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Original Research Article

Occurrence of malaria positive cases and their association with serum creatinine and blood urea in different age group

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ABSTRACT

Background: Malaria is a protozoan disease transmitted by the bite of infected anopheles mosquitoes. Malaria is one of the most serious parasitic diseases of the world affecting 300-500 million people and causing over 1 million deaths each year. Malaria is caused by Plasmodium species in human. 90% of the death from malaria is caused by *P. falciparum* and *vivax*. Complicated malaria is associated with multi organ dysfunction. ARF can be the presence of oliguria and increased serum creatinine and blood urea.

Objective: To confirm malaria positive case by peripheral blood smear. To determine association of malaria positive case with kidney function test.

Materials and Methods: The study was conducted in the department of microbiology TMMC&RC Moradabad. The study group comprised of 149 malaria positive cases confirmed by PBS & Antigen card test with serum creatinine and blood urea test. The sample venous blood was collected aseptically from the subjects using 5mL disposable syringes. The blood sample was collected and 4mL was transferred into plain vial for the biochemical assays whereas the remaining 1mL was transferred into EDTA vial for malaria parasite tests.

Result: Out of 1317 suspected cases in which 149(11.31%) samples were positive for malaria in which 140(93.95%) were infected with *P. vivax* and 9(6.04) were with *P. falciparum*. Out of 140 cases of *P. vivax*, 59(39.59%) had got deranged KFT while out of 9 cases of *P. falciparum* patients 5(3.35%) had got deranged KFT.

Conclusion: It is concluded that kidney function abnormality accounts for 42.18% in malaria positive cases.

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1. Introduction

Protozoan disease malaria is a sickness transferred by the bite of infected anopheles mosquitoes and it is most severe parasitic sicknesses in the world affecting 400-500 million populaces and affecting over 1 million losses each year. Around 2.5 million malaria ceases are informed annually from south Asia of which 75% are described in India.¹ Malaria continuous via be a chief communal fitness issued in India. Accordingly, to WHO report in 2014 around 1.08 million malaria cases and 332 deaths were reported at

communal level in India.² Malaria is a significant infections vectors born disease caused by Plasmodium species. There are 5 types of plasmodia species. *P.vivax*, *P.falciparum*, *P.ovale*, *P. malaria*, *P.knowlesi* It is 94% of the death from malaria is cause by *P.falciparum* and *vivax* but *P.vivax* is the most common causes of malaria infectious in humans.³ They are severely life threatening complication of malaria such as cerebral malaria. Severe pernicious anaemia, black water fever.⁴ The malaria can be a very serious illness and potentially fatal. The malaria parasite is frequently affected to the kidney, liver, and brain. There is severe malaria infection recognised by acute renal failure and hepatic malfunction. Renal failure when the presence of oliguria

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and increase level of creatinine and blood urea.⁵ Malaria parasite undergoes two cycle of development-Asexual cycle: man - intermediate host. Sexual cycle: mosquito - definitive host.⁶ These are cycle in man comprises of 4 stages:-Pre-erthrocytic cycle, Exo-erthrocytic cycle in liver, Second erythrocytic stage in RBCs, Gametogony cycle-in mosquito.⁷ The incubation period varies with deferent clinical plasmodia spp. This usually ranges from 7-30days. But may be up to months or even longer after the bite of an infected anopheles mosquito.⁸ The clinical symptom of malaria typical case develops within ten days to four weeks after the infection.⁹

1.1. Ethical and consent to participate statement

Ethical approval was obtained from TMMC Moradabad institutional ethical committee (TMMC-IEC) Ref. NO. TMMC & RC/IEC/18-19/084. Written consent/assent was sought from all individuals before enrolment.

2. Materials and Methods

This study was conducted in parasitology section of microbiology department Teerthanker Mahaveer medical college and research centre, Moradabad, 149 clinical samples were received as per inclusion and exclusion criteria were processed over the period of 11 months from September(2018) to November (2019). Patients with positive for widal, dengue, chikunguniya tests and hepatotoxic or antimalarial drugs taking patients were kept in exclusion criteria. Malaria was diagnosed on finding of parasite on giemsa stain or modified Leishman stained blood peripheral film.

3. Results

The present study was done for detection of malaria positive cases and to observe the effect of malaria infection kidney function test. In this study total 1317 blood samples of malaria suspected cases were screened for malaria test in which 149(11.31%) patients were found to be malaria positive by microscopy of peripheral blood smear. Out of 149 patients 80(53.70%) were male and 69(46.30%) were female.

In our study 140(93.95%) patients were found infected with plasmodium vivax, out of which 77(55%) were male and 63(45%) were female and 9(6.04%) patients were found infected with plasmodium falciparum out of which 3(33.33%) were male and 6(66.67%) were female.

Patients of all age group were included in the study and majority of malaria positive cases (29.53%) were found in the age group of 21-30 years. Most of the plasmodium vivax positive cases (42) and 6 positive cases of plasmodium falciparum were found in the age group of 11-20 year.

Out of 149 malaria positive patient's total 64(42.95%) patients were found having abnormal serum Creatinine &

blood urea while rest 85(57.05%) patients were having normal serum Creatinine & blood urea. Out of 64 abnormal serum creatinine & blood urea persons 27(42.18%) were male and 37(57.82%) were female.

It was found that out of 140 cases of plasmodium vivax, 59(39.59%) patients were having abnormal serum Creatinine & blood urea and out of 9 cases of plasmodium falciparum 5(3.35%) cases were having abnormal serum Creatinine & blood urea.

In our study, out of 149 malaria positive patients 64(42.95%) patients deranged level of creatinine and urea. Out of 64 deranged cases of creatinine and urea 59(92.18%) cases were of plasmodium vivax and 5(7.82%) cases plasmodium falciparum. Out of 59 deranged cases of creatinine 20(33.90%) cases were plasmodium vivax and 5 (100%) cases P. falciparum and urea 39(66.10%) cases were plasmodium vivax and 5(100%) cases of P. falciparum.

Table 1 Shows distribution of 1317 suspected patients in which 607 (46.09%) were male and 710 (53.91%) were female. Among 607 male patients 80 (53.70%) were diagnosed as malaria positive patients and 710 female patients 69 (46.30%) were diagnosed as malaria positive patients.

Table 2 Show distribution of 149 malaria positive patients among them 80 were male and 69 were female.

Table 3 Shows sex and species wise distribution of total 149 malaria positive patients. Out of 149 patients study 140 (93.95%) patients were found infected with plasmodium vivax, out of which 77 (55%) were male and 63(45%) were female. 9 (6.05%) patients were found infected with plasmodium falciparum, out of which 3 (33.33%) were male and 6 (66.67%) were female.

So, majority of the patients (93.95%) were found infected with plasmodium vivax.

Table 4 Shows that majority of the malaria positive patients were found in the age group of 21-30 year (29.53%). 100% Patients of the age group 11-20 were affected by plasmodium vivax followed by the age group of 11-20 year (30.39%) and 21-30 year (19.60%). Most cases of plasmodium falciparum were reported in the age group of age 21-30year (22.22%) and 11-20 year (66.67%).

Table 5 Shows that out of 64 malaria positive patients 25 (39.06%) patients abnormal level of total creatinine. 44 (68.75%) patients abnormal level of total urea.

4. Discussion

In our countries approximately 216 million cases human when suffering from the malaria cases each every years in all age group in the world but approximately one million deaths and which 75% deaths caused by the P.falciparum species. Most cases found in the South Africa of malarial parasites.¹⁰

In my study total 1317 malarial suspect patient cases were taken out of 149(11.31%) cases was diagnose as

Table 1: Distribution of 1317 malaria supposed patients

Gender	Total patients	No of positive cases	%	No of negative cases	%
Male	607	80	53.70	542	46.41
Female	710	69	46.30	626	53.59
Total	1317	149	100	1168	100

Table 2: Sex wise distribution of total malaria positive patient

Sex	Malaria positive Cases (n=149)	%
Male	80	53.70
Female	69	46.30
All cases	149	100%

Table 3: Sex and species wise distribution of malaria positive patients

Gender	P.vivax		P.falciparum		Total Positive
	N	%	N	%	
Male	77	55	3	33.33	80
Female	63	45	6	66.67	69
Total	140	100	9	100	149

Table 4: Age wise and species wise distribution of all malaria positive cases

Phase	Malaria Positive	%	P. Vivax	%	P. Falciparum	%
0-10 year	15	10.06	13	5.88	1	33.33
11-20 year	37	24.83	42	30.39	6	66.67
21-30 year	44	29.53	35	19.60	2	22.22
31-40 year	16	10.73	16	15.68	0	00.00
41-50 year	11	7.38	10	7.84	0	00.00
51-60 year	13	8.72	12	11.76	0	00.00
61-70 year	6	4.02	6	5.88	0	00.00
>70Year	7	4.69	6	2.94	0	00.00
Total	149	100%	140	100%	9	100%

Table 5: Species wise distribution with abnormal level of KFT marker of positive cases.

KFT marker	P.V (n=59)		P.F(n=5)		Total (n=64)	
	No	%	No	%	No	%
Serum creatinine	20	33.90	5	100	25	39.06
Blood urea	39	66.10	5	100	44	68.75

malaria positive cases under the microscopy. Rubina nuqvi et al. in 2015 observed in their study total 5623 patients taken in which 671(11.93%) were positive for malarial infection, in contrast Nitesh Chandra Toshan et al. in 2016 in their study showing out of 19053 fever cases screened for malaria, 509(2.67%) cases were formed positive for malaria.¹¹ In my study, out of 149 patients 80(53.70%) were male and 69(46.30%) be female where the study carried out of through Padhi RK. et al. (2013) result 60(55%) male positive cases and 48(44%) female patients which out of total 108 patients.¹² In my study, more percentage of malaria cases were attributable to Plasmodia vivax (93.95%) than P.falciparum (6.04%) as of high wide spread infection of vivax in this region. contrast Milind Y Nadkar et al. (2012) in their study showing out of 711 patients

with severe malaria of which 488(68.5%) patients had severe vivax and 223(31.2%) had strict falciparum malarial infection.¹³ In our study 149 malaria suspected cases a full 64(4.8%) patients were create have kidney functioning test disturbed while similar study Sandra mariel martin et al. In 2013 observed in their study total 1496 patients taken in which 66(4.4%) patients were found having acute kidney injury.¹⁴ In our study 64 abnormal serum creatinine and blood urea 27(42.18%) were male and 37(57.18%) be female and 92.18% case of Plasmodia vivax and 7.81% case of Plasmodia falciparum have unbalanced, in contrast chavan MS at al. 2017 in their learn out of 119 diagnosed cases of malaria, which 66(73.33%) cases acute kidney in injury in P.falciparum and out of 8(8.87%) were found of acute kidney injury in P.vivax.¹ In out of 64 deranged

case of p.vivax creatinine level was found increased level into 39.06% cases in our study while similar study Rajesh Kumar Padhi et al. Out of 55 cases (50.9%) which have renal involvement in the form proteinuria increased serum creatinine in contrast Shubhanker Mitra et al. 2015.¹⁵ In our study show an important increase in the serum creatinine and blood urea level in adults with strict malaria infection when compared from the group that had mild malaria infection and manage group.¹⁶

5. Conclusion

1. In my study it differentiates male and female positive patients of malaria and its two categorises, confirmed malarial patients according to species.
2. This study shows that the chances of malarial infection are more in men (49%) as compare to women. Plasmodium vivax (55%) affects more people as compared to plasmodium falciparum (6.04%) in this province.
3. In this study we found that 21-30-year age group (30.0%) are infected more by malaria parasite followed by the 11-20-year age group (24.83%) and 31-40-year age group (10.73%).
4. 42.95% malarial cases were found having abnormal KFT and majority of them were female (57.81%), it implies female are more affected with malaria having abnormal kidney function test.
5. Serum creatinine level was found raised up to 9.0mg/dl in cases of plasmodium vivax infections. Higher creatinine value may be due to muscular dystrophy paralysis.
6. It was also noticed that 66.66% positive patients of the falciparum malaria have abnormal KFT.
7. Hence, it was noted that renal dysfunction occurs more in P.falciparum malaria than P. vivax malaria.
8. In our study (68.75%) of the patients were found having increased blood urea is the clear evident of deterioration of renal dysfunction in malarial infected patients.
9. Association between serum creatinine and blood urea derangement is also linked in this study.
10. Hence, we recommend that such type of study having a large sample size and early diagnosed of malaria infection should be performed with serum creatinine and blood urea test in order to improve diagnosis and prognosis of the disease.

6. Conflicts of Interest

All contributing authors declare no conflicts of interest.

7. Source of Funding

None.

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