

## TREATMENT OF MALARIA QUARTAN AND PROPHYLAXIS AGAINST MALARIA WITH COMBINED SULFADOXINE-PYRIMETHAMINE IN JAYAPURA, INDONESIA

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*Malaria quartan (1) is a rare case to be found on daily consultations in Jayapura. In the locality where this survey was done, the houses has been sprayed with DDT twice a year for more than ten years. Malaria vector in this area is An. punctulatus group and the dominant species is An. farauti. This vector breeds in brackish and rain water along the slopes and rivers dividing the town. Jayapura lies on the northern shore of Irian Jaya. Indonesia. Ardiapura is situated on the slopes of hills on the periphery of Jayapura town. Houses are surrounded by forests connected with small and unpaved roads. Most of the people are gardeners. An elementary school is located in the center of this hilly area. The pupils of this school were the subjects of this survey which was started on 25 September 1978 for 28 days. On inquiries, information as collected that school age children in this locality attended school and none of them were instructed to do otherwise by their parents.*

The objective of this survey was to find out all species and treated them with quinine and combined sulfadoxine-pyrimethamine. Special attention was paid to *P. malariae* which can be easier to find in clinically healthy children due to its shorter pre-patent than incubation period. A broader goal of this study is to know the efficacy of combined sulfadoxinepyrimethamine as a prophylaxis against the three species found in this area.

It must be stated here that sulfadoxine-pyrimethamine as a single dose treatment against *P. falciparum* were found to be partly ineffective (2). Chloroquine for the treatment of *P. falciparum* were also found to be partly ineffective (3, 4). There is an indication that combined sulfadoxine-pyrimethamine as prophylaxis in *P. vivax* fails to give protection if given once a week (5).

### MATERIAL AND METHOD

Thick blood smears were taken from all the pupils on Day-1 and examined under

microscope after staining with 8% Giemsa. Each pupil's blood was put on a slide with thick and thin film. Slides were examined within three hours. All positive pupils were given an individual card and blood smears were examined every day till day 7 and once a week afterward till day 28. Asexual parasites were counted per mm<sup>3</sup>. No urine examination was conducted. *P. malariae* cases were treated since Day-0 everyday with single dose 20 mg per Kg. bodyweight quinine till their blood was negative and then followed up with single dose 15 mg per Kg. bodyweight Fansidar (Brand of ROCHE for combined 500 mg sulfadoxine plus 25 mg pyrimethamine each tablet) once a week. All the other positive *P. vivax* and *P. falciparum* were treated the same with quinine since Day-0 till their bloodsmears were negative and then they were given Fansidar 15 mg per Kg. bodyweight single dose once a week.

Total pupils surveyed in this school were 146. Out of them 121 pupils were admitted for Fansidar prophylaxis with results presented in table 2. The rest 25 were positive cases.

All 121 pupils admitted for Fansidar prophylaxis

**Table 1** Treatment of malaria quartan with quinine and combined sulfadoxine--pyrimethamine in Jayapura

| No. | Name | Age | Sex | Weight | Total Days |          | Asexual parasites on Day |      |    |      |      |     |    |     |      |     |       |    |
|-----|------|-----|-----|--------|------------|----------|--------------------------|------|----|------|------|-----|----|-----|------|-----|-------|----|
|     |      |     |     |        | Quinine    | Fansidar | 1                        | 0    | 1  | 2    | 3    | 4   | 5  | 6   | 7    | 14  | 21    | 28 |
| 1   | BM   | 13  | F   | 36     | 4          | 3        | 1000                     | 3000 | -- | 700  | --   | 200 | -- | 0   | 0.x  | 0.x | 0.x   | 0  |
| 2   | SM   | 10  | F   | 20     | 4          | 2        | 2000                     | 6000 | -- | 280  | 2400 | 20  | -- | 0   | 80.x | 0.x | 0     | 0  |
| 3   | HM   | 8   | F   | 19     | 3          | 3        | 1000                     | 2000 | -- | 80   | 0    | 0.x | -- | 0.x | 0    | 0.x | 0     | 0  |
| 4   | BM   | 16  | F   | 43     | 6          | 1        | 2000                     | 6000 | -- | 1200 | 1400 | 40  | -- | --  | 0    | --  | 800.x | 0  |
| 5   | YK   | 13  | M   | 30     | 4          | 2        | 1000                     | 2000 | -- | 0    | --   | 0   | -- | 0.x | 0    | 0.x | 0     | 0  |
| 6   | MD   | 13  | M   | 30     | 3          | 3        | 1000                     | 2000 | -- | 20   | 0    | 0.x | -- | 0.x | 0    | 0.x | 0     | 0  |
| 7   | YM   | 14  | M   | 38     | 4          | 2        | 1000                     | 2000 | -- | 2000 | 200  | 0   | -- | 0.x | 0    | 0.x | 0     | 0  |
| 8   | YW   | 12  | M   | 27     | 3          | 3        | 1000                     | 2000 | -- | 0    | 0    | 0.x | -- | --  | 60.x | 0.x | 0     | 0  |

Quinine were given as a daily single dose 20 mg per KG. bodyweight.

Fansidar were given once a week single dose 15 mg per KG. bodyweight.

( ---) not examined, (x) single dose Fansidar was given ; (0) negative blood examinations.

laxis were negative on Day 1 examination. After this they were given a single dose 15 mg per Kg. bodyweight Fansidar on Day 0, Day 7, Day 14, and Day 21. Blood examinations were conducted on Day 1, Day 0, Day 7, Day 14, Day 21, and Day 28 (six times). If the pupil's blood was negative from all six blood-smears examinations, then they are categorized as *Negative* table 2. If they were absent once or more from examinations on Day 7, Day 14, Day 21, and Day 28, then they were categorized as *Absent* in table 2.

Absenteeisms were checked, either by the teacher or their people at home to know their reason of absence. A special surveillance agent was instructed to do this duty. Total attendance of the pupils every time blood examinations and treatment were done were recorded carefully.

## RESULTS

The 25 positive cases (17%) consisted of 15 *P. falciparum*, 2 *P. vivax*, and 8 *P. malariae*. None of the 8 *P. malariae* cases were mixed infection and only one of them revealed symptoms with fever. This symptoms manifested after 8 days of treatment, case no. 4 in table 1. The *P. malariae* cases were negative after receiving quinine treatment, but three cases (2, 4, 8) showed relapses which were treated with combined sulfadoxine-pyrimethamine.

The two *P. vivax* cases were treated with quinine and followed with twice Fansidar. One case responded good but the other case after having quinine for 5 days and followed up with once Fansidar, no clearance of asexual parasites were seen.

Three of the 15 *P. falciparum* cases were negative on the first day of examination and were given Fansidar once a week. Surprisingly on the third week two cases showed positive *P. falciparum* blood smears and the third case was positive on the second week with the same species.

The rest 12 *P. falciparum* cases were all treated with quinine till asexual parasites were cleared and then Fansidar was given once a week for four weeks. No recrudescence was noted till week five.

Results of 121 pupils given Fansidar as prophylaxis once a week within four weeks are presented in table 2 which consisted of four groups of negative pupils; 13 pupils were given only once Fansidar within 4 weeks; 24 pupils were given twice Fansidar within 4 weeks; 76 pupils were given Fansidar thrice within 4 weeks; 8 pupils were given Fansidar four times within four weeks. Fansidar was given as single dose 15 mg per Kg. bodyweight once a week. As can be seen in table 2, one of the 13 pupils in the first group showed positive bloodsmear after taking Fansidar one week before. The other two cases were positive after taking Fansidar once a week for three previous weeks. Overall positive cases within 4 weeks are 2%.

Table 2 Combined sulfadoxine-pyrimethamine as prophylaxis against malaria in Jayapura

| Frequency once a week within 4 weeks (n) | Negative | Absent (%) | Positive after taking Fansidar (%) |
|--|----------|------------|------------------------------------|
| 1 x (13)                                 | 1        | 12 (92)    | 1 (7)                              |
| 2 x (24)                                 | 2        | 22 (91)    | 0                                  |
| 3 x (76)                                 | 62       | 14 (18)    | 2 (2)                              |
| 4 x (8)                                  | 7        | 1 (12)     | 0                                  |
| (121)                                    | 72       | 49 (40)    | 3 (2)                              |

There were no side effects found. All absent pupils gave reason of their absence as experiencing malaria or malaria-like illness. Attendance rates calculated on each visits to the school showed no significant differences.

## DISCUSSION

Single dose quinine 20 mg per Kg bodyweight given for 3–6 days in *P. malariae* case was not sufficient to eradicate the tissue parasites. Asexual parasites originating from the hepatic schizonts which entered the circulation with 72 hours intermittent appeared on relapses. This indicate that quinine had no schizonticiside effect in *P. malariae*. On the contrary Fansidar showed schizonticiside effect in *P. malariae* and gave reliable protection if given once a week. This can be seen in table 1, where six cases were still negative for two weeks after taking Fansidar on Day 14. It may be concluded that giving quinine for the acute phase is useful and effective to lower the parasite density and symptoms, but must be followed up with Fansidar for two consecutive weeks with single dose.

The failure of eradicating asexual *P. vivax* in one of the cases with quinine and Fansidar indicate the absence of tissue schizonticiside effect of Fansidar in this species.

The appearance of *P. falciparum* in three cases after taking Fansidar table 2, raises suspension of the possibility of resistant strain.

Table 2 shows Fansidar given in 121 pupils for prophylaxis once a month, twice a month, thrice a month and four times a month or once a week. Absenteeism in each group is reported and calculated to see if there is any significant differences between them (6). Negative results here means they are always negative (six times blood examinations within 4 weeks) since the first to the fourth administer of Fansidar. There is no significant difference found between the first and second group. No significant difference between group three and four. There is a very significant difference between taking once a week (group 4)

and fortnightly (group 2). Swallowing Fansidar fortnightly yields much greater (91%) absenteeisms than once a week (12%). There are no significant differences between group one and 3 plus 4; between group 2 and 3 plus 4. If absenteeisms here represents illness due to malaria, then swallowing Fansidar once a week will protect the pupils better than fortnightly prophylaxis.

Total sample used for the prophylaxis trial here were 121 pupils which is 82% of the actual sum of pupils studying in this school. Locating the pupils home addresses on the geographical reconnaissance map showed that they are equally scattered around the vicinity of the school.

The parasite formula found in this sample were *P. falciparum* 60%, *P. malariae* 32%, *P. vivax* 8% (7). The frequency of individual species shown here is in reverse with the usual DDT indoor house sprayed areas. Usually the prevalence of *P. malariae* is the lowest in other locaties in Jayapura. In highly endemic area before malaria control measures was introduced the *P. malariae* prevalence may be extremely high. In 1930 there were four areas in Java with 50% *P. malariae* among the detected cases before malaria control was attempted (8). It was assumed that immune response was more effective against *P. vivax* than against *P. malariae*. Furthermore *P. falciparum* in an effective DDT house sprayed areas should be lower than the *P. vivax* prevalence which was not the case in this study area (7). It may be concluded that more effective drug against *P. malariae* and *P. falciparum* than the widely used chloroquine is invaluable to find.

## SUMMARY

Treatment of 8 malaria quartan cases in Jayapura were reported using quinine for the acute stage and followed up with combined sulfadoxine-pyrimethamine.

Swallowing Fansidar once a week lessened absenteeisms in school children.

More observations are to be made of the effectiveness of combined sulfadoxine-pyrimethamine as tissue schizonticiside in *P. malariae* and *P. vivax*.

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