International Journal of Medical and Health Research
ISSN: 2454-9142, Impact Factor: RJIF 5.54
www.medicalsciencejournal.com
Volume 3; Issue 2; February 2017; Page No. 200-202

Monitoring of haematological parameters in malarial condition in adult patients

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Abstract
The morbidity and occasionally mortality related with malaria is high and these haematological factors show an significant part in it. Some current studies have shown that P. vivax can also source of severe disease and the haematological constraints are usually exaggerated in such cases. The present study was commenced to recognise the haematological modifications in vivax malaria patients.

The study has planned in IGIMS Patna, The 50 patients detected with malaria were enrolled in to the study. The age group of the patients are from 22-65 years. The patients visited to Out Patient Department (OPD) and in-patient department (IPD) of IGIMS Patna were considered in the study. All the patients are informed consents. The entire patient's clinical history was collected.

The malaria is the major problem in India. The P. Falciparum is the major causative organism responsible for the malaria. Along with it the P. Vivax is also found to cause the malaria. Haematological abnormalities are encountered in vivax malaria. Thrombocytopenia is the most common. A differential diagnosis of malaria should be considered in patients presenting with fever and thrombocytopenia.

Keywords: malaria, haematological changes, plasmodium falciparum, plasmodium vivaxetc

Introduction

Malaria is a mosquito-borne infectious disease of humans and other animals caused by parasitic protozoans (a group of single-celled microorganisms) belonging to the Plasmodium type [1]. Malaria causes symptoms that typically include fever, fatigue, vomiting, and headaches. In severe cases it can cause yellow skin, seizures, coma, or death [2]. Symptoms usually begin ten to fifteen days after being bitten. If not properly treated, people may have recurrences of the disease months later [1]. In those who have recently survived an infection, reinfection usually causes milder symptoms. This partial resistance disappears over months to years if the person has no continuing exposure to malaria [2].

The disease is most commonly transmitted by an infected female Anopheles mosquito. The mosquito bite introduces the parasites from the mosquito's saliva into a person's blood [1]. The parasites travel to the liver where they mature and reproduce. Five species of Plasmodium can infect and be spread by humans [2]. Most deaths are caused by P. falciparum because P. vivax, P. ovale, and P. malariae generally cause a milder form of malaria [1, 2]. The species P. knowlesi rarely causes disease in humans [1]. Malaria is typically diagnosed by the microscopic examination of blood using blood films, or with antigen-based rapid diagnostic tests [2]. Methods that use the polymerase chain reaction to detect the parasite's DNA have been developed, but are not widely used in areas where malaria is common due to their cost and complexity [3].

The risk of disease can be reduced by preventing mosquito bites by using mosquito nets and insect repellents, or with mosquito-control measures such as spraying insecticides and draining standing water [2]. Several medications are available to prevent malaria in travellers to areas where the disease is common. Occasional doses of the medication sulfadoxine/pyrimethamine are recommended in infants and after the first trimester of pregnancy in areas with high rates of malaria. Despite a need, no effective vaccine exists, although efforts to develop one are ongoing [1]. The recommended treatment for malaria is a combination of antimalarial medications that includes anartemisinin [1, 2]. The second medication may be either mefloquine, lumefantrine, or sulfadoxine/pyrimethamine [4]. Quinine along with doxycycline may be used if an artemisinin is not available [4]. It is recommended that in areas where the disease is common, malaria is confirmed if possible before treatment is started due to concerns of increasing drug resistance. Resistance among the parasites has developed to several antimalarial medications; for example, chloroquine-resistant P. falciparum has spread to most malarial areas, and resistance to artemisinin has become a problem in some parts of Southeast Asia [1].

According to the World Malaria Report 2014, 22% (275.5m) of India's population live in high transmission (> 1 case per 1000 population) areas, 67% (838.9m) live in low transmission (0–1 cases per 1000 population) areas and 11% (137.7m) live in malaria-free (0 cases) areas. In 2013, 0.88 million cases have been recorded, with 128 million tests being conducted on the suspected cases, with P. falciparum causing 53% and P. vivax causing 47% of the infections. The incidence of malaria in India accounted for 58% of cases in the South East Asia Region of WHO [5].

At present, official figures for malaria in India, available at NVBDCP [6], indicate 0.7–1.6 million confirmed cases and 400-1,000 deaths annually.

Hematological changes, which are the most common systemic complications, play a significant role in these serious complications. The haematological abnormalities that have been reported to consistently companion which comprise anaemia, thrombocytopenia, and atypical lymphocytosis and infrequently disseminated intravascular coagulation.2 Leucopenia, leucocytosis, Neutopenia, Neutrophilia, Eosinophilia and monocytosis also have been reported. In

tropical countries like India, the majorities of the shared complications commencing due to malarial consequences is from hyperparasitaemia. Mortality is very high (10- 30%) in complicated P. falciparum infection.

The morbidity and occasionally mortality related with malaria is high and these haematological factors shown significant part in it. Some current studies have shown that P. vivax can also source of severe disease and the haematological constraints are usually exaggerated in such cases. The present study was commenced to recognise the haematological modifications in vivax malaria patients.

Materials & Methodology

The study has planned in IGIMS Patna. The 50 patients detected with malaria were enrolled in to the study. The age group of the patients are from 22-65 years. The patients visited to Out Patient Department (OPD) and in-patient department (IPD) of IGIMS Patna were considered in the study. All the patients are informed consents. The entire patient's clinical history was collected.

The patients showing positive malarial signs in pathological diagnosis without any other complications were enrolled into the study.

Results & Discussion

The data from the 100 patients were collected and discussed as follows. Table 1 showed the age group and the number of cases.

Table 1: Age group Vs number of cases

Age Group	Number of Cases
22-30	8
31-40	21
41-50	10
51-60	6
61 and above	5
Total	50

The table 1 showed that the 31-40 years age group are more prone to the malarial. 16% were from the 20-30 age group. The 31-40 years age group had 42% of the cases. 20% of the patients were from the age group of 41-50 years. The 51-60 years age group had 12% of the patients.

In the present study the commonly affected age group is 31-40 years. In Layla A.M. *et al*. [7] study mean age of patients was 25.43years. Khaled Taha *et al*. [8] study mean age of patients was 33.2years.

Out of the 50 cases 11 patients were females and 39 cases are males. The male to female ratio is 3.54:1. In Layla A.M. [7] *et al*. study, there was a male predominance, with a male to female ratio of3.15:1. In KhaledTaha *et al*. [8] study 77 were male (74.8%) and 26 were female (25.2%) and male to female ratio was 2.96:1. Males are more to malaria due to more daily exposures and working conditions.

Table 2: Infection type with number of cases

Age Group	Number of Cases
P. Falciparum infection	30
P. Vivax infection	16
Mixed	4

In the 50 patients, 30 patients were observed with P. Falciparum infection. 16 patients were observed with P. Vivax infection. 5 cases are observed with mixed type of infections. In Dr Shamim Akhtar *et al*. [9] P. Falciparum malaria was commoner than P.Vivax having 39 cases (52.7%) versus 27 cases (36.48%) respectively, while Mixed infection represented only 8 cases (10.81%). In KhaledTaha *et al*. [8] the most common type of malaria was P.Falciparum (54.2%), followed by P.Vivax (39%), then (mixed) infections in 17(2.4%). So there has been change in the epidemiological pattern of malaria.

Table 3: Haematological profile in the malarial patients

Haematological Parameter	Number of Cases
Haemoglobin	
Less than 5 mg	3
Between 5-10 mg	21
More than 10 mg	26
Platelet Count(per cumm)	
Less than 50,000	10
Between 50,000-1,50,000	18
More than 1,50,000	22
Serum Bilurubin (per cu mm)	
Less than 1.2mg/dl	36
Between 1.2-1.5 mg/dl	14
More than 5-10 mg/dl	1
SGPT	
Less than 10-40 IU/L	28
Between 1.2-1.5 IU/L	16
More than 5-10 IU/L	6
Blood Urea %	
41-100	9
101-200	2
Serum Creatinine	
1.4-3	6
3-10	2
More than 10	1

Table 2 showed Haematological profile in the malarial patients.The haemoglobin level showed that 42% of the patients showed the anaemia. 3 patients are having significant lower level of Hb. As the per platelets count data 10 patients showed severe thrombocytopenia whereas 22 patients showed moderate thrombocytopenia. The 36 patients are having bilirubin level less than 1.2 mg/dl. 14 patients had Serum Bilurubin Between 1.2-1.5 mg/dl. And only 1 patient had bilirubin level More than 5-10 mg/dl. The SGPT level of less than 10-40 IU/L was found in 28 patients. Between 1.2-1.5 IU/L SGPT was seen in 16 patients. 6 patients showed the SGPT level more than 5-10 IU/L. 9 patients showed the blood urea level of above normal level. 41 patients were having normal blood urea levels. 9 patients showed higher level of the Serum Creatinine.

Conclusion

The malaria is the major problem in India. The P. Falciparum is the major causative organism responsible for the malaria. Along with it the P. Vivax is also found to cause the malaria. Haematological abnormalities are encountered in vivax malaria. Thrombocytopenia is the most common. A differential diagnosis of malaria should be considered in patients presenting with fever and thrombocytopenia.

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