Studies of variation of Haematological indices in Various Acute Febrile Illnesses in Jabalpur City

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Abstract - The common causes of acute febrile illnesses (AFI) are Malaria,Jaundic, Dengue ,Polycythemia, Leukocytosis and other miscellaneous diseases. To detect if certain hematological parameters would increase the probability to reach a provisional diagnosis of various acute febrile illnesses and prompt institution of specific therapy. Present prospective study was conducted from January 2019 to April 2019 in the Department of Zoology , St.Aloysious college Autonomous Jabalpur(Madhya Pradesh). Total 20 samples of acute febrile illnesses in age group 18 to 58 years (IPD) of National Hospital,Golbazar ranital jabalpur were included in the study.Hemoglobin (Hb)Red blood cell(RBCs) and White blood cell(WBCs)Other relevant tests wherever required, were done for confirmation of diagnosis. In our study,out of all febrile polycythemia showed highest haemoglobin and jaundice showed lowest haemoglobin polycythemia showed highest red blood cell and jaundice showed lowest red blood cell polycythemia showed highest white blood cell and jaundice showed lowest white blood cell Haematological changes that occurred in infected blood were the significance increase of the level .Haematological investigation is relatively inexpensive and a less technically sophisticated way for parasite detection.

Key words - Malaria,Jaundic, Dengue ,Polycythemia, Leukocytosis.

INTRODUCTION

Febrile is an adjective that means"related to fever "it can beuced in a medical sense when someone is sick and running a temperature or in a figurative sense to describe a state of excitement or energy .When febrile is used to describe to fever due to illness , it is often used together with the word seizure. Hematological changes are among the most common complications encountered in malaria.[7,8] Prediction of the hematological changes enables the clinician to establish an effective and early therapeutic intervention in order to prevent the occurrence of major complications. These parameters are measurable indices of blood that serve as a marker for disease diagnosis.[9] Abnormalities such as anemia and thrombocytopenia have been observed in patients with malaria.[10] In this study, we analyzed and statistically evaluated the hematological changes in cases of malaria and whether they could guide physicians to institute specific antimalarial treatment.AbujaNiger(2005)Blood is

the most easily accessible diagnostic tissue. Changes in haematological parameters are likely to be influenced by any disease condition which affects the haemopoetic physiology at any level. This is likely to happen with an endemic disease such as malaria that affects the host homeostasis at various fronts resulting in a myriad of clinical presentation. Malaria is a major cause of morbidity in the tropics. Two hundred and forty seven million cases were reported worldwide in 2006 Umar RA et al (2007) studied haematological changes are some of the most common complications in malaria and they play a major role in malaria pathology. These changes involve the major cell lines such as red blood cells, leucocytes and thrombocytes. In Western Kenya, severe anaemia is the predominant severe malaria syndrome peaking in the first two years of life and is attributed to *Plasmodium falciparum*. Abubakar MK, et al. (2007)In malaria-infected patients, especially non-immunes children, prompt and accurate diagnosis is key to effective disease management for a favourable outcome. Clinical diagnosis is widely used for diagnosis of malaria especially in resource-poor countries. Odaibo AB (2013) Impact of Acute Malaria on Some Haematological Parameters in a Semi-Urban Community in This is likely to be the scenario with changing epidemiology of malaria in Africa. Moreover, in tropical countries where malaria is most prevalent, it may be difficult to distinguish the disease from other infections e.g. viral or bacterial based on the symptoms and signs (1997) WHO World Malaria Situation in 1994, Part I, • WHO Weekly Epidemiological Record.Sarojini S (2013)Presumptive anti-malarial treatment is widely practiced and studies show that it is wrought with significant misuse of anti-malarial drugs Microscopic diagnosis is the ‘’imperfect gold standard” for malaria parasite detection and speciation. This technique requires technical expertise and is time-consuming in repeated smear examinations.Usen (2011) Nigeria Malaria Fact Sheet. However, it is a valuable technique when performed correctly in the right hands but can be unreliable and perceived as wasteful when poorly executed.Haematological changes in malaria, such as anaemia, thrombocytopaenia and leucocytosis or leucopaenia are well recognized. The extent of these alterations varies with level of malaria endemicity, background haemoglobinopathy, nutritional status, demographic factors, and malaria immunity Furthermore, diagnostic value of these haematological alterations has not been established in children living in malaria endemic areas. The present study examines the occurrences and severity of haematological changes and their diagnostic value in children with *P. falciparum* malaria in Kisumu, western Kenya. Haematological parameters (red blood cells, white blood cells, platelets, red cell distribution width, mean platelet volume and

haemoglobin) of children less than 5 years infected with *P. falciparum* are compared with uninfected children from the same community. In this study, haematological patterns and their possible predictive values of malaria infection are identified.Maina RN, Walsh D, Gaddy C, Hongo G, Waitumbi J, et al. (2010Malaria remains a leading communicable disease in the developing countries of the world. It occurs mostly in the tropical and subtropical regions and accounts for considerable morbidity and death. It causes the death of more than one million in Africa every year, and is responsible for fifteen percent (15%) of clinical illnesses in the tropical regions of the continent [1-4]. Ten percent (10%) of death in children aged below three years are estimated to be from malaria in some parts of the tropical regions. Of the estimated annual 300-500 million clinical malaria cases, 1.5 to 2.7 million deaths is directly attributed to malaria and the great majority occurs in young children especially in remote rural areas of the sub-Sahara Africa . Senthilkumaar P, Sarojini S.[2007]Malaria is transmitted into human during the bite of anopheles mosquitoes and the injection of sporozoites, the invasive forms of plasmodium. These invade the liver and subsequently the red blood cells, giving rise to periodic shivering, pyrexia and sweating with enlargement of the spleen. This may be followed by severe anaemia and in some cases of malignant tertian malaria, with local blocking of capillaries in individual organ.Cochran wG [1977].Anaemia is another of the many manifestations and results from red blood cells destruction through parasites invasion and development in the cells. In acute malaria, non-parasitized red cells may also undergo haemolysis and in some patients, Coomb's test is positive. However, immune destruction does not always play important role in the development of anaemia

MATERIALS AND METHOD

Present prospective study was conducted from January 2019 to April 2019 in the Department of Zoology , St.Aloysious college Autonomous Jabalpur(Madhya Pradesh). Total 20 samples of acute febrile illnesses in age group 18 to 58 years (IPD) of National Hospital,Golbazar ranital jabalpur were included in the study.

Malaria-Malaria is an infected female Anopheles mosquito borne infection disease that affects humans and other animal.Malaria causes symptoms that typically include fever ,vomiting and headaches.Jaundice - Jaundice also known as icteras is a yellowish of greenish pigmentation of the skin and white of the eye due to high bilirubin levels.Jaundice is typically seen when the level of bilirubin in the blood exceeds 2.3-3mg/dl(milligrams per

deciliter).Polycythemia(High red blood cell count)-Polycythemia means increased red blood cell volume .Polycythemia is divided into two main catagaries primary and secondary **.**Polycythemia can be linced to secondary causes,such as,chronic hypoxia or tumor releasing erythopoietin .Polycythemia vera is due to abnormally increased red cell production in the bone marrow .**Leukocytosis-** Leukocytosis refers to an increase in the total number of White blood cell (WBCs) due to any cause .From a partical standpoint leukocytosis is traditionally classified according to the component in the total number of WBCs.Therefor leukocytosis may be caused by an increase in (1)neutrophil Malaria continues to be a major health problem in some of the most populated areas of the world. It is one of the important causes of febrile illnesses in our part of the world. One of the most prevalent human infections worldwide, malaria results in 225 million cases each year. Around 40% of the global population at risk of malaria resides in the South-East Asian Region. In the Indian subcontinent, distribution is heterogenous and governed by many climatic and physiological risk factors. It is caused by protozoa parasite of the genus plasmodium which infects and destroys red blood cells. Four species of plasmodia (*P. falciparum*, *P. malariae*, *P. ovale* and *P. vivax*) cause malaria in humans of which *P. falciparum* is the cause of morbidity and mortality.1,2 However, *Plasmodium vivax* is the major malarial parasite in India, contributing towards the majority of cases.3The clinical diagnosis of malaria is challenging because of the non-specific nature of the signs and symptoms, which overlap considerably with other febrile illnesses common in tropical regions. This impairs diagnostic specificity and often promotes the indiscriminate use of antimalarials. As parasites of the blood for the majority of their complex life cycle, they expectedly induce hematological alterations. Hematological abnormalities are considered a hallmark of malaria and statistical analyses have shown that many of these hematological values may lead to an increased clinical suspicion for malaria, thus initiating a prompt institution of specific therapy even in the absence of a positive smear report for malaria.

Blood collection and preservation – Complete clinical examination was done and clinical findings were noted. Venous blood sample were collected for **:**Hemoglobin (Hb)Red blood cell(RBCs)White blood cell(WBCs)in EDTA vacuum tubes (2mg/ ml of blood). Thin blood smears were prepared, stained with Leishman's stain and studied for malarial parasite identification.Normal reference ranges of hematological parameters were taken from Dacie and Lewis practical hematology 9th edition and Lab technique by Swroop and Pathak

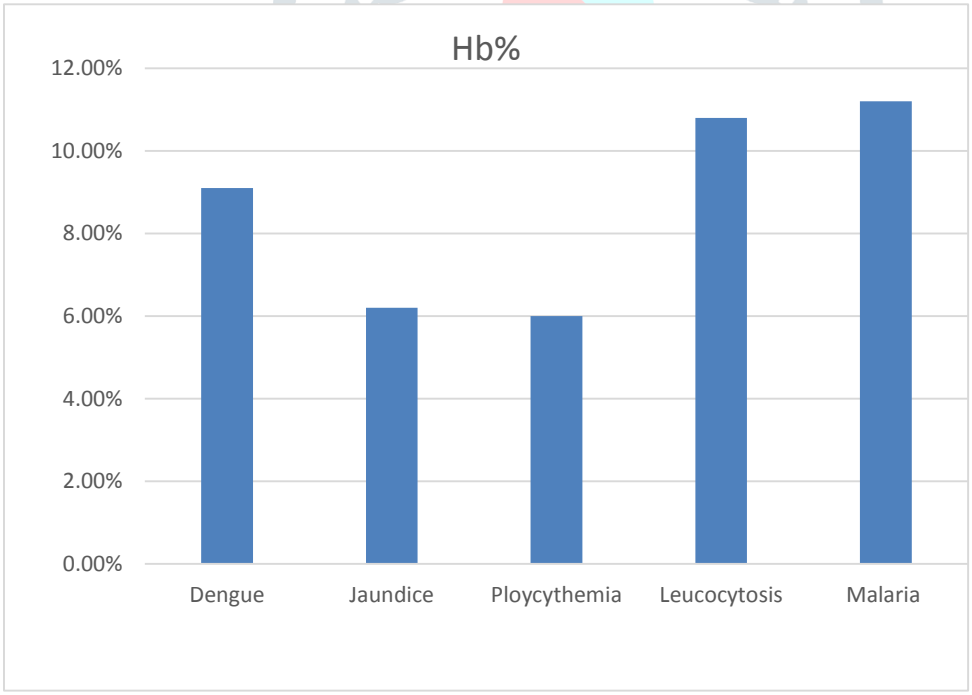
Result and discussion

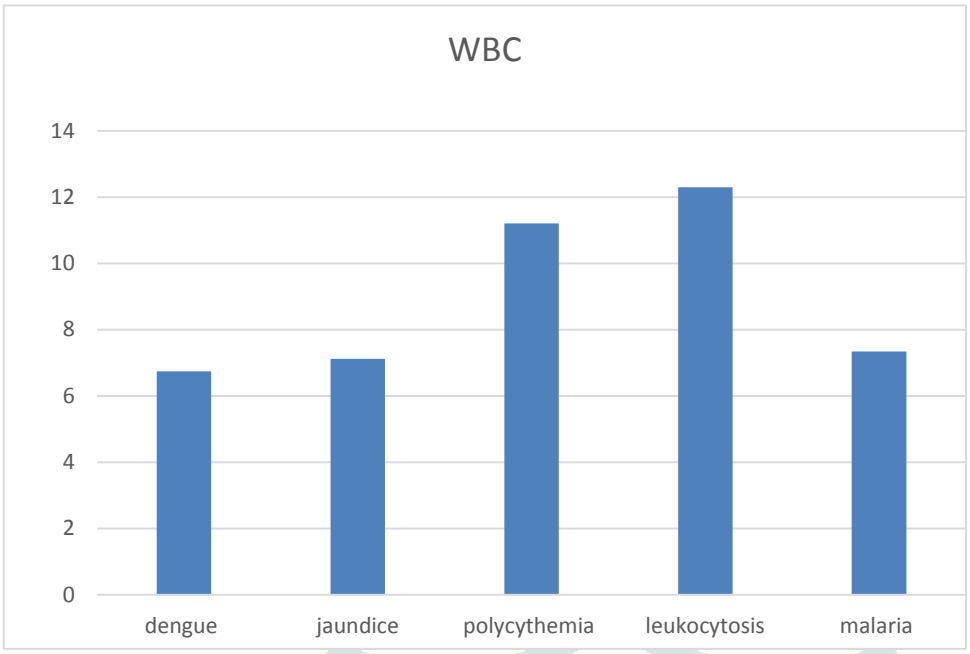
In our study,out of all febrile Dengue showed hemoglobin=9.1%, jaundice showed hemoglobin =6.2%, polycythemia showed hemoglobin = 16.0%, leukocytosis showed hemoglobin =10.8%,malaria=11.2%.Dengue showed red blood cell =54,20,000/cumm, jaundice showed red blood cell =63,90,000/cumm, polycythemia showed red blood cell =72,90,000/cumm , leukocytosis showed red blood cell =61,60,000/cumm, malaria=6810000/cumm

Dengue showed white blood cell =4,900/cumm, jaundice showed white blood cell =3,800/cumm, polycythemia showed white blood cell =9,050/cumm, leukocytosis showed white blood cell =8,400/cumm ,malaria=6800/cumm

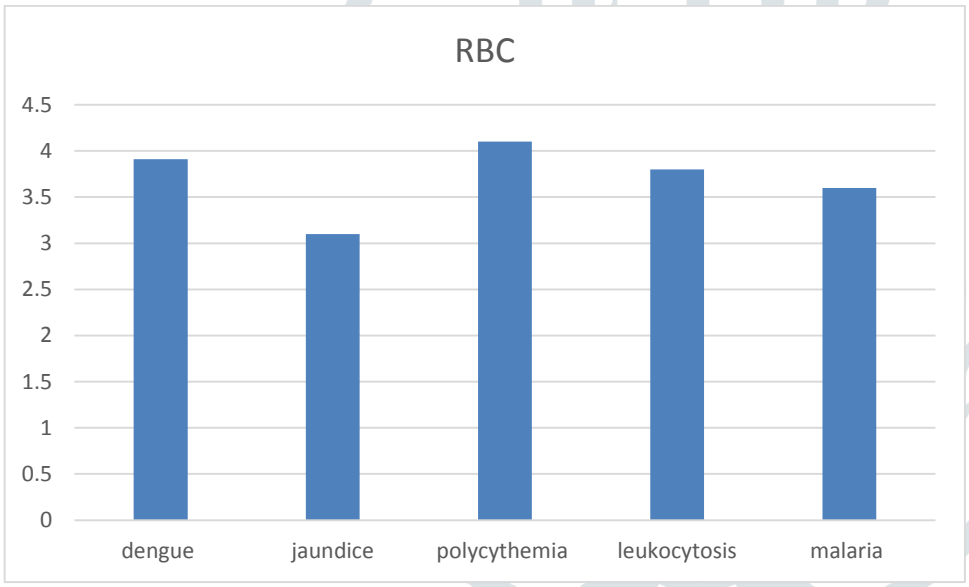
Table 1 :showing haematology of different fibrile illness

Graph showing Hb% in different fibrile illness of male patient

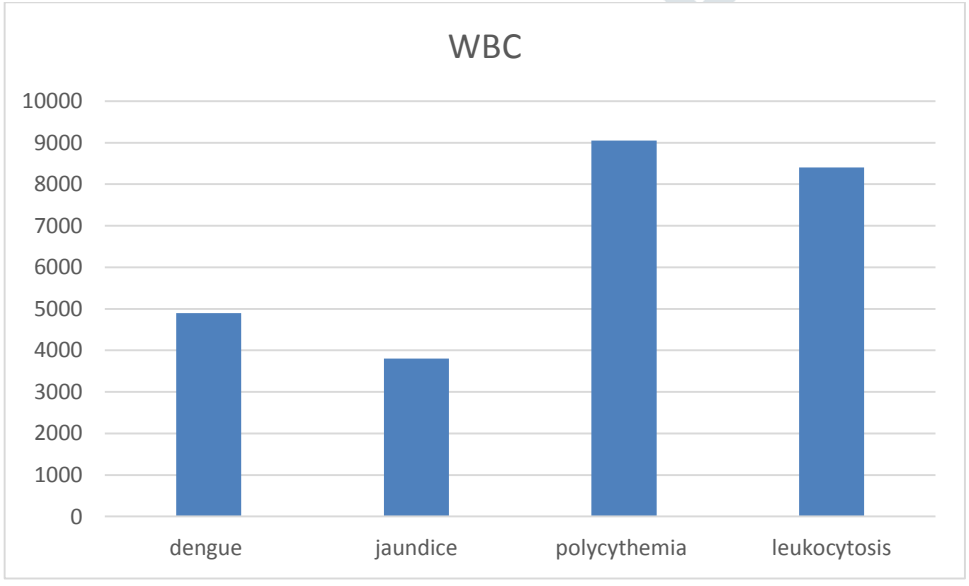




Graph showing RBC in different fibrile illness of male patients



Graph showing WBC in different fibrile illness of male patients



CONCLUSION

In our study,out of all febrile polycythemia showed highest haemoglobin and jaundice showed lowest haemoglobin polycythemia showed highest red blood cell and jaundice showed lowest red blood cell polycythemia showed highest white blood cell and jaundice showed lowest white blood cell Haematological changes that occurred in infected blood were the significance increase of the level .Haematological investigation is relatively inexpensive and a less technically sophisticated way for parasite detection.

The present study has demonstrated that the haematological parameters are reliable and competent measures to diagnose severity of infection, even at the early stages. methods used in this study are simpler in comparison to cell blood count with automatic analyzers which are even not readily available in many remote rural areas of the central india . Haematological investigations could therefore be useful here and are recommended as an adjunct tool in the management of early infections especially in economically depressed settings like central indiaS . However, the differences in the parameters between male and female patients should be taken into consideration when using haematological tests for diagnosis.

The new possibilities of antigen based rapid diagnostic tests which have added a completely new dimension to better management of malaria patients should effectively complement haematological parameters in rural diagnosis of malaria since only few rural clinics have the ability to properly diagnose malaria on site due a lack of adequate facilities and trained laboratory workers. This study gives an interesting view on the malaria diagnosis using rather simple methods that should be available even in such remote rural areas for both field research and in clinics for malaria diagnosis and studies.

However, this work should definitely be followed by more detailed studies as to for example to characterize the relevance of the proposed diagnostics in different time intervals post-infection: to assess on how early infection/severe malaria could be detected by the haematological tests.

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