15 on the first and second, eighth and ninth, and fifteenth and sixteenth days of treatment.

GROUP III (control series). An injection of quinine bihydrochloride grains 15 on each of two consecutive days only.

GROUP I (Cases 1526 to 1566)

In nine of the forty-one cases (Table I) treatment was commenced during an apyrexial period. In thirty cases the temperature fell to normal within one day, in one case (1533) in two days. In one case pneumonia developed on the second day of treatment.

In all the cases parasites disappeared from the blood in one day.

Relapses

Thirteen of the forty-one cases (32 per cent.) relapsed within the sixty-days' observation period. Parasites reappeared in thirteen to forty-eight days (average twenty-nine days), and febrile relapses occurred in fourteen to forty-eight days.

Two of the cases (1543 and 1551) which did not relapse within the sixty-day observation period did so on the sixty-fourth and sixty-fifth days respectively.

GROUP II (Cases 1567 to 1578)

In five of the twelve cases (Table II) treatment was commenced during an apyrexial period; in the remaining seven the temperature fell to normal within two days.

In all cases parasites disappeared from the cutaneous blood in one day.

Relapses

One case relapsed on the last, i.e. the sixtieth day of the post-treatment observation period.

In one case (1578) the observation period was less than sixty days, viz., forty-five days; consequently the minimum number of relapses, those actually observed, is 8 per cent. and the possible maximum number 17 per cent.

One case (1574) which did not relapse within the sixty-day observation period did so on the sixty-eighth day.

TABLE I.

Summary of results of a single intravenous injection of novarsenobillon gramme 0.9 on the 1st day, with an intramuscular injection of quinine bihydrochloride grains 15 on the 1st and 2nd days of treatment, in simple tertian malaria.

* E.A. = East Africa. F. = France. I. = India. M. = Mesopotamia. S. = Salonika.

Number of case.	*Place of infection	Interval (in months) between first admission to a hospital with malaria and present treatment	Interval (in months) between leaving infected area and present treatment	Interval (in months) between arrival in England and present treatment	Date of end of treatment	Temperature fell to normal in — days after first dose	Parasites disappeared from cutaneous blood in — days after first dose	Parasitic relapse occurred in — days after last dose	Febrile relapse (above 100° F.) occurred in — days after last dose	Observation period (in days) in cases which did not relapse	Remarks.
1526	S.	28	10	9	3.10.18	Same day	1	...	...	127	
1527	S.	13	9	9	3.10.18	1	1	...	...	62	
1528	S.	15	...	...	3.10.18	1	1	...	...	124	
1529	S.	21	3	2	8.10.18	1	1	...	...	106	
1530	S.	14	4	2	9.10.18	Same day	1	...	...	72	
1531	I.	16	7	3	9.10.18	Same day	1	...	...	7	
1532	S.	28	5	5	10.10.18	Apyrexia	1	...	...	61	
1533	E.A.	15	9	7	10.10.18	2	1	35	...	..	Quinine orally, grs. 45 on 44th day.
1534	E.A.	8	8	7	11.10.18	Apyrexia	1	27	29	..	
1535	S.	16	5	4	11.10.18	1	1	...	...	103	
1536	E.A.	15	9	7	11.10.18	Same day	1	39	39	...	
1537	F.	14	13	13	11.10.18	Same day	1	...	...	113	
1538	...	...	...	...	11.10.18	Same day	1	...	...	70	
1539	E.A.	10	9	7	12.10.18	Apyrexia	1	...	...	80	
1540	S.	28	2	2	13.10.18	Same day	1	...	...	68	
1541	E.A.	26	7	1	13.10.18	Apyrexia	1	...	...	69	
1542	S.	42	...	1	15.10.18	Apyrexia	1	...	...	118	
1543	S.	14	2	2	16.10.18	1	1	...	...	63	Relapsed on 64th day.
1544	S.	14	10	4	17.10.18	1	1	28	...	...	Quinine orally, grs. 45 on 37th day.
1545	M.	28	27	4	20.10.18	1	1	...	...	116	
1546	S.	26	7	7	20.10.18	Apyrexia	1	...	...	100	

TABLE I—Continued

Number of case.	*Place of infection	Interval (in months) between first admission to a hospital with malaria and present treatment	Interval (in months) between leaving infected area and present treatment	Interval (in months) between arrival in England and present treatment	Date of end of treatment	Temperature fell to normal in — days after first dose	Parasites disappeared from cutaneous blood in — days after first dose	Parasitic relapse occurred in — days after last dose	Febrile relapse (above 100° F.) occurred in — days after last dose	Observation period (in days) in cases which did not relapse	Remarks.
1547	S.	7	5	4	22.10.18	1	1	...	...	101	Relapsed on 65th day
1548	S.	28	2	2	23.10.18	Same day	1	...	...	111	
1549	S.	11	4	3	24.10.18	Same day	1	...	...	97	
1550	S.	12	1	0	25.10.18	Same day	1	...	...	97	
1551	S.	27	7	6	25.10.18	1	1	...	...	64	
1552	...	...	...	...	25.10.18	Apyrexia	1	13	14	...	
1553	S.	28	4	3	25.10.18	Apyrexia	1	20	21	...	
1554	S.	7	4	2	27.10.18	1	1	...	...	96	
1555	S.	13	5	4	27.10.18	Same day	1	...	...	63	
1556	E.A.	10	7	6	27.10.18	Apyrexia	1	43	...	...	
1557	E.A.	9	7	5	27.10.18	1	1	18	18	...	
1558	S.	23	2	2	27.10.18	Same day	1	...	...	82	
1559	S.	27	2	2	27.10.18	1	1	48	48	...	
1560	S.	...	2	1	29.10.18	1	1	...	...	92	
1561	S.	29	8	8	31.10.18	1	1	31	...	...	Quinine orally, grs. 30 on 32nd day.
1562	S.	24	6	5	1.11.18	1	1	30	30	...	
1563	I.	0	3	2	10.11.18	1	1	...	...	69	Quinine orally, grs. 45 on 27th day. Quinine orally, grs. 30 on 18th day. Pneumonia on 2nd day of treatment.
1564	E.A.	14	8	7	12.11.18	Same day	1	25	...	...	
1565	S.	8	8	2	26.11.18	1	1	17	...	...	
1566	S.	1	2	2	29.11.18	...	1	...	...	64	

TABLE II.

Summary of results of an intravenous injection of novarsenobillon gramme 0.9 on the 1st, 8th and 15th days, with intramuscular injections of quinine bihydrochloride grains 15 on the 1st and 2nd, 8th and 9th, 15th and 16th days of treatment, in simple tertian malaria.

* E.A. = East Africa. I. = India. S. = Salonika.

Number of case.	*Place of infection	Interval (in months) between first admission to a hospital with malaria and present treatment	Interval (in months) between leaving infected area and present treatment	Interval (in months) between arrival in England and present treatment	Date of end of treatment	Temperature fell to normal in — days after first dose	Parasites disappeared from cutaneous blood in — days after first dose	Parasitic relapse occurred in — days after last dose	Febrile relapse (above 100° F.) occurred in — days after last dose	Observation period (in days) in cases which did not relapse	Remarks.
1567	E.A.	14	11	9	1.12.18	Apyrexia	1	60	...	...	Quinine orally, grs. 30 on 61st day.
1568	E.A.	12	11	9	1.12.18	Apyrexia	1	...	...	65	
1569	S.	25	3	2	1.12.18	2	1	...	...	71	
1570	S.	2	5	4	4.12.18	2	1	...	...	65	
1571	S.	13	4	4	4.12.18	1	1	...	...	65	
1572	S.	28	2	2	6.12.18	Apyrexia	1	...	...	66	
1573	S.	18	7	7	8.12.18	Apyrexia	1	...	...	82	
1574	I.	12	7	5	11.12.18	1	1	...	...	67	
1575	S.	6	3	2	11.12.18	2	1	...	...	76	
1576	S.	31	3	3	12.12.18	1	1	...	...	60	
1577	S.	24	15	6	14.12.18	Same day	1	...	...	76	100.2° F. on last day of treatment Relapsed on 68th day.
1578	S.	17	8	7	15.12.18	Apyrexia	1	...	...	45	

TABLE III.

Summary of results of an intramuscular injection of quinine bihydrochloride grains 15, on each of two days only, in simple tertian malaria.

* E.A. = East Africa. I. = India. M. = Mesopotamia. S. = Salonika.

Number of case.	*Place of infection	Interval (in months) between first admission to a hospital with malaria and present treatment	Interval (in months) between leaving infected area and present treatment	Interval (in months) between arrival in England and present treatment	Date of end of treatment	Temperature fell to normal in — days after first dose	Parasites disappeared from cutaneous blood in — days after first dose	Parasitic relapse occurred in — days after last dose	Febrile relapse (above 100° F.) occurred in — days after last dose	Observation period (in days) in cases which did not relapse	Remarks.
1579	S.	29	3	3	1.11.18	Same day	1	29	...	...	Quinine on 32nd day
1580	S.	14	6	5	2.11.18	Apyrexia	2	20	...	...	Quinine orally, grs. 30 on 22nd day.
1581	S.	30	2	2	5.11.18	2	2	20	21	...	
1582	M.	29	29	5	5.11.18	1	3	20	23	...	
1583	S.	22	6	5	6.11.18	1	2	...	...	77	
1584	S.	...	6	5	6.11.18	Apyrexia	1	22	24	...	
1585	S.	15	4	3	9.11.18	Same day	1	22	20	...	
1586	S.	29	3	2	9.11.18	Same day	1	...	...	80	
1587	S.	8	8	2	9.11.18	Apyrexia	1	13	14	...	
1588	E.A.	10	9	3	10.11.18	1	1	18	18	...	
1589	...	...	...	...	26.11.18	Same day	1	...	...	37	
1590	E.A.	37	...	5	1.12.18	Same day	1	18	18	...	
1591	S.	16	4	3	11.12.18	Same day	1	10	...	...	Quinine orally, grs. 30 on 11th day.
1592	S.	27	2	1	14.12.18	Same day	1	...	...	60	
1593	E.A.	10	6	0	15.12.18	2	1	30	...	...	Quinine orally, grs. 30 on 32nd day.
1594	I.	34	7	2	21.12.18	1	2	51	52	...	
1595	S.	4	1	1	9.1.19	Same day	1	21	...	...	Discharged on 28th day.
1596	...	...	...	...	9.3.19	Same day	1	13	15	...	

TABLE IV.

Comparison of curative results obtained from the different treatments.

Treatment	Number of cases observed after treatment	Number of cases which relapsed within 60 days	Number of cases not relapsing but observed for less than 60 days	Percentage of cases which relapsed	
				Minimum	Maximum
Group I. Novarsenobillon gm. 0.9 intravenously on the 1st day, with quinine bihydrochl. grs. 15 intramuscularly on the 1st and 2nd days	41	13	0	32%	32%
Group II. Novarsenobillon gm. 0.9, intravenously on the 1st, 8th and 15th days, with quinine bihydrochl. grs. 15 intramuscularly on the 1st and 2nd, 8th and 9th, 15th and 16th days	12	1	1	8%	17%
Group III. Quinine bihydrochl. grs. 15 on each of two days only (Control Series)	18	14	1	78%	83%
*Study XVI. Novarsenobillon gm. 0.9 intravenously (single injection) ...	21	19	1	90%	95%

* *Vide* Reference.

GROUP III (Cases 1579 to 1596)

In three of the eighteen cases (Table III) treatment was commenced during an apyrexial period. In the remaining fifteen, the temperature fell to normal within two days.

In seventeen cases parasites disappeared from the cutaneous blood within two days, in one case within three days.

Relapses

Fourteen of the eighteen cases relapsed within the sixty-days' observation period. Parasites reappeared in ten to fifty-one days (average twenty-two days) and febrile relapses occurred in fourteen to fifty-two days.

In one case (1589) the observation period was less than sixty days, viz., thirty-seven days; consequently the minimum number of relapses is fourteen (78 per cent.) and the possible maximum fifteen (83 per cent.).

CONCLUSION

A combination of novarsenobillon and quinine is more effective than either novarsenobillon or quinine alone.

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