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Clinical Presentation, Diagnostic Evaluation and Treatment Results In Malaria In Pediatric Population In A Rural Health Care Setting In India.

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ABSTRACT

Malaria is a serious protozoal disease, caused by Plasmodium parasite and transmitted to human being by bites of female Anopheles mosquito, affecting peoples worldwide; more prevalent and problematic in developing and underdeveloped countries with high mortality and mortality particularly in pediatric age groups. Clinical presentation of malaria is varies from asymptomatic to severe complicated disease and in pediatric patients its presentation is not as classical as in adults. A prospective study including 120 patients of pediatrics age group were studied and age, sex, socioeconomic status, clinical presentation, laboratory finding, diagnosis, response to treatment, residual deficit and mortality are noted.

Keywords: malaria, falciparum malaria , vivax malaria, malaria outcome

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INTRODUCTION

Malaria is a protozoal disease caused by Plasmodium parasite and transmitted to human beings by bite of female Anopheles mosquito. It is a very common cause of fever in tropical countries and the most important parasitic disease of human with transmission in more than 100 countries [1]. Despite improving health facilities, better diagnostic facilities and newer drugs, Malaria still remain the major cause of illness and even death in underdeveloped and developing countries like India. In India 1.8 million cases and 940 deaths were reported during year 2005 [2]. Taking consideration to our poor surveillance system, this might be just tip of iceberg. In pediatric patients, the typical intermittent pattern of fever is invariably absent and instead irregular fever with respiratory and gastrointestinal symptoms mark the onset of disease [3]. We herein report our institutional experience of 120 consecutive pediatric patients of malaria diagnosed and treated in a rural health care setting.

METHODS

We prospectively reviewed the pediatric patients of malaria diagnosed and treated in our institute. Total number of patients was 120. Patient characteristics were noted to extract the following information: age, sex, socio-economic status, clinical symptoms, laboratory findings and diagnosis. All patients received treatment as per the standard WHO guidelines. Response to treatment, residual deficit and mortality were noted.

RESULTS

Patient characteristics are summarized in Table – 1. A total of 120 consecutive pediatric patients of malaria diagnosed and treated were analyzed. Most common age of presentation was 1-5 years of age (45.01%) followed by 5-10 years of age (36.66%) [5,6]. Malaria was most common in the lower socio-economic families comprising 62.50% of cases whereas the upper socio-economic patients comprised only 7.50% of cases. Microscopic blood film (thin and thick smear) examination was the laboratory method used in the diagnosis. Plasmodium falciparum was the most common parasite diagnosed in 50.83% of cases followed by Plasmodium vivax in 40.0% of cases [2,4]. Three patients (2.50%) had mixed falciparum and vivax infestation while eight patients (6.67%) had negative microscopy but had strong clinical suspicion of malaria and responded with antimalarial drugs. The most common symptom was fever which was present in all cases followed by splenomegaly (77.5%), anaemia (70.83%), hepatomegaly (64.17%), headache (50.83%) and chills with rigor (40.0%).(5;6) The other less commoner symptoms were altered sensorium, vomiting, seizures, jaundice, diarrhea, dyspnea, neck stiffness, acute renal failure, black water fever and shock. Severe complicated malaria was diagnosed in 35 patients (Table – 2).

Cerebral malaria was the most common severe complicated malaria seen in 22 patients followed by severe anaemia, hypoglycemia, jaundice, acute renal failure, black water fever, algid malaria and pulmonary edema [7-9,19]. Hepatomegaly was found in 77 patients (64.16%) and splenomegaly was found in 93 patients (77.5%) [6,19].

Table 1: Patient Characteristics

Total number of patients	120
Age (in years)	
< 1	9 (7.50%)
1-5	54 (45.01%)
5-10	44 (36.66%)
10-14	13 (10.83%)
Sex	
Male	74 (61.66%)
Female	46 (38.34%)
Socio-economic strata	
Lower	75 (62.50%)
Middle	36 (30.0%)
Upper	9 (7.50%)
Plasmodium species	
P. falciparum	61 (50.83%)
P. vivax	48 (40.00%)
Mixed	3 (2.50%)
Unknown	8 (6.67%)
Symptoms	
Fever	120 (100%)
Splenomegaly	93 (77.5%)
Anaemia	85 (70.83%)
Hepatomegaly	77 (64.17%)
Headache	61 (50.83%)
Chills/ Rigor	48 (40.0%)
Altered sensorium	27 (22.5%)
Vomiting	24 (20.0%)
Seizures	16 (13.33%)
Jaundice	8 (6.67%)
Diarrhea	6 (5.0%)
Dyspnea	6 (5.0%)
Neck stiffness	4 (3.33%)
Acute renal failure	4 (3.33%)
Black water fever	2 (1.66%)
Shock	1 (0.83%)

Table 2: Severe complicated Malaria

Total number of patients	35
Cerebral malaria	22 (62.86%)
Severe anemia	11 (31.43%)
Hypoglycemia	9 (25.71%)
Jaundice	8 (22.88%)
Acute renal failure	4 (11.44%)
Black water fever	2 (5.72%)
Algid malaria	1 (2.86%)
Pulmonary edema	1 (2.86%)

The relationship of hepatomegaly and splenomegaly with duration of fever and the different plasmodium species is tabulated in Table -3. Most of the patients presented with fever of less than 15 days duration and had palpable organomegaly which was more common with falciparum infestation as compared to vivax infestation [6,10].

Table 3: Relationship of Hepatosplenomegaly with duration of Fever/ Plasmodium species

	No. of cases	Hepatomegaly (n=77)	Splenomegaly (n=93)
Duration of fever (days)			
1-7	62	30 (48.38%)	40 (64.51%)
8-15	43	34 (79.06%)	39 (90.69%)
16-23	15	13 (86.66%)	14 (93.33%)
Plasmodium species			
P. falciparum	61	47 (77.04%)	44 (72.13%)
P. vivax	48	23 (47.91%)	42 (87.50%)
Mixed	3	2 (66.67%)	2 (66.67%)
Unknown	8	5 (62.50%)	5 (62.50%)

All patients received treatment as per the standard WHO guidelines.

All patients had clinical improvement in symptoms. Reduction in hepatosplenomegaly was assessed 7-14 days after treatment completion (Table – 4). Complete reduction in hepatomegaly was seen in 63.33% of cases while 31.16% had variable reduction and 5.19% had no reduction [10]. Similarly, complete reduction in splenomegaly was seen in 68.81% of cases while 29.03% had variable reduction and 2.15% had no reduction [10]. There was no mortality in uncomplicated malaria cases, but 7 patients (20.0%) of the complicated malaria cases (35 patients) died in spite of proper treatment [11,12].

Table 4: Reduction in Hepatosplenomegaly 7-14 days after treatment completion

	Hepatomegaly (n=77)	Splenomegaly (n=93)
Complete reduction	49 (63.33%)	64 (68.81%)
Variable reduction	24 (31.16%)	27 (29.03%)
No reduction	4 (5.19%)	2 (2.15%)

DISCUSSION

Study was conducted including 120 cases of malaria in pediatric age group to examine childhood malaria in respect of its clinical characteristic, diagnostic evaluation and treatment outcome. Malaria is most common in age group of 1-5 yr, followed by 5-10 yr and 10-14yr and least common in below 1 yr. Almost 89% of malaria cases occurs in 1-10 yr of age group [5,6]. Neonates and infants are less susceptible to infection because of high concentration of fetal haemoglobin and presence of protective immunity from breast milk. 1-5 yr of childrens have high susceptibility of malarial infection because of waning passive immunity and lack of development of acquired immunity [3]. Male children having more incidence of malaria in comparison to female children as males having high outdoor activities ,less well clothes and

due to social factors like illiteracy and sex discrimination girl child given less importance and consequently having less hospital visits [16]. Malaria have reciprocal relation with socioeconomic status and its incidence, being more common in low socioeconomic peoples as compared to middle and high socioeconomic peoples. It signify better antimosquito and other control measures including better health facility availing by peoples of high socioeconomic groups [16]. In our area most cases of malaria infection is caused by plasmodium falciparum constituting more than 50% cases ; followed by plasmodium vivax infection [2]. P. Ovale and p. Malariae infection are not prevalent in these area. Mixed infection is also very less.

In childrens malaria having wide variability of clinical presentation. The classical paroxysm of cold stages, hot stages and sweating stages with a definite pattern of intermittent fever is invariably absent, instead irregular fever with respiratory and gastrointestinal symptoms mark onset of disease making great difficulties in clinical diagnosis and management [3]. Prompt and accurate diagnosis is key to effective disease control and to prevent mortality and morbidity associated with malaria. This is particularly very important in severe complicated malaria which is a medical emergency where timely and accurate diagnosis is very important to provide appropriate treatment and to prevent mortality and morbidity as most of the death is either due to delay in diagnosis or missed diagnosis.

Inaccurate and delay in diagnosis of malaria is contributed by many factors i.e nonspecific clinical presentation, high prevalence of asymptomatic infections, lack of resources and trained personels, widespread practices of self treatment and parasite sequestration (p.falciparum). Light microscopic examination of a well prepared blood film by an expert technician is the “ gold standard “ method for detecting and identifying malarial parasite [15,17,20]. But it has certain disadvantage like it is a labour intensive and time consuming process, absolutely depends upon good trained technician, good laboratory set up, requires considerable expertise for its interpretation particularly at low levels of parasitemia [21]. Due to these disadvantages of microscopy there is a need of another diagnostic tool of malaria which should be simple, rapid, easy to perform and reliable. Rapid diagnostic test like hisitidine rich protein- II and parasite lactate dehydrogenase strip test have promising result for rapid diagnosis of malaria but they are not 100% sensitive or specific and they are also not much sensitive at low level of parasitemia [22-26].

CONCLUSIONS

Malaria is still a major and global health problem worldwide have more impact of health in developing and underdeveloped countires. It is particularly problematic in pediatric age groups. Current knowledge of malaria diagnosis , treatment and its preventive measures are not sufficient to control disease burden and there should be continuous need of further research for its better diagnosis, treatment, prevention and control.

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