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Assessment of malarial fever in children by estimation of haematological profile

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Abstract
Haematological changes are very commonly associated with malaria and play a significant role in serious complications associated with the disease. The haematological abnormalities that have been reported to consistently accompany malaria include anaemia, thrombocytopenia, and atypical lymphocytosis and infrequently, disseminated intravascular coagulation.
Hence, from the above literature findings the current study was planned to know the spectrum of clinical manifestations, infecting species, age distribution and mortality in admitted patients of malaria.
Fifty patients found positive for malaria in Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga were enrolled in the present study for duration of Nov 2011 to Oct 2012. The following were the inclusion and exclusion criteria for the present study. The patients visiting Out Patient Department (OPD) and in-patient department (IPD) in DMCH were considered in the study. All the patients were duly informed and valid consent was taken. The entire patient's clinical history was collected.
From the present study it can be concluded that malaria should be evaluated by haematological parameters. Patients of vivax malaria should be monitored for the development of different complications as their early detection and treatment could be lifesaving. The prompt recognition, prompt supervision, and reasonable reassuring therapy may reduce mortality due to falciparum cerebral malaria.

Keywords: malaria, haematological changes, plasmodium falciparum, *Plasmodium vivax*

Introduction
Malaria is a disease having symptoms of recurrent fever with chills and headache. After onset of fever, it subsides after sometimes and again reoccurs. In severe cases, it can progress to coma or even death. It is caused by a parasite known as Plasmodium. It commences with the bite of female Anopheles mosquitoes which carries this parasite. The disease is widespread in tropical and subtropical regions around the equator, including much of Sub-Saharan Africa and Asia. In India, the disease occurs throughout the year across the country. However, it is more prevalent during and after the rainy season due to mosquito breeding. According to World Health Organization (WHO), India contributes 77% of the total malaria cases in Southeast Asia [1].
Symptoms of malaria can develop in seven days after the bite from the infected mosquito. Typical symptoms include:

- Fever, headache, vomiting and other flu-like symptoms, (The fever occurs in four-to-eight hour cycles).
- The parasite infects and destroys red blood cells resulting in fatigue, fits/convulsions and loss of consciousness.

Malaria is caused by parasite known as Plasmodium this parasite is generally spread by female Anopheles mosquitoes, known as night-biting mosquitoes, as it generally bites between dusk and dawn. If a mosquito bites a person infected with malaria, it can also become infected and spread the parasite on to others. During the bite of female mosquitoes, the half matured parasite transmits from the saliva of the mosquitoes into the small blood vessels (circulatory system) of the human through a special body part of the mosquitoes called as Proboscis. The parasite enters the bloodstream and travels to the liver. In the blood, the parasites travel to the liver cells where they mature and reproduce. The infection develops in the liver before re-entering the bloodstream and invading the red blood cells. The parasites grow and multiply in the red blood cells. At regular interval, the infected blood cells burst, releasing more parasites into the blood. Infected blood cells usually burst every 48 to 72 hours. Each time they burst, one will have a bout of fever, chills and sweating.
Man develops disease after 10 to 14 days (incubation period) of being bitten by an infective mosquito. Uninfected female Anopheles if bites does not cause Malaria.
Malaria can be diagnosed by the doctor based on the patient's history (fever with chills and rigor) followed by the clinical assessment (enlargement of liver and spleen).

Microscopic examination: The most preferred and reliable diagnosis of malaria is microscopic examination of blood film as all of the four major parasite species can be distinguished easily.

Immuno Chromatographic Test: This is also called as Malaria Rapid Diagnostic Test. This test uses finger-stick and a drop of venous blood. The reading can be assessed visually

as the presence of colored strips on the dipstick. It takes a total of 15-20 minutes to complete the procedure.

Molecular methods: Molecular methods are available such as polymerase chain reaction (PCR). It is more accurate than microscopy.

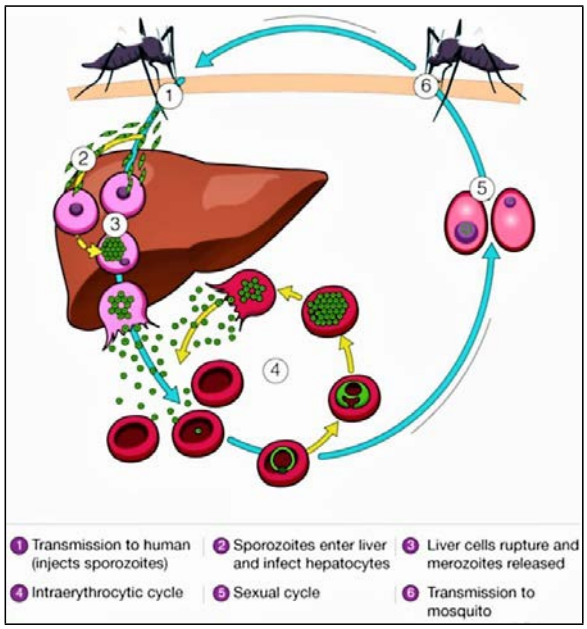

Fig 1

The treatment chosen will depend upon whether the patient has vivax malaria or falciparum malaria as diagnosed by the blood test, age of the patient, the pregnancy status of the female patient and location of the patient [2].

Haematological changes, which are very common, play a significant role in these serious complications. The haematological abnormalities that have been reported to consistently accompany the disease comprise anaemia, thrombocytopenia, and atypical lymphocytosis and infrequently disseminated intravascular coagulation. Leucopenia, leukocytosis, Neutropenia, Neutrophilia, Eosinophilia and monocytosis also have been reported. In tropical countries like India, majority of the shared complications commencing due to malarial consequences is from hyperparasiteamia. Mortality is very high (10-30%) in complicated P. falciparum infection [3].

The morbidity and occasionally mortality related with malaria is high and these haematological factors play a significant part in it. Hence from the above literature findings the current study was planned to know the spectrum of clinical manifestations, infecting species, age distribution and mortality in admitted patients of malaria.

Materials & Methodology

Fifty patients found positive for malaria in Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga were enrolled in the present study duration of Nov 2011 to Oct 2012. Patients who visited to Out Patient Department (OPD) and in-patient department (IPD) in DMCH were considered in the study. All the patients were duly informed and consent was taken. Patient's complete clinical history was collected.

Inclusion criteria

- Patients positive for malaria
- Children in age group of 2-17 years.
- Peripheral smear or rapid malaria antigen test (RMAT) positive for *Plasmodium vivax* and plasmodium falciparum malaria.

Exclusion Criteria

- Patients above 17 years of age
- Having any other complications other than malaria
- Patient presenting with fever but treated empirically like malaria.

Results & Discussion

Data from the 50 patients were collected and is presented as below. The enrolled patients were found positive for the malaria were assessed to know the clinical profile of the children below age of 17 years.

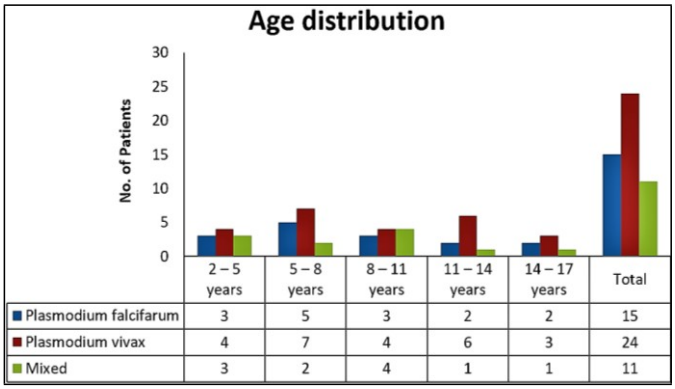

Fig 2: Age distribution of malarial cases

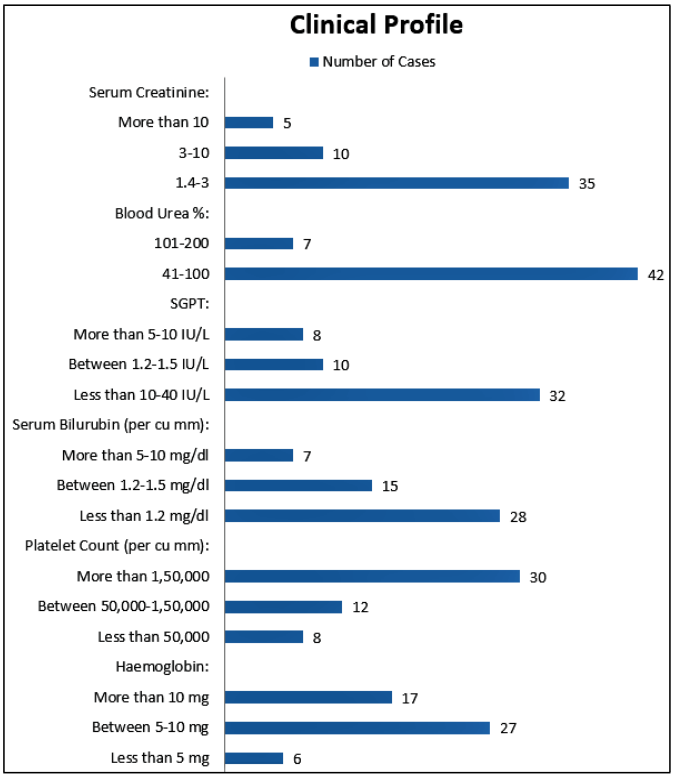

Fig 3: Haematological profile in the malarial patients

Although haematological changes are well-recognised with malarial infection, background haemoglobinopathy, nutritional status, demographic factors and malaria immunity play a major role in specific changes in that geographical region [4].

Malaria is the most common cause of severe anaemia in endemic areas 13. Although vivax malaria is thought to be benign, some studies have shown that it can cause severe anaemia as well [5]. Anaemia in malaria is believed to occur due to haemolysis of parasitised and non-parasitised RBCs, peripheral sequestration of RBCs, and ineffective erythropoiesis. In malaria endemic areas, the prevalence and severity of anaemia are usually determined by a number of interacting factors. These include the level of parasitaemia, age of host, host genetic factors (e.g., co-existing RBC polymorphisms like haemoglobinopathies, G6PD), and non-malarial causes of anaemia (e.g., infections, malnutrition) [6].

Vivax malaria has always been described as benign disease in the past. However, in recent few years many cases of severe vivax malaria has been reported and some of them have resulted in death. The present study also suggests that many of the cases of severe malaria are caused by P vivax. The exact cause of change in the presentation and complications of vivax malaria is not known. However, various hypotheses may be change in the gene of the parasite or gradually developing resistance to commonly used drug chloroquine. Earlier it was thought that the severity of vivax malaria was actually due to coinfection with falciparum but now it is clear that vivax alone can cause life threatening complications [7]. Severity of vivax malaria is mainly because of inflammatory and immunological response [8]. Thrombocytopenia in malaria is because of immune mediated hemolysis [9]. Low platelet count has been commonly reported in vivax malaria [10].

Malaria continues to be common cause of morbidity and mortality in children. Globally 60% of clinical malarial cases and 80% of deaths occur in young children

Conclusion

From the present study it can be concluded that malaria should be evaluated by haematological parameters. Patients of vivax malaria should be monitored for the development of different complications as their early detection and treatment could be life-saving. The Prompt Recognition, prompt supervision, and reasonable reassuring therapy may reduce mortality due to falciparum cerebral malaria.

References

1. www.mohfw.nic.in
2. nvbdcp.gov.in/malaria-new.html
3. "Malaria Fact sheet N°94". WHO. March 2014. Retrieved 28 August 2014.
4. Price RN, Simpson JA, Nosten F. Factors contributing to anaemia after uncomplicated falciparum malaria. Am J Trop Med Hyg. 2001; 65:614-22
5. Srivastava S, Ahmad S, Shirazi N *et al*. Retrospective analysis of vivax malaria patients presenting to tertiary referral centre of Uttarakhand. Acta Trop. 2011; 117:82-5.
6. Abdalla SH, Pasvol G. Malaria: A Hematological Perspective, Imperial College Press, London, UK, 2004.
7. nvbdcp.gov.in/malaria-new.html
8. Picot S, Is P. Vivax still a paradigm for uncomplicated malaria? Med Mal Infect. 2006; 36:406-413.
9. Price RN, Tjitra E, Guerra CA. Vivax malaria: neglected and not benign. Am. J Trop. Med. Hyg. 2007; 77(6):79-87.
10. Looareswan S, Davis JG, Allen DL, *et al*. Thrombocytopenia in malaria. Southeast asian J Trop Med Public Health Health. 1992; 23:44-50.
11. Kakar A, Bhoi S, Prakash V, Kakar S. Profound thrombocytopenia in *Plasmodium vivax* malaria. Diagn Microbiol Infect Dis. 1999; 3593:243-244.