Clinical Spectrum, Complications & Treatment Outcomes Of Malaria (In Pediatric Patients)

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Abstract : Malaria is one of the foremost public health problems in India. Objectives: To study the clinical spectrum, complications & treatment outcome in smear positive hospitalized children having malaria. Method: this prospective observational study enrolled 190 smear positive malaria patients admitted in pediatric wards of general hospital during 6 months. History taken & examination done. All patients were investigated & treated according to WHO guidelines & followed twice daily till their hospital stay. Results: 88% of patients were having P. vivax malaria. Males were 2.1 times more commonly affected. Age group most commonly affected was 5 to 10 years. Highest no of cases were reported in month of August. All patients were having history of fever. Thrombocytopenia was frequently associated (87%). Cerebral malaria was the commonest complication. Almost all patients with uncomplicated vivax malaria responded to Chloroquine. CFR was 1.05%. [Desai P et al NJIRM 2013; 4(2) : 140-143]

Key Words: Malaria, Symptoms, Complications, Antimalarial drugs

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Introduction: Malaria is one of the major public health problems & found in tropical & subtropical countries since thousands of years ago[1]. The estimated worldwide incidence of malaria is greater than 350-500 million clinical malaria episodes per year with more than 1 million deaths annually, most of which occur in children less than 5 years[2]. Around 1.5 parasitologicaly confirmed cases of malaria are annually reported in India[3]. In India the major contributing states for total malaria are MP, Maharashtra, Orissa, Karnataka, Rajasthan, 7-North East states & Gujarat[1]. Plasmodium species known to cause malaria in men are P.vivax, P.falciparum, P.ovale& P.malarie. Mix infections by P.vivax & P.falciparum are also seen. Life cycle of the malarial parasite passes in 2 hosts of which man is the intermediate host & the mosquito is the definitive host[4].

Material And Methods: This prospective observational study enrolls 190 cases of malaria admitted in pediatric wards of tertiary care hospital (L G Gen hospital) at Ahmedabad from 1st April 2012 to 30th September 2012.

Selection of patients (inclusion criteria): All admitted patients with age less than 18 years, irrespective of gender, positive for asexual form of P.vivax or P.falciparum on peripheral smear examination during the study period.

Study design: All patients who presented with high grade fever were evaluated for malaria by rapid diagnostic test and in all positive patients peripheral smear sent for examination. All patients whose smear were positive for asexual form of P.vivax or P.faiciparum were admitted in pediatric wards and enrolled in study.

Detailed medical history regarding symptoms, treatment taken and complications was taken of each patient. General and systemic examination was done of each patient.

Basic laboratory investigations- hemoglobin, total count, platelet count, peripheral smear, G6PD and blood glucose level were done of each patient. Other investigations like liver function test, prothrombin time, urine examination, chest x ray, ultrasonography of abdomen, blood gases and CSF examination were done whenever indicated.

All patients were treated with antimalarials as per WHO guidelines. Supportive treatment like antipyretics, IV fluids and anticonvulsants were given as and when required. Inj. PRC were given only when platelet counts fell below 10000/cmm or if low platelet (<50000) was associated with bleeding from any site. Inj. PCV was given only if Hb level fell below 6 gm%.

Patient's hospital stay was noted in form of days. Patients were assessed twice daily during the hospital stay.

Results & discussion: In the present study total 190 children of malaria admitted in the tertiary care hospital during 1st april to 30th September were enrolled. Most of them (88.94%) were p. vivax malaria (Table 1).

Table 1: Type of infection

Type	No of cases	%
p. vivax	169	88.94
p. falciparum	20	10.52
Mix infection	1	0.52

Males were more commonly affected (67.89%) than females (32.10%). Male : Female ratio was 2.1:1(Table 2). Males are more frequently exposed to the risk of acquiring malaria than females because of outdoor life. Females in India are better clothed than males.

Table 2: Sex distribution

Sex	No of cases	%
Male	129	67.89
Female	61	32.10

Maximum cases were noted in 5 to 10 yr age group (44.21%)(Table 3).In their study, Talsania N J &Vani S N also found that the children of 5 to 9 years of age group suffered maximum from malaria[5].

Table 3: Age distribution

Age in years	No of cases	%
Less than 1	5	2.63
1 to 5	54	28.42
5 to 10	84	44.21
10 to 15	47	24.73

Pick of malaria cases was seen in month of August (34.73%) (Table 4). Rain provides opportunities for the breeding of the mosquitoes. It also increases the atmospheric humidity which is necessary for the survival of the mosquitoes. Malaria cases were maximum during the period of May to September in the study by Talsania N J &Vani S N[5].

Table 4: Month distribution

Month	No of cases	%
April	20	10.52
May	17	8.94
June	24	12.63
July	26	13.68
August	66	34.73
September	37	19.47

All patients of malaria complained of high grade fever. Headache & vomiting were other common symptoms seen in 50% cases. Convulsion, altered sensorium & abdominal pain were uncommon symptoms. Bleeding was rare as a presenting symptom on admission (Table 5).All the clinical features of malaria are caused by the erythrocytic schizogony in the blood. The rupture of the RBCs by merozoites release certain factors & toxins which could directly induce the release of cytokines such as TNF & interleukin 1 from macrophages, resulting in high grade fever[6].

Table 5: Presenting symptoms

Symptoms on admission	No of cases	%
Fever	190	100
Headache	98	51.57
Bodyache	62	32.63
Vomiting	95	50.00
Cough & cold	25	13.15
Convulsion	18	9.47
Bleeding	3	1.57
Altered sensorium	7	3.68
Abdominal pain	12	6.31

Anemia (Hb < 10) was common (68%), but severe anemia (Hb < 5) was very uncommon (2.63%)(Table 6). The mechanism of anemia in malaria are invasion & destruction of reticulocytes by plasmodium, increased fragility of infected & non infected RBCs & pooling of RBCs in spleen[7].

Table 6: Severity of anemia

Hb level in gm %	No of cases	%
< 5	5	2.63
5 to 10	124	65.26
> 10	61	32.10

Thrombocytopenia was very common & was seen in 86.85% cases but severe thrombocytopenia was seen in 16.8% only(Table 7). The mechanism of thrombocytopenia in P.vivax is not clearly known but possible mechanisms includes, both nonimmunological destruction as well as immune mechanisms, oxidative stress damage of thrombocytes & splenic destruction[7,8].

Table 7: Severity of thrombocytopenia

Platelet count per cmm	No of cases	%
< 50000	32	16.84
50000 to 100000	89	46.84
100000 to 150000	44	23.15
> 150000	25	13.15

Most common complication of malaria, as per study was cerebral malaria (5.26%)(Table 8). All 10 patients presented with altered sensorium, of which 6 patients were having history of convulsions. None of these patients was having h/o epilepsy in the past. Other possible infectious, noninfectious & metabolic cause for fever with altered sensorium were ruled out. All patients were treated with supportive treatment & injectable Artesunate in the recommended dose. 9 patients recovered & discharged in clinically stable condition. One patient expired within 24 hours of admission. One patient who presented with ARF, shock & metabolic acidosis also expired within 24 hours of admission. Severe anemia was seen in 5 patients only, all of tham were treated with Artesunate Combination Therapy (ACT) & inj. PCV. Jaundice was seen in 6 patients. All other complications were rare & seen only in 1 to 2% of cases(Table 8).

Table 8: Complications in malaria

Complication	No of cases	%
Cerebral malaria	10	5.26
Acute renal failure	1	0.52
Bleeding	3	1.57
Severe anemia	5	2.63
Metabolic acidosis	2	1.05
Shock	2	1.05
Acute pulmonary edema	1	0.52
Hyperpyrexia	0	0
Hypoglycemia	3	1.57
Jaundice	6	3.15
Hemoglobinuria	2	1.05

All patients with uncomplicated p.vivax malaria were treated with CQ only. Only 10 patients were shifted to injectable Artesunate because 0f intolerance of CQ. All patients with p.falciparum, p.vivax with complications &persistant vomiting were treated with ACT. Only 2 patients with complicated p.vivax were treated with Quinine + ACT as they were already treated with ACT alone at private & their smears were positive on admission(Table 9).Primaquine was given to all patients except 5 infants.

Table 9: Antimalarial therapy

Antimalarials used	No of patients	%
Chloroquine (CQ)	110	57.89%
ACT	68	35.78%
CQ f/b ACT	10	5.26%
ACT + Quinine	2	1.05%

Inj. PCV was given to 10 patients, inj. PRC to 3 patients & inj.FFP was given to only 1 patient.
Only 2 patients expired within 24 hrs of admission, 2 patients took DAMA; all other patients were discharged after completion of treatment. Case fatality rate (CFR) was 1.05% only. In the study by VyasSheetal an average CFR was 3.03%. Median duration of survival after hospitalization was 23.5 hours[9].

Conclusion: In the present study total 190 children of malaria admitted in the tertiary care hospital during 1st april to 30th September were enrolled. Most of them (88.94%) were p. vivax malaria, 10.52% were P.falciparum malaria & 0.52% were having both. Males were more commonly affected (67.89%) than females (32.10%). Male : Female ratio was 2.1:1. Maximum cases were noted in 5 to 10 yr age group (44.21%). Pick of malaria cases was seen in month of August (34.73%). All patients of malaria complained of high grade fever. Anemia (Hb < 10) was common (68%), but severe anemia (Hb < 5) was very uncommon (2.63%). Thrombocytopenia was very common & was seen in 86.85% cases but severe thrombocytopenia was seen in 16.8% only. Inj. PCV was required in only 10 patients & inj. PRC was given to 3 patients. Most common complication of malaria, as per study was cerebral malaria (5.26%). Other common complications were severe anemia & jaundice. All patients with uncomplicated p.vivax malaria were treated with CQ only. Only 10 patients were shifted to injectable Artesunate because 0f intolerance of CQ. Second line treatment (quinine) was required only in 2 patients (1.05%). Only 2 patients expired within 24 hrs of admission. Case fatality rate (CFR) was 1.05% only.

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