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Research Article

Clinical, Hematological and Coagulation Proflile in Malaria

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Abstract: The Objective of the study was to determine the morbidity and mortality in patients with a diagnosis of malaria with altered hematological and coagulation parameters. 100 patients of Malaria confirmed by PS.MPQBC or Antigen Assay underwent detailed clinical history, through physical examinations and investigated with haematological and coagulation parameters. This was followed by monitoring the outcome of patients with respect to morbidity and mortality. Of the 100 patients 14 patients had severe anemia (Hb % <6gm %) and all of these patients were falciparum, mixed infection and one case was Pl. Vivax infection. Thrombocytopenia was observed in 63% of the patients and severe thrombocytopenia (<50,000 cumn) was seen in 5% of the patients. PT and APTT was increased in 21% and 31% of the cases respectively. BT was increased in 5% of the cases. Increased BT is associated with high mortality. Severe anemia is a poor prognostic factor and adverse outcome. Thrombocytopenia, increased in PT, apt does not have any correlation to mortality. Mixed infection behaves like falciparum malaria.
Keywords: Malaria; Plasmodium falciparum; Severe Anemia; Thrombocytopenia

INTRODUTION

Malaria is a protozoan disease caused by Plasmodium species (*P. falciparum, P. Vivax, P. ovale, P. malaria, P. knowlesi*) which s transmitted by the bite of infected female *Anopheles* mosquitoes occurs through the tropics and sub tropics at altitudes below 1500 metres [1]. It is found all over the world from 40 degree south to 60 degree north [2]. Malaria is a major health problem in India with mortality due to malaria annually in India is about 200,000 [3]. In the last few decades efforts has been made to produce an effective malarial vaccine. These are still at developmental stages[4]. Even with all these efforts the malaria affects almost all the organs of the body. But one of the chief components affected is blood. So, this work puts in an effort to correlate the changes in blood.

MATERIALS AND METHODS

We undertook a prospective study comprising 100 patients with fever who were proven to have malaria either by MPQBC. Peripheral smear and following Antigen detection sero diagnostic test.

a. Histidine rich protein 2 for Plasmodium falciparum.
b. pLDH for any Plasmodium species

After a detailed history and clinical examination these people underwent complete hemogram. BT. PT. APTT. Renal function test and chest x-ray then the patients was treated with anti-malarials and other supportive treatment.

RESULTS

All the diagnosed cases were aged between 20-70 years with the predominant age group affected 20-40 years ,the majority of the population was from rural areas (59%) than the urban areas (41%).The total number of *P. falcifarum*, *P. vivax*, mixed infections were 50%, 40% and10% respectively.

All the patients presented with fever was present in 94% of the patients and chills and rigors were present in 77% of the patients easy fatigability was seen in 44% of the cases most of whom had severe anemia (<6gm/dl). Nausea and vomiting was seen in 21% of the cases. Altered sensorium was seen in 10% of the patients. Only patients with falciparum and mixed infection had these complaints. A typical presentation is very common in the form of abdominal pain arthralgia which was subsided after starting anti malarial therapy.

Table-1: Prevalence of symptoms Plasmodium species

Symptoms	*P. falciparum*	*P. vivax*	Mixed	Total
Fever	94%	92.5%	100%	94%
Chills and rigor	78%	77.5%	60%	77%
Easy fatigability	46%	40%	50%	44%
Headache	36%	30%	20%	32%
Nausea and vomiting	22%	15%	40%	21%
Cough	4%	0%	0%	2%
Altered Sensorium	14%	0%	30%	10%

Showing incidence of clinical features

Spleenomegaly is an important sign in malaria which was observed in 53% of the patients, but absence of this does not rule out malaria .69% patients had Hb% less than 19 gm %. Among the patients who had less than 10gm percentage Hb%.

a) 30 patients had Hb 8%-10%gm (mild anemia)
b) 25 patients had Hb 6%-8%gm (moderate anemia)
c) 14 patients had Hb<6gm%(severe anemia)

Anemia was present in 69% of patients which was more common with *P. falciparum* infection and among them 40 patients had spleenomegaly i.e. 58% of the patients with anemia had spleenomegaly. Of the total 100 cases 63 patients had thrombocytopeneia. 66.6% of the patients with thrombocytopenia had splenomegaly.

Table-2: Clinical profiles of malaria

	Pallor	Icterus	Pedal edema	Splenomegaly	Hepatomegaly	CNS Involvement
P. falciparum	90%	24%	12%	62%	24%	16%
P. vivax	62.5%	25%	25%	35%	5%	
Mixed	90%	30%	10%	80%	50%	30%
Total	79%	16%	8%	53%	19%	11%

Leucocytosis was predominant in present study. Monocytosis was observed in15% of the patients which was a good predictor of effectiveness of antimalaraial therapy. PCV was <20 in 14% of the patients with predominantly *P. falciparum* infection (20%) and 10% with mixed infection, thus indicating the degree of anemia and higher rate of destruction of RBC's associated with falciparum malaria. PT AND APTT was increased in 21% &13% of the cases respectively which was predominantly in falciparum and mixed infections, but this does not result in spontaneous bleeding manifestation which is an indicator of poor prognosis.

Table-3: Hematological profiles of malaria

	P. falciparum	*P. vivax*	Mixed	Total
Lymphocytosis	60%	37.5%	30%	48%
Lymphopenia	20%		10%	11%
Neutrophilia	34%	25%	40%	31%
Neutrocytopenia	24%	12.5%	10%	18%
Eosiniphilia		10%	10%	5%
Monocytosis	16%	15%	10%	15%

DISSCUSSION

In our study the male to female ratio was 3:76:1 and compared to Bhakshi *et al*.[5], the males were affected were more in our study [5]. The incidence of malaria was more in men than in women due to the working pattern i.e men are exposed to mosquito hites outdoors whereas females are less exposed. Our study follows the age pyramid where the base is formed by young people and apex by the older age who constitute lesser percentage of the population

Table-4: Prevalence of incidence of malaria

Age	Malhotra *et al*. [6]	Present Study
20-30	36%	46 %
31-49	60%	44%
>50	4%	10%

Fever was the predominant complaint in our study i.e is 94% of our patients presented with the fever of 77% of the patients had chills and rigors. In the study conducted by Mehta et al fever was presented in 100% of patients and 96%in the studies conducted by Malhotra *et al.* [6] and naval hospital respectively. It was also noted that 44% of our patients in our study had easily fatigability as their presenting complaint. There was no mention of regarding in any other studies. Vomiting was observed in 43.3% in the patients of our study conducted by Mehta and et al[8] it was also seen in 21% and 23% patients in the study conducted by the naval hospital cough and breathlessness was presenting complaint in 4.47% of the patients by study of Mehta *et al*. and the symptoms were noticed in 2% of the patients in our study [8]. The higher incidence of these symptoms may due to higher number of falciparum cases compared to other areas where vivax malria was predominant It also signifies that the number of complicated malaria cases were in more in our area than in other studies. The number of patients presenting were altered in sensorium was seen in 50% of the cases in the study conducted in the study by Malhothra where as in our in study it was only 10%. The higher incidence in their study was due to fact that their study was conducted in patients with complicated malaria only [6].

Pallor was presented in 79% of the patients in the study carried out by Malhothra [6], it was noticed 79% in our study. The incidence of pallor was more in the patients with falcipurum and mixed infection which was 90%.Pallor was present in vivax malaria in our study. It co-relates with the study by Sharma [10]. Leteures was noted in 16% of the patients in our study where as it was seen in 25% of patients by Malhothra and it was seen in 46% by Nand Splenomegaly was seen in 53% of the patients in the present study where as rates where observed in a study by Murthy where the percentage of the patients with spleenomegaly was w 50 % high incidence of spleenomegally was noted in a study conducted by ram it was 88.75 % in their study comparatively high incidence of 60 % was also observed by nand . Hepatomegally was noted in 19% of the patients in the present study. Sudies by Ram and Murthy [13] have shown an higher incidence of hepatomegaly in their work .it might be due t o the fact that their study mainly concentrated on the subject such as malarial hepatitis and jaundice in malaria. The incidence in these studies was 79.5%and 91%in ram and murthy respectively where as in another study by nand the incidence was !#.3 % which was comparable to our study.

Coma seizures or altered sensorium was observed among 10%of the patients in our study. It was noted only in patients with pl.falciparum or mixed infection had these symptoms. The study by Malhothra also had similar observation where the CNS involvement was noted in 12.5% of the patients this signifies that cerebral malaria can be caused only by pl.falciparum .

In the present study the percentage of falciparum malaria was 50% and the incidence of vivax and mixed infection was 40% and 10% respectively. In a study by Rajanasthein [14] the prevalence of falciparum was 76.2% where as vivax malaria was just 23.8%. In a study by Reddy *et al*. [15] there was high incidence of vivax malaria i.e 61.2 % and falciparum being 36.8 %. In another study conducted by Bhakshi *et al*. [5] the incidence of falciparum, vivax and mixed infection was 60%, 35% and 5% respectively. From these observations we can conclude that incidence of particular species varies with geographical area, the area where we have conducted the study is known to be endemic for falciparum and hence the higher incidence is noted in my study.

Anemia was present in 69% of the patients in our study , the incidence of severe anemia (hb> 6gm%)was seen in 14% and it was comparable to study done by Mehta et al with with incidence of 18% [9]. The over all incidence of anemia was higher in studies conducted by Sharma et al where the incidence was 86.7% . The higher incidence could be explained by the fact that their study involved with cases of falciparum malaria only. If we consider only falciparum cases even our study showed an incidence of 80%.out of the 69 patients who had anemia only 49 patients had splenomegaly this indicates that there are other factors other than spleenic sequestration which could lead anemia.

Leucocytosis was seen 11% of the total patients in our study. Similar observations were made in a study conducted by Sharma SK *et al*. [10] where the incidence of leucocytosis was 13.3%. In our study 14% of the patients with falciparun malaria had leucocytosis and it was comparable to the study by Sharma SK *et al*. [10]. All the patients who had leucocytosis had neutrophilia which indicates superadded bacterial infecton.

Monocytosis was observed in 15% of patients in our study. It was observed N.K.D. Hakin *et al*. [19] in their study that monocytosis in patients especially those on antimalarial therapy may be an indicative of an anti malarial effect by monocytes, thus monocytosismay enhance predisposition to a favorable outcome. Eosinophilia was observed in 5% of the cases in our study. Thrombocytopenia was present in 53% of the cases in the present study. In a study by Sharma SK *et al*. [10] observed that 70% of the patients had thrombocytopenia. Thrombocytopenia was present in 80% of the cases with faliparum malaria in our study. In our study 57.6%of the patients with vivax malaria had thrombocytopenia.

In our study only 54 patients out of 63 had splenomegaly.it can be observed that only 66.6% of the patients with thrombocytopenia had splenomegaly.so hereby we can conclude that splenic sequestration is not only the cause of thrombocytopenia other causes such as immune mediated platelet destruction also play a role.

Increased ESR was seen in 56% of the patients in total number of cases. In patients with Pl. falciparum malaria elevated ESR was seen in 72% cases. This was comparable to the study by Bakshi *et al*. [5].

In our study 57% of the patients had normocytic normochromic blood picture. It was comparable to a study by Sen et al were half the patients had normocytic normochromic blood picture [19]. Inour study 25%of the patients had microcytic hypochromic blood picture which was comparable to a study by a same et al 24 in their study also had microcytic hypochromic blood picture in 20% of the cases . In our study prevalence of diamorphicanemia was seen in 18% of the cases similar results were also observed by Seen were the prevalence of dimorphic anemia was 20% in their study.

CONCLUSION

The incidence is higher in males than females with peak in 3rd and 4th decade. Fever is the presenting complaint in almost all cases. Easy fatigability indicates severe anemia in malaria. A typical presentation is very common in the form of abdominal pain, arthralgia which was subsided after starting anti malarial therapy. Spleenomegaly is an important sign in malaria, but absence of this does not rule out malaria. Anemia is the most common hematological abnormality. Thrombocytopenia is very common in malaria, but spontaneous bleeding is rare. The higher incidence of Pl Falciparum in this study is because these areas are endemic for Pl. Falciparum infections. PT and APTTwere prolonged in some cases predominantly in falciparum and mixed infections, but this does not result in spontaneous bleeding. BT was prolonged in 5% of the cases, most of them had spontaneous bleeding. It is also indicator of poor prognosis. Severe anemia is poor prognostic factor and it increased the duration of hospital stay and even mortality. Mixed infections behave like falciparum malaria but its incidence and severity is less than severe Pl Falciparum malaria. In mixed infection, Pl. Vivax malaria has a protective role against severity of Falciparum malaria. Use of antibiotics along with antimalarial has shown better response in patients with malaria indicating the prevalence of superadded bacterial infection.

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