Management of severe *Falciparum* malaria on a mission: A case report

Manuel Monti

*Emergency Department, Local Health Unit “Umbria 1”, Assisi, Italy*

**Abstract**

A sailor for forty-two years, in military service on the Italian aircraft carrier, while on a mission in sub-Saharan Africa, came to a physician due to fatigue with a fever, flu-like illness and headache for 6 days. The temperature was 38.8°C, BP 80/145 mmHg and RR 30/min. The oxygen saturation was 88%, while the patient was breathing room air. Laboratory findings showed that WBC count and platelet counts were greatly reduced. Blood smears were positive for *Plasmodium falciparum* malaria with more than 10 parasites per field. It began immediately antimalarial treatment. After 24 hours the patient showed a 50% reduction in parasitemia but continued to have tachypnoea, dyspnea and hypoxemia. A chest TC scan was then performed that revealed a right basal alveolar consolidation with bilateral pleural effusion. The patient was ultimately diagnosed with pneumonia and malaria (overlap syndrome). The patient began antibiotic and steroid therapy. After two days the fever was gone away and the clinical condition of the patient was greatly improved. The clinical overlap between pneumonia and malaria has important implications for case management strategies and their treatment should be integrated into community case management activities.

**Case Report**

A 42-year-old man, unmarried office worker and non-smoker, was admitted in 2015, in Role 2 of Navy, with a fever, headache, flu-like illness, cough, shortness of breath and myalgia. The temperature was 38.8°C, the blood pressure was 80/145 mmHg, respiratory rate (RR) of 30 breaths/min and the oxygen saturation was 88%. The patient had normal heart and breath sounds. Abdomen, neurological and musculoskeletal examinations were unrevealing. In history, the patient reported no antimalarial prophylaxis.

Laboratory tests have shown white blood cell count 1.9 x 10^3/mm^3 and platelet count 78 x 10^3/mm^3. Prothrombin and activated partial tissue thromboplastin times were normal (Table 1). The serum hepatitis B virus (HBV) surface antigen, hepatitis C virus (HCV) antibody, hepatitis A virus (HAV) IgM antibody, and human immunodeficiency virus (HIV) antibody, were all negative. An ABG (arterial blood gas), with the patient breathing spontaneously, revealed (ABG) pH of 7.36, PaCO2 at 25.6 mmHg, PaO2 at 87.4 mmHg, bicarbonate at 21.2 mmol/L, and lactate at 1.8 mmol/L.

A blood smear detected a *Plasmodium falciparum*, with more than 10 parasites per field. Film and stained it for malaria parasite identification using Giemsa staining methods. The diagnosis was confirmed using the rapid diagnosis specifically for *P. falciparum*. A urine sample was taken to exclude other infections.

Among the criteria of diagnosis of severe malaria, the patient presented only hyperparasitemia (*P. falciparum* parasitemia >10%) and, for this reason, oral therapy was preferred [7].

The patient, who was already treated with crystalloids and paracetamol for the hyperpyretic syndrome, was immediately subjected to Atovaquone / Proguanil (250 mg / 100 mg) 4 tablets once a day for 3 days. Hematochemical examinations showed the...
Case Report

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improvement of leukocyte (6.800 mm3). Twenty-four h after start-
consciousness, prostration, respiratory distress, multiple seizures,
intestinal symptoms [9]. According to the WHO criteria impaired
wellness, can be observed in only 50-70% of the cases. The asso-
fever alternating with periods of fatigue but otherwise relative
nia and anemia. Classical presentation, consisting of paroxysms of
areas presenting with fever, especially if they have thrombocytope-
(Congo), previously visited by the Italian Naval Unit.
Africa, probably in the ports of Lwanda (Angola) and Pointe Noire
ments [8].

The findings were suggestive of interstitial pneumonia with acute respiratory distress syndrome. He was commenced on high-
dose prednisolone. The steroids were continued and the patient started antibiotic therapy (with piperacillin 4 g / tazobactam 500
mg, 3 times a day). His condition improved on supportive treat-
ment, and he was discharged home after 10 days.

Discussion

Vector-borne and environmentally-acquired infections are a threat to all travelers to endemic locations, but military personnel
are at elevated risk due to the duration and intensity of environ-
mental exposure. When evaluating fever in military personnel, a
careful history should include country and terrain of any deploy-
ments [8].
The case of malaria described here was acquired in West Africa, probably in the ports of Lwanda (Angola) and Pointe Noire
(Congo), previously visited by the Italian Naval Unit.

Malaria should be considered in all travelers from endemic areas presenting with fever, especially if they have thrombocytope-
ia and anemia. Classical presentation, consisting of paroxysms of
fever alternating with periods of fatigue but otherwise relative
wellness, can be observed in only 50-70% of the cases. The asso-
ciated symptoms include sweats, myalgia, abdominal pain and
intestinal symptoms [9]. According to the WHO criteria impaired
consciousness, prostration, respiratory distress, multiple seizures,
jaundice, hemoglobinuria, abnormal bleeding, severe anemia, cir-
culatory collapse and pulmonary edema are features of severe malaria [7].

Uncommon presentations more frequent in P. Falciparum
malaria are acute abdomen or intestinal obstruction, viral hepatitis-
like illness, Guillain-Barré syndrome, severe headache, hemiple-
gia, pancypenopia, cardiac and respiratory disorders. Several pul-
monary syndromes in severe malaria have been described, such as
acute non-cardiogenic pulmonary edema ARDS, acute pulmonary
injury and interstitial pneumonia. In particular, it has been shown
that impaired lung function depends on small obstruction sense of
air, gas exchange abnormalities, and an increase in pulmonary
phagocytic. This is due to the accumulation of monocytes and a
pulmonary intravascular inflammatory response [10,11].

Severe pulmonary complications of malaria usually appear
from six hours to eight days after the initiation of anti-malarial
treatment. These findings are consistent with what is observed in
cases of falciparum malaria, and they could correspond to an exac-
erbation of the post-treatment inflammatory response.

Nevertheless, our patient presented severe pulmonary symptoms
before the initiation of antimalarial treatment, characterized as
pneumonia [12]. The clinical overlap between pneumonia and malaria has important implications for proper patient management.

Studies conducted in different countries indicate that there is a sig-
nificant overlap in the clinical presentation of pneumonia and malaria [13]. Case management algorithms are based on the prem-
ise that a patient is likely to have only one disease at a time. On the
other hand, a patient can have both diseases but must be evaluated
and treated for only one disease. For this reason, in the management
of patients with pulmonary complications, it is important carefully
evaluating the pulmonary symptoms and the results of the investi-
gation and deciding, in case of doubt, to initiate a dual therapy.

Conclusions

Military populations continue to be at a high risk of malaria
and reported case series have frequently revealed poor compliance
with preventative measures. The symptoms of malaria are non-spe-
cific and its management depends on awareness of the diagnosis
and early recognition and treatment.

In particular, pulmonary complications of malaria can be mis-
diagnosed as acute respiratory illnesses. This has been noted to be
more prevalent in the background of national or international
emerging diseases. The early recognition and effective intensive
care support can greatly reduce mortality and improve outcomes.

Table 1. Patient’s main serum chemistry values.

<table>
<thead>
<tr>
<th>Laboratory data</th>
<th>Numerical value</th>
<th>Normal range values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb</td>
<td>14.0</td>
<td>13.5-17 gr/dl</td>
</tr>
<tr>
<td>MCV</td>
<td>82.2</td>
<td>75-98 fl</td>
</tr>
<tr>
<td>MCHC</td>
<td>35.8</td>
<td>31-38 gr/dl</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>34.3</td>
<td>15.9-44.1%</td>
</tr>
<tr>
<td>PLT</td>
<td>78×10³</td>
<td>140-440×10³ mm³</td>
</tr>
<tr>
<td>WBC</td>
<td>1.9×10⁹</td>
<td>3.5-10×10³ mm³</td>
</tr>
<tr>
<td>Aspartate transaminase</td>
<td>458</td>
<td>10-40 UI/L</td>
</tr>
<tr>
<td>Alanine transaminase</td>
<td>573</td>
<td>10-40 UI/L</td>
</tr>
<tr>
<td>Sodium</td>
<td>135</td>
<td>136-145 mmol/L</td>
</tr>
<tr>
<td>Potassium</td>
<td>4.3</td>
<td>3.5-5.1 mmol/L</td>
</tr>
<tr>
<td>Bilirubin total</td>
<td>0.9</td>
<td>0.2-1.1 mg/dl</td>
</tr>
<tr>
<td>Protein total</td>
<td>7.4</td>
<td>6.4-8.3 mg/dl</td>
</tr>
<tr>
<td>Albumin</td>
<td>3.6</td>
<td>3.8-5.1 mg/dl</td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.9</td>
<td>0.8-1.2 mg/dl</td>
</tr>
</tbody>
</table>

Hb, hemoglobin; MCV, mean corpuscular volume; MCHC, mean corpuscular hemoglobin concentration; PLT, platelets; WBC, white blood cells; LDH, lactate dehydrogenase.

References