



To study the Incidence of Retinopathy in Cerebral and Non-cerebral Malaria and its Relationship with them

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Abstract

Objective: To assess the incidence of retinopathy in cerebral malaria and non-cerebral malaria and to study the relationship of retinopathy with cerebral and non-cerebral malaria

Design: Prospective, observational, cohort study, comprising of all malaria positive patients.

Setting: Department of Pediatrics, S.S.M.C and associated G.M. Hospital Rewa, Madhya Pradesh during the period of 1st August 2015 to 31st July 2016.

Participants: 100 consecutive patients with cerebral malaria and 100 patients with non-cerebral malaria were included in the study. All 200 cases were malaria positive. All children were evaluated by ophthalmologist for changes of retinopathy

Main Outcome Measure(s): Retinopathic changes and its correlation with mortality and duration of hospitalisation.

Results: Retinopathy was present in 41% of children in cerebral malaria group (malaria positive with encephalopathy) and 7% in non-cerebral malaria group (malaria positive without encephalopathy) indicating that incidence of retinopathy was significantly higher in Cerebral malaria than in Non-cerebral malaria.

Conclusions: Retinopathy is a significant finding associated with cerebral malaria hence retinopathy can be used as diagnostic tool to differentiate cerebral malaria from non-cerebral malaria. Presence of retinopathy in malaria can be used as a marker of serious disease and as an indication for early up-referral.

Keywords: Malaria, Cerebral Malaria, Retinopathy, Febrile encephalopathy.

Introduction

Malaria is highly prevalent in India and especially in Madhya Pradesh. It is a major health problem and leading cause of mortality and morbidity in

this region. Cerebral malaria is one of the most common non-traumatic encephalopathy in the world^[1]. It can be fatal in the absence of, prompt recognition of the disease and its complication,

and non-institution of active appropriate management of patients, especially in young children. Vindhya area of Madhya Pradesh is classified under hyper endemic zone for malaria [2,3]. By this study we aim to recognize cases early and to limit mortality and morbidity related to malaria. The detection of malarial retinopathy can be a good diagnostic and prognostic tool for cerebral malaria. There is a set of retinal abnormalities unique to cerebral malaria. These abnormalities include blurred disc margins, papilledema, retinal haemorrhages, retinal whitening, retinal oedema, vascular changes and soft exudates [4,5,6]. Of these retinal whitening and vascular changes are specific to cerebral malaria. [7]

Objective

The objective of present study was to assess incidence of retinopathy in cerebral malaria and non-cerebral malaria and to study the relationship of retinopathy with cerebral and non-cerebral malaria.

Methodology

The study was carried out in the Department of Pediatrics, SS Medical College and associated GM Hospital, Rewa, Madhya Pradesh during the period of 1st August 2015 to 31st July 2016, after clearance from the Institutional Ethics Committee. The study design is prospective, observational, cohort study.

The study group comprised of 100 consecutive children with cerebral malaria presenting with acute febrile encephalopathy with Glasgow Coma Scale ≤ 10 with or without seizures. Hundred patients with non-cerebral malaria served as control who presented with acute febrile illness with no evidence of encephalopathy. All cases and controls were malaria positive either by peripheral smear examination or by rapid diagnostic kit.

All children were managed as per WHO standard guidelines for treatment of cerebral and non-cerebral malaria. [8] All cases and controls were

evaluated by ophthalmologist for any changes of retinopathy within 24 hours of admission.

A detailed clinical evaluation including history and examination was carried out for all study participants at the time of admission. A base line evaluation in the form of blood sugar estimation (glucose strip), complete blood counts, liver function and renal function tests were done at the time of admission in all children. Using aseptic precautions, finger prick sample of blood was collected to prepare thick and thin smears of blood on glass slides, and evaluated for presence of any malarial parasite under oil immersion, as per standard procedures.

Rapid diagnostic test kits were also used for the diagnosis of malaria. (SD BIOLINE Malaria Ag Pf./Pan kit manufactured by Standard Diagnostics (Alere) limited, Korea.)

Fundus examination was performed by ophthalmologist in all patients, after pupils were fully dilated using mydriatic eye drops. Presence of papilledema, retinal hemorrhages, vessel changes, peripheral whitening, and blurring of disc margins were noted and recorded separately, in addition to any other ophthalmologic abnormality.

All children were followed till discharge or death. The duration of hospitalisation was noted in both eventualities.

Statistical Analysis: The data of the study were entered and analysed using the software Microsoft Excel 2013 for windows. Appropriate univariate and bivariate analysis were carried out using the Student t test for the continuous variable / proportion test (z test / t test) and two-tailed Fisher exact test or chi-square (χ^2) test for categorical variables. The critical levels of significance of the results were considered at 5% i.e. $P < 0.05$ was considered significant.

Results

In our study 59% and 61% children were males in study and control group respectively. The incidence of malaria was minimum in below 6 months age in both groups while highest incidence

was observed between 6 years-12 years (Table no 1)

Retinopathy was present in 41 patients out of 100(41%) in CM group and 7 out of 100(7%) in Non CM group indicating that incidence of

retinopathy was significantly higher in Cerebral malaria than in Non-cerebral malaria and retinopathy was significantly associated with cerebral malaria. (Table no. 2)

Table 1 Sample characteristics

	Cerebral malaria(CM) (n=100)	Non cerebral malaria (Non CM) (n=100)
1. Gender		
Male (M)	59(59%)	61 (61%)
2.Age		
<6 month	5(5%)	2(2%)
6 –60 mon	27(27%)	29(29%)
6 yrs–12yrs	47(47%)	51(51%)
Above 12yrs	21(21%)	18(18%)

Table no. 2 Incidence of Retinopathy in CM and Non CM group

	Cerebral malaria (CM) (n=100)	Non cerebral malaria (Non CM) (n=100)	Statistical Analysis
Present	41(41%)	7 (7%)	P value<0.001
Absent	59(59%)	93 (93%)	
Total	100(100%)	100 (100%)	

Discussion

In our study we found that in the study group (malaria positive with encephalopathy) 59% patients had normal fundus and 41% patients had retinopathy, while in the control group (malaria positive without encephalopathy) 93% patients had normal fundus and 7% patients had retinopathy. Retinopathy had statistically significant association with cerebral malaria. i.e. retinopathy can be used to differentiate cerebral malaria from non-cerebral malaria. Beare, et al. (2004)^[9] reported 61% while Birbeck, et al. (2010)^[10] reported 79% incidence of retinopathy in their studies of cerebral malaria.

Conclusions

Retinopathy is a significant finding associated with cerebral malaria hence retinopathy can be used as diagnostic tool to differentiate cerebral malaria from non-cerebral malaria. Presence of retinopathy in malaria can be used as a marker of serious disease and as an indication for early up-referral. This categorisation in turn will facilitate optimum use of intensive care facilities.

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