



# FALCIPARUM MALARIA; ITS DIVERSE CLINICAL SPECTRUM. A DESCRIPTIVE STUDY OF 150 ADMITTED PATIENTS

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**ABSTRACT... Objective:** To determine how Falciparum Malaria can present clinically in various ways. A study conducted on 150 admitted patients. **Subjects and Methods:** This descriptive case-series, single center study was conducted in Medical B Unit, Khyber Teaching Hospital, Peshawar from November 2012 to June 2013. A total of 150 patients admitted with falciparum malaria were studied. A detailed history and clinical examination was performed. The falciparum malaria was diagnosed by examining peripheral blood film. All patients were thoroughly investigated to find out the complications of falciparum malaria. **Results:** Out of 150 patients, 95 (63.33%) were males 55 (36.67%) were females with mean age of 30 years. Fever was present in all patients, rigors and chills in 93%, headache and vomiting in 60%, jaundice in 50%, confusion in 37 %, abdominal pain in 26% were main presentations. Other presentations were Oliguria, hypotension, cerebral malaria, dyspnea and cough, hypoglycemia and seizures. Clinical examination showed splenomegaly (58%), hepatomegaly (46%), hepato-splenomegaly (22%) of patients. Laboratory investigation showed Hemoglobin < 10gm% in 22% and leukocytosis > 12000/ $\mu$ l in 10% of patients. **Conclusions:** As Falciparum Malaria presents in multiple ways clinically, it should be considered as a possibility in all febrile illnesses.

**Key words:** Plasmodium Falciparum, Malaria, confusion, acute renal failure.

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## INTRODUCTION

Malaria is a major common health problem in the developing world. There were an estimated 216 million episodes of malaria in 2010, out of which approximately 174 million cases (81%) were in the African Region. There were an estimated 655,000 malaria deaths in 2010, out of which 91% were in Africa<sup>1</sup>. Its name is derived from Italian word-meaning bad air. Hippocrates gave the first exact description of benign tertian and quatern fever<sup>2</sup>.

Human malaria is caused by four species of plasmodia: P. Falciparum, P.vivax, P.Ovale and P. Malariae. P. Knowlesi, a fifth species previously confined to monkeys, has also been implicated in human beings especially in South East Asia<sup>3</sup>.

The geographic variation of malaria is complex. Malaria affected and malaria free areas are found

close to each other<sup>4</sup>.

Infection with Plasmodium falciparum (PF) is more serious than with other malarial species because of frequency of severe and fatal complications associated with it. This lethal parasite can cause cerebral malaria, acute renal failure, acute malarial hepatitis, hypoglycaemia, hyperpyrexia, noncardiogenic pulmonary oedema, adult respiratory distress syndrome, adrenal insufficiency-like syndrome, Blackwater fever, cardiac arrhythmias and gastrointestinal syndromes like secretory diarrhea<sup>5-7</sup>. Neuropsychiatric symptoms, Guillain-Barre syndrome and psychosis have also been reported<sup>8,9</sup>.

The case fatality of plasmodium falciparum is around 1%. This accounts 1 to 3 million deaths per year all over the world and 80% of these deaths are

caused by cerebral malaria<sup>10,11</sup>.

Falciparum malaria is a major community health problem in Pakistan with high morbidity and mortality. Its presentations and complications are different in different patients. The incidence of malaria is on the rise for the last two decades in Pakistan<sup>12</sup>.

With such great diversity of clinical presentation, a lot of awareness is needed on part of treating physicians. The present study was carried out to observe the clinical features and complications of Falciparum Malaria.

### PATIENTS AND METHODS

This descriptive case-series, single center study was carried out in Medical B Unit, Khyber Teaching Hospital, Peshawar from November 2012 to June 2013. A total of 150 admitted patients above age of 12 years suffering from falciparum malaria were included in the study, comprising of 95 males and 55 females. Patients who had MP smear positive for falciparum malaria were included in the study. The falciparum malaria was diagnosed by examining thick and thin blood films. To exclude other diagnosis and to find out the complications, full blood count (FBC), liver function tests (LFTs), CSF analysis, x-ray chest, blood and urine culture, urine routine examination, renal function tests (RFTs), daily blood sugar, 12 lead electrocardiography (ECG) were performed in all patients. Patients with definitive alternative diagnoses like enteric fever, urinary tract infection, meningitis, tuberculosis, liver abscess, acute viral hepatitis etc were excluded from the study. All patients with vivax and falciparum co-infection were also excluded from the study.

The patient's detailed history with physical findings and results of relevant investigations were recorded on questionnaires, devised in accordance with the objectives of the study. SPSS computer software version 16 was used for data analysis.

### RESULTS

It was observed that out of 150 patients, 95 (63.33%) were males while 55 (36.67%) were

females. Majority of the patients (68%) were in age range of 25-35. The mean age was 30 years. The minimum age of the patients was 12 years and maximum age was 70 years.

Fever was the leading symptom. All patients were febrile at the time of admission. Another prominent feature, rigors and chills were present in 140 (93%) patients. Headache and vomiting occurred in 90 (60%) patients. Jaundice was observed in 75 (50%) patients. Confusion was observed in 55 (37%) patients. 39 (26%) patients had abdominal pain and 15 (10%) had loose motions. Oliguria was present in 20 (13%) patients. Acute renal failure (ARF) in 15 (10%) patients and hypotension in 18 (12%) patients. Shortness of breath and cough was present in 15 (10%) patients. 5 (3%) patients had hypoglycemia and 2 (1.3%) had tonic clonic fits.

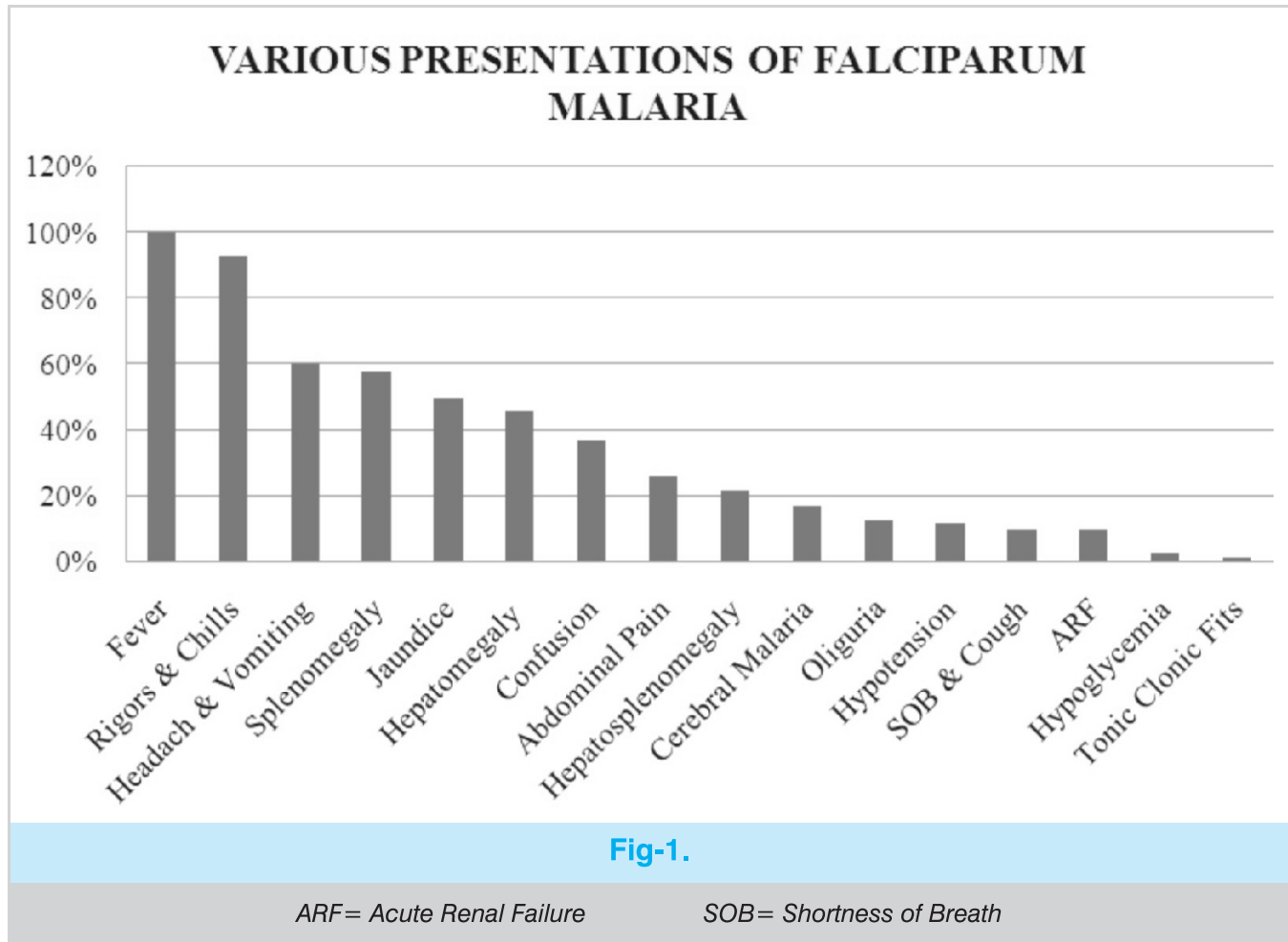
Clinical examination revealed splenomegaly in 88 (58%), hepatomegaly in 70 (46%), hepatosplenomegaly in 33 (22%) patients. Cerebral malaria occurred in 25 (17%) patients. All the clinical features are shown in Fig. 1.

Laboratory Investigations showed anemia (Hemoglobin < 10 gm/dl) in 33 (22%), deranged LFTs in 80 (53%), deranged renal functions in 30 (20%) patients and leukocytosis > 12000/ $\mu$ l in 15 (10%) patients.

### DISCUSSION

Malaria is one of the most important public health problem occurs primarily in tropical and subtropical areas<sup>13</sup>. Pakistan is almost in the middle of malaria belt in the globe among tropical and subtropical countries where majority of population is living in rural area<sup>14</sup>. In towns the faulty sewerage system, stagnant water, power breakdown, improper dumping of garbage contribute to the spread of malaria<sup>15</sup>.

Falciparum malaria is a multisystemic disease with a diversity of clinical presentations. In our study, all patients were febrile (100%). Rigors and chills were present in 93% of cases, headache and vomiting in 60% of cases, and anemia in 33% of



cases. A study conducted by Bhalli et al showed fever in 100% of cases, rigors in 62% of cases, vomiting in 31% of patients, headache in 30% and anemia in 13% of patients<sup>6</sup>. Another study mentioned splenomegaly in 50%, hepatomegaly in 48% and hepato-splenomegaly in 52% of cases<sup>16</sup>. Our study showed splenomegaly in 58%, Hepatomegaly in 46% and hepato-splenomegaly in 22% and thus nearly correlates with the above study. Patil VC mentioned splenomegaly in 57% and hepatomegaly in 53% of patients<sup>22</sup>.

Cerebral malaria is serious complication of falciparum malaria and is defined as unarousable coma persisting for more than 6 hours following a generalized convulsion, after excluding other causes of encephalopathy, and confirmed by finding asexual forms of *P. Falciparum* in peripheral smear or bone marrow<sup>16,23</sup>. In clinical practice every patient with altered consciousness should be

treated for cerebral malaria if infected with *Plasmodium falciparum*. In our study, cerebral malaria was present in 17% of patients while Bhalli et al has reported cerebral malaria in 26% of cases<sup>6</sup>. Iqbal S study showed that cerebral malaria was present in 16% of patients<sup>16</sup>.

Acute renal failure (ARF) is a complication of malaria and in our study 10% of patients presented with ARF. Sheikh MK et al showed ARF in 14% in his study<sup>17</sup>. Another study conducted by Mahmood K et al demonstrated that 2.7% of patients suffered ARF<sup>18</sup>. Iqbal S et al demonstrated that renal failure occurred in 24% of the patients<sup>16</sup>.

The presence of jaundice in *P. falciparum* malaria indicates a more severe illness with a higher incidence of complications and poor prognosis<sup>25</sup>. The prevalence of jaundice is rising in falciparum malaria and has been reported to be between 2%

and 57%<sup>19,20</sup>. Jaundice was a prominent feature in our patients and was present in 50% of cases. This is in accordance to the study conducted by Mohanty S et al<sup>20</sup>.

Sequestration of splanchnic vasculature and visceral vasoconstriction leads to varying gastrointestinal manifestations. In our study, abdominal pain and diarrhea was present in 26% and 10% of patients respectively. Mahmood S et al observed abdominal pain and diarrhea in 8.33% of patients<sup>18</sup>. Bhalli et al reported that 10% of patients had diarrhea which is in accordance to our study<sup>6</sup>.

Acute lung injury causing bilateral diffuse infiltrates on chest radiography is a well known complication of falciparum malaria<sup>21</sup>. In our study, 10% of patients presented with bilateral pulmonary infiltrates along with dyspnea and cough. Mahmood S et al observed 7.40% patients having falciparum malaria simulated lower respiratory tract infection<sup>18</sup>. Iqbal S et al have reported respiratory involvement in 13% in a similar study<sup>16</sup>. Breathlessness and cough were present in 10.63% of patients in a study conducted by Patil VC which is similar to our study<sup>22</sup>.

Hypotension and hypoglycemia was observed in 12% and 3% of patients in our study respectively. Patil VC has reported hypotension and hypoglycemia in 8.5% and 6.4% in studied population respectively<sup>22</sup>.

Hemoglobin level < 10 was observed in 22% of patients in our study while Bhalli et al reported in 10.5%, Mahmood et al reported in 16.6% and Hashmi et al reported in 24%<sup>6,18,23</sup>.

Leukocytosis more than 12000/ $\mu$ l shows severe disease. Leukocytosis >12000/ $\mu$ l was recorded in 10% of our patients. Iqbal S et al recorded leukocytosis of >12000/ $\mu$ l in 16% of patients and Mahmood K et al in 12.96% of patients<sup>16,18</sup>. In the present study, male gender was more prominent and it is consistent with the study conducted in India by Dhangadamajhi G et al<sup>24</sup>.

## CONCLUSIONS

*Plasmodium falciparum* is the most aggressive form of malaria which can present clinically in different ways such as fever, vomiting, headache, seizures, renal failure and acute abdominal pain. So the consulting physicians as well as general practitioners practicing in endemic areas like Pakistan should have adequate knowledge of various clinical presentations of falciparum malaria.

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