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Pediatrics

CLINICAL PROFILE AND EFFICACY OF QUANTITATIVE BUFFY COAT, MALARIA RAPID ANTIGEN TEST AND PERIPHERAL BLOOD SMEAR EXAMINATION IN THE DIAGNOSIS OF MALARIA CASES IN CHILDREN ADMITTED IN A TERTIARY CARE HO

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ABSTRACT BACKGROUND: Malaria is of overwhelming importance in the developing world today, with an estimated 300 to 500 million cases and more than 1 million deaths each year. Presently, about two million cases and a thousand deaths due to malaria are reported annually in India. Present study was undertaken to study clinical profile of malaria and evaluate efficacy of QBC, Rapid malarial antigen test and Peripheral blood smear in diagnosis of malaria in children. MATERIALS AND METHODS: A prospective study was conducted in the Department of Pediatrics of ASRAM Hospital, Eluru, over a period of 2 years from August 2011 to July 2013.RESULTS: Out of 105 malaria cases 58(55.3%) belong to 6 years – 10 years age group followed by 26(24.7%) in 10-14 years ,17(16.2%) 1 year – 5years and 4(3.8%) in < 1 year age group. 58 were males accounting for 55.2% and 47 were females accounting for 44.8%.Out of 105 malaria cases, severe malaria constitutes 66 cases (62.9%) cases and uncomplicated malaria constitutes 39(37.1%) cases.All 3 tests are positive in 64 cases. Among 2 test combination – 20 cases positive for both antigen test + QBC , 8 cases for antigen test + peripheral smear and 3 cases for peripheral smear + QBC. Among single test positive – antigen test only positive in 5 cases, peripheral smear only in 4 cases and QBC only in 1 cases.CONCLUSION: Malaria is the most common serious parasitic disease affecting human beings. Major breeding season for vector is rainy season, which coincides with peak incidence of malaria transmission. Vector control measures should be strengthened during this period to decrease malarial incidence.

KEYWORDS : MALARIA, MALARIA RAPID ANTIGEN TEST, PERIPHERAL BLOOD SMEAR EXAMINATION MALARIA, QUANTITATIVE BUFFY COAT.

INTRODUCTION:

Malaria is of overwhelming importance in the developing world today,with an estimated 300 to 500 million cases and more than 1 million deaths each year1. Presently, about two million cases and a thousand deaths due to malaria are reported annually in India2. 6% of the total malaria cases occur in South East Asia, mostly India and Myanmar and 65% of total deaths due to malaria in South East Asia are from these two countries only3. Children under five years of age are most vulnerable group affected.There were an estimated 660000 malaria deaths around the world in 2010,of which 86% were in children <5 years of age4.

Malaria is the world's most important parasitic infection, ranking among the major health challenges for the poor countries. Five parasitic species of the genus Plasmodium infect human beings, but only Plasmodium vivax and Plasmodium falciparum cause majority of the infections. Nearly all deaths and major proportion of morbidity is caused by Plasmodium falciparum. During the "eradication era"; half a century ago, malaria is eliminated or suppressed, particularly in subtropical regions. Malaria is now on the rise due to drug resistance of the parasite and insecticide resistance of the vector.

OBJECTIVES:

1. To study clinical profile and complications in patients with malaria.
2. To evaluate the efficacy of QBC, rapid malarial antigen test and peripheral blood smear in diagnosing malaria cases.

MATERIALS AND METHODS:

A prospective study was conducted in the Department of Pediatrics of ASRAM Hospital, Eluru, over a period of 2 years from August 2011 to July 2013.

Inclusion criteria: Children of age group less than 14 years. Children with presence of clinical features suggestive of malaria. Children with fever positive for either QBC or Rapid malarial antigen test or peripheral blood smear for MP.

Exclusion criteria: Other causes of fever, anaemia, jaundice and encephalopathy like meningitis,encephalitis.

Study Method:

The study group comprised of 350 patients presenting with pyrexia attending Pediatric department ASRAM and all were subjected to QBC,peripheral smear for malarial parasite and rapid antigen test (HRP-II/pLDH)test.Malaria was diagnosed by the clinical presentation and confirmed by either of positive QBC or rapid malarial antigen test(HRP-II/pLDH) or smear for MP.

Out of 350 patients,105 patients showed atleast one of the 3 tests positive. These 105 cases diagnosed as malaria were studied clinically by detailed history along with physical examination according to the semi-structured proforma and cases were followed till discharge to note the outcome. Evaluation done for efficacy these tests in diagnosing malaria among fever cases tested taking peripheral blood smear as gold standard test.

RESULTS:

Out of 105 malaria cases , most common presenting age group was 6 years – 10 years accounting for 58(55.3%) cases followed by 26(24.7) cases in 10-14 years ,17(16.2%) cases in 1 year – 5years and 4(3.8%) cases in < 1 year age group as shown in table-1. 58 were males accounting for 55.2% and 47 were females accounting for 44.8%. Topographical distribution of present study showed that tribal areas contributed 48(45.7%), rural area 39(37.1%) and urban areas 17(16.2%) of malaria cases. Peak incidence of cases was found in the months between July – October 78(74.3%),maximum in

august 24(22.8%) corresponding to rainy season, which is a favorable breeding season for vector

Out of 105 malaria cases, severe malaria constitutes 66 cases (62.9%) cases and uncomplicated malaria constitutes 39(37.1%) cases.Most common presenting clinical feature in the present study was fever accounting for 105 (100%) cases, followed by splenomegaly 96(91.4%), hepatomegaly 80(76.2%), pallor 77(73.3%), headache 37(35.5%),vomiting 33(31.4%), icterus 22(21%),dark urine 12(11.4%) and melena in 4(3.8%) cases as shown in figure-1.

The most common clinical presentation of severe malaria cases in present study was impaired consciousness which account for 36 cases (54.5%).Remaining in the order of frequency are multiple convulsions 20 (30.3%), shock 17 (25.7%), respiratory distress in 12(18%) and abnormal spontaneous bleeding in 6 (9%) cases.

Among the 66 cases of severe malaria defined by WHO guidelines 2010, the most common laboratory finding was severe normocytic anaemia (Hb< 5 g/dl, packed cell volume < 15%) account for 25 (37.8%)cases followed by hemoglobinuria in 9(13.6%), metabolic acidosis in 8 (12.1%), renal impairment in 6 (9%) and hypoglycemia in 5 (7.5%) cases.

All 3 tests are positive in 64 cases.Among 2 test combination – 20 cases positive for both antigen test+QBC , 8 cases for antigen test+peripheral smear and 3 cases for peripheral smear+QBC.Among single test positive – antigen test only positive in 5 cases, peripheral smear only in 4 cases and QBC only in 1 cases.

Out of 88 QBC +ve cases, species distribution in present study was P.falciparum only in 40,P.vivax only in 23 and Mixed infection in 23 cases. Out of 97 Antigen test(HRP II/pLDH) +ve cases , species distribution in present study was P.falciparum only in 43,P.vivax only in 27 and Mixed infection in 27 cases.Out of 79 Peripheral smear +ve cases, species distribution in present study was P.falciparum only in 29,P.vivax only in 23 and Mixed infection in 27 cases.

DISCUSSION:
Malaria is one of the major parasitic diseases affecting 300-500 million people annually worldwide and accounts for over 1 million deaths[5]. Approximately, 40% of the world's population, mostly those living in the world's poorest countries, are at risk of malaria. Children have an increased susceptibility to malaria with mortality predominant in children[5].

In the present study, we have tried to study the clinical profile and outcome of malaria and evaluated for efficacy of QBC,antigen test(HRP-II/pLDH)and peripheral smear in diagnosing malaria cases from 350 fever cases attending tertiary hospital during the study period. A total 350 patients aged <14 years presented with fever to pediatric department ASRAM Hospital during study period were subjected to QBC, peripheral smear (thin and thick blood smears) and antigen test using HRPII/pLDH(SD Bioline). Out of these, 105 patients(30%) were diagnosed as malaria (atleast one of the 3 tests was positive) and remaining 245 patients(70%) were non-malaria cases(all three tests were negative).

In present study most common age group affected with malaria was 6 -10 years accounting for 58 (55.3%) cases. 4 cases(3.8%) were reported in infants but none in neonates. Similar prevalence was noted by R.K.Padhi et al6;2013 where 5-10 years was the most common group (62%) followed by 10 – 14 years(27%) and in study by Satpathy SK et al7.

Sex prevalence of the present study showed, males (55.2%) were commonly affected than females(45.5%).Similar sex prevalence was noted in study by Arnaud D Ella et al8. Sex ratio in the present study was male : female = 1.23 : 1 . Similar sex ratios were seen in studies by R.K.Padhi et al6 which was 1.25:1 and 1.2:1 by D P Mawili-Mboumba et al9.

In present study,children < 14 years, diagnosed as malaria were recruited and characterized using the WHO definition for severe and uncomplicated malaria. Severe malaria constituted 62.9 % cases and uncomplicated malaria seen in 37.1% cases. This is due to majority of cases are referrals to our hospital.Similar observation of more than 50% cases of severe malaria are seen in study by Achidi E.A. et al10.

Most common presenting clinical feature in present study was fever seen in 100% cases and splenomegaly in 91.4% cases. Other features in order of frequency are hepatomegaly 76.2%, pallor 73.3%, headache 35.5%,vomiting 31.4%, icterus 21%,dark urine 11.4% and melena in 3.8% cases.

The most common clinical presentation of severe malaria cases in present study was impaired consciousness which account for 36 cases (54.5%).Remaining in the order of frequency are multiple convulsions 20(30.3%),shock in 17 (25.7%), respiratory distress in 12(18%) and abnormal spontaneous bleeding in 6 (9%) cases. Similar observations were seen in study by JS Kaushik et al11 which showed impaired consciousness 50%,multiple convulsions 33.3%,abnormal spontaneous bleeding(8.3%), respiratory distress in 8.3% cases and shock in 8.3% cases. Shock and respiratory distress are more commoner presentation in our study.15.8% cases of respiratory distress were seen in study by Tsige Ketema etal12.

Out of 350 fever cases, positivity rate of Antigen test(HRPII/pLDH) was 27.7%,QBC was 25.1% and peripheral blood smear was 22.5%. Urmila Shenoi etal13 showed similar positivity rate of 25% for QBC and lower positivity rate of 18% for peripheral smear.

Test combinations in present study showed all 3 tests are positive in 64 cases, all 3 tests are negative in 245 cases.Among 2 test combination – 20 cases positive for both antigen test+QBC , 8 cases for antigen test+peripheral smear and 3 cases for peripheral smear+QBC.Among single test positive – antigen test only positive in 5 cases, peripheral smear only in 4 cases and QBC only in 1 cases.

CONCLUSION:
Malaria is the most common serious parasitic disease affecting human beings. Major breeding season for vector is rainy season, which coincides with peak incidence of malaria transmission.Vector control measures should be strengthened during this period to decrease malarial incidence.

Combining all three tests have detected large number of cases than any other test combination,so wherever feasible it can be done.In places where it is not feasible,antigen test is better test for screening than other tests and is simple and rapid.In our country where malaria is endemic, opting for more than 1 test wherever feasible will not be a problem,as early diagnosis and treatment will avert florid manifestations of malaria and reduce mortality and morbidity.

No single test can replace conventional peripheral thick blood smear, all negatives cases of QBC and antigen test should be confirmed by peripheral smear. Even if child found positive on these tests and negative for smear, initiation of antimalarial therapy gives better results.

TABLE -1:

S.No	Age	No. of cases	Percentage(%)
1.	< 1year	4	3.8
2.	1year – 5years	17	16.2
3.	6 years – 10 years	58	55.3
4.	10 years – 14years	26	24.7
	Total	105	10 0%

FIG -1: Study of clinical profile of malaria cases

CLINICAL FEATUURES OF MALARIAL CASES

LABORATORY FINDINGS OF SEVERE MALARIA CASES
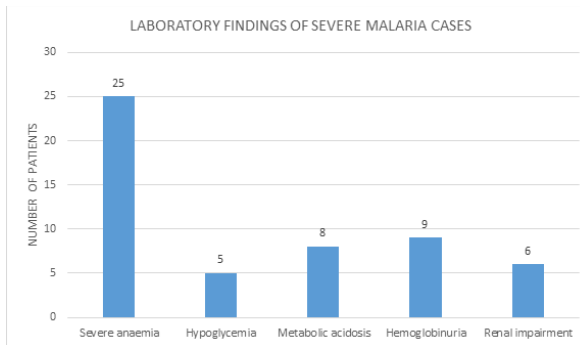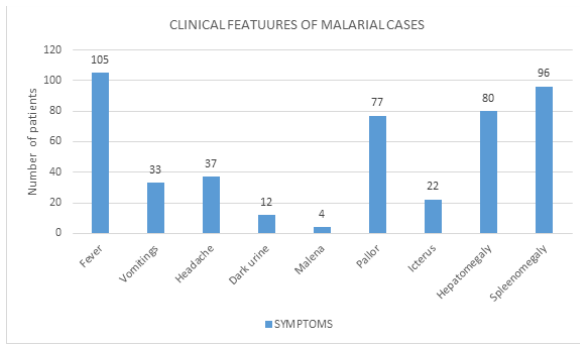
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