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TO DETERMINE THE FREQUENCY OF OCCULAR LESIONS RELATED WITH MALARIA IN CHILDREN

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Abstract:

Objective: *The aim of this study was to investigate the incidence and prognostic value of ocular complications in malaria.*

Place and Duration: *In the Ophthalmology Unit II of Civil Hospital, Karachi for One-year duration from June, 2015 to June, 2016.*

Methods: *A total of 140 children (105 of whom had cerebral malaria, 35 not having neurological issues) and 34 with mild malaria and 82 children without malaria were compared.*

Results: *Eye complications were infrequent in the group of malaria (5.8%). In 11.8% of children, retinal hemorrhage noted in the non-cerebral malaria group. Cerebral malaria was related with retinal edema (10.5%) and retinal bleeding (22.9%).*

Conclusion: *There was no correlation between ocular findings such as retinal edema, retinal bleeding. The presence of cotton spots, papilledema and exudates were related with high mortality risk. Seizures and coma score were strongly related with mortality, but not with ocular findings. The retinal symptoms present in a child in an area endemic to malaria may indicate a serious malaria case.*

Key Words: *Malaria, ocular complications, endemic area, retinal haemorrhages.*

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INTRODUCTION:

Eye complications are common in severe cases of malaria. Some lesions, such as papilledema or extramacular are associated with lethal complications in cerebral malaria[1-3]. The aim of this study is to know the ophthalmic lesions incidence and prognostic value among severe malaria children in Pakistan. The study was held in a hospital during the period of high malaria[4]. Children with severe malaria with or without brain complications and from 6 months to 9 years of age were paralleled with two control groups, 1 with P. falciparum and the former with fever-free uncomplicated malaria[5-6]. Depending on the severity of the symptoms, the coma was scored on a Molyneux 4 coma scale derivative from the Glasgow coma scale, with 5 to 0 scoring. By fundoscopy; abnormalities in fundus has been recorded[7]. A Sight-F test, thick blood smear and a manual test for histidine-rich protein 2 (HRP-2) direct qualitative detection from whole blood were performed to measure parasitemia for Plasmodium falciparum[8]. To determine haemoglobin levels, hemoglobin electrophoresis and serum glucose venous blood samples were taken[9]. Cerebral malaria was defined as axillary temperature of 37.5 ° C, > 1,000 trophozoites / mm3 and the additional impediments: Molyneux 3 score coma, obnubilation (Molyneux score 4) and > 2 seizures episodes[10]. Children with a positive Para-Sight-F test, negative blood smear test and have no other cause of fever and if they recovered after antimalarial cure were also labelled cerebral malaria. Severe non-cerebral malaria was definite as having hypoglycemia (0.40 g / L or 2.26 mmol / L), severe anemia (hemoglobin 5 g / 100 ml), 1,000 trophozoite / mm3 and temperature 40 ° C. The non-severe malaria control group did not include children with severe malaria evidence and 37.5 ° C, 1,000 to 80,000 trophozoites / mm 3. The fever control group included children at 37.5 ° C without evidence of blood parasites and Para-Sight-F test was negative[11].

METHODS:

This prospective study was held in the Ophthalmology Unit II of Civil Hospital Karachi for One year duration from June, 2015 to June, 2016. Thirty-five children with severe malaria, 105 without cerebral malaria and 35 without neurological complications were included in the study. Also, simple malaria 34 children and with fever82 children but not having malaria were encompassed in the control group.

RESULTS AND DISCUSSION:

There were no ocular findings in the fever control group and 2 children (5.8%) in the severe malaria group experienced bleeding or retinal edema. The retinal bleeding was the usual sign found with severe non-cerebral malaria in 11.8% patients. The most common symptoms of serum malaria were retinal edema and retinal bleeding (10.5% and 22.9%, respectively), followed by papilledema, exudate and vascular sinulosity. All clinical symptoms were less common than by a cohort analysis stated by Lewallen et al. As in the Looreesuwan et al study, papilledema is occasional in cerebral malaria cases. The ocular symptoms frequency raised with postponement in consultation and coma duration. Retinal bleeding was more common in children older than 2 years,> 2 seizures per day or at 40 ° C (Table 1).

TABLE 1
Variables associated with ocular signs in children with cerebral malaria

Variable	Affected, n (%)	Hemorrhage, n (%)	*P* value	Edema n (%)	*P* value
Age					
≤ 2 years	21 (20.0)	3 (14.3)		2 (9.5)	
> 2 years	84 (80.0)	21 (25.1)	0.23	9 (10.7)	0.62
Convulsions per day					
< 2	70 (66.7)	13 (18.6)		7 (10.0)	
2–5	24 (22.9)	9 (37.5)		2 (8.3)	
> 5	11 (10.5)	2 (18.2)	0.15	2 (18.2)	0.66
Scoring of coma					
≤ 2	71 (67.6)	13 (18.3)		8 (11.3)	
> 2	34 (32.4)	11 (32.3)	0.11	3 (8.8)	1
Temperature at Day 1					
< 40	93 (88.8)	20 (21.5)		9 (9.7)	
≥ 40	12 (11.2)	4 (33.3)	0.46	1 (8.1)	1
Serum glucose (g/L)					
≤ 0.40	14 (13.3)	1 (7.1)		1 (7.1)	
> 0.40	91 (86.7)	23 (25.3)	0.13	10 (11.0)	1
Hb* (g/L)					
≤ 5	15 (14.6)	6 (40.0)		3 (20.0)	
> 5	88 (85.4)	17 (19.3)	0.07	8 (9.1)	0.20
Electrophoresis of Hb					
Abnormal	7 (6.7)	0 (0.0)		0 (0.0)	
Normal	98 (93.3)	24 (24.5)	0.19	11 (11.2)	1
Parasitemia (/mm^3)					
< 1,000	10 (9.6)	2 (20.0)		0 (0)	
1,001–50,000	34 (32.7)	10 (29.4)		3 (8.8)	
> 50,000	60 (57.7)	12 (20.0)	0.56	8 (13.3)	0.41

* HB = hemoglobin.

The severe anemia children were expected to suffer from retinal edema (9.1%, 20.0% and 0.20 P value) or retinal bleeding (19.3%, 40% and 0.07 P value). In contrast to that observed with hypoglycaemia sign haemorrhages were not common in patients (25% versus 7.1%, 0.1%, P 0.13) and deep coma (18.3% versus 18.3%, 0.11 P value). Numerous retinal hemorrhage was reported in patients with hemoglobinopathy, but no ocular findings were observed in seven children with anomalous levels of hemoglobin (0.19 P value). This can be clarified by the fact that heterozygous forms are protected against severe malaria forms or with fewer favourable circumstances for the parasite[12]. Like Lewallen and 2 others, no correlation was found between ocular findings and parasitemia. In the cerebral malaria group; mortality rate was 26.7% (with anemia 46.7% and 21.6% without anemia) and no neurological symptoms were noted in 5.7% in severe malaria (16.7% and 3.4% if there was severe anemia). Mortality rate raised with postponement in pursuing attention, emphasizing the early diagnosis importance and management. With the age; mortality decreased (Table 2).

TABLE 2
Prognostic factors analysis for children with cerebral malaria

Variable	Affected, n (%)	Mortality, n (%)	Relative risk	P value
Age				
≤ 2 years	21 (20.0)	8 (38.1)	1.60	0.19
> 2 years	84 (80.0)	20 (23.8)	1	
Convulsions per day				
< 2	70 (66.7)	16 (22.9)	1	
2–5	24 (22.9)	6 (25)	1.09	0.83
> 5	11 (10.5)	6 (54.5)	2.39	0.002
Scoring of coma				
≤ 2	71 (67.6)	25 (35.2)	4.34	0.004
> 2	34 (32.4)	3 (8.8)	1	
Temperature at Day 1 (°C)				
< 40	93 (88.8)	24 (25.8)	1	
≥ 40	12 (11.2)	4 (33.3)	1.29	0.73
Serum glucose (g/L)				
≤ 0.40	14 (13.3)	9 (64.3)	3.08	0.002
> 0.40	91 (86.7)	19 (20.9)	1	
Hb* (g/L)				
≤ 5	15 (14.6)	7 (46.7)	2.16	
> 5	88 (85.4)	19 (21.6)	1	0.05
Electrophoresis of Hb				
Abnormal	7 (6.7)	3 (42.9)	1.68	0.38
Normal	98 (93.3)	25 (25.5)	1	
Parasitemia				
< 1,000	10 (9.6)	3 (30.0)	1	
1,001–50,000	34 (32.7)	10 (29.4)	0.98	1
> 50,000	60 (57.7)	15 (25.0)	0.83	0.7
Ocular lesions				
Retinal hemorrhages	24 (22.9)	6 (25.0)	0.92	0.83
Retinal edema	11 (10.5)	3 (27.3)	1.03	0.75
Perimacular edema	9 (8.6)	1 (11.1)	0.82	0.94
Exudates	1 (1.0)	1 (100)	3.85	0.26
Cottonwool spots	3 (2.9)	2 (66.6)	2.62	0.17
Papilla edema	1 (3.0)	1 (100)	3.85	0.26

*Hb = hemoglobin.

The deepness of coma is an important risk factor for seizures and death (> 5 and 54.5% within the first 24 hours). Temperature was not knowingly associated with mortality. Anemia and hypoglycemia were associated significantly with increased mortality in cerebral malaria (P 0.05 and 0.002, respectively). Parasitemia did not ominously affect mortality; Hemoglobinopathies of interest were related with higher mortality. Retinal hemorrhage in cerebral malaria did not indicate fatal consequences[13].

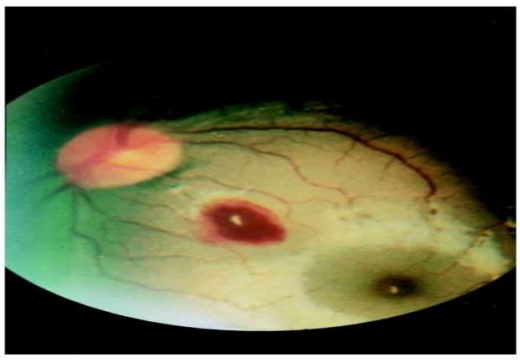

FIGURE 1. A new single hemorrhage between papilla and macula.

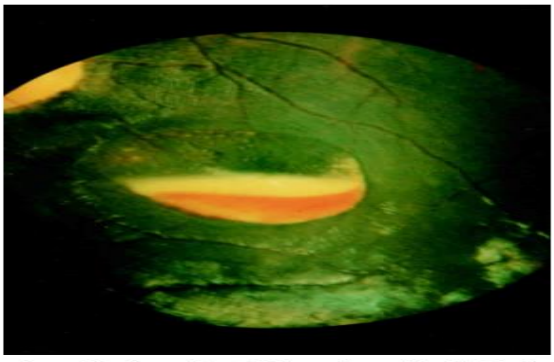

FIGURE 2. Resorption of a hemorrhage with white level.

We could not find any confirmation of association between mortality and retinal edema. However, Lewallen et al. Although used a more constricting cerebral malaria definition (Molyneux 2 score), he reported an increased risk of death[14]. Like Lewallen and others, we believe papillary edema predicts death. However, the few children who experience fairy-tale events do not allow the presence of a significant connection even in later children, even if vascular synocytosis, optic disc turbidity or cotton spots appear[15].

CONCLUSION:

Ocular findings in complicated malaria are associated with findings classifying the severity of the disease. In severe malaria cases, especially if there is low platelet count, an ophthalmic examination must be done and patients who advance ocular signs or symptoms should be cautiously evaluated and monitored.

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